University of Colorado at Colorado Springs

Course Bulletin 2001-2002

General Information

University of Colorado
at Colorado Springs
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Mission

The mission of the University of Colorado at Colorado Springs states: "The Colorado Springs campus of the University of Colorado shall be a comprehensive baccalaureate liberal arts and sciences institution with selective admission standards. The Colorado Springs campus shall provide selected professional programs and such graduate programs as will serve the needs of the Colorado Springs metropolitan area, emphasizing those professional programs not offered by other institutions of higher education." (Section 5 of Colorado House Bill 1187.)

The University

CU-Colorado Springs is located on a 520-acre campus in northeast Colorado Springs at the foot of Austin Bluffs with a sweeping view of the Front Range of the Rockies. A gift of the Cragmor Foundation to the University, the campus, then 80 acres, was opened to classes in September 1965.

The campus is administered by a chancellor of the University. Represented at Colorado Springs are the College of Business and Administration, the College of Education, the College of Engineering and Applied Science, the Graduate School, the Graduate School of Public Affairs, the College of Letters, Arts and Sciences, and the Beth-El College of Nursing and Health Sciences.

CU-Colorado Springs is one of four campuses in the University of Colorado system. CU-Colorado Springs emphasizes a broad range of liberal arts and sciences, and provides professional programs in business, engineering and nursing at the baccalaureate and graduate level, and education and public affairs at the master's level.

However, as CU-Colorado Springs and the community it serves continue to grow and evolve, the University's general mission remains constant to emphasize quality teaching while encouraging research and creative work, and service to the University and community.

As the Pikes Peak Region's only state-supported university, CU-Colorado Springs works to enrich existing programs and sensibly expand its offerings. For example, CU-Colorado Springs has responded to the area's infusion of high tech industries and military installations by moving to meet specialized needs of those industries. The University has established Ph.D. programs in electrical engineering and computer science and offers coursework in space studies. But even as CU-Colorado Springs is developing these programs and promoting concomitant research, the University maintains its commitment to quality undergraduate education.

CU-Colorado Springs will remain a comprehensive university, one that thrives on a diversity that has promoted and will continue to promote healthy growth.

Vision Statement

We will provide a public undergraduate education unexcelled in the state and selected excellent graduate programs.

Core Values

Excellence: We will attract, develop and retain outstanding faculty, staff, and students, and focus on those programs and services that we can offer at an exemplary level.

Student Success: We will help traditional and non-traditional students succeed in their academic endeavors by assuring a stimulating, supportive, safe, and naturally beautiful setting. Campus residence halls will enrich students' experiences by providing a living-learning environment. We will encourage students to recognize their responsibility to participate fully in their own educational success and to contribute to the quality of campus life.

Accountability and Public Communication: We will make known our vision, values, and goals and provide a demonstrated return on investment to the citizens of Colorado. We will link the University more closely to the community we serve. We will reflect a positive, unified and consistent campus image and communicate the value of the University to the citizens and elected leaders of our state, alumni, and potential students everywhere.

Enriching Environment: We will aggressively seek the development of a multicultural campus environment in which each person contributes unique talents to make the University a better place and in turn is fully valued and supported. We will reaffirm the tradition of shared governance and encourage all members of our campus community to join together in creating a positive working environment where all enjoy respect, fair treatment, and a voice in campus decisions.

Quality Teaching: We will demonstrate the highest regard for teaching excellence and will reward quality teaching. We will strive to maintain predominantly small classes taught by dedicated and accessible full-time faculty and other qualified professionals.

Research and Creative Work: We will promote and reward research and creative work that advances knowledge, that makes a valuable contribution, that enhances our teaching and service missions, and that encourages collaboration between undergraduate or graduate students and faculty.

Service: We will attract and reward members of the campus community who place a high value on service and who are committed to contributing their expertise to the University and the public good.

Staff Contribution: We will value the vital role that staff play in supporting and enhancing the educational mission of the University.

Innovation and Change: We believe that universities both preserve the past and help create the future. We will encourage innovation in teaching, research, and service and prepare our students to succeed in a rapidly changing global and technologically advancing environment.

Life-long Learning: We will commit to serving our students at many points along life's path–during and after high school, as they enter the work force, as they retrain for new careers, and as they continue to learn and grow throughout their lives.

Total Learning Environment

The Total Learning Environment is an initiative designed to make the entire University of Colorado more responsive to the needs of students and the state as a whole. On the Colorado Springs campus, our plan for implementing TLE includes the following initiatives:

- Grow responsibly to meet the needs of students, the community, and the state.
- Provide a comprehensive, personalized, educational experience that prepares students to excel personally, professionally and as citizens.
- Enhance research, scholarship and creative works on and off campus.
- Use and enhance technology to improve teaching, learning, research and management.
- Expand and strengthen community partnerships.
- Model the values of diversity in the campus climate and educational programs.
- Enhance the University's human, physical and fiscal infrastructure.

Diversity

The University of Colorado recognizes its responsibility to prepare students to live and prosper in a pluralistic global society. All members of the University community are encouraged and empowered to aggressively develop a campus culture in which each individual is fully valued.

The University's goal is to provide opportunities for all to learn and interact in a Total Learning Environment (TLE). Central to TLE is the respect and acknowledgement of diverse cultural and ethnic heritages. This respect will be reflected in all areas of campus life, including the composition of all constituencies of the campus community. To achieve this end, the University will actively recruit and retain students, faculty, administrators and staff who reflect the population of Colorado and the nation. Such an inclusive university best prepares students to succeed in a world in which an understanding of human diversity is essential.

This commitment to diversity will be embraced throughout the University's programs, colleges and schools, and by our administration, faculty, staff and students.

Accountability

Campus

CU-Colorado Springs has adopted the following campus goals for undergraduate general education:

The overarching purpose of general education is to cultivate students' intellectual, personal and ethical development and thus equip them to be life-long learners, able to adapt to an ever-changing environment. More specifically,

1) Students will be able to read, write, listen and speak in a manner that demonstrates critical, analytical and creative thought.

2) Students will achieve a depth of understanding in their majors and a breadth of experience in other fields.

3) Students will understand and apply the tools and methodologies used to obtain knowledge.

4) Students will be prepared to participate as responsible members of a pluralistic society — locally, nationally and globally.

In addition, each academic department has adopted assessable goals for that department's graduates. Listed below are the accountability goals for each major or department.

College of Business and Administration

- Have developed the following skills and personal characteristics: leadership, written communication, oral communication/presentation skills, planning and organizing, information gathering and problem analysis, decision-making delegation and control, self-objectivity, and disposition to lead
- Have an acceptable degree of knowledge in the following cognitive areas of business and management: accounting, business environment and strategy, finance, human resources management and organization theory, marketing, quantitative analysis/operations management, and management information systems

College of Education

- Demonstrate competence as a teacher through content area knowledge, pedagogical theory and professional practice
- Understand and demonstrate appropriate ethical conduct, personal accountability, and reflective decision-making
- Develop knowledge and understanding about student literacy development in reading, writing, speaking, viewing and listening
- Develop knowledge and understanding about mathematics and mathematics instruction
- Practice self-reflection in the performance of teaching strategies, planning practices, and assessment techniques
- Integrate subject area coursework and field experiences to enrich and extend student learning
- Apply educational foundations, theory and research to classroom practice
- Employ a range of teaching strategies to match the intellectual, emotional and social needs of each student including those based upon culture, community, ethnicity, economics, linguistics, and learning ability
- Apply and use technology to increase student achievement, communicate information, and assess learning
- Develop, model, and articulate positive behavior, respect for the rights of others, and moral standards necessary for personal, family, and community well being

College of Engineering and Applied Science

- Have developed communication skills
- Have demonstrated leadership potential and sound professional judgment
- Have acquired a broad knowledge base in engineering or applied science
- Be qualified to begin graduate studies or enter professional practice
- Have developed the ability to synthesize information and facts from a diverse set of disciplines into practice

Computer Science

- Be capable of both designing and implementing software solutions using state-of-the-art hardware, software design methodologies, and programming languages
- Be able to quickly learn to use new design methodologies, operating systems, languages, and other software development tools

Electrical and Computer Engineering

- Read, interpret, and critically assess literature in electrical engineering and evaluate its impact on current issues in engineering and society
- Write technical reports and other documentation
- Be able to present oral reports of a technical nature
- Use basic knowledge in science and mathematics as well as knowledge and tools in engineering disciplines to analyze and synthesize real-world engineering problems
- Design processes, devices, circuits or systems using engineering knowledge and tools while considering economics, safety, ethics, ergonomics, and aesthetics
- Function in an effective manner, alone or as part of a team, in an engineering capacity
- Appreciate the importance of keeping up with the engineering field

Mathematics

- Be able to analyze problems and formulate appropriate mathematical models
- Understand mathematical techniques and how they apply
- Recognize phenomena and be able to abstract, generalize and specialize these patterns in order to analyze them mathematically
- Be able to express themselves in writing and orally in an articulate, sound and well-organized fashion

Mechanical Engineering

- To prepare students for successful careers and lifelong learning
- To provide students with a strong foundation in engineering science (including the appropriate background in pure sciences and mathematics), along with the ability to apply this knowledge to solve engineering problems
- To ensure that students are proficient in modern computational methods and in the use of current computational tools for engineering applications
- To educate students in the methods, standards, and conventions that are followed in the practice of engineering
- To equip students with the skills and knowledge required to fomulate and solve large scale design problems; in addition to giving them a thorough understanding of the design process, this includes developing their creativity, general knowledge, engineering intution, problem formulation skills, project management skills, leadership skills, communication/presentation skills, and teamwork skills
- To train students in the theory and practice of experimental methods in engineering
- To inculcate in the students a broad understanding of their social and cultural environment, particularly in the context of their professional responsibilities and ethics

College of Letters, Arts and Sciences

Anthropology

- Be able to read and assess arguments in a field that is notorious for its contentiousness
- Be familiar with the major theoretical positions that have influenced anthropological thinking
- Be familiar with the nature of data in at least one of the subfields and be able to construct arguments using that data
- Be familiar with the basic concepts of the field

Biology

- Be able to critically read, assess and discuss the biological literature
- Be able to assess and synthesize information from a variety of scientific disciplines
- Be able to independently formulate hypotheses, to design and carry out rational tests of such hypotheses, and to interpret the results of such tests
- Be able to effectively compete in the job market and in professional and graduate schools

Chemistry

- Have knowledge of general organic, analytical, physical and inorganic areas of chemistry, and an integrated overview of chemistry
- Have knowledge of additional areas of mathematics, physics and computer science to enable the students to manipulate experimental data and facilitate the understanding and derivation of fundamental relationships
- Be able to compete effectively for a position in the workplace as a professional chemist, for admission to graduate or professional schools, or for careers in other fields

Communication

- To expand students' knowledge and abilities in order to prepare them for employment and future graduate studies and research
- To prepare students with a thorough background in the discipline of communication
- To provide a service function by contributing to the liberal education of other students who take courses in communication

Economics

- Be able to gain access to existing economic knowledge
- Be able to display command of existing economic knowledge
- Be able to display ability to draw out existing economic knowledge
- Be able to utilize existing knowledge to explore economic issues

English

- Have knowledge of the world in which we live, the cultures which have shaped that world, and the behavior of the people who inhabit it
- Have developed capacities for rational and logical thought and analysis
- Have skills to express rational and logical thought clearly and effectively
- Be prepared for life as well as careers

Fine Art

- Have knowledge of two and three dimensional media at all levels of instruction
- Have general knowledge of all periods of the history of occidental art

■ Be able to demonstrate proficiency in the techniques and compositional skills of both two and three dimensional media

■ Be able to articulate their personal aesthetic in both two and three dimensional media, both orally and in writing

Geography

■ Have an understanding of the general configuration and processes associated with the earth's landform

■ Have a general knowledge of the variety and processes of human geography that are reflected in various cultures

■ Have an understanding of the methods of analysis used to solve geographic problems

History

■ Have a sense of where we and others in the world belong in time and space

■ Have developed research skills to find information

■ Have developed cognitive skills to make sense of information

■ Have developed writing skills to express clearly and succinctly what the data mean

■ Have developed reasoning skills to follow the flow of logic in an argument

Philosophy

■ Be able to read and discuss critically and in detail at least one classic philosophic text in its entirety from each of the major periods in the history of philosophy

■ Be able to articulate and assess some of the major issues raised in the classic texts of philosophy and their connections to their historical and cultural context

■ Be able to write and defend a senior thesis on some philosophical issue approved by the department

■ Be able to undertake graduate work in philosophy or enter a professional school in law, medicine or business

Physics

■ Be prepared in the fundamental physics necessary for admission into graduate programs in physics or related fields, or to become professional physicists in education, industry, research and the military

■ Should understand the fundamental ideas and methods of physics and be able to apply them to problems

■ Be able to prepare and present several research topics and defend them before peers and faculty

Political Science

■ Have an understanding of domestic and foreign governments and relations between them

■ Be able to do political analysis — this implies the ability to think critically about and find rigorously defensible answers to political questions as well as the ability to understand and use empirical and other analytical methods in the pursuit of answers to political questions

Psychology

■ Know the terminology and major concepts of the general subdisciplines of psychology

■ Be able to apply basic descriptive and inferential statistics to psychological data

■ Be able to design and execute a psychological experiment and then analyze the data

■ Be able to write a report of a psychological experiment in the technical format required by the journals of the American Psychological Association

■ Have knowledge in basic as well as applied subdisciplines of psychology and in a specified array of content areas

■ Be able to use library resources to complete a review of literature on a topic in psychology

■ Be able to think critically about the theoretical assumptions behind, and data related to, their intuitive hypotheses about psychological functioning

■ Have option to attain a deeper understanding of a subdiscipline of psychology through in-depth course work

Sociology

■ Be able to read critically, write in a clear logical manner, and verbally communicate clearly and effectively

■ Have a broad knowledge about society and social behavior and be able to provide credible explanations that satisfy the individual's curiosity about how and why social development has taken a particular direction

■ Be aware, understand and appreciate the complexity of the human experience as related to social institutions

■ Be able to analyze how we developed as a people or society, including the social phenomena of racism, sexism, and other forms of structured inequality

■ Be able to identify and question ethnocentrism

■ Have developed analytic, evaluative, and critical skills and apply appropriate methods of data collection and analysis to the learning process

■ Be prepared for graduate work or professional study

Spanish

■ Be able to speak Spanish well enough to satisfy routine social demands and limited nonspecific, work-related tasks

■ Be able to comprehend face-to-face speech in standard Spanish spoken at a normal rate with some repetition and rewording by a native speaker not accustomed to dealing with foreigners

■ Have sufficient comprehension to read authentic printed material or edited texts and material within a familiar context

■ Be able to write routine social correspondence and simple discourse as well as cohesive summaries, resumes, short narratives and descriptions on factual topics in the past, present and future times

■ Have social and professional competence. Be able to participate in almost all social situations, being familiar with social taboos

■ Possess a broad understanding of the history and civilization of target culture

■ Possess a critical awareness of the literary traditions, periods, genres and theories of Spanish

Beth-El College of Nursing

Bachelor of Science in Nursing

■ Enhance the healing potential of individuals, families and communities through the practice of human caring

■ Communicate with individuals and the community to enhance the therapeutic process, to maintain collegial professional relationships and to participate as a citizen in society

■ Synthesize relevant knowledge from the arts, sciences, humanities, personal experience and nursing to provide a

comprehensive basis for the application of critical thinking, ethical decision-making and independent judgement

- Integrate the art and science of nursing to promote health and healing
- Provide safe professional nursing care across a variety of health care settings, for individuals, families and communities at any developmental stage, to meet selected societal health needs
- Incorporate research and theory into nursing practice
- Demonstrate responsibility and accountability through the development of an integrated personal and professional identity
- Apply leadership and management principles in interactions with members of the multidisciplinary health team
- Uphold professional standards and demonstrate decision making based on a code of ethics

Bachelor of Science in Health Care Services

- Develop skills and knowledge to prepare for positions in work settings and graduate school in emergency health services, forensic services, sports and wellness settings, health care management roles or other allied health positions
- Communicate with individuals to enhance health care delivery
- Synthesize relevant knowledge from the arts, sciences, humanities, and personal experience to provide a comprehensive basis for the application of critical thinking, ethical decision making and independent practice are
- Provide safe health care within an identified practice area
- Incorporate research and theory into the delivery of health care service
- Demonstrate responsibility and accountability through the development of an integrated personal and professional identity
- Apply leadership and management skills within the context of interdisciplinary teams
- Uphold professional standards and demonstrate decision making based on a code of ethics

Master of Science in Nursing

- Demonstrate competence as an advanced practice nurse in the roles of scientist, artist, caregiver, ethicist, and citizen
- Function as a scholar in a practice setting, integrating research into advanced nursing practice
- Synthesize patterns of knowing to manage contemporary health care challenges and issues
- Manage the care of complex patients within a variety of practice settings
- Create future direction for advanced nursing practice across health care settings
- Enhance transpersonal healing of patients using creativity and critical thinking
- Initiate collaborative interactions that respect the patient's/other's human health experiences and promotes holistic health care
- Embrace the moral caring imperative within advanced nursing practice

Graduate School of Public Affairs

- To provide concepts and applicable skills in the key areas of the fundamentals of public administration, organizational management and change, information and analytic methods, economics and public finance, the policy process, and ethics and leadership
- To combine insights from classics in the field with the best of contemporary experience, literature and research
- To provide students with analytic understandings of organization and management by discussing and applying various theories, applied approaches, and real cases
- To assist managers and policy makers in using and understanding statistics, research and technology to become better managers of their organizations
- To prepare students to recognize, understand, and work with the policy process in their current and future work environments
- To learn and integrate skills typically associated with effective leadership, integrity, and ethical practice
- To prepare students to work effectively in a diverse global community

ACCREDITATION

Accredited — The Higher Learning Commission; Member — North Central Association.

ADMISSION

Admission of Undergraduate Students

The University of Colorado seeks to identify applicants having a high probability of successful completion of their academic program. Admission is based on evaluation of many criteria; among the most important are the following:

1. General level of academic performance before admission to the University, as indicated by the evaluation of work taken at other educational institutions

2. Evidence of scholarly ability and accomplishment as indicated by scores on accepted tests of scholastic aptitude and achievement

3. Motivation and potential for academic growth and ability to work in an academic community, as indicated by trends in the student's record, by letters of recommendation from teachers and others qualified to comment on the student, by accomplishments outside academic work, and by other relevant evidence

All credentials presented for admission to the University of Colorado become the property of the University.

A student who is granted admission or readmission must reflect in a moral and ethical sense a personal background acceptable to the University. The University of Colorado reserves the right to deny admission to applicants whose total credentials reflect an inability to assume the obligations of performance and behavior deemed essential and relevant to any of its lawful missions, processes, and functions as an educational institution.

Admission to the University of Colorado does not guarantee eligibility for future intrauniversity transfer.

APPLICATION

How to Apply

1. Obtain an application form from the Office of Admissions and Records in person, by phone, or by mail. The mailing address is at the front of this catalog.

The telephone number is (719) 262-3383 or 1-800-990-UCCS (8227). Apply on the web at "www.uces.edu".

2. Follow the instructions for completing the form and ensure that all required documents are delivered by the deadline dates published in the Schedule of Courses.

Credentials

To be considered for admission, applicants must submit complete and official credentials as required by the desired program of study. An "official credential" is one received directly from the issuing institution via a third party common carrier. Students may not disregard any part of their previous educational background. Failure to submit transcripts from all institutions previously attended will be cause for canceling the admission process or dismissal. All credentials presented for admission to CU-Colorado Springs become the property of the University and may not be returned to the applicant.

Notification

As soon as possible after the Office of Admissions and Records receives all required credentials, students will be notified of their admission status. If eligible, the student will receive notification of eligibility for admission. Admission eligibility to the University of Colorado does not constitute a guarantee of enrollment in any specific course.

Minimum Academic Preparation Standards (MAPS)

Freshmen entering the University of Colorado who have graduated from high school in 1988 or later will be required to meet Minimum Academic Preparation Standards (MAPS). The individual college's requirements are listed in the chart below. Students should be careful to note the different requirements in particular colleges and plan their academic preparation accordingly.

Options For Those Not Meeting "MAPS" Requirements as Entering Freshmen

What if my high school doesn't offer all the courses I need to meet the MAPS?

An admission decision involves many factors. There will also be consideration of the extent to which this curriculum has been available. Students with deficiencies may be admitted to the University provided they meet the other admission standards (e.g. test scores, rank in high school class, and grade point average) and provided they make up the deficiencies in the MAPS prior to graduation from the University.

How will my deficiencies be dealt with while enrolled in the University?

Freshmen who are admitted but who are deficient in MAPS will be required to make up the deficiency in accordance with the following policy.

1. Students who are deficient one unit in one or more areas may:

a. Make up that deficiency by taking a course that would normally be counted as degree credit and have that course count as part of their undergraduate total hours, assuming that all prerequisites are fulfilled. (For example, students could enroll in I.D. 105, successfully complete the course, eliminate their one-unit deficiency in mathematics, and earn three credits toward the 124.)

b. Take a proficiency test (if one is available): A score of 35-50 on the foreign language proficiency test eliminates that one-unit deficiency and permits students to enroll in the second semester of that language. A score of 42 on the TSWE or a score of 19 on the ACT-English test eliminates a one-unit deficiency in English and entitles students to enroll in English 131. A score of 60 on the Reasoning Skills Exam will eliminate a one-unit deficiency in mathematics.

c. Utilize appropriate Advanced Placement and CLEP scores to eliminate the deficiency.

d. Eliminate a single-unit deficiency in English by successfully completing English 099 (formerly English 121); and in mathematics by successfully completing MATH 090, Fundamentals of Algebra. These courses are offered through Extended Studies; and while they do eliminate one unit of deficiency, they DO NOT count toward the total number of hours needed to graduate.

Minimum Academic Preparation Standards (MAPS) CU-Colorado Springs

	English	Mathematics	Natural Sciences	Social Sciences	Foreign Language	Other
Business and Administration (16)	4(a)	4	3(d)	2	2(e)	1(f)
Engineering and Applied Science (16)	4	4(b)	3(c)	2	2(e)	1(g)
Letters, Arts and Sciences (15)	4	3	3	2	2 (e)	1 (g)
Nursing (15)	4	3	3(h)	2	2 (e)	1 (g)

[Above numbers refer to a full year of high school study]

English

a. Includes two years of composition.

Mathematics

b. Includes at least two years of algebra, one year of geometry and one year of college preparatory mathematics such as trigonometry, analytic geometry or elementary functions.

Natural Science

c. Includes one year of physics and one year of chemistry.

d. Includes two years of laboratory science.

h. Includes one year of biology and one year of chemistry.

Social Science

Civics, economics, geography, history, philosophy, psychology and sociology are examples of courses which meet this requirement.

Foreign Language

e. All units must be in a single foreign language.

Other

f. One year of academic elective, not including high school business courses. Students are urged to select courses that include oral communication, such as courses in speech, debate and theater.

g. One year of academic elective or additional units from among the five academic areas listed above

Undergraduate and Unclassified Student Admission Information

Applications and required credentials should be filed no later than July 1 for fall, December 1 for spring, and May 1 for summer. Call 1-800-990-UCCS

Type of Applicant	Criteria for Admission[1]	Required Credentials[2,3,4]	Notes
Freshman (Students seeking a Bachelor's Degree who have never attended a collegiate institution)	▪ Rank in the upper 40% of high school graduating class ▪ Have 15 or 16 units of acceptable academic high school work ▪ G.P.A. 2.8 or above ▪ Minimum test scores: ACT Comp. 24 or SAT Combined 1080	▪ Complete application ▪ $45 application fee (non-refundable) ▪ Official high school transcript showing rank in class and date of graduation. If still enrolled in high school, 7th semester grades and 8th semester courses in progress. ▪ Official ACT or SAT score report.	▪ For specific unit requirements refer to the college sections of this catalog. ▪ Non-high school graduates must submit copies of GED scores and a state equivalency certificate in addition to a high school transcript showing work completed through highest grade.
Transfer (Students seeking a Bachelor's Degree who have attended a collegiate institution other than CU-Colorado Springs)	▪ Must be in good standing and eligible to return to all institutions previously attended. ▪ Minimum G.P.A. requirements varies from 2.0 to 2.5 depending on the transfer institution and the number of college level hours attempted.	▪ Complete application ▪ $45 application fee (non-refundable) ▪ One official transcript from each college attended. ▪ Freshman credentials may be required. ▪ Non-high school graduates must submit copies of GED scores and state equivalency certificates.	▪ While credits from an institution may appear on the transcript of a second institution, transcripts must be submitted form all institutions where credit has been earned.
Unclassified (Non-degree) (Students who are not seeking a degree at this institution or who have not yet been admitted to degree status.	▪ Must be 20 years of age by Sept. 15 of fall semester or summer term, or Feb. 15 for spring semester. ▪ Must be a high school graduate or possess equivalency certificate. ▪ Must have at least a 2.0 G.P.A. and be in good standing and eligible to return to all institutions previously attended.	▪ Complete application ▪ $20 application fee (non-refundable) ▪ Non-high school graduates must submit copies of GED scores and state equivalency certificates.	▪ Unclassified students without a degree must maintain a 2.0 G.P.A. to remain eligible to continue. ▪ After completing 12 semester hours, degree seeking students must change to degree status. ▪ Not eligible for most forms of financial aid.
Former CU Set-up (Returning unclassified student; returning degree student with fewer than 12 semester hours at another institution since CU)	▪ Must be in good standing (*see Note A)	▪ Former student application. Degree students must have official transcripts sent for any work attempted since last CU semester.	Note A - students under academic suspension in certain schools and colleges at CU may enroll during the summer term as a means of improving their G.P.A.
Former CU Re-entering (Degree student who has attempted 12 or more hours at another institution since attending CU)	▪ Same as for transfer student.	▪ Same as for transfer student. Application fee required.	Will be considered for previous major unless a different major is requested on the application. Must meet same criteria as transfer student
Change of Status: Unclassified to Degree (Current or former CU unclassified students who wish to enter a degree program)	▪ Same as for transfer student.	▪ Same as for transfer student. Application fee required.	
Change of Status: Degree to Unclassified (*See Note B – Current or former CU degree students who have graduated and wish to take additional work)	▪ Must have completed degree. ▪ Must be in good standing and eligible to return to all institutions attended.	▪ Unclassified student application. ▪ NO application fee required.	▪ Note B - only students who have completed and received a degree are eligible for change from degree status to unclassified.
INTER-CAMPUS TRANSFER (Students who have been enrolled on one CU campus and wish to take courses on another.)	▪ Must be in good standing	▪ Former student application. ▪ Credentials as required by Campus Admissions Office.	▪ Transfers from CU-Colorado Springs to another CU campus should refer to appropriate catalog for any additional requirements.

1 Applicants not meeting these criteria are considered on an individual basis. Requirements for individual schools and colleges may vary or exceed the stated minimum.

2 Transcripts must be sent directly to the University of Colorado from each issuing institution. All documents submitted become the property of the University.

3 Any applicant who did not graduate from a high school must submit GED scores and a State Equivalency Certificate in addition to other required credentials.

4 Additional credentials may be required in individual cases.

Undergraduate Programs of Study

In addition to the degree programs listed below, course work in a number of other undergraduate areas of study is offered. College Freshmen and Undergraduate Transfers May Enter

Business and Administration

B.S. – four years

Emphasis Which May Be Completed at CU-Colorado Springs

Accounting*

Finance*

General Business

Information Systems

International Business

Marketing*

Organizational Management

Personnel – Human Resources Management

Education

Professional Licensure:

Elementary Education

Alternative Licensing Program

Secondary Education: English, Mathematics, Science, Social Studies, Spanish

Special Education Licensing Program

Professional Licensure through the Teacher Education Program requires two semesters of study plus one summer session and may be included as a part of a four-year degree program in the College of Letters, Arts and Sciences, or may be pursued after a bachelor of arts has been earned in a liberal arts program. Professional Licensure through the Alternative Licensure Program requires three semesters of study plus one summer session and may be pursued after a bachelor of arts degree has been earned.

Engineering and Applied Science

B.S. – four years

Majors Which May Be Completed at CU-Colorado Springs

Computer Engineering

Computer Science

Electrical Engineering

Mathematics BA or BS

Mechanical Engineering

Generally, two years of work toward the following degrees from the College of Engineering and Applied Science may be taken on this campus:

Architectural Engineering

Chemical Engineering

Civil Engineering

Engineering Physics

Letters, Arts and Sciences

B.A. – four years
B.S. – four years
B.A. with teaching certificate – four years[1]

Majors

Anthropology

Biology

Chemistry (B.A. or B.S.)

Communication

Distributed Studies[2]

Economics

English

Fine Arts

Geography and Environment Studies

History

Philosophy

Physics (B.S.)

Political Science

Psychology

Sociology

Spanish

Preprofessional Programs of Two to Four Years[3] Which May Be Completed at CU-Colorado Springs

Pre-Dental Hygiene

Pre-Dentistry

Pre-Education

Pre-Medical Technology

Pre-Medicine

Pre-Pharmacy

Pre-Physical Therapy

Beth-El College of Nursing and Health Science

Majors

Health Care Services

Nursing

*May include an additional emphasis in Information Systems.

[1] See College of Education section of this catalog for details.

[2] Distributed Studies majors include: Justice Studies, Public Administration and Special Education.

[3] Not a major. A group of courses which meet specified professional school requirements but by themselves do not meet degree requirements.

Graduate School

Graduate Programs of Study (Programs Which Require a Bachelor's Degree)

Business and Administration

Business Administration – M.B.A.

Areas of Emphasis

Health Care Administration

International Business

Services Management

Technology Management

Functional Areas of Emphasis

Accounting

Finance

Information Systems

Basic Technology Track

Infrastructure Integration Track

Leadership and Human Resource Management

Marketing

Operations and Technology Management

Education

Counseling and Human Services — M.A.

Options

Community Counseling

Leadership

School Counseling

Curriculum and Instruction — M.A.

Options

Gifted and Talented

Educational Computing

Educational Leadership

Reading

Science Education

Special Education — M.A.

Option

Gifted and Talented

Option: Principal and Administrator Licensure

Engineering and Applied Science

Applied Mathematics – M.S.

Computer Science – M.S., Ph.D.

Electrical Engineering – M.S.

Areas of Emphasis

Communications and Signal Processing

Computer Aided Design

Computer Engineering

Control Systems

Electromagnetics

Microelectronics

Signal Processing

Space Systems

Electrical Engineering – Ph.D.

Engineering –Master of Engineering (M.E.)

Areas of Emphasis

Aerospace and Information Operations (pending)

Engineering Management

Information Engineering and Operations (pending)

Manufacturing

Remote Sensing

Software Engineering

Space Operations

Mechanical Engineering – M.S.

Areas of Emphasis

Aerospace Engineering

Dynamic Systems and Control

Manufacturing

Materials Science

Mechatronics/MEMS

Process Engineering

Graduate School of Public Affairs

Public Administration – M.P.A.

Criminal Justice –M.C.J.

Areas of Emphasis

Certificate in Nonprofit Management

Certificate in Criminal Justice

Certificate in Public Management

Letters, Arts and Sciences

Basic Science – M.B.S.

Options

Anthropology

Biology

Biotechnology/ Biochemistry

Chemistry

Exercise Science

Geography and Environmental Studies

Mathematics

Mathematics, Teaching

Physics

Science, Teaching

Communication – M.A.

History – M.A.

Psychology – M.A.

Sociology – M.A.

Beth-El Graduate School of Nursing

Nursing – M.S.

e. Take appropriate courses at community colleges or other colleges to eliminate a unit of deficiency. Students should be aware of courses which will and will not transfer to the University of Colorado.

2. Students who are deficient two or more units, may:

a. Remove any single unit of deficiency by any of the methods in 1, above.

b. Remove two units by various combinations of the methods in 1, above.

(Note: A score of at least 51 is needed on the foreign language proficiency exam to remove two units of foreign language deficiency).

Admission of Freshmen

(719) 262-3383

Freshmen may enroll in the Beth-El College of Nursing and Health Sciences, College of Letters, Arts and Sciences, the College of Business and Administration, and the College of Engineering and Applied Science in the fall, spring, or summer terms. The schools of the University – Dentistry, Education, Graduate, Graduate School of Public Affairs, Journalism, Law, Medicine, Nursing, and Pharmacy – require one or more years of college-level work before a student may be considered for admission. The programs at the University of Colorado at Colorado Springs provide all the course work required for entrance into the Schools of Dentistry, Education, Graduate, Graduate School of Public Affairs, Journalism, Law, Medicine, and Pharmacy. Students may complete teacher certification requirements on this campus.

1. Priority for admission to the College of Letters, Arts and Sciences is given to applicants who (a) rank in the upper 40% of their high school graduating class at the end of the 6th, 7th, or final semester; (b) achieve a combined Scholastic Aptitude Test (SAT) score of 1,080 or above, or a composite American College Test (ACT) score of 24 or above; (c) a G.P.A. of 2.8 or above; and (d) complete all high school course units as required by the college to which they have applied. Increased requirements for admission to the colleges of Business and Administration, Engineering and Applied Science, and Nursing and Health Sciences are described in their respective sections of this catalog. Applicants who do not meet all of these requirements should refer to category number 2 below.

2. Applicants for freshman admission whose records vary in any way from the above priority admissions category will be considered on an individual basis by evaluation of their overall academic records including (a) the quality of their high school program of study; (b) the level of their college entrance test scores (SAT or ACT); and (c) any information unique to an individual situation. In addition, all applicants whose records reflect innovative grading systems, unusual curricula, no rank in class, or a high school equivalency through the General Education Development (GED) test, will be considered in this category. Students in this category admitted to the University may not exceed 20% of the total admitted pool.

Advanced Placement Program

The University participates in the high school advanced placement program of the College Board. Students receiving scores of 3, 4, or 5 on advanced placement examinations are generally granted college credit. Official scores must be sent to the University directly from the College Board. Please see chart on following page.

Applicants Who Did Not Graduate From an Approved High School

An applicant who has not graduated from high school must submit satisfactory scores on the General Educational Development Test (GED), a Certificate of Equivalency from any state department of education, a complete transcript of any high school work completed, and SAT or ACT entrance examination scores. Each applicant will be considered on an individual basis.

Students Not Granted Admission

An applicant who is not granted admission as an entering freshman may wish to consider a transfer to the University after one or two years of study elsewhere (see transfer requirements section). In the best interest of students pursuing educational goals for which they lack some academic preparation, the University Committee on Admissions often recommends that such applicants complete at least one full year of college level course work at a college where much personal attention and the appropriate courses will prepare the student for an eventual successful experience at the University of Colorado.

High School Concurrent Enrollment

High school juniors and seniors with proven academic abilities may be admitted for one term at a time with special approval from the admissions committee. Credit for courses taken may subsequently be applied toward a University degree program. For more information and application instructions, contact the Office of Admissions and Records. The telephone number is (719) 262-3383.

International Baccalaureate Program Credit

Credit is awarded only for higher level exams on which a student scores sufficiently high on a scale of 1-7. All colleges accept these credits, but apply them differently depending on the student's degree program. Please contact an advisor in the Student Success Center for test score interpretation.

IB Examination Title	Examination Score	UCCS Course Equivalent	Semester Hours
Art / Design	4	AH 100, V A 101	6
Biology	4	BIOL 100, 106	6
Chemistry	4	CHEM 103	6
Computers	4	C S 115	6
Economics	4	ECON 1- -	6
English	5	ENGL 131, 150	6
	6-7	ENGL 131, 141, 150	6
Languages - Group I / A1	4	102, 211	8
Languages - Group II / A2 / B	4	101, 102	8
Geography	4	GES 198, 199	6
History - American	4	HIST 151-154	6
History - European	4	HIST 101-104	6
Mathematics - Calculus	5	MATH 135	6
Philosophy	4	PHIL 1- -	6
Psychology	5	PSY 100	6

Advanced Placement Program Credit

Credit Toward Graduation Requirements By College. (X) Credit will apply to degree programs in the specific college

Advanced Placement Examination Title	Examination Score	CU-Colo. Springs Course Equivalent	Semester Hours	Business and Administration	Engineering and Applied Science	Letters, Arts and Sciences
Biology						
Biology	5, 4	BIOL 110, 115	6	X	a	c
Chemistry						
Chemistry	5, 4	CHEM 103, 106	10	X	b	X
	3	CHEM 103	5	X	b	X
Classics						
Vergil	5, 4	Elective	6	X	c	X
	3	Elective	3	X	c	X
Catullus-Horace	5, 4	Elective	6	X	c	X
	3	Elective	3	X	c	X
Vergil and Catullus-Horace	5, 4	Elective	9	X	c	X
Computer Science						
Computer Science	5	CS 115	3	X	c	X
Economics						
Microeconomics	5, 4	ECON 101	3	X	c	X
Macroeconomics	5, 4	ECON 102	3	X	c	X
English						
English Composition	5	ENGL 131, 141, 150	6	X	X	X
and Literature	4	ENGL 131, 150	6	X	X	X
English Language	5	ENGL 131, 141	6	X	X	X
and Composition	4	ENGL 131	3	X	c	X
Fine Arts						
Studio Art	5, 4, 3	FA 104, 206	6	X	c	X
Art History	5, 4, 3	FA H 280, 282	6	X	X	X
Foreign Language						
French Language	5, 4	FR 217, 301	6	X	c	X
	3	FR 211	3	X	c	X
French Literature	5, 4	FR 217, 311	6	X	X	X
	3	FR 211	3	X	X	X
German Language	5, 4	GER 217, 301	6	X	c	X
	3	GER 211	3	X	c	X
German Literature	5, 4	GER 217, 311	6	X	X	X
	3	GER 211	3	X	X	X
Spanish Language	5, 4	SPAN 217, 301	6	X	c	X
	3	SPAN 211	3	X	c	X
Spanish Literature	5, 4	SPAN 217, 311	6	X	X	X
	3	SPAN 217	3	X	X	X
Government & Politics						
U.S. Government & Politics	5, 4	Elective	3	c	c	X
Comparative Gov't & Politics	5, 4	Elective	3	c	c	X
History						
American History	5, 4	HIST 151, 154	6	X	X	X
European History	5, 4	HIST 101, 103	6	X	X	X
Mathematics						
Math – Calculus AB	5	MATH 135, 136	8	X	X	X
	4	MATH 135	4	X	X	X
Math – Calculus BC	5, 4	MATH 135, 136	8	X	X	X
	3	MATH 135	4	X	X	X
Music						
Music Theory	5, 4	Elective	6	X	c	X
	3	Elective	3	X	c	X
Physics						
Physics B	5, 4, 3	PES 101, 102	8	X	c	X
Physics C - Mechanics	5, 4	PES 101, 102	5	X	X	X
Physics C - Electricity & Magnetism	5, 4	PES 112, 215	5	X	X	X
Psychology						
Psychology	5, 4	PSY 100	4	c	c	X

a Does not apply. Computer Science majors and premedical options check with faculty adviser.

b Chemistry 103 fulfills departmental requirements in all areas. Chemistry 106 fulfills Computer Science requirements and may be an elective credit in Applied Mathematics.

c Check with faculty adviser in major department.

Admission of Transfer Students

(719) 262-3383

To be considered for admission, transfer students must be eligible to return to all collegiate institutions attended; they may not disregard any part of a previous collegiate record. Failure to advise the University of all institutions previously attended may be sufficient cause for rejection or dismissal.

Transcripts must be sent directly to the University of Colorado from each issuing institution. All documents submitted become the property of the University of Colorado.

General Academic Requirements

Transfer students who graduated from high school in 1988 or later are subject to the same minimum academic preparation standards as those required by freshmen. Please see "Minimum Academic Preparation Standards" section of this catalog.

Transfer students must meet a minimum G.P.A. requirement which varies according to the hours of collegiate work completed and the type of institution in which the course work was taken. If the transfer student has 30 semester hours or more, the required G.P.A. is 2.0 for several fields of study. If the student has earned from 12 to 29 semester hours, and the institution has comparable admission standards then a 2.0 G.P.A. is the minimum requirement. In the 12-29 hour range, if the work was earned at an institution with lower admission standards, then a 2.5 G.P.A. minimum is required. If the student who has earned 12-29 semester hours had high school criteria which meet our freshmen minimum requirements, then he or she is admissible with a 2.0 G.P.A. Work in progress at the time of application cannot be considered in computing the cumulative average. As there are some schools and colleges at the University which require a higher grade-point average for transfer, students are urged to investigate specific requirements.

Community College Transfer Students

Transfer students who complete the prescribed Colorado community college core curriculum and receive the Associate of Arts or the Associate of Science degree will be considered upper division students with essentially two years of work to complete the bachelor's degree. Please see the flexible transfer statements in each of the college sections of this catalog.

These statements respond to the interaction of the transfer student's breadth and depth of study in relation to the requirements of a particular degree.

Transfer Guides

Guides to assist students in their transfer from Colorado community colleges are available for student use in the Student Success Center at 262-3260

Transfer of College Level Credit

No evaluation of transfer credit is made until after students are admitted as degree students and have confirmed their intent to enroll. Admitted students will be notified when the evaluation has been completed, and should make an appointment at that time with an adviser in their school or college.

College credit is transferable to CU-Colorado Springs according to the following stipulations:

1. Credit must have been earned at a college or university of recognized standing.

2. Only courses in which a grade of C or better has been attained will be accepted for transfer at this institution. Grades of pass, satisfactory, honors, etc., are also accepted for transfer. However, a limitation is placed on the number of pass hours accepted toward a degree by each school and college.

3. Credit is not transferable from vocational or technical curricula.

4. Credit will be granted only for course work appropriate to the curricula at CU-Colorado Springs.

5. Remedial or subcollege level courses are not transferable.

6. A maximum of 72 hours may be transferred from a two-year or junior college.

7. A maximum of 102 semester hours of transfer credit may be counted toward graduation. Individual schools and colleges determine which courses and hours will apply toward the degree.

8. Individual schools and colleges reserve the right to accept or deny credit earned while under scholastic suspension.

9. A maximum of 60 semester hours of extension credit (including no more than 30 semester hours of correspondence) may be counted toward an undergraduate degree at the University of Colorado.

10. Advanced placement credit is evaluated upon receipt of an official score report from the College Entrance Examination Board. Usually only scores of 3, 4, and 5 are considered for credit. Credit is not granted for an advanced placement score if the student has completed a college course which is equivalent to the course for which he would receive advanced placement credit.

11. College Level Examination Program (CLEP) credit for approved subject examinations only may be granted if a score of 67 percentile or above is received and if the courses are acceptable to the student's school or college. A maximum of 30 semester hours may be counted toward a degree. Credit is not granted for a CLEP score if the student has completed equivalent work.

Colorado residents may secure CLEP materials from the state regional office by contacting:

College Level Examination Program
c/o College Entrance Examination Board
4155 East Jewell Street, Suite 705
Denver, Colorado 80222

Students outside of Colorado may obtain CLEP information and application forms by writing:

College Level Examination Program
Box 1822
Princeton, New Jersey 08540

12. Credit for military schooling is evaluated upon receipt of forms DD 295 and DD 214. Evaluation of credit is in accordance with the American Council on Education's credit recommendation and is generally considered as elective credit.

13. Admission to the University of Colorado does not guarantee eligibility for future transfer into other programs, colleges, or schools within the University.

All course work is evaluated on the semester hour basis, i.e., 1 quarter hour equals 2/3 semester hour.

Transfer Credit Appeal Procedure

The procedure for appealing a decision involving the acceptance of course work

from a Colorado community college for credit toward a degree is as follows:

1. Students must file an appeal within 15 days of receiving their transcript evaluation by writing the office assigned responsibility for transfer evaluations at CU-Colorado Springs. The decisions made in the transcript evaluation will be binding if the student fails to file an appeal within this time frame. CU-Colorado Springs will have 15 days to respond in writing to the student appeal. A transfer student should abide by the following procedure when appealing a credit transfer decision:

a. Complete and return a petition form, available in the academic advising office, to the dean. Attach to your petition a statement from the relative department chair which presents the chair's evaluation of the transfer credit in question.

b. The dean will respond in writing to the petitioner.

2. If the dispute cannot be resolved between the student and CU-Colorado Springs personnel, the student may appeal in writing to the community college which offered the credit. The student has 15 days from receipt of the written notification to file an appeal with the community college that offered the course. The chief campus CEOs (president, chancellor, etc.) from both institutions will attempt to resolve the dispute within 30 days from receipt of the appeal at the community college which offered the course. Agreement between the two institutions will constitute a final and binding decision which CU-Colorado Springs will communicate to the student.

3. If the issue is not resolved between the two institutions, it becomes an institutional dispute to be resolved by institutional dispute procedures.

a. The student will be notified about the process used and the final decision reached.

b. The dispute must be resolved within 60 days after the institutional dispute procedures are initiated and within 120 days from the day the student first filed the appeal.

International Student Admission

The University is authorized under federal law to enroll non-immigrant foreign students. International applicants are required to contact the director of admissions for international students in the office of admissions and records before submitting an application. All foreign applicants from non-English speaking countries are required to demonstrate proficiency in English by submitting scores on the test of English as a foreign language (TOEFL). International students must follow special procedures and observe special deadlines. The application fee is $100 and is nonrefundable. English as a second language (ESL) is not available at CU-Colorado Springs.

Admission of Unclassified Students

(719) 262-3383

The unclassified student designation has been established to meet the needs of those students who wish to take University courses but who do not presently intend to work toward a degree at the University of Colorado. Permission to register for specific courses is contingent upon the availability of space. Unclassified students may have difficulty obtaining course space due to class enrollment limits and because degree students may have a higher priority in certain departments.

Unclassified students enrolled during the academic year (fall, spring and summer terms) must be 20 years of age or older by September 15 for the fall and summer terms and February 15 for the spring term, and must have a 2.0 G.P.A. in all college work attempted, and must be in good standing at all collegiate institutions attended.

An unclassified student who is not a high school graduate must submit GED scores and a high school equivalency certificate issued by a state department of education at the time of application.

Unclassified students may take courses on a pass/fail basis; however, such credit will be counted as part of the total pass/fail credit allowed by the various schools and colleges should the student change to degree status.

Continuation as an unclassified student (Major Code NOLD, NOUD, NOHS or NODW) is contingent upon maintaining an overall grade point average of 2.0 upon completion of 12 or more semester hours.

Certified teachers with baccalaureates who seek only a renewal of the certificate currently held and who do not require institutional endorsement or recommendation may qualify for the University-wide unclassified student classification as outlined above.

Persons with baccalaureates who seek initial teacher certification must apply for and be admitted to the Teacher Education Program separately and meet the requirements of the College of Education. For information on the deadlines for admission to the program, unclassified students should consult the College of Education.

Unclassified students may not register concurrently on more than one campus of the University.

Applying Unclassified Student Credits Toward Degree

Unclassified students may apply for admission to an undergraduate degree program by submitting an undergraduate admissions application, complete academic credentials, and the application fee. Accepted degree applicants may transfer a maximum of 12 semester hours taken as an unclassified student at this university to an undergraduate degree program with the approval of the appropriate dean's office.

Unclassified students desiring to pursue a graduate degree at the University are encouraged to submit the complete graduate application and supporting credentials as soon as possible. Students may be allowed to transfer up to 9 semester hours of credit taken as an unclassified student at this University to apply toward a master's degree provided the transfer is recommended by the department concerned and approved by the dean of the Graduate School. Students are advised to contact the Office of the Dean of the specific graduate school in which they wish to enroll for further details on the transfer of unclassified student credentials. See also Transfer of Unclassified Student Credit Hours in this bulletin.

Eligibility to Return

Continuation as an unclassified student (Major Code NOLD, NOUD, NOHS or NODW) is contingent upon maintaining an overall grade point average of 2.0 upon completion of 12 or more semester hours.

Failure to maintain the required average will result in an unclassified student being suspended. The suspension is for

an indefinite period of time and becomes part of the student's permanent record at the University. While under suspension, enrollment at the University is restricted to summer terms or courses offered through Extended Studies.

Unclassified students are not placed on academic probation prior to being suspended.

Admission of Graduate Students

Complete information is contained in the Graduate School section of this catalog.

Classification of In-state and Out-of-state Students

(719) 262-3380 or (719) 262-3385

A student is initially classified as an in-state or out of-state registrant for tuition purposes at the time an application and all supporting credentials have been received in the Office of Admissions and Records. The classification is based upon information furnished by the student and from other relevant sources. After the student's status is determined, it remains unchanged in the absence of satisfactory evidence to the contrary. The student who, due to subsequent events, becomes eligible for a change in classification, whether from out-of-state to in-state or the reverse, has the responsibility of informing the tuition classification officer, Office of Admissions and Records, in writing within 15 days after such a change occurs.

If adult students, or emancipated minors, establish domicile outside Colorado, they are to send written notification within 15 days to the tuition classification officer.

Petitioning for Classification Change

Instructions as to the procedure to follow, the necessary petition forms, and detailed information regarding the statute are available from the tuition classification officer, Office of Admissions and Records.

Classification Notes

1. Petitions will not be acted upon until an application for admission to the University and complete supporting credentials have been received.

2. Changes in classification are made effective at the time of the student's next registration.

3. A student who willfully gives wrong information to evade payment of the out-of-state tuition is subject to legal and disciplinary action.

4. Petitions must be submitted by census date (see below, Registration, Fee Regulations). Late petitions will not be considered until the next semester.

U.S. and Canadian Military Waivers/Olympic Waivers

Special rules apply to active duty members of the U.S. and Canadian Armed Forces permanently stationed in Colorado and their dependents and Olympic athletes in training. Strict deadlines of certification each term one enrolls are enforced for these individuals. Please contact the tuition classification officer in Admissions and Records for details.

Registration

(719) 262-3361

See the Academic Calendar for dates. Times and details of registration as well as instructions on how to register by touch tone telephone or over the web at the on-line student center are a part of the Schedule of Courses for each academic term.

Tuition

Concurrent registration

CU-Colorado Springs degree students with authorized concurrent registration for another campus will pay tuition on the CU-Colorado Springs campus for the total University enrollment. Arrangements are made through the Office of Admissions and Records where the Concurrent Registration Form is available. The student's academic dean grants authorization to register concurrently and negotiates for space in the requested course at the away campus. The student must take at least one course on the home campus and not more than two courses or 6 semester hours (whichever is greater) on all the other campuses. Courses taken concurrently may not be taken on a pass/fail, no credit option, or as independent study.

Concurrent registration is not available for unclassified students.

Other students enrolling on more than one campus will pay tuition and fees to each campus at the rate appropriate to the number of credits for which they are registered on that campus.

Tuition and Fees

(The Board of Regents reserves the right to change tuition and fees at any time.)

Students are required to pay a down payment prior to registration. Down payment requirements and due date for payment of balances are contained in the Schedule of Courses.

All students enrolled for courses are assessed mandatory student fees. These consist of a base student fee of $55.00 per semester (1/2 for the summer term) plus $7.50 per credit hour. The income is used to fund student activities and to finance the University Center and Family Development Center.

1. All persons attending regularly scheduled classes must be registered and must have paid the proper tuition and fees. The tuition for those auditing a course on this campus is the same as for those registered for credit. Auditors register for courses for No Credit (NC).

2. Students enrolled as "Candidate for Degree" only to take a comprehensive examination for a master's degree will pay graduate, resident tuition for 1 credit hour, plus appropriate fees.

Fee Regulations

(719) 262-3392

Payment of Fees

Students must pay a substantial tuition down payment. The down payment requirements and payment due date is contained in the Schedule of Courses. Students receiving financial aid or a guaranteed student loan should contact the Financial Aid Office to determine if they are eligible for a down payment waiver. Students covered by a third-party contract should contact the Third Party Billing Office. Students receiving veterans assistance will be expected to pay the specified down payment.

Due date for payment of balances is contained in the Schedule of Courses. Bills will be mailed approximately two weeks after the end of the drop/add period for the balance of tuition and fees less the down payment. Payments must be received at the Bursar's Office by the due date. Mail postmarked on the due date will not be honored.

Bills not paid by the due date will be assessed a prorated late fine up to $50 and will accrue a 1 percent per month service charge on the unpaid balance (12% A.P.R.).

Students receiving financial aid will have tuition and fees deducted from their awards. Any balance remaining may be picked up at the Loan Disbursement Office.

Personal Checks

A student's personal check is accepted for any University obligation, unless student is deemed to be a poor credit risk. A $17 service charge plus bank collection charges will be assessed for all returned checks. If the returned check was for a down payment, a reinstatement fee of $25 plus $10 per month will be assessed until cleared. If the check was for a tuition bill, a prorated late payment fine up to $50 plus interest will be assessed if applicable.

Drops or Withdrawals

A course drop or withdrawal is effective on the date that the completed form is returned to and stamped received by the Records Office, and any adjustment in tuition is made as of that date by the Records Office.

Refunds/Rebates

Refunds/rebates will not be processed until approximately two weeks after the end of the drop/add period. The amount of refund/rebate is determined by the time of withdrawal in accordance with the policy contained in the Schedule of Courses.

Payment Policy

It is the student's responsibility to ensure payment is completed by the established due date. Students who enroll after the last day of late registration must pay a $50 late penalty fee.

Census date

The census date is the final controlling date for payment of tuition, receiving a refund for a change in registration (dropped course), requesting the pass/fail option or changing back to a letter grade, and a number of other academic, financial, and registration functions. Census date is the 12th class day of a fall or spring semester or the 6th class day of the summer term. The exact day and date is printed in the schedule of courses for a particular semester or the summer term.

General Fees

Matriculation Fee

This nonrefundable charge is assessed all students new to the University of Colorado system. It is a one-time charge of $25 and covers the normal cost of transcripts and establishing your university record. The fee is assessed during registration at the time of initial enrollment and is nonrefundable, even though the student may withdraw.

Student ID Fee

The fee for a student photo I.D. is $15.

SIS (Student Information System) Fees

This is a nonrefundable fee approved by the Board of Regents to be effective fall 1984. The fee is payable each semester of registration.

The Student Information System (SIS) enables the University to provide better service to its students through student records, course scheduling, data management, transcripts, financial aid, student accounts and registration using the online touch-tone voice response telephone system. All students pay $5.50 each semester or term.

Credit by Examination Fee

Special examinations, given for the purpose of obtaining credit for a course solely through the passing of an examination without otherwise registering for and taking the course, are available to degree students in the University. The fee for each examination is the lower division, resident rate for 3 semester hours regardless of the number of hours of credit that are awarded. Credit is Pass/Fail ONLY.

Arrangements for special examinations are made through the Office of Admissions and Records. The fees for the examinations are payable in advance and are nonrefundable.

In cases where the examination is administered for other institutions and the results reported to that institution, the same nonrefundable fee will be assessed in advance; the individual student is responsible for payment.

Safety and Transportation Fee

It is the policy of the Colorado Commission on Higher Education that parking for vehicles owned by students, faculty and staff must be funded on a self-supporting basis from special charges made of those owning automobiles and parking them on campus. In accordance with this policy, the CU-Colorado Springs Transportation and Traffic Services Operation is established as a self-supporting auxiliary enterprise, RECEIVING NO STATE APPROPRIATIONS from tax revenues. This means that construction, improvement and maintenance of all parking facilities at CU-Colorado Springs are financed solely through permit sales, parking fines and the Student Safety and Transportation Fee. Annual revenue from parking must be sufficient to satisfy operating expenses and to repay revenue bonds sold to construct parking facilities.

The Safety and Transportation fee is $42.35 per student, per semester regardless of a student's credit hour course load. Some of the things student fees pay for:

1. The construction and maintenance of all parking lots and roadways located on the campus of the CU-Colorado Springs.
2. The campus shuttle.
3. Increased hours and service from the campus police.
4. Emergency phones.
5. Lighting along all roadways and in all parking lights.

Students may park in any of the parking lots designated as Spoke or Rim parking. Spoke parking lots are the gravel parking lots adjacent to the main part of campus (Lots 9 and 10). These lots are located within walking distance of the academic buildings.

Students may not park in the Hub Parking Lots without a special permit which must be purchased for an additional charge. A LIMITED number of Hub Parking permits will be made available to students.You can find out more information by calling 262-3111 or referencing our web page at: http://www.uccs.edu/~pusafety/

Parking is not permitted behind any building without a special permit. Cars violating parking regulations are subject to ticketing and/or towing. Parking is on a first come, first served basis. Faculty, staff and students should direct all parking or traffic inquiries to Transportation and Traffic Services, in the Department of Public Safety, Room 237, Campus Services Building, or call 262-3528 (ext. 3528 on campus).

TUITION SCHEDULE — FALL 2001 Tuition is based on your Student Status, not the level of the course

Undergraduate Freshmen and Sophomore Students and non-degree/unclassified students without an undergraduate degree with less than 60 semester hours completed

Credit hour	Resident	Non-resident
0-1	$119	$ 555
2	238	1112
3	356	1667
4	474	2223
5	594	2779
6	711	3316
7	830	4332
8	950	4554
9	1011	4778
10	1074	5000
11	1152	5222
12-15	1245	5598
each hour over 15	$ 119	$ 555

Undergraduate Junior and Senior Students in the Colleges of Business or Engineering

Credit hours	Resident	Non-resident
0-1	$ 131	$ 575
2	264	1151
3	395	1726
4	526	2302
5	657	2877
6	790	3453
7	921	4482
8	1054	4716
9	1133	4950
10	1184	5183
11	1274	5417
12-15	1358	5817
each hour over 15	$131	$ 575

Undergraduate Certificate Students in the College of Education

Credit hours	Resident	Non-resident
0-1	$ 114	$ 495
2	231	991
3	345	1486
4	461	1980
5	576	2475
6	691	2969
7	806	3686
8	921	4015
9	1009	4344
10	1101	4671
11	1208	5000
12-15	1303	5503
each hour over 15	$ 114	$ 495

Undergraduate Junior and Senior Students in the College of Letters, Arts and Sciences and non-degree/unclassified students without an undergraduate degree with greater than 60 hours completed

Credit hour	Resident	Non-resident
0-1	$123	$ 566
2	244	1131
3	366	1695
4	489	2262
5	612	2826
6	734	3392
7	855	4401
8	977	4631
9	1043	4863
10	1121	5096
11	1226	5327
12-15	1323	5717
each hour over 15	$123	$ 566

Undergraduate Junior and Senior Students in the Beth-El College of Nursing and Health Sciences.**

Credit hours	Resident	Non-resident
0-1	$ 161	$ 428
2	323	856
3	485	1284
4	647	1713
5	808	2140
6	969	2568
7	1132	2997
8	1293	3424
9	1454	3852
10	1616	4281
11	1777	4708
12-15	1931	5322
each hour over 15	$ 161	$ 428

Graduate Students in the College of Education

Credit hours	Resident	Non-resident
0-1	$ 171	$ 646
2	342	1288
3	512	1934
4	682	2579
5	854	3224
6	1024	3868
7	1254	5291
8	1430	5513
9	1586	5737
10	1648	5962
11	1712	6187
12-15	1761	6458
each hour over 15	$ 171	$ 646

Graduate Students in the Beth-El College of Nursing and Health Sciences**

Credit hours	Resident	Non-resident
0-1	$ 212	$ 469
2	423	939
3	635	1409
4	848	1878
5	1060	2348
6	1271	2817
7	1483	3287
8	1695	3757
9	1907	4226
10	2118	4696
11	2331	5165
12-15	2545	5733
each hour over 15	$ 212	$ 469

Graduate Students in Master of Basic Science

Credit hours	Resident	Non-resident
0-1	$ 152	$ 526
2	302	1051
3	453	1578
4	604	2104
5	755	2629
6	907	3155
7	1112	3988
8	1281	4404
9	1388	4803
10	1502	5188
11	1606	5561
12-15	1660	5998
each hour over 15	$152	$ 526

Graduate Students in the College of Engineering and Applied Science

Credit hour	Resident	Non-resident
0-1	$178	$ 646
2	355	1288
3	534	1934
4	710	2579
5	888	3224
6	1066	3868
7	1304	5291
8	1484	5513
9	1586	5737
10	1648	5962
11	1712	6187
12-15	1761	6458
each hour over 15	$ 178	$ 646

**Different Rates may apply for Beth-El students who enrolled in Fall 1997

Graduate Students in the Graduate School of Public Affairs

Credit hours	Resident	Non-resident
0-1	$ 166	$ 579
2	333	1156
3	498	1735
4	666	2313
5	831	2892
6	998	3470
7	1219	4355
8	1403	4823
9	1526	5274
10	1655	5712
11	1773	6137
12-15	1863	6553
each hour over 15	$ 166	$ 579

Graduate Students in the College of Business and Administration

Credit hours	Resident	Non-resident
0-1	$ 184	$ 652
2	369	1303
3	554	1954
4	738	2604
5	922	3256
6	1108	3907
7	1354	5359
8	1540	5584
9	1646	5809
10	1711	6032
11	1774	6256
12-15	1822	6528
each hour over 15	$ 184	$ 652

Graduate Students in Non-Professional Programs (see the list of majors below) and non-degree/unclassified students with a bachelor's degree

Credit hours	Resident	Non-resident
0-1	$ 158	$ 617
2	317	1235
3	474	1854
4	632	2472
5	789	3090
6	948	3708
7	1160	5047
8	1318	5268
9	1408	5489
10	1468	5712
11	1528	5934
12-15	1569	6206
each hour over 15	$158	$ 617

Non-Professional Majors: Communication, History, Psychology, and Sociology.

*The Board of Regents reserves the right to change tuition and fees at any time.

*Tuition and fees for fractional hours are prorated at the 1 hour rate.

Health Center Fee

The Health Center is available to all full-time and part-time students who have paid the following fees, per semester: Fall semester, $25; Spring semester, $25; Summer session: $12.50.

Laboratory Fees and Deposits

Refunds for laboratory fees and deposits for students who withdraw from school are made according to the refund schedules found in the Schedule of Courses for each semester or term of the academic year. A full refund of laboratory fees and deposits for courses dropped on or before the census date is made to students who remain enrolled for at least one course. Colleges and Schools may change the fee schedule at anytime without prior notice. The following laboratory fees and deposits is representative of, but not inclusive of, all fees.

Business Laboratory Fees

All students taking Information Systems courses will be charged a $15 per credit hour fee. Students taking any other course in the College of Business will be charged a $5 per credit hour fee. The maximum fee charged to a single student in a single semester for these fees is $120.

Biology Fee

All students enrolling in biology courses with laboratory components (or equivalents) will be assessed a materials fee per course. This fee provides for specimens, slides, glassware, etc. Biology 101 level laboratory courses-$30; Biology 200-$40; Biology 300 and above laboratory courses - $50.

Chemistry Breakage Deposit

There is a total charge of $25 for each laboratory course, one course = $25, two courses = $50, etc. Twenty dollars of the $25 charge is a fee and $5 is a deposit against breakage. If breakage charges do not exceed the breakage deposit, any balance up to $5 will be refunded at the end of the term. Students who drop or withdraw before any liability accrues against this deposit will receive a $5 refund at the time they drop. The policy for fee refunds for dropping or withdrawal is described in the schedule of courses. Independent study courses are considered to be lab courses.

Communication – Filmmaking and/or TV Production Fee

A $30 laboratory fee will be assessed for each course in TV production and filmmaking. Communication 350 (American Cinema) carries a fee of $20.

Engineering Laboratory Fees

All students taking computer science courses will be charged a $12 per credit hour fee for all computer science classes up to a maximum of $36.

All students taking electrical and computer engineering courses will be charged an Instructional Fee of $10 per credit hour, up to a maximum of $120 per student per semester, for all courses except ECE 7000, 8000, 9200, 9300, 9400, 9500 and 9900.

All students taking mechanical or aerospace engineering courses will be charged and Instructional Fee of $10 per credit hour, up to a maximum of $120 per student per semester, for all courses except MAE 7000, 7500, 9400, 9500, 9520 and 9999.

All students enrolled in any one of the following courses: MATH 105, 111, 112, 135, 136, 235, 310, 313, 340, 405/505, 410/510, 448/548 and 511 will be charged $36 as a Mathematics Technology fee. The maximum charge is $36 per semester.

These fees are nonrefundable and will be used by the departments for inventory renewal. Students are responsible and liable for damage to equipment caused by neglect, improper use, or failure to follow operating instructions.

English Composition

All students enrolled in English composition courses will be assessed a $10 fee per course.

Visual Arts Fee

All students enrolling in studio art courses will be assessed a fee of $30 per class to help defray the cost of supplies. Students enrolled in Film 100 or 200 will be assessed $5 per course. Fees for Theatre 250, 310, 336, and 337 will be $10 per course. There is a full refund of the deposit for courses dropped the first two weeks of the term.

Foreign Culture Lab Fee

Students enrolled in Foreign Culture lab

courses will be assessed a $10.00 fee per course. $25 for courses with travel.

Geology and Geography

Students enrolled in certain Geology or Geography courses will be assessed materials fees.

Letters, Arts and Sciences Field Trips

Students taking courses with field trips may be assessed a $20.00 trip fee.

Nursing

Students taking NURS 210 are assessed a $25 lab fee.

Physics and Energy Sciences

Amounts vary for lab courses.

Psychology

Amounts vary for lab courses.

College of Education Fees

Students enrolled in certain College of Education courses will be assessed fees ranging from $10 to $100 per course. Fees are subject to change.

Graduate School of Public Affairs

Students enrolled in on-line courses are assessed a $100 fee per class.

Academic Policies

Course Numbering System

The word preceding the course number identifies the department offering the course. The first digit in the number indicates in a general way the class level of the course: 100/1000-level courses are primarily for freshmen, 200/2000-level courses for sophomores, 300/3000-level for juniors, 400/4000-level for seniors and 500/5000- and 600/6000-level for graduates. The digit after the dash denotes the credit-hour value of the course. Thus, "CHEM 101-4" signifies that the course is in chemistry, that it is freshman level, and that it carries 4 hours of credit.

Level of Courses Numbered 900-998

900-929. Lower division, undergraduate
930-949. Upper division, undergraduate
950-959. Graduate, Level 1
960-979. Graduate, Level 2
980-998. Other

Course Load Definitions

The definitions for full-time/part-time enrollment are:

1. A full-time undergraduate degree student is one who is enrolled for at least 12 credit hours. Undergraduate degree students are considered part time when they are enrolled for fewer than the hours described above. These criteria also apply for unclassified students without a degree.

2. A full-time graduate student is one who is enrolled for 5 semester hours of graduate level course work, or at least 8 semester hours in a combination of undergraduate/graduate course work acceptable for graduate credit, or any number of thesis hours. Graduate degree students need only enroll for half this amount to be considered full time during summer terms. The definition of "full-time" may be different for graduate students seeking financial aid.

3. Unclassified students with a degree-seeking student loan deferment must be enrolled for 12 semester hours to be considered full-time.

Schedule Changes

The University reserves the right to cancel, postpone, or combine scheduled classes and to change instructors.

Auditing Courses

All persons who wish to attend regularly scheduled classes and who are not registered students must obtain auditor's status. Auditors, whether in-state or out-of-state, pay in-state tuition for 3 semester hours at the lower division undergraduate rate per fall, spring, or summer term and receive class instruction and library privileges only. Auditors may attend as many courses as they wish. An auditor's card must be presented to the instructor when requesting permission to attend a class. Cards may be obtained from the Bursar's Office in Main Hall, Room 139 after classes begin. To qualify as an auditor, an individual must be 21 years of age or older. Persons are not eligible to audit courses if they are under suspension from the University. Auditors may attend as many courses as they wish (except those courses with laboratories or where equipment is used), provided they have permission from the instructor.

If a regular degree student wishes to participate in a class without receiving credit, the student must register for the course for No Credit. Tuition for courses taken for No Credit is the same as for courses taken for credit. Auditors should note that the Office of Admissions and Records does not keep any record of courses audited; therefore, credit for these courses cannot be established. See Grading System, Drop/Add, and Auditing.

Courses Taken for "No Credit"

Students wishing to enroll for no credit are required to pay regular tuition. In order to register for no credit, the student should complete a Credit Change Form indicating the course for which no credit is desired. Deadlines and rules for changing are the same as for Drop/Add.

Dropping and Adding Courses

1. Students will be allowed to drop and add through the 12th day of classes of the regular semester or the 6th day of classes of the summer term.

2. After this time the instructor's and dean's signatures are required for adds. For drops, if the instructor chooses to sign the Course Change Form, he is indicating that the student is in good standing and the drop will be processed. If the instructor judges the student to be failing the course, he will not sign the form and the student will not be dropped from the course. (Course Change Forms will not be accepted without required signatures.)

3. After the 10th week of the regular semester or the 5th week of the summer term, courses may not be dropped unless there are circumstances clearly beyond the student's control (accident, illness, etc.); In addition to the instructor's certification (as in 2 above), the dean of the college offering the course must approve the drop.

4. Students receiving financial aid or veterans benefits must also obtain the signature of the appropriate certifying official.

5. Courses may be added without instructors' signatures during the first 12 class days of the regular semester or the first six class days of the summer term. After this time courses may be added only with the approval of both the instructor of the course and the dean of the college offering the course.

6. Tuition assessment for courses added after initial registration, which would result in additional tuition charges, will be added to the student's bill.

Withdrawal

1. Withdrawal means that the student is dropping all courses for which he or she is registered.

2. Students will be allowed to withdraw during the first ten weeks of the semester or the first five weeks of the summer term. After this time, a student may not withdraw unless the circumstances are clearly beyond the student's control and would require the signature of the dean of the student's academic unit.

3. Students receiving financial aid or veterans benefits must obtain the signature of the appropriate certifying official.

4. Student must obtain approval from the Bursar/Cashier office.

5. A withdrawal becomes effective on the date the withdrawal form, completed by the student and signed by the student's dean, is received by the Admissions and Records Office. Eligibility for refund is determined by the date the form is received in the Admissions and Records Office, not the date the student stops attending class.

6. Unless the student follows these procedures, the withdrawal is not effective and grades of F will be recorded for all courses not completed.

Final Examination Policy

It is the policy of the University of Colorado at Colorado Springs to adhere to the final examination schedule as published in the Schedule of Courses each semester. While it may be appropriate not to give a final in some cases, such as laboratory courses, seminars, and colloquia, final examinations should be given in all other undergraduate courses.

Exceptions to this policy should be agreed upon by the faculty member and the chair of the department no later than the beginning of the semester in which an exception is requested. The resulting decision should be announced in writing to students in the class during the first week of classes.

In addition to the principles stated above, the following guidelines should be followed by all faculty members and administrators in order to assure fairness and the best possible educational experience for students:

1. The scheduled final examination period should be considered an important part of the course and used as a final examination period or for additional instruction.

2. The final examination in a course should be given as scheduled and not at other times even if the faculty member and all students in a course agree to such a change.

3. The week of classes preceding the scheduled final examination period should be used primarily for continued instruction and may include the introduction of new material. No hourly examinations are to be given during the week preceding final examinations.

4. Individual students may be granted a variance from these policies provided the instructor is satisfied that:

a. the exception is based on good and sufficient reasons (such as religious observances), and

b. such an exception for an early or late examination will not prejudice the interests of other students in the course.

5. When students have three or more examinations on the same day, they will be entitled to arrange an alternative examination time for the first exam or exams scheduled on that day. Such arrangements must be made no later than the end of the 10th week of the semester (i.e. At the end of the drop period). Students will be expected to provide evidence that they have three or more examinations in order to qualify for exceptions.

6. This policy applies to all undergraduate students, including seniors. Graduating seniors should not be exempted from final examinations. Such exemptions are inappropriate on both procedural and academic grounds.

The actual schedule for final exams appears in the Schedule of Courses for the appropriate semester or term.

Declaration of a Major

Policy of the Board of Regents requires that students declare a major by the time they have 60 hours towards their degree — by the start of their Junior Year.

Writing Competency Requirement for Graduation

No student will be awarded a bachelor's degree (B.A. or B.S.) unless he or she can demonstrate competency in writing. Students may demonstrate such competency in either of the following ways:

1. By passing English 131, fulfilling the other composition course requirements stipulated by their college, and then passing the writing competency portfolio assessment administered *after the completion* of their final 3 credit hours of composition coursework.

2. By completing their composition requirements at a major two-year or four-year institution (C or better), and upon transferring to CU-Colorado Springs, passing the writing portfolio assessment administered by the Writing Program. Students have one year from their initial enrollment to demonstrate competency by earning a pass on the portfolio. **Students who do not pass the competency within one year must alternately complete an advanced writing course at the 300-level. This course will be in addition to other 300-level composistion courses stipulated by their college as part of their degree requirements.** The "final" composition course for each undergraduate program is listed below:

- for LAS and Nursing students:ENGL 141
- for BUS students: ENGL 141 or ENGL 307 or COMM 324
- for EAS students: ENGL 307 or 309

For further information about the writing portfolio assessment, see the Schedule of Courses, or contact the Writing Program, (719) 262-4038 or (719) 262-4040. Transfer students who have completed all composition requirements before enrolling at CU-Colorado Springs **should contact the Writing Program concerning the portfolio assessment during their first semester** in order to progress toward graduation in a timely manner.

Policy Concerning Commencement

Students seeking to participate in commencement and other academic ceremonies will need to complete all academic requirements in advance. Participation in academic ceremonies

that recognize or honor students for the completion of an academic program or specific academic accomplishment is based on the understanding that all requirements have been completed. Every effort will be made to determine eligibility in advance and only students who have met requirements will be permitted to participate.

DIPLOMAS

Diplomas will carry the designation of the campus where the majority of the academic work was done at the upper division level.

General and departmental honors are shown on the diploma. The discipline is indicated in award of departmental honors.

The Bachelor of Science or Arts (B.S. or B.A.) will indicate the field of study, such as business, chemistry, electrical engineering, or physics.

In the Graduate School, the designation is Master of Arts, Master of Basic Science, or Master of Science. The Graduate School of Public Affairs designates its degree Master of Public Administration.

The Graduate School of Business Administration designates its degree Master of Business Administration.

Commencement exercises for graduates of the summer term, fall and spring semesters are held at the end of the spring semester. Graduates will receive diplomas approximately eight weeks after the end of the term in which the degree is conferred.

GRADING

Grade Reports

Official grade reports are normally mailed by the Records Office within ten working days after the end of the semester.

Grade Symbols

The instructor is responsible for whatever grade symbol (A, B, C, D, F, P, IF, IW, or IP) is to be assigned. Special symbols (NC and W) are indications of registration or grade status and are not assigned by the instructor but are automatically converted by the grade application system, explained under Pass/Fail Procedure.

Refer to the Schedule of Courses for the term in question to determine which faculties are authorized by their college to employ the (+), (–) grades.

Standard Grades		Quality Points for Each Hour of Credit
A	= superior/excellent	4.0
A (–)	=	3.7
B (+)	=	3.3
B	= good/better than average	3.0
B (–)	=	2.7
C (+)	=	2.3
C	= competent/average	2.0
C (–)	=	1.7
D (+)	=	1.3
D	=	1.0
D (–)	= minimum passing	0.7
F	= failing	0.0

Special Symbols

NC indicates registration on a no-credit or audit basis

W indicates withdrawal or drop without discredit

IF incomplete – regarded as F if not completed within one year.

Students should be aware that IF grades are automatically changed to F grades, without formal notification, when the one-year time allowance has passed.

IW incomplete – regarded as W if not completed within one year (the College of Business does not give IW grades; for incomplete work it uses the IF grade only).

IP in progress – thesis at the graduate level only.

P/F pass/fail – P grade is not included in the grade point average; the F grade is included; up to 16 hours of pass/fail course work may be credited toward a bachelor's degree; a letter grade of D or above is considered passing.

Explanation of IW and IF

An IF or IW is an incomplete grade. Policies with respect to IF/IW grades are available in the individual college and school dean's offices. Use of the IF or IW is at the option of the academic dean's office.

The student must ask for the incomplete grade. An incomplete grade is given only when students, for reasons beyond their control, have been unable to complete the course requirements. It is understood that a substantial amount of work must have been satisfactorily completed before approval for such a grade is given.

If an instructor decides to grant a request for IF or IW, the instructor sets the conditions whereby the course work will be completed. The instructor may set less time than one year for completion. The student is expected to complete the requirements within the established deadline.

The instructor, with approval of the department, determines if the course should be retaken. If a course is retaken, the student must register for the course and pay the appropriate tuition.

The final grade (earned by completing the course requirements or by retaking the course) does not result in deletion of the IF or IW grade symbol from the transcript. A second entry is posted on the transcript to show the final grade for the course.

At the end of one year, IF and IW grades for courses that are not completed or repeated will be regarded as F or W, respectively. Requests for an extension of time to complete the course beyond the one-year deadline can not be approved.

Pass/Fail Option

1. Students who wish to register for a course on a pass/fail basis do so during regular registration.

2. Changes to or from a pass/fail basis may be effected during the first 12 class-days of the fall or spring semesters or the first six class-days of the summer term. After this period it will not be possible for the student to change his registration unless it is approved by his dean as a specific exception.

3. Only 6 hours of course work may be P/F in any given semester.

4. Students should refer to the rules of their particular school, college, and/or department for additional information regarding the guidelines and limitations of pass/fail registration.

5. The record of pass/fail registration is maintained by the Office of Admissions and Records. Academic deans and faculty will not be aware of specific pass/ fail registrations. All students who are registered on a pass/fail basis appear on the regular class roster and a normal letter grade is assigned on the final grade ros-

ter by the professor. When grades are received in the Admissions and Records Office, those registrations which require a P/F designation are converted by the grade application system. Grades of D- and above convert to a grade of P. Grades of F remain.

Computing a Grade Point Average

The grade point average is computed by multiplying the credit points per hour, (A=4, A-=3.7, B+=3.3, B=3, B-=2.7, C+=2.3, C=2.0, C-=1.7, D+=1.3, D=1.0, D-=0.7, F=0) by the number of hours for each course, totaling the hours and the credit points, and dividing the latter by the former. For example:

ENGL 131	-3	B	= 9 credit points
PSY 210	-4	C+	= 9.2 credit points
HIST 101	-3	B	= 9 credit points
CHEM 103	-5	A	= 20 credit points
15 hours			= 47.2 credit points

The grade point average is therefore 47.2 divided by 15 = 3.147. The grade point received at another institution will not be used in computing the student's grade point average at the University of Colorado.

Grades of P, H, NC, Y, W, IP, IW, and IF are not included in the grade point average. IFs that are not completed within one year are calculated as F in the G.P.A. at the end of the one year grace period.

It is University of Colorado policy that the undergraduate G.P.A. is calculated separately from the graduate G.P.A..

If a course is repeated, all grades earned are used in determining the University G.P.A..

Students should refer to their academic dean's office for individual grade point average calculations as they relate to academic progress and graduation from their college or school.

Academic Records and Transcripts

How Academic Work Is Recorded

Courses are grouped by the term or semester in which they were taken. When a college or school is unique to a particular campus of the University (the College of Letters, Arts and Sciences on the CU-Colorado Springs campus) and the student has completed the degree requirements, the degree and field of study will be designated on the transcript as follows:

Example:
Degree — B.A.
Conferred (date) at Colorado Springs
Sociology

For students graduating from colleges and schools represented on two or more campuses, there may be no campus designation.

Example:
Degree — B.S.
Conferred (date)
Business

Students completing a double major will be listed as follows:

Example:
Degree — B.A
Conferred (date) at Colorado Springs
Psychology and Sociology

College of Letters, Arts and Sciences students graduating in Distributed Studies will show all the disciplines used to meet the unique degree requirements:

Example:
Degree B.A.
Conferred (date) at Colorado Springs
Distributed Studies–Fine Arts History, Communication, and English

General and departmental honors are recorded on the transcript.

Transcripts

(719) 262-3376

How to Order

Transcripts of records should be ordered from the Office of Admissions and Records. Requests should include the following:

1. Student's full name (include maiden or other name if applicable).

2. Student number.

3. Birthdate.

4. The last term student was in attendance.

5. Whether the current semester grades are to be included when a transcript is ordered near the end of a term.

6. Agency, college, or individuals to whom transcripts are to be sent with complete mailing addresses.

7. Student's signature. (This is the student's authorization to release the records to the designee.)

There is no additional charge for transcripts beyond the matriculation fee paid by all new students. Transcripts are prepared only at the student's request. A student having financial obligations to the University that are due and unpaid will not be granted a transcript. Copies of transcripts from other institutions cannot be furnished. Special fees are charged for special handling (rush, fax, etc.).

Individual Academic Records

All credentials (high school and/or college transcripts, test reports, etc) used for admission become the property of the University of Colorado. When a student has been out of school for five years, the file is destroyed.

The Permanent Record Card showing all academic work done at any of the University of Colorado campuses, including credit courses through the Division of Extended Studies, will be maintained in perpetuity.

Eligibility to Return Each Session

Eligibility to Return – Degree Students

Degree students should refer to the appropriate school or college section of this catalog for information regarding eligibility to return.

Eligibility to Return – Unclassified Students

Continuation as an unclassified student (Major Code NOLD, NOUD, NOHS or NODW) is contingent upon maintaining an overall grade point average of 2.0 upon completion of 12 or more semester hours. Failure to maintain the required average will result in an unclassified student being suspended. The suspension is for an indefinite period of time and becomes part of the student's permanent record at the University. While under suspension, enrollment at the University is restricted to summer terms or courses offered through the Division of Extended Studies.

Unclassified students are not placed on academic probation prior to being suspended.

Financial Aid/ Student Employment

Dwire Hall, Room 250

(719) 262-3460
1(800) 990-8227
fax (719) 262-3650

http://www.uccs.edu/~finaidse/

Office hours:
9 a.m. to 7 p.m. Monday
9 a.m. to 5 p.m. Tuesday through Friday

The financial aid program is designed to assist those students who would be unable to attend the University without aid. The University receives funding from the state of Colorado and the federal government to meet the needs of students who can document their financial eligibility.

For more information about any of the services listed below, contact the Office of Financial Aid/Student Employment.

Types of Financial Aid

There are two basic types of financial aid available to help students meet their educational costs: need-based aid and non need-based aid.

Need-based Aid

Need-based aid requires sufficient documentation of need. See the directions in the section below entitled How do I Apply for Financial Aid? Need-based aid consists of:

■ *Grants*

Grants are funds that do not have to be repaid. Examples are the federal government's Federal Pell Grant and the Federal Supplemental Educational Opportunity Grant. Grants funded by the General Assembly of the State of Colorado include the Colorado Student Grant, the Colorado Leveraging Educational Assistance Program (federal funds are matched by the state), the Supplemental Leveraging Educational Assistance Program (federal funds are matched by the state), the Governor's Opportunity Scholarship Program and the Colorado Graduate Grant.

■ *Loans*

Funds that have to be repaid at a future date. Examples are the Federal Perkins Loan and the Federal Stafford Loan.

■ *Work-study*

This offers part-time, subsidized employment (approximately 12 to 20 hours per week) with both on and off-campus employers. Both Federal Work-Study and Colorado Work-Study are available. Students must apply for financial aid and receive a work-study award to be eligible. Students must also be enrolled at least half-time and comply with the Financial Aid policy on Reasonable Academic Progress to maintain eligibility for work-study.

NOTE: State of Colorado funds are available only to students who qualify for resident tuition (not based upon Military status or Olympic status). Both resident and non-resident students may be eligible for Federal funds.

Non Need-based Aid

Information and applications are available on the web at www.uccs.edu/~finaidse/

■ *Loans* – not based on need. Interest accumulates immediately.

a. Federal Parent Loan (PLUS);

b. Unsubsidized Federal Stafford Loan

For application information check with the Financial Aid Office. While eligibility for these loans is not based on need, an applicant must first establish that he/she is not eligible for need-based aid. Therefore, the financial aid application procedure described in the section entitled "How Do I Apply for Financial Aid?" must be followed.

■ *Colorado No-Need Work-Study* – is not based on financial need and offers part-time, subsidized employment (approximately 10-14 hours per week), on or off campus. Applications are available for 2 weeks, beginning the week before fall classes start. Undergraduate degree students who are eligible for resident tuition (not military or Olympic status), take at least six credit hours and who comply with the financial aid policy on Reasonable Academic Progress may apply for Colorado No-Need Work-Study. Students are selected for this award by a computerized random selection program.

How Do I Apply for Financial Aid?

Follow these instructions to apply for financial aid, including Federal Stafford Loans (subsidized and unsubsidized), and Federal PLUS (Parent Loan to Undergraduate Students).

1. Obtain the Free Application for Federal Student Aid (FAFSA) from your high school counselor or the Financial Aid Office. This form is generally available after January 1 each year. The form can be filled out on the web at www.fafsa.ed.gov if you prefer.

2. Complete the entire form and mail it (or enter it on line) no later than March 1. The FAFSA analyzes your family's income, assets, family size, and other factors, and allows the Financial Aid Office to estimate your contribution and/or the amount your family could reasonably be expected to contribute to your education.

3. After the processor receives the form, they will send the results electronically to CU-Colorado Springs (assuming you listed the correct code of 004509 on the form). You will receive a Student Aid Report (SAR). If corrections are needed, call or come in to the Financial Aid Office and we will make them electronically. If no corrections are needed, keep the SAR. You are no longer required to submit the paper SAR to the Financial Aid Office.

4. If you wish to apply for a Federal Stafford Loan, Unsubsidized Federal Stafford Loan, Federal Parent Loan (PLUS), you will need to follow all of the steps listed above and,

In addition:

a. Obtain a loan questionnaire from the Financial Aid Office, complete it and send it in or fax it.

b. If this is your first federal loan at CU-Colorado Springs, complete pre-loan counseling on the web at www.uccs.edu/~finaidse/finview.htm then click on Online Pre-Loan and Exit Counseling. Confirmation will be sent to us electronically,

If you select a lender on our recommended lender list, and it is the first time you have borrowed a Federal Stafford loan at CU-Colorado Springs, certification will be done electronically and the Colorado Student Loan Program will send you a Master Promissory Note (MPN). This note is valid for 10 years if you remain with the same lender. The timely return of the MPN to the CSLP is imperative. Funds will then be applied to your student bill electronically.

If you select a lender that is not on our list of recommended lenders, you must obtain the Master Promissory Note (MPN) and school certification form directly from your lender and submit the school certification form to Financial Aid

Office to complete. A school certification form is required each time you borrow. Loan eligibility is certified, and funds are sent, by mail. This is a much longer process.

All correspondence will be sent to your permanent address (not your mailing address). Be sure to keep it updated in Records or Financial Aid Office.

Student Employment

The Financial Aid/Student Employment Office offers a self-referral employment service to currently enrolled students, and to students who have been accepted for the following term. Students need not document financial need to apply for these jobs. There is no charge for any of these services.

On-campus (hourly/non work-study) employment is available to full-or part-time degree status students and full-time unclassified students. Additionally, during the summer, degree-seeking students may work on campus without being enrolled if they were enrolled as half-time students during the previous spring semester and will return in the fall semester. Jobs are generally part-time and are listed throughout the year depending upon employer needs. However, the majority of openings are at the beginning of each term.

Off-campus employment, both part-time and full-time, is available throughout the year depending upon employer needs. Openings range from highly skilled technicians and computer assistants to clerical work, food service and general labor. Temporary and on-call positions in such areas as day care, house cleaning and furniture moving are also listed. Many residential nationwide camps list openings for the summer.

Current job openings, both on and off campus, work-study and non work-study, are listed on SEAN's PLACE, a computerized student employment assistance network for students. This service is strictly self-referral, and to apply for any job the student must contact the employer directly. Students may access SEAN's PLACE on the web at www.uccs.edu/~stuemp/sean.htm

Scholarships

All of the scholarships available to students are listed on the web at www.uccs.edu/~finaidse/scholarships/index.html and are also available in the Financial Aid Advisor (which is financial aid, student employment and scholarship information in print). The deadline for most of the institutional scholarships is March 1. Many of the scholarships require that students have completed the FAFSA (see above). The Universal Scholarship Application is available on the web and in print. Outside scholarship search databases (all free) are also listed on the scholarship web page.

Temporary Assistance

The University has available a short-term loan program for students in need of emergency financial assistance. These loans are temporary in nature and have a minimum repayment period of one semester. The amount of these loans cannot exceed $400. The fee to borrow is $4.00 per $100.00 borrowed. Applications are available in the office of financial aid/student employment.

Tuition Downpayment Loans are also available for up to the amount of the resident downpayment. The fee to borrow is $4.00 per $100.00 borrowed. The fees are added to the student's bill.

Student Loan Deferment

(Includes Summer Term)

All special or unclassified students seeking an enrollment deferment for student loans will be considered undergraduates for verification purposes. In order to receive a deferment as a half-time student, the student must be enrolled for six credit hours. In order to receive a deferment as a full-time student, the student must be enrolled for 12 or more credit hours.

The Office of Financial Aid recommends that students wanting a deferment as a graduate student obtain degree status in their school or college.

Public Safety

Department of Public Safety
Campus Services Building, Room 237

(719) 262-3111

Photo Identification

All students, faculty and staff are required to have a CU-Colorado Springs photo I.D. card. This card is required to check out material from the Kraemer Family Library, cash checks on campus, take advantage of special student prices for software or events, or gain admittance into sensitive areas of the campus. The charge for an I.D. card is nonrefundable. All new students will be automatically billed for an I.D. card whether or not a card is made. Photo I.D. cards must be made and claimed in the semester during which the charge is made. At the end of each semester, I.D. cards not yet claimed will be destroyed. I.D.s made after the first semester of attendance for any reason, will result in a recharge. I.D. photos are taken Monday through Friday, 8 a.m.-7 p.m. during the semester.

Validation stickers for photo I.D.s are available each term at the Department of Public Safety. The photo I.D. card is not valid until the current term sticker has been affixed. Check the current schedule of courses for the date validation stickers become available each semester.

Any questions pertaining to photo I.D. cards should be directed to the Department of Public Safety Transportation and Traffic Services at 262-3528.

911 Emergencies

An "emergency" refers to any situation where there is an immediate danger to life or health of an individual, or individuals, on campus. Emergencies may be related to fires, chemical releases, medical problems or a wide variety of other events. For life threatening emergencies on campus, call 9-911. All other calls for police services, including crime reporting, should be made by calling 262-3111.

Police Operations

(719) 262-3111

The Department of Public Safety maintains a full-service police operation to respond to reports of criminal acts and emergencies on campus. These officers are state certified and hold police commissions with the State of Colorado. The Department of Public Safety Office is also responsible for responding to all incidents that occur on campus involving police, parking, traffic, fire prevention and protection, environmental health and safety, emergency disaster coordination and insurance/risk management services.

In addition, Public Safety provides several community services upon request:

1. Motorist assists: dead battery jump starts, retrieval of keys from locked vehicles, etc.

2. Escorts to and/or from vehicles or buildings.

3. Lost and Found Service

4. Keeps pertinent medical information on faculty, staff and students. This enables the Department to be aware of a special problem or required treatment, in the event of an emergency.

Campus Closure

In the event that the campus is closed due to weather or other reasons, the information will be available by calling the campus closure line at (719) 262-3346.

Student Rights and Responsibilities

Academic Honor Code

Academic honesty and integrity are vital elements of a dynamic academic institution. The responsibility for ethical conduct rests with each individual member of the academic community — students, faculty, and staff.

CU-Colorado Springs has an ongoing commitment to maintain and encourage academic integrity. Therefore, the University has created a set of standards of academic honesty and procedures governing violations of these principles. Copies of the Academic Honor Code document may be obtained at the Kraemer Family Library, from the offices of the deans of the various schools/colleges, from the office of the Dean of Students, or from the Office of the Vice Chancellor for Academic Affairs.

Forms of Academic Dishonesty

1. Plagiarism – use of distinctive ideas or words belonging to another person, without adequately acknowledging that person's contribution.

2. Cheating – intentionally possessing, communicating, using, or attempting to use unauthorized (by the instructor) materials, information, notes, study aids, or other devices, in any academic exercise.

3. Fabrication and Falsification – intentional and unauthorized alteration or invention of any information or citation in an academic exercise.

4. Multiple Submission – submission of substantial portions of either written or oral academic work which has previously earned credit, when such submission is made without instructor authorization.

5. Misuse of Academic Materials – intentionally or knowingly destroying, stealing, or making inaccessible, library or other academic resource material.

6. Complicity in Academic Dishonesty – intentionally or knowingly contributing to the academic dishonesty of another.

These examples of academic dishonesty shall not be construed to be comprehensive, and infractions will be dealt with on an individual basis. It is the obligation of each student to assist in the enforcement of academic standards; infractions – whether by students or faculty – should be first brought to the attention of the instructor.

Detailed instructions about reporting a suspected infraction; appealing an alleged infraction; and sanctions for an infraction are outlined in the CU-Colorado Springs Academic Honor Code document. Questions about the academic honor code should be addressed to the Dean of Students, Room 19 Cragmor Hall, (719) 262-3260.

Affirmative Action

Cragmor Hall, Room 111
(719) 262-3359

CU-Colorado Springs follows a policy of equal opportunity in education and employment. In pursuance of this policy, no campus department, unit, discipline, or employee shall discriminate against an individual or group on the basis of race, color, religion, sex, age, national origin, individual handicap or veteran status. This policy applies to all areas of the University affecting present and prospective students or employees.

The institution's educational programs, activities, and services offered to students and/or employees are non-discriminatory and consistent with State affirmative action guidelines, as well as with Federal laws and orders.

For information about these provisions on equity, discrimination, or fairness, as well as internal and external complaint procedures, contact the Director of Student Enrichment Services.

Family Educational Rights and Privacy Act

Periodically, but no less than annually, the University of Colorado informs students of the Family Educational Rights and Privacy Act of 1974. This Act, with which the institution intends to comply fully, was designated to protect the privacy of education records, to establish the right of students to inspect and review their education records, and to provide guidelines for the correction of inaccurate or misleading data through informal and formal hearings. Students also have the right to file complaints with the Family Educational Rights and Privacy Act Office (FERPA) concerning alleged failures by the institution to comply with the Act.

Local policy explains in detail the procedures to be used by the institution for compliance with the provisions of the Act. Copies of the policy can be found in the library on each of the several campuses of the University of Colorado.

A directory of records which lists all education records maintained on students by this institution may be found in the office of the chancellor on each campus.

The following items of student information have been designated by the University of Colorado as public or directory information: name, address, telephone number, dates of attendance, registration status, class level, major field of study, awards, honors, degree(s) conferred with location, past and present participation in officially recognized activities and sports, physical factors (height, weight of athletes), date of birth. Such information may be disclosed by the institution for any purposes, at its discretion.

Currently enrolled students may withhold disclosure of directory information under the Family Educational Rights and Privacy Act of 1974. To withhold disclosure, written notification must be received in the Office of Admissions and Records on the appropriate campus prior to the 12th day of classes in any given term (6th day of classes for the summer term). Forms requesting the withholding of directory information are available in the Office of Admissions and Records.

Students also have the right to file complaints with the Family Educational Rights and Privacy Act Office (FERPA) concerning alleged failures by the institution to comply with the Act. Complaints can be filed with:

Family Policy Compliance Office
U.S. Department of Education

400 Maryland Avenue, SW
Washington, DC 20202-4605

The University of Colorado assumes that failure on the part of any student to specifically request the withholding of directory information indicates individual approval for disclosure.

Questions concerning the Family Educational Rights and Privacy Act may be referred to the Office of Admissions and Records on each of the campuses.

Policy on Cheating

If a student cheats and, as a consequence, receives a passing grade for a course or receives a higher grade than he or she would otherwise be capable of achieving, a disservice is done to the individual student, the department as a whole and the entire university.

When a student obtains a position in industry, on the basis of formal education received at CU-Colorado Springs, it is expected that his/her level of competency and areas of interest are reflected in the courses taken and grades obtained. If a student does not exhibit the degree of knowledge which formal qualifications indicate, the student will have a difficult time coping with industrial problems and the level and content of courses taken may be called into dispute. This can reflect badly on the department and serve to lower the value and worth of other students' qualifications and can damage the reputation of the department and the university as a whole. It is for these reasons that a departmental policy on cheating is essential. It should be noted that the policy will apply to other examples of cheating such as plagiarism, misrepresentation, or falsification, but is not limited to those examples stated explicitly in this policy statement. This policy is stated below:

1. Each class will be advised, at the beginning of each semester, of the departmental policy on cheating, as stated in the bulletin.

2. If a student is suspected during an examination or test situation of cheating, (as a first warning) the class will be reminded of the existence of a departmental policy on cheating and of its consequences. This should serve to advise the individual student that the test proctor is suspicious of his/her actions, without incriminating him/her personally when no strong evidence exists. If such suspicious actions continue, (as a second warning) the student will be questioned on his/her suspicious actions.

3. If a student is suspected, after submission of examination or test paper, of cheating, the student involved will be advised that there is cause for suspicion. Should another suspicious situation occur, this will be grounds for bringing the situation to the attention of the department chair.

4. If a student is caught cheating in a particular situation and there is no disputing the fact (i.e., caught in possession of unauthorized notes or with another student's examination paper from a previous occasion, etc.) this constitutes grounds to fail the course outright with no opportunity for any kind of make-up work to turn the failing grade into a passing grade.

5. On a second occurrence of the above (item 4), proceedings will be instigated to suspend the student from the University.

Any warnings given, action taken, etc. will be noted in the student's file with evidence, if applicable, or grounds for suspicion, also noted. The department chair will arbitrate any discussions between the student and the faculty member concerned.

Sexual Harassment

Cragmor Hall, Room 111
(719) 262-3359

Sexual Harassment Policy

CU-Colorado Springs is a collegial academic community whose mission requires an open learning and working environment which values and protects individual dignity. CU-Colorado Springs' educational process is based upon mutual trust, freedom of inquiry, freedom of expression, and the absence of intimidation and exploitation.

As a place of work and study, CU-Colorado Springs must be free of inappropriate and disrespectful conduct and communication of a sexual nature, of sexual harassment, and of all forms of sexual intimidation and exploitation. Unwelcome sexual advances, requests for sexual favors, and other verbal or physical conduct of a sexual nature constitute sexual harassment when: submission to such conduct is made either explicitly or implicitly a term or condition of an individual's employment, living conditions and/or academic evaluation; submission to or rejection of such conduct by an individual is used as the basis of employment or academic decisions affecting such individual; or such conduct has the purpose or effect of unreasonable interfering with an individual's work or academic performance or creating an intimidating, hostile, or offensive working or educational environment.

Any person who desires information, has questions about procedures, or feels that he/she may have been sexually harassed is encouraged to seek advice and counsel from a member of the Committee on Sexual Harassment. Names of the committee members as well as a full statement of the Sexual Harassment Policy are available on the campus website, www.uccs.edu, and from the campus Sexual Harassment Officer, the University Center, and in most offices on campus.

Standards of Conduct

Ron Wisner, Dean of Students

Cragmor Hall, Room 19
(719) 262-3260

Purpose

CU-Colorado Springs has established a code of conduct to maintain the general welfare of the University community. The University strives to make the campus a place of study, work, and residence where people are treated with civility, respect, and courtesy. Admission to the University carries with it the expectation that students will be responsible members of the campus community. This includes respecting the personal safety and individual rights of all in the University community, acting in accordance with accepted standards of social behavior, and abiding by the regulations of the University and the laws of the city, state, and nation. The Standards of Conduct clearly state the University's expectations for student behavior.

Students are expected to become familiar with these standards and fully understand their responsibility as University community members.

Jurisdiction

The Standards of Conduct apply to all students at CU-Colorado Springs, regardless of designation, program, or residence. These regulations apply primarily to misconduct on University

premises; however, off-campus violations that may impact the University's mission fall under the jurisdiction of the Office of Student Conduct and may lead to disciplinary action. Students may be held accountable to both civil and criminal authorities as well as to the University, by breaking a law that also violates the University standards. Disciplinary action by the University will not be subject to challenge or postponement on the grounds that criminal charges involving the same incident have been dismissed, reduced, or are pending in any state or federal judicial system. In addition, the University can pursue disciplinary action if a student violates a standard of conduct and then withdraws from the University.

Standards

Standards of conduct help to promote a safe and civilized campus environment. All students enrolled at CU-Colorado Springs are required to abide by these standards, or they will be subject to discipline. An attempt to commit an act prohibited by these standards, or attempts to aid, abet, or incite others to commit acts prohibited by these standards, are subject to discipline to the same extent as a completed act. Similar standards of conduct apply to other members of the University community - faculty, staff, and visitors.

Prohibited acts are enumerated in the document, "Students' Rights and Responsibilities: Standards of Conduct," which is available in the Office of Student Conduct. Allegations of any violations should be directed to the Office of Student Conduct for resolution.

Complaints

Any member of the University community may file a written complaint with the Office of Student Conduct alleging that a student has violated the Standards of Conduct. The complaint must include a statement of the facts describing the alleged violation. The Office will not accept anonymous complaints. The Office may also initiate charges. Upon receipt of a complaint, the Office decides whether there is substance to the complaint; whether the complaint falls within the jurisdiction of the Standards of Conduct; and whether disciplinary proceedings should occur. In order to make this determination, the Office may need to gather additional information about the incident.

Rights and Responsibilities

The Standards of Conduct document details the rights and responsibilities of students accused of misconduct as well as victims of alleged student misconduct.

Additional Information

Questions regarding behavioral issues should be directed to the Office of Student Conduct.

Student Appeals

The University has established systematic procedures for students who believe that inappropriate decisions have been made that affect them. Academic issues (for example, graduation requirements or course grades) should be addressed to the office of the dean of the appropriate school/college. Appeals of administrative actions (for example, financial aid awards or parking tickets) should be directed to the office which made that decision. Allegations of any discriminatory practices should be referred to the Office of Student Enrichment Services, Room 111, Cragmor Hall. Advice and assistance on appeal procedures are available from the Dean of Students, Cragmor Hall 19, 262-3260. There is a one-year statute of limitations on appeals concerning financial matters.

Student Services

Admissions and Records Office

Cragmor Hall, Room 200

Web site: www.uccs.edu
E-mail: admrec@mail.uccs.edu

Admissions (719) 262-3383
Certifications (719) 262-3387
Fax (719) 262-3116
Records and Registration Information (719) 262-3361
Transcripts (719) 262-3376
Tuition Classification (719) 262-3380

The Admissions Office provides services in admissions advising, foreign student admission, application processing, transfer credit evaluation, and residency tuition classification.

For admission requirements to the Graduate School, see the Graduate School section and individual college and school sections of this Bulletin.

The Records Office handles matters pertaining to the demographic and academic student record. It provides information on these processes: address changes, grades, grade changes, drops, adds, withdrawals, changes to pass/fail grading, credit changes, stops, releases, registrations, Privacy Act requests, requests for transcripts, course description requests, and concurrent registrations with other University campuses.

Alumni and Community Relations

Modular 993, Room 56
(719) 262-3046

The Office of Alumni and Community Relations works to provide programs and services which build a mutually beneficial and enduring relationship among alumni, students, the University and the community.

Army ROTC

Department of Military Science
(719) 262-3520

The Army Reserve Officers Training Corps program is available to CU-Colorado Springs students. Enrollment in the basic courses (100/200 level) is available to all full-time students. Enrollment in advanced courses (300/400 level) is open to juniors and seniors who have successfully completed all basic courses or Basic ROTC Summer Camp or to veterans at any level. All students should be academically aligned between their ROTC level and academic level (i.e., A freshman should enroll in freshman ROTC classes). All textbooks are furnished. Scholarships are available to qualified students. Completion of the ROTC program leads to a commission as an officer in the United States Army, Army National Guard or Army Reserve upon graduation. A Minor in Military Science is available to students who complete all commissioning requirements. Interested students are encouraged to consult with the Department of Military Science.

Bookstore

University Center, lower level
(719) 262-3247

The Bookstore caters to the special needs of the academic community. The educational pursuits and the professionalism of the student, faculty, and staff dictates a full service store offering required course materials, optional course materials, self-helps, software, hardware, as well as best sellers, general

reading books, cards, posters, T-shirts, CU-Colorado Springs insignia items, school supplies and much more. For convenience, personal checks with proper identification, Mastercard and Visa cards are accepted.

The Bookstore is open year-round, six days a week with special hours at the beginning of fall, spring, and summer terms. In special situations, the hours vary and are posted or you may call the Bookstore.

Textbooks

Required and optional course materials are available in the Bookstore. Each course taught is identified by its shelf tag listing course information and arranged according to department, course number, and section. Some used books are available for most classes. Used books sell for 25 percent off the book's list price when new.

Convenience Store

University Center, next to the Bookstore

The Convenience Store provides additional products to meet the needs of students, providing items such as snacks, grocery items, magazines, personal products and more. The Convenience Store is open seven days a week during the Fall and Spring semesters and six days a week during the Summer semester.

Dean of Students

Ron Wisner, Dean of Students

Cragmor Hall, Room 19
(719) 262-3260

The Office of the Dean of Students serves as a link between individual students, the student government, and the various academic and administrative offices of the University. The dean serves as an advocate for students' interests and needs to the rest of the University. Students who have a suggestion or concern should either call or stop by the office.

EXCEL Centers

Project EXCEL is a program designed to help students achieve academic success during their collegiate careers. The activities and support services of Project EXCEL are provided to students via five learning centers located across the campus. The Centers provide programs that are linked to and support the academic curriculum across the campus. Refer to the Schedule of Courses for hours of operation or contact each center directly.

Center for Advancement of Excellence in Writing
Director – Deborah Odell
Location – Columbine Hall 316
Telephone – (719) 262-4336

Center for Excellence in Oral Communication
Director – Adriana Karch
Location – Columbine Hall 312
Telephone – (719) 262-4770

The Science/Health Science Learning Center
Director – Barbara Gaddis
Location – Science 145
Telephone – (719) 262-3689

The Mathematics Learning Center
Director – Shannon Schumann
Location – Engineering 129
Telephone – \ 262-3687
Fax – (719) 262-3605

The Language Technology Center
Director – Judy Conroy
Location – Dwire Hall 311
Telephone – (719) 262-3690
Fax – (719) 262-3146

Family Development Center

(719) 262-3483

The Family Development Center provides quality, affordable preschool, kindergarten and child care for university families and the community at large. We offer educational programs for children ranging in age from 1 year (and walking) to 12 years.

At the Center we strive to help children build self-esteem and to feed each child's curiosity and enthusiasm. We create a positive environment that supports the intellectual, social, emotional and physical growth of children.

The Center maintains a staff of highly qualified and caring teachers. The activities in the classrooms are planned by professional lead teachers trained in early childhood/child development. Lead teachers are assisted by additional teachers and aides. The Center strives to meet the standards for low child/staff ratios adopted by the National Association for the Education of Young Children (NAEYC).

The Center is open from 7:00am to 6:00 pm, Monday through Friday. Rates are competitive discounts for students.

Enrollment is limited and is on a first come, first served basis, with priority given to CU-Colorado Springs students. Phone or visit the Center for further enrollment information.

Housing Village

Monarch House
(719) 262-4042

The Housing Village provides a variety of on campus living options for students including four person suites, three person suites, and single rooms with private baths. Each suite is same gender, and students may choose to live on a floor with people of the same gender. The Housing Village offers the appropriate mix of privacy and the opportunity to relax and meet friends. Students have the option of selecting their own roommates.

Many extras and amenities are offered to the residents of the Housing Village including a variety of meal plans, laundry facilities, computer lab, cable television, and lounges on each floor. The Housing Village also offers a variety of educational, social, and cultural programs in addition to many recreational opportunities.

Contracts are available for the full academic year (August–May) and also for summer school. For contracts, annual costs, meal plan options or additional information, please contact the Housing Village office, or visit online at www.uccs.edu/~housing.

Intercollegiate Athletics

University Center, Second Floor
(719) 262-3575

The Intercollegiate Athletic program at the CU-Colorado Springs seeks to carry out its primary mission of developing exemplary student athletes who participate in the total spectrum of University life. Exemplary student athletes play intercollegiate sports and also focus on education, good character, no substance abuse, leadership, and goals.

To that end, CU-Colorado Springs sponsors 12 varsity sports that compete at the NCAA Division II level in the Rocky Mountain Athletic Conference (RMAC). Varsity sports include: men's and women's basketball, men's and women's cross-country, men's and women's outdoor/indoor track, men's and women's tennis, women's volleyball, women's fastpitch softball, men's soccer, and men's golf.

The RMAC is divided into two divisions (East and West) in the sports of women's volleyball and men's and women's basketball. CU-Colorado Springs competes in the West Division of the RMAC along with New Mexico Highlands University, Mesa State College, Western State College, Fort Lewis College, Adams State College, and the University of Southern Colorado. The East Division of the RMAC includes the University of Nebraska-Kearney, Chadron State College, Ft. Hays State University, Metropolitan State College of Denver, Regis University, Colorado School of Mines and Colorado Christian University.

The CU-Colorado Springs Mountain Lion volleyball and basketball teams compete in the "Lion's Den", a 400-seat gymnasium located on the second floor of the University Center in the heart of the campus. The softball and soccer teams play at the 4-Diamond Complex on Nevada Avenue, just north of Austin Bluffs Parkway.

The CU-Colorado Springs tennis teams play at The Broadmoor and at the Memorial Park Tennis Center while the men's golf team plays at local area golf clubs.

CU-Colorado Springs offers limited athletic scholarships which are awarded on an individual basis by the head coaches of each of the varsity sports.

Kraemer Family Library

(719) 262-3296

The Kraemer Family Library supports the teaching and research activities of the students and faculty by providing a diverse collection of over one million items and offering a wide array of interpretive services. These services include a comprehensive library instruction program, electronic data bases, interlibrary loan and reference services. Access to a wide variety of electronic resources and the library's online catalog is available through the library web page at http://web.uccs.edu/library/.

The library occupies its new home in the El Pomar Center. Library services are available over 95 hours per week during the regular semesters. Individual study carrels, computer labs, multimedia development labs, group study rooms, and copy machines are available. Special equipment and software are available to assist the hearing and visually impaired gain access to library materials.

Library users have access to the library's collection of 390,000 book volumes, 618,000 microform volumes, 10,800 maps, and 5,060 media items. These items include 2,171 paper and 6,150 electronic journal titles as well as U.S. and Colorado government documents. In addition, students and faculty have access to the collections of many of the state's other academic libraries through personal visits, shared electronic catalogs or interlibrary loan. The library's interlibrary loan agreements also provide students and faculty with access to the collections of most of the libraries in the U.S. and other countries.

Printshop

(719) 262-3213

The CU-Colorado Springs print shop offers full service printing and copying, including color copies and fax services to students, faculty and staff. There are two convenient locations on campus, in the University Center, room 109 and Campus Services Building, room 230. Hours are: 8 a.m. to 8 p.m. in the University Center and 8 a.m. to 5 p.m. in the Campus Services Building.

Student Activities Center

University Center, first level

(719) 262-3450

The Student Activities Center (SAC), located across from the Information Desk, is your doorway to campus life! Through involvement in one or more of the areas within the SAC, you are guaranteed to grow personally, make lifelong friendships, develop valuable skills you will use the rest of your life, have input into programs and services offered to students at CU-Colorado Springs, contribute to the present and future of the university, and have great fun in the process. The following areas are included in the Student Activities Center.

Campus Activities Board (CAB)

(719) 262-3447

The CAB is dedicated to providing entertaining and educational programs for the CU-Colorado Springs community. Involvement in the selection and production of programs is open to any CU-Colorado Springs student. It's also a great way to meet people, learn new or improve upon skills, and explore career options. Programs include musical events, dances, comedy nights, films, cultural events, speakers and more. Most programs are free to students and all programs are open to CU-Colorado Springs students, faculty, staff, their families, and the community. For information about programs or how to get involved call 262-3128 or 262-3532 or come by the office in the Student Activities Center.

Student Government and Student Organizations

(719) 262-3470

All students at CU-Colorado Springs are automatically members of the CU-Colorado Springs Student Government, the official voice of the student body. Student Government provides a wide variety of activities and services. For more information call or visit the office in the SAC.

In addition, there are more than 60 student clubs and organizations at CU-Colorado Springs. They include academic, social, religious, sports, political, honorary, and special interest. Enjoy the satisfaction of being part of a group and getting things done, meeting people with similar interests, and developing your leadership skills. For information about how to join an organization or to form a new organization, call or come by the Student Activities Center.

Recreational Sports

(719) 262-3448

The Recreational Sports Office provides indoor and outdoor facilities, equipment, programs and services that support the leisure and wellness needs of CU-Colorado Springs students, faculty and staff. This is accomplished in a variety of ways including,

Open Recreation—free student access to the gym and fitness center during posted hours.

Intramurals—provides broad recreational and competitive opportunities through team and individual leagues and special event activities. A few of the intramural leagues include softball, volleyball, basketball, soccer, floor hockey, tennis, table tennis, bowling, and miniature golf.

Club Sports—various clubs, which have received university approval, sponsor instructional, recreational and competitive programs for their members. Club teams include, but are not limited to, cycling, karate, fencing, rodeo, baseball, women's soccer, martial arts, mountain biking, and ice hockey.

Outdoor Equipment Rental—an ever-increasing inventory of outdoor equipment is available for a nominal fee and on a first come-first served basis.

Outdoor Facilities—softball diamonds, a soccer field, tennis courts, sand volleyball court may be scheduled through the Recreational Sports Office. In addition, a hiking trail starts near the Science Building and runs along the top of the bluffs on the north side of campus.

For more information about any or all of these programs and services, call or come by the SAC or the Recreational Sports Office on the second level, University Center.

Student Enrichment Services

International Student Services

Cragmor Modular 991
(719) 262-3238 or -3819

International Student Services serves as an advocate for foreign students attending or planning to attend CU-Colorado Springs by identifying services and programs that are in place that can assist them in meeting their needs. This unit also promotes, supports, and develops any activity that brings about a cross-cultural understanding and sensitivity on this campus. The unit is responsible for providing current and future international students with information and services available to them on the campus and surrounding community. International Student Services staff provide assistance to students in the full use of these services and activities.

Pre-Collegiate Development Program

Cragmor Modular 991
(719) 262-3239

CU-Colorado Springs has entered into a partnership with public schools in the Pikes Peak region including six Pueblo schools to help prepare under-represented and first generation college students to be competitive for college entrance upon graduation from high school.

The program consists of an academic year component which includes workshops on self-concept, career planning, time management, and cultural activities. The program also includes an on-campus summer component which is designed to build the students' academic skills. Students remain in the program until they graduate from high school. The program is for students in grades 9 through 12, with a limited middle school program that serves students in grades 6 through 9.

Student Health Center

Vail House, Suite 2117
(719) 262-4444

E-mail: hlthcntr@mail.uccs.edu

The Student Health Center provides convenient and affordable access to quality medical care for eligible students. The Center is located in the Housing Village. Medical insurance is not required to be seen for an appointment.

The Center provides health care services 40 hours per week during fall/spring semesters including Monday evening hours, and abbreviated hours for all breaks and summer semester. Services include, but are not limited to diagnosis and treatment of minor injuries and illnesses, administration of MMR, allergy, and other shots, routine gynecological exams, health education, and referral to community health recourses as needed. Limited lab and prescriptions services are also available on-site.

Immunization Requirement

The Colorado Department of Health and Environment requires any student who is enrolled for one or more classes at a college or university and who is physically present at the institution, including auditing classes but excluding correspondence/distance learning classes, born January 1, 1957 or later, to be immunized against Rubeola measles, Rubella measles and mumps (MMR), or provide documented proof of immunity. Individuals born before January 1, 1957 are presumed immune and are exempt from the immunization requirement.

In order to comply with this State law, you must do one of four things:

1. Provide a copy of documentation from a health care professional that you have met the requirements of two MMR immunizations. Records must include month, day and year of each shot, an official signature or stamp or official letterhead. Note: obtain CERTIFIED records from your former college, high school, doctor's office, military records or family (certified) records.

2. Provide a copy of proof of immunity by blood lab tests for the Rubeola measles, mumps and Rubella measles.

3. Request an exemption from the law on personal, religious or medical grounds.

4. Get two MMR immunizations (30 days apart) immediately.

Please bring a copy of your immunization records to the Health Center. The Health Center will assist you in complying with this State law. MMR immunizations are available at a reduced cost at the Health Center; call for an appointment. You may also receive the immunizations from your personal health care provider or your county health department.

Student Success Center

Cragmor Hall, Room 19

(719) 262-3260 • 1-800-990-UCCS(8227) • Fax: (719) 262-3645

The Student Success Center is a "one stop" location on campus for meeting students' needs. Services include academic advising for all undergraduate students, new student orientation, career services, testing, health insurance, disability services, off-campus housing, CU Opportunity, and student life information.

Career Services

(719) 262-3260 or -3657

The Career Services Office is a resource center open to students and alumni from all colleges on campus. Assistance and information is available for career exploration and job searches. Undecided students have a unique opportunity to work with academic advisors and career exploration tools to investigate various majors and career options.

Students preparing to graduate have access to employers through Career Services link on the campus web-site, on-campus recruiting, and an annual Career Fair. One-to-one assistance is available for help with resumes, interviewing skills, and Internet job searching. Through the web-site, students can review new job postings and send their resumes directly to employers.

CU Opportunity Program (CUOP)

(719) 262-3260 or -3647

CUOP is a special program that seeks to provide equal educational opportunity for students who have not traditionally been a part of the University environment. The program strives to recruit, admit, retain, and graduate a representative number of minority students – or any otherwise economically or academically disadvantaged person.

The primary focus of the CUOP is to increase the minority student population, but it is also CUOP policy not to exclude anyone showing a need for the services offered by the program. The program has a cooperative relationship with the office of admissions, financial aid and academic departments. This relationship allows the staff to be available to assist CUOP students who experience difficulties in any of these areas. Interested students should contact the Student Success Center, preferably before admission to the University.

Disability Services

(719) 262-3354

In accordance with CU-Colorado Springs' intent to make every effort to ensure the accessibility of its campus, academic and support programs, the Disability Services staff assists the student with disabilities in utilizing the variety of university and community resources available to help the student become integrated into the campus environment. If you are a student with a disability, you are encouraged to call Disability Services for an appointment to discuss your needs and the services available. Since some services may require advance budgeting and special arrangements with other agencies, please let us know what your special needs are as soon as you are considering coming to CU-Colorado Springs.

Orientation for New Students

(719) 262-3260

Orientation programs are held preceding each term to acquaint new students with the academic programs, out-of-class activities, and services. Academic advising, registration for classes, and introduction to campus life constitute the main orientation activities. New students will be informed of planned events by mail and are required to attend an orientation session before being permitted to enroll.

Student Health Insurance

(719) 262-3260

CU-Colorado Springs offers a group health insurance program to the student body each year. Brochures and enrollment cards are available in the Student Success Center.

Testing Services

Cragmor Hall, Room 116
(719) 262-3260

Contact the Testing Office for scheduling and information.

ACT – American College Test. Residual test for prospective CU-Colorado Springs students. It is administered three times a year.

RST – Reasoning Skills Test is administered once per month.

MAT – Miller Analogy Test is administered by appointment.

MPT – Math Placement Test. The Algebra Diagnostic Test and the Calculus Readiness Test are administered at least once per month.

University Connection

(719) 262-3260 or -3181

CU-Colorado Springs has entered into agreements to assist students in two-year academic programs who complete their A.A. or A.S. degrees and plan to transfer to CU-Colorado Springs. The program provides transfer advising and close coordination with the academic colleges at CU-Colorado Springs. University Connection scholarships are also available.

University Connection offers these transfer services to the following community colleges: Pikes Peak Community College, Arapahoe Community College, Red Rocks Community College, Otero Junior College, Lamar Community College, Pueblo Community College, and Trinidad State Junior College. Students attending other two year institutions not listed can contact the program staff to make special arrangements for assistance with transfer to CU-Colorado Springs.

University Center

(719) 262-3450

The University Center is the community center for the university, serving students, staff, faculty, administration, and guests. The University Center complements the academic programs by providing support to the out-of-classroom experience through an extensive array of cultural, recreational, social and educational programs. The University Center is a student-centered organization that values participatory decision making and volunteerism. The University Center provides programs through the services and facilities that are within the Center; the Campus Activities Board, Student Government and Student Organizations, Recreational Sports, the Scribe, Information Desk, Meeting Rooms, Lounges, Game Room, Food Service Snack Bar, Bookstore, Convenience Store and Copy Center.

University Counseling Center

Forster House
(719) 262-3265

The Center helps CU-Colorado Springs students maximize their learning experiences. When students have difficulties with personal issues, career indecision, or relationship problems, academic achievement may suffer. The University Counseling Center (UCC) exists to help students with these issues using short-term therapy approaches.

UCC provides 1) individual, couples, family and group counseling to help students address personal problems experienced while enrolled at the University; 2) career counseling and testing to assist with career exploration; 3) workshops that address mental health needs and academic skill needs of CU-Colorado Springs students; 4) consultation services for faculty, staff and students; and 5) mental health information and referral services.

If a student presents a complex problem that should be treated by a specialist from the community, UCC staff will provide referrals to qualified specialists. Specialist referrals must be paid by the student. The university recommends that students carry sufficient health insurance to cover both routine and unforeseen medical and mental health situations. The university sponsored student health insurance policy covers approved inpatient mental health treatment, but it does not cover outpatient mental health treatment.

Veteran Affairs Office

Cragmor Hall, Room 110
(719) 262-3253

The Office of Veteran Affairs (OVA) assists veterans and others eligible for Department of Veterans Affairs education benefits. The office is supervised by the University and bound to complete documentation and maintain records according the guidelines Department of Veterans Affairs (DVA) and the Colorado

State Approving Agency for Veterans Education and Training.

Veterans Education Benefits

Chapters 30, 31, 32, 35, 106, 901 and 903: The veteran must establish eligibility for educational benefits from the DVA by filing the appropriate paperwork at this office. Applicants wishing to receive advance payment must complete the appropriate form no later than 45 days prior to the first day of classes. The student must be registered in classes before this office can release the check. A request for an advance does not guarantee the check will arrive before tuition deposits are due. Finances should be planned accordingly.

Procedures

After registration each semester, the veteran must submit a course load work sheet to the OVA for review and for the certification of the student's course load to the DVA. Any changes in course load (i.e., Adds, drops, withdrawals) must be reported to the Department of Veterans Affairs through the office at CU-Colorado Springs.

Dependents, Education Assistance Act, Chapter 35

Students between the ages of 18 and 26 who are eligible for educational benefits because of the death of a parent during active military duty or because of service-connected disability rated by the DVA as 100% permanent and total should file appropriate forms with the OVA according to the preceding paragraphs. The registration procedure is also the same as described above.

Chapters 30, 32, and 35 are eligible for tutorial assistance. The tutoring must be essential to correct a deficiency as certified by the instructor.

Technology Services

Information Technology

CU-Colorado Springs makes the power of technology accessible. The Information Technology department provides a 150-station computer commons area and 10 computer equipped labs with an average of 25 computing stations per lab. Of those ten labs, 7 are dedicated classrooms; 1 is an open lab and the two remaining are open labs except when occasional classes are scheduled there. (Open labs are computing labs that are available to students on a walk-in basis 7 days a week, per the prevailing lab schedule.)

Each of the computing labs and computing classrooms provide a Personal Computer or Macintosh per student station, a high speed network connection, printers in each room and access to a wide range of software. Our extensive list of software includes Windows 95, Office Pro 97, Pagemaker, Photoshop, First Class, Internet applications such as UW Term, Netscape and FTP and specialized software (i.e. Accounting, Statistical and Group Systems.)

In addition to the seven computerized classrooms, Columbine Hall provides a 50 station open lab. This lab includes 40 Pentiums and 10 Macs, 2 black and white lasers, 1 color laser and 2 color scanners. Columbine Hall also provides easy access to technology in 22 general classrooms. This technology is in the form of a PC for the instructor and a built-in remote control data / video projecting unit. The PC is connected by a state of the art switched network providing the instructor with dedicated 10 Mb per second transfer capacity. The data / video projecting unit remotely accesses cross platform compatible audio and/or video media. This equipment allows easy integration of Internet or video examples or a Powerpoint presentation to create a more robust lecture.

CU-NET

(719) 262-3282

CU-Colorado Springs offers live, interactive, credit-bearing classes over the CU-NET instructional television system. CU-NET broadcast classes are regular courses with the addition of broadcast and cablecast elements. Off campus students will have access to the instructor through a standard telephone link, and will be able to ask any questions as they arise. Off-campus students will be expected to follow the same syllabus and meet the same course requirements as in-class students.

Course offerings vary semester-to-semester. Each college is given the opportunity to schedule telecourses. CU-NET classes are available to adult learners over Adelphia Communications (channel 11 and ATI/WANTV Channel 112). Anyone subscribing to these cable companies will receive the classes as part of their basic service. However, to receive credit for classes students must enroll through Extended Studies.

CU-Fibernet

The CU-Fibernet system provides video, voice and data transmission among the four campuses and supports, in addition to academic courses, administrative teleconferencing and professional development training.

Teleconferencing

CU-NET provides professional teleconferencing services to the campus community and public and private enterprises in the Pikes Peak Region. Downlinking services are available on campus and uplinking services can be arranged. For more information call 262-3597.

College of Business

College of Business and Administration
Graduate School of Business Administration

Joseph C. Rallo, Dean

Room 179 - Dwire Hall
Telephone: (719) 262-3113
Fax: (719) 262-3100

Website: http://web.uccs.edu/business

The College of Business was established with the University of Colorado at Colorado Springs in 1965. The College serves the needs of the Pikes Peak Region and Southern Colorado for competent and responsible managers, for continued education of those already in such positions, and for research. It also serves the needs for business education throughout the world with its Distance M.B.A. program. The College is committed to providing its students with the knowledge, skills, and ethical framework to be effective leaders and managers in the contemporary business environment. Both the undergraduate and the graduate degree curricula have an applied perspective and offer students the opportunity for in-depth study in one of the primary business disciplines. The College works closely with the local business community in the professional development of its students. The Minority Advisory Council (MAC) assists the College in the recruitment and retention of ethnic minority students and in promoting a community that values individual differences and perspectives.

College faculty contribute to the advancement of knowledge in their fields through research and publication, and by serving in positions of leadership in business, civic, and professional organizations locally, nationally, and worldwide.

The College regularly interacts with business leaders to incorporate their recommendations into its programs.

Both the undergraduate and the graduate business degree programs are fully accredited by AACSB: The International Association for Management Education.

Vision

To be the College of Business of choice for those who are committed to excellence in education, scholarship, and lifelong learning in the markets we serve.

Mission

The mission of the College of Business is to build futures. To achieve this mission, we will:

- Provide an innovative, learner-focused education of superior quality and value that integrates theory and practice;
- Cultivate strong partnerships;
- Create and disseminate knowledge through excellent teaching and nationally recognized publications; and
- Motivate students, faculty, and staff to achieve their potential, be principled professionals and positively impact the organizations and communities in which they work.

Core Values

Student Success

Student success is paramount to our thinking, teaching, programs, and processes and is the key to our success.

Excellence, Integrity, and Professionalism

We commit to creating quality and value as the hallmark of the College, living our ideals, treating others with respect, and working collaboratively for the best interests of the College and the University.

Building Lasting Relationships

We will establish and maintain mutually beneficial relationships with all of those individuals and organizations who have an interest in our success.

Research Centers

Center for Research on Creativity and Innovation

The research of the Center concentrates on business-related issues-specifically on how individuals, teams, and companies can become more creative in both services and products. The Center also conducts workshops for business and governmental organizations. The four areas for research are Person, Process, Product and Press (environment). The Center is housed in the College of Business.

CITTI

CITTI (Colorado Institute for Technology Transfer and Implementation) was established in 1990 through a grant from El Pomar Foundation as an alliance among local, small, high-tech companies; entrepreneurs; community leaders; the University of Colorado; and El Pomar Foundation. CITTI's mission is to provide access to capital, information and special services, with the purpose of broadening the high-tech industry based in Colorado Springs. CITTI's objective is to improve the Colorado Springs climate for entrepreneurship and small business. Priority is given to services where it can address important challenges at limited cost to the client.

Small Business Development Center

The mission of the El Paso and Teller County Subcenter of the Small Business Development Center (SBDC) is to enhance economic development through assisting small businesses in reaching their growth and profit potential. Sponsored jointly by the U.S. Small Business Administration, the State of Colorado, CU-Colorado Springs, and Pikes Peak Community College, the SBDC offers seminars, workshops, and one-on-one counseling for startup and ongoing small businesses in the region.

Southern Colorado Economic Forum

The Forum provides businesses in El Paso county with information to assess local economic conditions in order to help them make more informed and better decisions. The objective in preparing the Economic Forum is to provide timely and useful information focused specifically on the Pikes Peak Region. This information serves as a community

progress report, identifying areas where the local community excels as well as areas where it faces challenges.

Faculty

Dean and Professor: Joseph Rallo; Associate Dean and Professor: Jeffery Ferguson; Associate Dean for Graduate Programs and Associate Professor: Venkateshwar Reddy; El Pomar Professor: Robert Keeley; Couger Professor: Gary Klein; Professors: Alan Davis, Richard Discenza, Donald Gardner, Robert Knapp, Paul Miller, James Rothe, Donald Warrick; Associate Professors: Charles Beck, Lexis Higgins, Benjamin Martz, John Milliman, Eric Olson, Kirkland Wilcox, Thomas Zwirlein; Assistant Professors: Andrew Czaplewski, Rebecca Duray, Thomas Gruen, Ann Hickey, Morgan Shepherd, James Suleiman, Robert Weigand, Ethlyn Williams; Instructors: David McLain, Douglas McPherson, Kenneth Meisinger, Sally von Breton, and Sam White.

Academic Policies

All students are responsible for knowing and following the provisions set forth in this Bulletin and in the Schedule of Courses. Any questions concerning these provisions are to be directed to the College of Business M.B.A. advising office (graduate inquiries) or the Student Success Center (undergraduate inquiries). It is the responsibility of the student to know and observe program requirements and deadlines.

In an effort to incorporate new business techniques and paradigms into our business programs, as well as to meet the needs of our students on a timely basis, we periodically make changes to our curriculum. These changes may not be reflected in this catalog. We therefore encourage you to visit our web site at http://web.uccs.edu/business.

The academic degree requirements for a student at either the undergraduate or the graduate level are defined in the Bulletin which was in effect when the student first enrolled as an admitted business student in the particular degree program. Students who find that program requirements have changed since they began attending as admitted degree students should work closely with their advisors in planning their schedules as they proceed toward graduation. Students transferring from both two- and four-year public higher education institutions of Colorado should consult the articulation agreements and transfer guides which are in effect between the College of Business and these institutions.

The academic policies and regulations stated herein are in effect at the time this bulletin is printed but may be subject to change. Any questions should be directed to the Student Success Center or the M.B.A. advising office.

Administrative Drop

Both instructors and the dean may initiate the process to drop students who do not have the proper prerequisites and/or class standing from their classes. Students who fail to meet expected class attendance may also be administratively dropped.

Attendance Policy

It is the expectation of the College of Business that students will attend all classes. However, classroom attendance policy is left to the discretion of the instructor. Students are responsible for knowing the attendance policies of their instructors.

Degree Credit

To be considered for the degree, all academic credit must be listed by the Office of Admissions and Records on the student's official University of Colorado transcript or on the University Transfer Credit Evaluation report. Credit listed on these documents is then evaluated by the appropriate College of Business advising office for degree applicability.

Transfer Credit

The College of Business reserves the right to disallow any credit that is not appropriate degree credit as determined by the College. Only work from regionally accredited institutions will be considered for transfer to the undergraduate degree program, and from AACSB accredited graduate programs to the M.B.A. degree. See the following Undergraduate Degree Program and M.B.A. Program sections for more detail.

Independent Study

Junior, senior, and graduate business students desiring to work beyond regular business course coverage may take variable credit courses (1-3 semester hours) under the direction of a full-time instructor who approves the project. The student must also have the prior approval of the dean. Information and request forms are available in the advising offices.

To receive degree credit for independent study and experimental studies courses in non-business areas, students must obtain the approval of the College of Business dean prior to registering for the course.

No credit is given for work experience or cooperative education programs. The tutoring of lower division courses is considered a form of work experience, and is not applicable for degree credit.

A maximum of 6 hours of preapproved independent study credit may be applied to the undergraduate degree and the M.B.A. degree.

Pass/Fail Course Registration

With the exception of BUAD 301, 302, 303, 496, 696, ACCT 496, and certain experimental courses, students in the College of Business may not use courses taken on a pass/fail basis to satisfy required business or non-business courses, or business elective courses. Only 9 hours of non-business electives may be taken on a pass/fail basis and applied toward the undergraduate degree. Pass/fail determination must be made within the first two weeks of the semester and is irreversible.

Grading Policies

Failed Courses

Although failed courses may be repeated, the F will remain on the student's transcript and will be included in his/her grade point average.

Grade Changes

Final grades as reported by instructors are to be considered permanent and final. Grade changes will be considered only in cases of documented clerical errors, and must be approved by the associate dean or the dean.

Incomplete Grades

The only incomplete grade authorized by the College of Business is IF; IW is not used. IFs are appropriate for students who have completed a substantial portion of the semester but who then become ill or encounter other documentable extenuating circumstances

beyond their control that prevent them from completing their coursework.

Students who receive an IF must meet with their instructors to be advised of the terms and deadline for remedy. To resolve an IF the student must complete the specified work by the specified deadline. In all cases where an IF is not remedied, the IF grade automatically converts to an F on the student's permanent record one calendar year after award of the IF. Students should make up the missing work and neither register for nor attend the course a second time. The student is responsible for having incomplete grades removed four weeks prior to his/her scheduled graduation date.

International Student Exchange Program

A limited number of attractive opportunities are available for business students to study abroad on an exchange basis with students from participating international institutions. Course work taken abroad which has been pre-approved by the College of Business advisor will apply for either the undergraduate business degree or the M.B.A. degree. College of Business residency and junior status are required for application. Selection criteria for participation include prior academic performance. Information and deadlines for application are available in the appropriate College of Business advising offices.

Internships

The College of Business offers a limited number of internships for business degree students both for credit and not for credit. In order to register for an undergraduate internship for academic credit, students must be in good academic standing in their junior year. Internships are 1-3 credit hours, pass/fail only, and at the undergraduate level are used as business elective credit.

Information on business internships is available in the College of Business Career Services Office.

Career Services

The Career Services Office for undergraduate and graduate business students in located in Dwire 239. Services available include one-on-one career counseling, assistance with writing, and internship placement. By linking through the College of Business web site at www.uccs.edu, business students are able to access the Career Services on-line site which contains on-line templates, internship and job postings, and career fair information. It also allows prospective employers to view student information, enabling them to contact students for interviews. The e-mail address of Career Services is career@mail.uccs.edu; the telephone number is (719) 262-3433.

Student Organizations

The following opportunities for professional development and for recognition of scholastic achievement of students are supported by the College of Business:

Beta Gamma Sigma: national honorary scholastic fraternity in business

Delta Sigma Pi: international fraternity for students of business

SHRM: student chapter of the Society for Human Resource Management

MAC: Minority Advisory Council.

Programs of Study

Bachelor of Science — Business

The student alone is responsible for the fulfillment of degree requirements. Any questions that a student might have should be directed to the Student Success Center. The College reserves the right to disallow any credit that is not appropriate academic degree credit as determined by the College. Students approaching graduation must complete a graduation audit prior to registering for their final semester.

General Requirements

Total Credits. A minimum of 120 semester hours of appropriate academic credit as follows:

Required non-business hours	49
Required business core hours	37
Area of emphasis (minimum)	15
Business electives	7
Non-business electives	12

A minimum of 45 hours must be upper level (300-400) course work.

A maximum of 64 semester hours of appropriate academic credit taken at a junior or community college may be applied toward the baccalaureate degree in business. Course work at the graduate level is not applicable to the baccalaureate degree.

The student is responsible for having incomplete grades removed at least four weeks prior to his/her scheduled graduation date.

Residency. Completion at CU-Colorado Springs of at least 30 semester hours of business course work which includes the 15 hours in the area of emphasis after the student has been admitted to the College of Business undergraduate degree program is required.

Grade Average. A minimum scholastic cumulative grade point average of 2.0 is required for all courses attempted at CU-Colorado Springs, as is a 2.0 for all business courses. In addition, a grade point average of C (2.0) is required for the five area of emphasis courses, with no grade below C- (1.7) in the student's area of emphasis.

Undergraduate Admission

Freshmen

Students who rank in the upper 30th percentile of their high school graduating class and who satisfy the suggested high school units and the entrance test score requirements are assured admission. Test scores for assured admission are a combined SAT score of 1080 or above; or an ACT composite score of 24 or above with a minimum ACT English score of 24, and a minimum ACT mathematics score of 22. Students not meeting the above standards will be considered on the basis of a combination of several factors including class rank and performance in college prep classes.

Suggested High School Course Units

English (one year of speech/debate and two years of composition are strongly recommended)	4
Mathematics (including at least two years of algebra and one year of geometry)	4
Natural science (laboratory science courses)	3
Social Science	2
Foreign language	2
Academic electives (additional courses in English, foreign language, mathematics, natural or social sciences; not to include business courses)	1
Total	16

Students with strong mathematics and verbal skills are encouraged to apply even though their test scores and/or class rank may vary from the indicated admissions criteria.

Transfer Students

Transfer students are expected to demonstrate proficiency in English and mathematics. Prospective transfer students should have completed 30 or more semester hours of courses equivalent to those taken by the business freshman and sophomore.

For admission to the College of Business, transfer students must meet either one or the other of the following standards:

A. Overall 2.5 GPA and 2.0 GPA in Business classes; or

B. Overall 2.0 GPA and 2.5 average in the following five courses: Econ 101 and 102, Math 111 and 112, and Engl 131

Applicants with less than 30 semester hours of college level work will be required to submit a high school transcript and SAT or ACT test scores. Applicants with 30 semester hours or more of college level work who submit a high school transcript and SAT or ACT test scores will be considered for admission. Applicants who lack a high school transcript and/or test scores, but who have completed 30 or more semester hours of college level work comparable to the freshman year business curriculum will be considered for admission. Additional credentials may be required in individual cases.

Intrauniversity Transfer

Students who wish to transfer to the College of Business from another degree program at CU-Colorado Springs may submit an application in the Student Success Center upon completion of at least 15 semester hours of graded work on campus. Proficiency in English and math must be demonstrated by completing freshman English and at least one required math course. Academic standards for admission are those listed above for Transfer Students. Please see the advisors in the Student Success Center for complete details.

The General Business Program

Students admitted to the College of Business are initially designated as General Business students. They follow the freshman and sophomore sequence of courses listed in the Model Degree Program. Students are required to follow the recommendations of an academic advisor in completing the prescribed background and skills courses.

Skills courses

Engl 131	3
Econ 101, 102	6
Math 111, 112 or 135	6
INFS 100	3
ACCT 201, 202	6
QUAN 201	3
Total	27

Information Systems majors should refer to their specific requirements which list variations in the skills courses.

Completion of lower division requirements does not ensure acceptance to the upper division Professional Program. See Admission to the Professional Program below for admission standards.

The Professional Program

The junior and senior years constitute the Professional Program of the undergraduate curriculum. Admission to the Professional Program is competitive and limited to available resources. Admission is granted to those applicants demonstrating the highest promise for professional success. Students must be within one semester of completing the prescribed background and skills courses and attaining junior standing prior to applying to the Professional Program.

Students who wish to apply to the College of Business Professional Program must submit an application during one of the three annual application periods. Candidates are strongly encouraged to visit the business advisor in the Student Success Center CH 19 at the beginning of the semester in which they wish to apply in order to pick up information regarding academic qualifications, admissions criteria, and application deadlines. To be admitted to the Professional Program students must have an overall GPA of 2.5, and a 2.5 in their business classes. The application can be found at the following internet address: http://web.uccs.edu/business/.

All applicants must be admitted to CU-Colorado Springs by the time they submit their Professional Program application.

Admission to the Professional Program

After admission to the College of Business, an overall GPA of 2.5 and a business course GPA of 2.5 are required for admission to the Professional Program. Business students may apply for the Professional Program if they are within one semester of completing the skills courses described above and attaining junior standing.

Students who transfer from other institutions and have completed coursework equivalent to the freshman and sophomore business curriculum may be considered for admission directly to the Professional Program.

Graduation Requirements

To graduate from the Professional Program, students must have an overall GPA of 2.0, a Business course GPA of 2.5, and a 2.5 GPA in their area of emphasis courses with no grade below a C- (1.7) in the area of emphasis. Graduation with a General Business degree requires an overall 2.0 GPA, a 2.0 Business course GPA, and a 2.0 area of emphasis GPA with no grade below C- (1.7) in the General Business area of emphasis.

Model Degree Program

The following four-year plan lists all the specific course requirements for the bachelor of science (business) degree. Equivalent courses taken at other institutions prior to admission to this degree program may satisfy these requirements subject to College of Business policies regarding the transfer of academic credit. The order in which these courses are taken may vary with course availability. However, normal degree progress in the College of Business requires that students complete the degree in a freshman, sophomore, junior, senior sequence. All courses listed are degree requirements. Students are responsible for completing all course prerequisites. Course prerequisite and class standing requirements are enforced by the College of Business.

Freshman Year

Engl 131, 141 or (Engl 307, Comm 324). Composition (Note 1). 6

Econ 101, 102. Micro and Macroeconomics 6

Math 111, 112 or 135. Linear Algebra and Calculus (Note 2). 6

Psy 100. General Psychology (Note 3) 3

INFS 100. Information Technology and Business Problem Solving. 3

BUAD 100. Introduction to Business (Note 4) 3

Non-business elective (Note 10). 3

Sophomore Year

Soc 111. Introduction to Sociology (Note 3). 3

Humanities electives (Note 5) 3

American/Global electives (Note 6) 6

Natural Science with Lab (Note 7) 4

Comm 210. Speech 3

ACCT 201, 202. Financial and Managerial Accounting 6

BLAW 200. Business Law. 3

QUAN 201. Business Statistics. 3

Junior Year

Humanities elective (Note 5) 3

Philosophy elective (Note 8) 3

BUAD 302. Resume Writing and Interviewing Skills . . . 1

FNCE 305. Basic Finance. 3

MKTG 300. Marketing 3

ORMG 330. Management and Organization 3

ORMG 335. Groups and Teams in Organizations 3

OPTM 300. Fundamentals of Operations Management. 3

Area of Emphasis (Note 9) 6

Non-business electives (Note 10) 3

Senior Year

INFS 401. Applied Electronic Commerce. . 3

BUAD 410. Business and Environment . . . 3

BUAD 450. Cases and Concepts in Business Policy 3

Area of Emphasis (Note 9) 9

Nonbusiness electives (Note 10) 6

Business electives (Note 4). 4

Minimum to graduate 120

Curriculum Notes:

1. Composition. To fulfill the 6 hour composition requirement, students take Engl 131 and may choose from Engl 141, English Composition II or Engl 307, Technical and Business Report Writing, or Comm 324, Business and Professional Communication. Upper level courses are taken in the junior year. Information Systems majors must take Engl 307, Technical and Business Report Writing, as their second composition course.

2. Mathematics. Math 111 and 3 hours of college level calculus are required. Students may choose either Math 112 or 135 to fulfill the calculus requirement. Only one of these courses will apply toward the degree; if Math 135 is chosen, students will have the additional credit hour applied to electives.

3. Psychology and Sociology. These are 4 credit hour courses at CU-Colorado Springs; however, a 3 credit hour psychology and sociology transferring from another university will fulfill these requirements. Students who take either of these courses on this campus will have the additional credit hour applied to electives.

4. Business Electives. BUAD 100, Intro to Business, is recommended but not required; it applies as a business elective. Seven hours of business elective credit are required.

Accounting students take one additional accounting course that applies to business electives. Thirty hours of accounting course work is the maximum that will apply to the accounting degree.

Information Systems students take INFS 230 and INFS 240 and apply them to business electives. INFS 230 is considered a skills course for Information Systems majors and should be completed early in the degree program.

With careful selection of business electives, students may wish to pursue a double area of emphasis, a dual area of emphasis with information systems, or a business minor. Additional information is available in the Student Success Center.

5. Humanities Electives. Students may choose courses from within the following categories: English literature, film studies, fine arts history, humanities, music, philosophy, religious studies, or theatre. A complete list of acceptable courses is available from the Student Success Center.

6. American/Global Studies Electives. Students are required to take six hours within this category which may be a combination of 3 hours American studies and 3 hours global studies or 6 hours global studies. American studies may be chosen from history or political science. Global studies may be chosen from courses in anthropology, foreign culture, foreign language, geography, history, political science, or sociology. A complete list of acceptable courses is available from the Student Success Center.

7. Natural Science with Lab. Business students may choose from Biol 100 + 106, Biol 151 + 153, Chem 100 + 110, Chem 103, Chem 106, EnSc 160 + 162, Ges 100, 101, 105, Geol 101 + Geol 101 L Geol 153, Pes 100 + 114, Pes 105 + 109, Pes 106 + 110. Students may apply additional natural science credit toward non-business electives.

8. Philosophy Elective. Students choose a course from Phil 100, 102, 104, 112, 115, or Phil 416.

9. Area of Emphasis. The business student will select one of the following areas of emphasis: Accounting, Custom Business, Finance, General Business, Human Resources Management, Information Systems, International Business, Marketing, Organizational Management, or Service Management. Students may also elect to obtain a double area of emphasis, dual area of emphasis with information systems, or a business minor. Careful selection of business electives is required. Additional information is available in the Student Success Center.

10. Non-Business electives. The business degree requires 12 hours of non-business electives. Electives should be chosen carefully based upon the student's interests and objectives. Acceptable electives must be taught by regular University of Colorado faculty, must have a form of assessment such as a term paper and/or examinations, and must be regular classroom-type courses. Course coverage must be college level, not repetitious of other work applied toward the degree, and must be academic as opposed to vocational/technical. The College of Business reserves the right to examine all sources of credit for applicability to the degree.

Business students may elect to pursue a non-business minor offered through the College of Letters Arts, and Sciences. Additional information is available in the Student Success Center.

The following special sources of credit may be appropriate for non-business electives:

a. A maximum of 9 hours upper division ROTC credit if the student completes the ROTC program.

b. A maximum of 2 hours of physical education activity, health, or first aid credit.

c. A maximum of 6 hours (total) of the following: physical education theory, recreation theory, dance theory, music, band, choir, and art classes. Experimental and independent studies and certain correspondence courses may be included in the 6 hours with the approval of the dean prior to registration.

The following are not acceptable for degree credit in the College of Business: CS 100, CS 103, CS 104, GES 416, work experience, cooperative education programs, tutoring of courses, teacher education courses, teaching methods, orientations, practicums, workshops, and the teaching or proctoring of courses. Elementary foreign language course credit in the native language of the student is not acceptable for degree credit.

The above examples are not exhaustive, but are intended to provide guidelines. The College of Business reserves the right to disallow any credit that is not appropriate academic credit as determined by the College. Students should direct questions to the Student Success Center.

11. Registration in BUAD 410, BUAD 450, and INFS 401 is restricted to business seniors only.

Area of Emphasis

Each candidate for the Bachelor of Science — Business degree in the Professional Program must complete the prescribed courses in an area of emphasis comprising a minimum of 15 semester hours taken at CU-Colorado Springs. A grade point average of C is required for the five area of emphasis courses, with no grade below a C-.

Accounting

The principal areas of study in accounting are financial accounting, managerial accounting and systems, taxation, and auditing. The major is designed to prepare students for careers in public accounting, business and industry, and not-for-profit and governmental organizations.

Course work in accounting is intended to convey a comprehensive understanding of the theory and concepts that underlie accounting practice. Emphasis is placed on logical reasoning to enable students to solve problems in accounting and to make sound accounting policy decisions.

In addition to training in accounting, a thorough knowledge of the social, legal, and political environments is essential. Because solid communication skills are indispensable to the professional accountant, course work in English composition, report writing, and speech are highly recommended.

The undergraduate area of emphasis in accounting consists of a minimum of 18 semester hours beyond Accounting 201 and 202. The basic requirements for all accounting majors are as follows:

Required Courses

ACCT 201 Intro to Financial Accounting. . 3
ACCT 202 Intro to Managerial Accounting 3
ACCT 301 Intermediate Accounting I 3
ACCT 302 Intermediate Accounting II . . . 3
ACCT 311 Cost Accounting. 3
Accounting electives. 9
Total 24

The 24-hour program outlined above provides minimum preparation for a general career in accounting. Students planning to take the Certified Public Accountant's (CPA) exam must take more than the required 24 hours in accounting in order to comply with the law in the State of Colorado and to be more fully prepared for the exam. The current law requires 27 hours of courses in accounting. In addition to the 200-300 level courses listed above, the State Board of Accountancy requires 12 hours of accounting electives covering the following subjects:

Required Courses (by state law)

ACCT 461 Auditing 3

Recommended electives (minimum of 9 hours)

ACCT 401
Advanced Financial Accounting. 3
ACCT 402 Financial Accounting Theory . . 3
ACCT 421 Individual Income Tax 3
ACCT 422 Corporate and Partnership Taxation 3
ACCT 441 Fund Accounting for Government and Nonprofit Organizations . 3
ACCT 451
Accounting Ethics and Institutions 3

In addition, the applicant for the exam must have at least 24 semester hours in at least four other areas of business such as business law, finance, management, marketing, statistics, business communications, information systems, and ethics.

Students who are not planning to take the CPA exam are encouraged to select a specialty track. These tracks can be in either managerial accounting/systems or taxation. In order to specialize in one of these tracks, it is recommended that the accounting electives be selected as described below:

Managerial/Systems Track

Recommended electives

ACCT 422 Corporate and Partnership Taxation 3
ACCT 431 Introduction to Accounting Systems 3
ACCT 441
Fund Accounting for Government and Nonprofit Organizations 3
ACCT 451
Accounting Ethics and Institutions 3

Taxation Track

Recommended electives

ACCT 421 Individual Income Tax 3
ACCT 422 Corporate and Partnership Taxation 3
ACCT 451
Accounting Ethics and Institutions 3

While it is permissible to take as many hours in accounting as the student desires, not more than 30 hours of accounting will be applied toward the total requirements for the undergraduate degree. Students should work closely with accounting faculty and the undergraduate advisor in planning their accounting programs.

Graduate study in accounting is receiving increasing emphasis by professional organizations and employers. In Colorado, for example, individuals may become certified as CPAs with no experience in the profession if they have 30 semester hours of course work above the baccalaureate degree and a total of 45 hours of accounting and related courses in their undergraduate and graduate studies. Students meeting admission requirements might consider continuing their education at the graduate level.

In addition, many states now require a minimum of 150 semester hours to be eligible to take the CPA exam. Students who plan to move from Colorado should check the requirements of the state to which they anticipate moving for specific requirements.

Accounting/Information Systems

Students interested in a career in the fast growing area which applies computers to the accounting field should take the combined accounting and information systems area of emphasis. Five accounting courses beyond the 200-level courses are required for the accounting portion of the program, with four additional computer-related courses in accounting and information systems to be applied as electives for the degree.

Required Courses

ACCT 301 Intermediate Accounting I 3
ACCT 302 Intermediate Accounting II . . . 3
ACCT 311 Cost Accounting 3
Accounting electives. 6
Required Information Systems Courses
INFS 230 Business Programming I. 3
INFS 330 Systems Analysis and Design . . . 3
INFS 340
Database Concepts and Application. 3
ACCT 431 Introduction to Accounting Systems 3

Custom Business

The Custom Business area of emphasis allows the student to select 15 semester hours of upper division business course work based on the individual's particular interests and objectives. Course work selected for the area of emphasis must be preapproved by the business advisor. For additional information please contact the Student Success Center.

Finance

Finance encompasses both the science and the art of managing money and investments. The finance curriculum is divided into three primary areas: financial management, financial markets and institutions, and investments. The study of finance provides students with an understanding of numerous financial theories such as the relation between risk and return, the factors that determine asset values, and strategies for minimizing the risk exposure of both corporations and investors. An understanding of these theories helps students develop the ability to make sound and practical business and personal investment decisions. Three different tracks are offered to prepare students for careers in corporate finance, financial services, and financial/information systems. The various tracks stress the importance of finance in the economy and the functions and purposes of monetary systems, credit, prices, money markets, and financial institutions. Students are trained to think logically regarding financial problems and to formulate sound financial decisions, policies, and practices.

Corporate Finance Track

The corporate finance track prepares students for jobs in a corporate industrial setting. Students who study in this track prepare for careers managing corporate assets. Specific jobs in the corporate setting can include cash and receivables management, capital budgeting decision making, short- and long-term financial planning and analysis, risk analysis and management, and financing decisions.

Required Courses

FNCE 400
Advanced Corporate Finance. 3
FNCE 410
Cases and Concepts in Finance 3
FNCE 420 Investment and Portfolio Management. 3
FNCE 440 International Financial Management. 3
FNCE 450 Money and Banking 3

Recommended elective:

FNCE 470 Financial Information Systems . 3

Financial Services Track

The financial services track prepares individuals for any of a number of financial services careers. The financial services industry continues its rapid growth in the global economy. Financial services involves the design and delivery of financial products and services to businesses, individuals, and government. Employment in this industry is broadly based and includes careers in banking, investments, investment banking, risk management, insurance, and real estate.

Required Courses

FNCE 400 Advanced Corporate Finance . . 3
FNCE 420 Investment and Portfolio Management. 3
FNCE 430 Bank Management*. 3
FNCE 450 Money and Banking 3
MKTG 440
Service Management and Marketing. 3

*offered in alternate years

Recommended elective:

FNCE 470 Financial Information Systems . 3

Finance/Information Systems

The objective of the combined finance/information systems major is to prepare students to be information systems specialists within an organization's finance department. The individual will help other personnel in the department in designing and using financial decision support systems. The individual will also serve as a liaison with the central IS organization to design better methods of handling and organizing data to make it easily accessible in a usable format for the finance specialists. The effective interaction of the information systems and finance functions will aid in increasing the quality and timeliness of financial decisions. The finance/information systems major requires the successful completion of five finance courses combined with four required information systems courses.

Required Finance Courses

FNCE 400 Advanced Corporate Finance . . 3
FNCE 410 Cases and Concepts in Finance 3
FNCE 420 Investment and Portfolio Management. 3
FNCE 450 Money and Banking 3
Finance elective 3
Required Information Systems Courses
INFS 230 Business Programming I. 3
INFS 330 Systems Analysis and Design . . . 3
INFS 340
Database Concepts and Application. 3
FNCE 470 Financial Information Systems . 3

General Business

Students may choose a General Business emphasis if they desire a career in which a broad background and general knowledge in the field of business are required. Courses are upper-level and must be selected from at least two different emphasis areas to provide a solid business foundation.

Human Resources Management

The goal of the human resources (HRMG) management function in organizations is to develop and maintain effective relationships between employers and employees. HRMG managers achieve this in a number of ways-matching people's skills to job requirements, developing fair compensation practices, appraising employees' performance levels, developing employees' skills and abilities through training and career planning, implementing productivity improvement programs, and many other activities. They must also maintain harmonious labor-management relationships. HRMG managers perform

these roles ethically and legally, in an ever-changing environment. These changes include new employment laws, the changing skills and demographics of the work force, people expecting more and different things from their employers, and companies becoming increasingly globalized in their operations. The HRMG manager's job is challenging, and knowledgeable HRMG managers are in high demand. The Human Resources Management major prepares students for careers in HRMG by covering such topics as recruiting, staffing, training and development, evaluation, compensation, career planning, safety and health, equal employment opportunity and affirmative action, and labor relations.

Required Courses

HRMG 438 Human Resources - Management, Staffing and Development 3

HRMG 439 Legal, Social and Union Issues in Human Resources Management 3

HRMG 441 Motivating, Rewarding and Appraising Employees 3

ORMG 437 Organization Development and Change 3

and one of the following:

ORMG 411 Experiences in Leadership

HRMG 485 Directed Research Projects in Human Resources Management

Recommended electives

BUAD 390 Personal and Team Creativity. . 3

BUAD 496 Internship in Business 3

ORMG 436 Organization Processes and Design. 3

MKTG 330. Marketing Research. 3

MKTG 440 Service Management and Marketing 3

Information Systems

The information systems area of emphasis is designed for two categories of students. Persons in the first category have decided upon a career in the information systems field. Persons in the second category desire a strong information systems background to aid their progress in other career fields such as accounting, finance, and marketing. (See areas of emphasis in accounting/information systems, finance/information systems, and marketing/information systems.)

Since the use of information technology is pervasive, all business majors need a solid foundation in information systems to enable them to acquire increasing levels of sophistication in computer use. The continuous advances in technology and methodology for developing management information systems and decision support systems make the field an exciting, challenging area of emphasis.

Required Courses

INFS 230 Business Programming I. 3

INFS 240 Business Programming II 3

INFS 330 Systems Analysis and Design . . . 3

INFS 340
Database Concepts and Application. 3

INFS 370 Computer Networks and Telecommunications 3

INFS 440 Emerging Technologies. 3

INFS 450 Information Systems Project Management. 3

International Business

Economies are intertwined as never before, and in most industrial sectors competition is increasingly global. Simultaneously, there are a number of new and dynamic events and processes that influence the world economic, cultural, and political arenas. It is essential that managers understand the implications of these changes. They affect managers in at least three ways.

First, firms that see themselves as primarily domestic companies are facing increased competition by foreign firms in their domestic market. Secondly, foreign markets and resources are increasingly becoming important in terms of incremental revenue, profitability, sources of technology, and capital. And third, U.S. world-wide economic influence has diminished in a relative sense, and it has become more important than ever for executives to be aware of international influences. This area of emphasis addresses these issues and introduces the students to the challenges and basic skills required for effective international business management.

Required Courses

BUAD 460 International Business 3

FNCE 440 International Financial Management. 3

MKTG 490 International Marketing 3

and two of the following electives

BUAD 461
Regional Business Environment: Europe . . 3

Comm 328 Intercultural Communication . 3

Econ 341 International Economics 3

Econ 441 International Trade 3

Econ 442 International Finance. 3

The above 15 semester hours compose the student's area of emphasis.

Required Foreign Language

Six hours of a foreign language, or an equivalent demonstrated proficiency. Languages offered on this campus include French, German, Japanese, Russian and Spanish.

Marketing

Global and national economies are directly influenced by marketing, a dynamic and challenging activity relevant to profit and nonprofit organizations alike. Marketing is the guiding force in conceiving and designing products and services, pricing them according to perceived value in the marketplace, promoting them through advertising and personal selling to potential buyers, and providing acceptable distribution arrangements for customers. Customer-oriented planning and implementation, as opposed to technology-based approaches, provide the cornerstone of modern marketing techniques and strategies. Marketing is a vital ingredient in an organization's formula for success, the essential bridge, the crucial link in effecting mutually beneficial exchanges between buyers and sellers. The field of marketing is eclectic in applying such disciplines as economics, psychology, statistics and sociology in creative work, problem solving and strategic management. For the graduate, career opportunities are plentiful in sales, advertising, marketing research, product development, retailing, wholesaling, and related endeavors, both domestically and internationally.

Required Courses

MKTG 330 Marketing Research 3

MKTG 465 Promotion Management and Strategy 3

MKTG 480
Marketing Policies and Strategies. 3

MKTG 485
Marketing Analysis and Planning Project . . 3

Marketing elective 3

Marketing electives

MKTG 440 Service Management and Marketing 3

MKTG 455 Contemporary Issues in Marketing 3

MKTG 460
Business Marketing Management 3

MKTG 470 E-Commerce 3

MKTG 490 International Marketing 3

Marketing/Information Systems

The purpose of the Marketing/Information Systems major is to prepare students to be marketing information systems specialists. These individuals

will be qualified to facilitate the use of marketing information within the organization. They will also assist in the design of marketing information systems and help others in the use of these systems. The integration of the information systems and marketing functions will effectively improve the quality and timeliness of marketing decisions.

Required Marketing Courses

MKTG 330 Marketing Research 3
MKTG 440 Service Management and Marketing 3
MKTG 465 Promotion Management and Strategy 3
MKTG 485 Marketing Analysis and Planning Project . . 3
Marketing elective 3

Required Information Systems Courses

INFS 230 Business Programming I 3
INFS 330 Systems Analysis and Design . . . 3
INFS 340 Database Concepts and Application 3
MKTG 431 Introduction to Marketing Information Systems 3

Organizational Management

In today's highly competitive, constantly changing global environment, a premium will be placed on skilled managers who know how to lead and motivate people, build high performance teams, develop world class organizations, and understand the dynamics of organization behavior. All organizations of all sizes and types need skilled managers. The organizational management curriculum provides a foundation for careers in management, personnel/human resource management, small business management and entrepreneurship, and public agency management. This area of emphasis addresses contemporary issues in management and the changing roles of managers and leaders at all levels of the organization.

Required Courses

ORMG 436 Organizational Processes and Design 3
ORMG 437 Organization Development and Change . . . 3
ORMG 411 Experiences in Leadership 3

and two of the following four courses

HRMG 438 Human Resources: Management, Staffing and Development . . 3
HRMG 439 Legal, Social, and Union Issues in Human Resources Management 3
HRMG 441 Motivating, Rewarding and Appraising Employees 3
HRMG 485 Directed Research Projects in Human Resources and Management 3

Recommended business electives

BUAD 390 Personal and Team Creativity . . 3
BUAD 496 Internship in Business 3
MKTG 330 Marketing Research 3
MKTG 440 Service Management and Marketing 3

Service Management

The Service Management area of emphasis is designed to provide skills and knowledge for those who will work in a management or professional capacity in the service sector, including customer service departments, call centers, helpdesks, insurance, professional service organizations (e.g. law, accounting), etc.

Required courses

ORMG 411 Experiences in Leadership . . . 3
ORMG 437 Organizational Development and Change 3
MKTG 440 Service Management and Marketing 3
MKTG 480 Marketing Policies and Strategies 3

and one of the following four courses

HRMG 438 Human Resources: Management, Staffing and Development . . 3
HRMG 439 Legal, Social and Union Issues in Human Resources Management 3
HRMG 441 Motivating, Rewarding and Appraising Employees 3
HRMG 485 Directed Research Project in Human Resources Management 3

Recommended business electives

BUAD 390 Personal and Team Creativity . . 3
BUAD 496 Internship in Business 3
MKTG 330 Marketing Research 3
ORMG 436 Organizational Processes and Design 3

The General Business Degree

Students may choose a general business emphasis if they desire a career in which a broad background and general knowledge in the field of business are required. Courses are upper-level and must be selected from at least two different emphasis areas to provide a solid business foundation. Students should meet with the business advisor to plan their ideal program.

Minors

Minors for Business Students

Business students may minor in a second business area (9 credit hours) or choose a minor through the Colleges of Letters, Arts, and Sciences; Engineering; or Nursing (18 credit hours). All 9 credit hours of business courses for the minor must be taken in residence in the College of Business. Information is available in the Student Success Center.

Minors in Business for Non-Business Students

Students admitted to undergraduate degree programs other than business may elect to pursue a minor in business with the approval of the appropriate advisor in the Student Success Center. It is a College of Business requirement that all course work in the area of specialty composing the minor and a minimum of 9 credit hours be taken in residence at CU-Colorado Springs. Specifically the minors available to non-business students are in the areas of general business, accounting, finance, information systems, international business, organizational management, and marketing, and require the following course work:

General Business

Required courses

ACCT 201 Introduction to Financial Accounting 3
ACCT 202 Introduction to Managerial Accounting . . . 3
BLAW 200 Business Law 3
INFS 100 Information Technology and Business Problem Solving 3
QUAN 201 Business Statistics 3
MKTG 300 Principles of Marketing 3
ORMG 330 Introduction to Management and Organization 3
FNCE 305 Basic Finance or
OPTM 300 Fundamentals of Operations Management 3
Total 24

Accounting

Required courses

ACCT 201 Introduction to Financial Accounting 3
ACCT 202 Introduction to Managerial Accounting . . . 3
ACCT 301 Intermediate Accounting I 3
ACCT 302 Intermediate Accounting II . . . 3
ACCT 311 Cost Accounting or
ACCT 421 Individual Income Tax 3
INFS 100 Information Technology and Business Problem Solving 3

Econ 101
Introduction to Microeconomics or
Econ 102
Introduction to Macroeconomics 3
Total 21

Finance

Required courses

ACCT 201
Introduction to Financial Accounting 3
INFS 100
Information Technology and Business
Problem Solving 3
Econ 101
Introduction to Microeconomics 3
Econ 102
Introduction to Macroeconomics 3
FNCE 305 Basic Finance 3
Elective in Finance Area (300-400 level) . . 3
Elective in Finance Area (300-400 level) . . 3
Total 21

Information Systems

Required courses

ACCT 201 Introduction to Financial
Accounting 3
INFS 100 Information Technology and
Business Problem Solving. 3
INFS 230 Business Programming I. 3
INFS 330 Systems Analysis and Design . . . 3
INFS 340
Database Concepts and Application. 3
INFS 240 Business Programming II or
INFS 370
Telecommunications and Networks 3
Econ 101 Introduction to Microeconomics or
Econ 102 Introduction to Macroeconomics 3
Total 21

International Business

Required courses

ACCT 201 Introduction to Financial
Accounting 3
INFS 100 Information Technology and
Business Problem Solving. 3
Econ 101 Introduction to Microeconomics or
Econ 102 Introduction to Macroeconomics 3
MKTG 300 Introduction to Marketing 3
FNCE 305 Basic Finance 3
and three of the following courses:
FNCE 440 International Financial
Management 3
MKTG 490 International Marketing 3
BUAD 460 International Business 3
BUAD 461
Regional Business Environment: Europe . . 3
Total 24

Organizational Management

Required courses

ACCT 201 Introduction to Financial
Accounting 3
INFS 100 Information Technology and
Business Problem Solving. 3
Econ 101
Introduction to Microeconomic or
Econ 102
Introduction to Macroeconomics 3
ORMG 330 Introduction to Management
and Organization 3
Elective in Organization Management or
Human Resources Management
(300-400 level) 3
Elective in Organization Management or
Human Resources Management
(300-400 level) 3
Any Business course
(except BUAD 410, 450, and INFS 401). . . 3
Total 21

Marketing

Required courses

ACCT 201 Introduction to Financial
Accounting 3
INFS 100
Information Technology and Business
Problem Solving 3
Econ 101
Introduction to Microeconomics or
Econ 102 Introduction to
Macroeconomics 3
MKTG 300 Principles of Marketing 3
Elective in Marketing Area
(300-400 level) 3
Elective in Marketing Area
(300-400 level) 3
Any Business course
(except BUAD 410, 450, and INFS 401). . . 3
Total 21

Questions concerning the minors in business should be directed to the Student Success Center. Students may not register for business courses for which they do not have the stated prerequisites including class standing.

Undergraduate Academic Policies
Academic Advising
Undergraduate:
Student Success Center
Cragmor Hall 19
P.O. Box 7150
Colorado Springs, CO 80933-7150

(719) 262-3260 or (719) 262-3630
1-800-990-8227 ext 3630 or 3260

FAX (719) 262-3645

success@mail.uccs.edu

Academic Policies

Registration and Enrollment Status

Students may register only for those courses for which they have the stated prerequisites. At the undergraduate level, a minimum of junior standing is required for all business courses numbered 300-499. Priority for registration for business courses is given to business degree students.

Students enrolled in one section of a business course while attending a different section will receive a final grade of F for nonattendance. Students attending classes for which they are not enrolled will not be added after the add period is over.

Course Load

The normal scholastic load for a full-time undergraduate business student is 16 semester hours, with 18 hours the maximum during the fall/spring semesters. A maximum of 12 hours may be taken in the 8 week summer session, and 6 hours in the 4 week summer term.

Standards of Performance — Undergraduate

To be in good standing, a minimum scholastic cumulative grade point average of 2.0 is required for all courses attempted at CU-Colorado Springs, as is a 2.0 for all business courses. In addition, a grade point average of C is required for the five area of emphasis courses, with no grade below C- in the student's area of emphasis. This applies to work taken at all University of Colorado campuses. Remedial course work is not included in the overall average.

College rules governing probation and suspension are as follows:

1. Any student whose overall grade average or business course average is less than 2.0 shall be placed on probation immediately. A student may be removed from probation when the overall average and the business average have been raised to 2.0.

2. Students may remain on probation for up to four semesters as long as they maintain normal degree progress each semester as determined by the college and obtain no grade below a C-. Such probationary status may continue for a maximum of four semesters providing these provisions have been met. Please

note that students may be on probation a maximum of four semesters during their entire academic career in the College of Business, and probationary terms are not necessarily consecutive. Summer is considered a semester. Failure to meet probationary provisions will result in suspension.

3. Indefinitely suspended students are not eligible to take College of Business classes for one calendar year from the time of their suspension.

4. A student who has been under indefinite suspension for one calendar year may apply for readmission to the College of Business. If readmitted, that readmission will be on a probationary status. After being readmitted under such probationary status, students who fail to comply with the requirements of their probation will be subject to permanent suspension.

5. Any student who is placed on suspension more than once will be permanently suspended from the College of Business and may not attend any campus of the University of Colorado as a business student.

6. Students who have been suspended at any time in the past by the College of Business will be automatically suspended if their overall average or business course average again falls below 2.0.

7. Suspended College of Business students who transfer into another degree program will not be eligible to register for business courses and will be subject to administrative drops. Suspended students who transfer into another degree program of the university are rarely readmitted to the College of Business, and then only by special consideration by petition to the college.

8. Any student earning all failing grades or no academic credit for the semester will not be permitted to register without the dean's approval.

Honors Recognition

Upon recommendation of the faculty, undergraduate students who demonstrate superior scholarship are given special recognition at graduation. Students must achieve an overall grade point average of 3.7 and a grade point average of 3.9 in all business courses taken at the University of Colorado to be considered for *summa cum laude*. Those who achieve an overall grade-point average of 3.5 and a grade-point average of 3.7 in all business courses taken at the University of Colorado will be considered for *magna cum laude*. An overall grade point average of 3.3 and a business course average of 3.5 qualifies a student to be considered for *cum laude.*

Beta Gamma Sigma. Membership in Beta Gamma Sigma is an honor which must be earned through outstanding scholastic achievement. Such membership is one of the highest scholastic honors that a student in a business or management program can attain.

To be eligible for Beta Gamma Sigma membership, students must rank in the top 7 percent of their junior class, the top 10 percent of their senior class, or in the top 20 percent of those students receiving Master's degrees. Beta Gamma Sigma chapters may be chartered only in those schools of business and management accredited by AACSB.

Undergraduate Certificates

The College of Business offers undergraduate certificates to students who have already completed an undergraduate degree in business and would like to complete the course work for an additional area of emphasis. Certificates consist of 15-21 hours of course work and are offered in accounting, finance, information systems, marketing, organizational management, and human resources management. Priority for registration for business courses is given to business degree students.

General Education Unit Transfer from Colorado Public Institutions

The College of Business will accept in transfer a general education unit if the student has successfully completed the total distribution and credit hours of lower division general education courses (minimum of 33 semester hours) required at the sending institution. The integrity of the general education (core curriculum) program is recognized. The general education unit will satisfy the 33 semester hour general education core required for the business degree. Conversely, College of Business students who have taken the following general education core will, upon request, receive certification that this unit core may be used to satisfy the general education core requirements of other Colorado two- and four-year public institutions.

College of Business General Education Unit Core (33 hours)

Engl 131, 141. Composition I and II	6
Comm 210. Public Speaking	3
Math 111. Topics in Linear Algebra	3
Psy 100. General Psychology	3*
Soc 111. Introduction to Sociology	3*
Humanities electives	6
American/Global electives	3
Natural Science with lab	4
Electives	2
Total	33

*Credit awarded will be 3 or 4 semester hours, depending upon credit awarded at the sending institution.

Students may use only general education courses earned at a single institution to qualify for the general education unit transfer, and the prescribed general education program at the sending institution must require no fewer than 33 semester hours. Once a student has been certified by the sending institution as having satisfactorily completed the general education unit core, the lower division general education core requirement of 33 semester hours as defined above by the College of Business will be entirely satisfied.

Other specific lower division course work totaling 31 semester hours (beyond the 33 semester hour general education core) composes the entire freshman and sophomore (lower division) curriculum for the baccalaureate in business. The following courses, which are essential to the degree and required of both native and transfer students, may be satisfied on a course by course basis with equivalent course work from the sending institution as articulated in individual transfer agreements.

Other Lower Division Course Requirements (30 hours)

Econ 101 Introduction to Microeconomics	3
Econ 102 Introduction to Macroeconomics	3
INFS 100 Information Technology and Business Problem Solving	3
Math 112 Introduction to Calculus	3
Global Elective	3
ACCT 201 Introduction to Financial Accounting	3
ACCT 202 Introduction to Managerial Accounting	3
BLAW 200 Business Law	3
QUAN 201 Business Statistics	3
Elective	4
Total	31

Summary of lower division requirements for the degree:

College of Business
General Education Unit Core 33

Other Lower Division
Course Requirements 31

Total lower division course work 64

Business Courses — Transfer Credit

Credits in business subjects transferred from other institutions will be limited to the number of credit hours given for equivalent work in the regular offerings of the university. With the following exception, the college will limit transfer credit for business courses taken at a lower division level to such courses as the college offers at that level: Principles of Management and Principles of Marketing taken at the sophomore level may be transferred as lower division credit subject to the 64 credit hour limit provided that the student had attained sophomore standing and had completed two accounting courses, two economics courses, and business statistics prior to enrolling in Principles of Marketing or Principles of Management. Students who transfer sophomore level Principles of Marketing or Principles of Management to the College of Business would not take either MKTG 300 or ORMG 330 for degree credit at CU-Colorado Springs. Transfer students must be aware of the upper division minimum credit requirement of 45 semester hours for the Business degree.

A maximum of 64 semester hours of credit may be accepted from a community or junior college. Actual equivalent courses usually may be substituted for required courses. However, students must verify with the College of Business advising office that courses are equivalent. Students may be asked to provide additional information on courses completed at other institutions.

A student admitted to a business degree program is required to take all course work from CU-Colorado Springs. Business students who wish to take course work at another institution or another campus of the University of Colorado and apply the work toward the degree must have the prior approval of the dean. Generally, only elective credit is acceptable in transfer from other institutions once the student has enrolled in the College.

Transfer students must take a minimum of 30 semester hours of business courses including the five area of emphasis courses in residency at CU-Colorado Springs after admission to the undergraduate degree program of the College of Business.

Student transfer agreements between the CU-Colorado Springs College of Business and the two- and four-year public institutions in the Colorado system of higher education have been established and may be accessed through the advising offices of each institution.

Special Sources of Credit

The College reserves the right to accept or reject all special sources of credit which do not have prior approval of the dean. See Model Degree Program Curriculum Note 10 for a discussion of elective credit for the business degree.

Correspondence Credit

Required business courses and area of emphasis courses may not be taken by correspondence. All correspondence courses are evaluated to determine their acceptability. Approval for degree credit is required prior to registration.

Credit by Examination

Please see the General Information section for information about Advanced Placement and College Level Examination Program (CLEP) credit.

Generally, CLEP credit is appropriate only for (a) lower division non-business requirements and (b) non-business electives. A maximum of 6 hours of credit in any one course area is allowed. CLEP may not be used in course areas where credit has already been allowed. General examinations are not acceptable. Credit for CLEP must have prior approval in writing from the business advisor.

ROTC Credit

Students who complete the ROTC program may apply a maximum of 9 hours of advanced ROTC credit toward non-business elective requirements for the business degree. Students must be enrolled as official ROTC students in order to receive degree credit for ROTC courses. No credit toward degree requirements is granted for basic (freshman and sophomore) ROTC courses. The ROTC advisor can provide more detailed information.

Transcript Evaluation

Appeals Process

A. Appeal of Initial Transcript Evaluation (College of Business)

1. The student may appeal the following:

a. a decision regarding the transferability of a specific course(s);

b. a decision regarding the placement of a specific course(s); or

c. the failure of CU-Colorado Springs to provide a transcript evaluation within the designated thirty (30) calendar day period.

The appeal must be submitted in writing to the College of Business dean's office. The decisions regarding course transferability and/or placement made in the initial transcript evaluation will be binding if the student fails to file a written letter of appeal within fifteen (15) calendar days.

2. The College of Business will consider the student's appeal, and will have thirty (30) calendar days to inform the student in writing of their decision on the appeal, including the rationale for that decision. In addition, the student shall be informed in writing of the process for appealing the appeal decision should the student feel that reasonable doubt exists.

B. Opportunity to Appeal the First Appeal Decision (CU-Colorado Springs)

1. The student may appeal the first appeal decision by writing to the CU-Colorado Springs vice chancellor for academic affairs. This appeal must be filed within fifteen (15) calendar days of the postmark date of the letter notifying the student of the College of Business decision. If the student fails to file an appeal within this time period, the original decision shall be binding.

2. CU-Colorado Springs must hear and reach a decision on the appeal within (15) calendar days after the appeal is filed.

3. The student will be notified in writing by the vice chancellor for academic affairs of the decision regarding the transfer appeal and the rationale for the decision. In addition, the student shall be informed in writing of the subsequent process for appealing the CU-Colorado Springs transfer decision, if the student chooses to do so.

C. Opportunity to Appeal the Institutional Appeal Decision (CU

System)

1. The student may appeal the institutional decision by writing the vice president for academic affairs of the University of Colorado System. This appeal must be filed within five (5) calendar days of the postmark date of the letter notifying the student of the CU-Colorado Springs decision. If the student fails to file an appeal within this time period, the CU-Colorado Springs decision shall be binding.

2. The staff of the University of Colorado System shall review and reach a decision on the appeal within five (5) calendar days after the appeal is filed.

3. The student will be notified in writing by the vice president for academic affairs of the University of Colorado System of its decision regarding the transfer appeal and the rationale for the decision. In addition, the University of Colorado System shall inform the student that the student may appeal the decision by writing the Colorado Commission on Higher Education. The appeal must be filed within five (5) calendar days of the postmark date of the letter notifying the student of the decision of the University of Colorado System.

Master of Business Administration

The Graduate School of Business Administration offers an M.B.A. program, delivered both on-campus and online via distance learning.

The Master of Business Administration program is devoted to the concepts, analytical tools, and communication skills required for competent and responsible management. The management of an enterprise is viewed in its entirety and within its social, political, and economic environment. All on-campus graduate level courses are scheduled during the evening hours to accommodate employed students.

M.B.A. Program Admissions Policy

The Graduate School of Business Administration seeks to admit students who show a high likelihood of success in postgraduate business study. The following three basic indicators are used to evaluate candidates for admission:

1. Prior academic experience. A four-year baccalaureate degree from a regionally accredited institution or foreign equivalent is a condition for application. The applicant's complete academic record from all institutions attended is examined.

2. Graduate Management Admission Test scores. The total score as well as the individual verbal, quantitative and analytical writing scores of the applicant are examined. Results of other standardized graduate admission tests may be used with the approval of the M.B.A. advising office.

3. Employment experience. Of particular interest is the progression of the work and/or military experience of the candidate. Recommendations from prior and current colleagues may be requested.

Individuals who have submitted all required credentials may be admitted on a provisional status at the discretion of the admissions committee. If the terms of the provisional admittance are met, the student will be transferred to regular degree status. Students who do not meet the terms of the provisional admission are not eligible for admittance into the program.

Seniors in this university who have satisfied the undergraduate residence requirements and who need not more than 6 semester hours of advanced subjects and 12 credit points to meet their requirements for undergraduate degrees may be admitted to the M.B.A. program. They must meet regular admissions criteria and submit complete applications by the published deadlines.

The application, GMAT or other test scores, two official transcripts (not student copies) from each post-secondary institution attended, and the nonrefundable application fee should be submitted by April 1 for summer admission, by June 1 for fall admission, and by November 1 for spring admission. See MBA web site: http://web.uccs.edu/business for application material.

The mailing address for applications and supporting materials is as follows:

Graduate School of Business Administration
CU-Colorado Springs
P.O. Box 7150
1420 Austin Bluffs Parkway
Colorado Springs, CO 80933-7150

M.B.A. Preparatory Requirements

The College of Business provides the following series of business preparatory courses as required background courses for the graduate study of business. These courses, which are open only to admitted M.B.A. degree students, may be waived on a course-by-course basis with prior academic course work or successful scores on designated achievement tests.

Course	Title	Credit
BCOM 550	Professional Business Communication	3
BUAD 550	Fundamentals of Economics	3
BUAD 556	Business, Government and Society	3
QUAN 550	Fundamentals of Business Statistics	3

These preparatory courses are graduate level courses which - if required - are taken in addition to the 36 semester hours required for the M.B.A. degree.

Graduate students who are interested in waiving one or more of the M.B.A. preparatory courses based on related prior course work must consult with an M.B.A. advisor. Waivers of preparatory courses are based on a number of criteria including the age of the prior course work, the grade earned and other considerations determined by the faculty. Prior course work must have been completed at a regionally accredited institution. Preparatory course waivers are made at the discretion of the College of Business and are recorded on a degree plan approved by the dean.

M.B.A. Degree Requirements

In addition to any preparatory courses which may be required (see previous section), students must complete a minimum of 36 semester hours of course work for the M.B.A. degree. This course work consists of 21 hours of core courses, 9 hours in an area of emphasis, and 6 hours of 600-level business electives, of which at least 3 hours are outside the student's area of emphasis. (Accounting and Health Care Administration majors complete 12 hours of emphasis courses and 3 hours of electives.) Students who do not choose to have an area of emphasis may select 15 hours of course work outside of the core which are tailored to the student's interest and which satisfy the requirements for a custom M.B.A. All M.B.A. degree plans require the final

approval of the dean.

M.B.A. Core Requirements (21 hours)

ACCT 600
Contemporary Issues in Accounting 3

BUAD 650 Strategic Management 3

FNCE 600
Corporate Financial Management 3

INFS 620 Information Systems 3

LHRM 600 Leading and Managing in Changing Times 3

MKTG 620 Marketing Strategy 3

OPTM 600 Operations: Competing through Capabilities. 3

M.B.A. Areas of Emphasis

Custom M.B.A.

A Custom M.B.A. allows the student to select 15 hours of 600 level business courses based on the individual's particular interests and objectives. Students should submit a proposal to the M.B.A. office for suggestions and final approval.

Interdisciplinary M.B.A.

Health Care Administration — 12 hours

Required Courses:

BUAD 680 New Venture Management 3

NURS 624 Managed Care 3

NURS 702 Clinical Research 3

NURS 704 Health Care Administration . . . 3

Students completing this area of emphasis complete 3 rather than 6 hours of electives.

International Business –9 hours

Complete three of the following six courses:

BUAD 690 Managing in Global Markets . . . 3

BUAD 691
Regional Business Environment: Europe . . 3

FNCE 640 International Financial Management 3

INTB 660 Contemporary Topics in International Business 3

INTB 670 International Field Project 3

MKTG 690 International Marketing and Export Management 3

Services Management –9 hours

Required Courses:

BUAD 670
World Class Service Management. 3

MKTG 640 Service Marketing 3

Complete one of the following:

MKTG 630 Marketing Research and Decision Making 3

OPTM 644 Customer Focused Processes: Quality Management and Metrics. 3

Technology Management –9 hours

Required course:

BUAD 661 Managing Technology for Strategic Advantage 3

Complete any two of the following courses

BUAD 670
World Class Service Management. 3

BUAD 680 New Venture Management 3

INFS 690 Special Topics in Information Technology 3

LHRM 610 Development of Groups and Organizations 3

LHRM 620 Managing Organization Development and Change 3

MKTG 630 Marketing Research and Decision Making 3

OPTM 644 Customer Focused Processes: Quality Management and Metrics. 3

OPTM 664 Managing Projects for Competitive Advantage 3

M.B.A. with Functional Area of Emphasis

Functional Area of Accounting — 12 hours

Students who select a functional area in accounting will take 21 semester hours of the M.B.A. core courses, 3 semester hours of M.B.A. electives and 12 semester hours of accounting courses. The required courses for a functional area in accounting are as follows:

Students with an accounting undergraduate degree:

ACCT 601
Seminar: Financial Accounting Theory . . . 3

ACCT 611
Seminar: Managerial Accounting Issues . . . 3

ACCT 661
Seminar: Issues in Auditing 3

ACCT 4xx
(3 hour accounting elective with prior approval) 3

Students with nonaccounting undergraduate degree:

ACCT 201 Intro to Financial Accounting. . 3

ACCT 202 Intro to Managerial Accounting 3

ACCT 301 Intermediate Accounting I 3

ACCT 302 Intermediate Accounting II . . . 3

ACCT 311 Cost Accounting 3

The 600-level and 400-level accounting courses as listed above (12 hours)

The 400-level accounting course included above should be selected after consultation with the accounting faculty and must be approved for graduate credit prior to enrollment. Course work assignments in the 400-level course will be appropriate to graduate degree course work. Accounting 301, 302, and 311, or their equivalents are prerequisites for 600-level accounting courses in the accounting major.

Functional Area of Finance –9 hours

Complete any three of the following:

FNCE 610 Problems and Policies in Financial Management 3

FNCE 620 Investment Management and Analysis 3

FNCE 640 International Financial Management 3

FNCE 650 Managerial Economics and the Business Cycle 3

FNCE 660 Financial Engineering and Corporate Risk Management 3

Functional Area of Information Systems –9 hours

The Information Systems functional area is designed in tracks to be appropriate for several career choices in the Information Systems field. Each interested person should select the proper path in consultation with the MBA advisor and one or more Information Systems faculty members.

Basic Technology Track

The basic technology track is for students with minimal skills in information systems who wish to be current. This track is appropriate for persons looking to change career fields or for those who have an interest in expanding their understanding of the technology that supports their chosen field (accounting, marketing, finance, etc.)

Required courses for the basic technology track are:

INFS 640 Development of Information Systems 3

INFS 660 Database Principles 3

INFS 681 Telecommunications and Networking Principles 3

INFS 630 Principles of Programming 3

(Required elective for basic technology track majors without a programming background.)

Strongly recommended:

OPTM 664 Managing Projects for Competitive Advantage. 3

Infrastructure Integration Track

The infrastructure integration track is for students who have significant Information Systems education or experience and seek to understand the integrating technologies that are deconstructing standard modes of organizational operations. The focus is

on the marshalling and deployment of technology resources in a dynamic economic climate.

Required are three of the following four courses (offered alternate years) for the infrastructure integration track:

INFS 661 Data Warehouse Implementation and Applications. 3

INFS 671 Enterprise Systems. 3

INFS 673 IT Portfolio Management 3

INFS 683 Building Virtual Organizations . . 3

Strongly Recommended:

OPTM 664 Managing Projects for Competitive Advantage. 3

Functional Area of Leadership and Human Resource Management — 9 hours

Required courses:

LHRM 610 Development of Groups and Organizations 3

LHRM 630
Contemporary Human Resource Management. 3

and complete one of the following:

LHRM 620 Managing Organization Development and Change 3

LHRM 640 Legal and Social Issues in Human Resource Management 3

LHRM 950 Independent Study in Leadership and Human Resource Management 3

Functional Area of Marketing — 9 hours

Required course:

MKTG 630
Marketing Research and Decision Making . 3

and two of the following five courses:

MKTG 610 MBA Seminar in Contemporary Topics in Marketing 3

MKTG 640 Services Marketing. 3

MKTG 650 Marketing Communications. . . 3

MKTG 670 E-commerce. 3

MKTG 690 International Marketing and Export Management 3

Functional Area of Operations and Technology Management –9 hours

Complete three of the following four courses:

BUAD 670
World Class Service Management. 3

OPTM 644 Customer Focused Processes: Quality Management and Metrics. 3

OPTM 646 Managing Supply Chains 3

OPTM 664
Managing Projects for Competitive Advantage. 3

M.B.A. Electives - 6 hours

All M.B.A. students completing a 9 hour area of emphasis must complete 6 hours of 600-level M.B.A. electives beyond the core and area of emphasis requirements. Three of the 6 hours must be taken outside the area of emphasis. Students may choose their electives from any 600-level M.B.A. courses not counting towards their core or area of emphasis requirements. Students completing a 12 hour area of emphasis must complete 3 hours of 600-level M.B.A. electives beyond the core and area of emphasis requirements.

Graduate Academic Policies

Access to M.B.A. Courses

Students must be officially admitted to the M.B.A. program in order to register for graduate level courses.

Students who are officially admitted to other CU graduate programs may be eligible to register for M.B.A. courses. All course prerequisites must be met. Interested students should contact the M.B.A. advising office for more information.

Each student must meet with an M.B.A. advisor during the student's first term in residence to prepare a degree plan.

Course Load

The normal course load for full-time graduate students is 12-15 semester hours during the fall and spring semesters. The normal course load for part-time graduate students is 3-6 hours during the fall and spring semesters.

Grade Point Average

Any grade below C (2.0) is not a passing grade for graduate students. A student may repeat a course once for which he or she has received a grade below C. Both the original grade and the grade for the repeated course count in the computation of the grade point average. A course may be repeated only once. Please see the Standards of Performance-M.B.A. section for more information.

M.B.A. Completion Timeframe

Candidates for the M.B.A. degree are expected to complete the degree within five years after they begin their first 600-level course. If course work is completed more than five years before the expected graduation date, the work will not be acceptable for the degree unless it is validated by the appropriate College of Business faculty member.

Students approaching graduation must complete a graduation audit prior to registering for their final semester.

Academic Advising

Each degree plan requires the approval of an M.B.A. advisor and the dean. The preparatory courses which the student will complete (if any), and the student's area of emphasis will be discussed at that time. A maximum of 6 semester hours of appropriate coursework from another AACSB graduate program may be considered for transfer to the degree program.

M.B.A. Advising (On-campus):

Graduate School of Business Administration
Dwire Hall 179
P.O. Box 7150
Colorado Springs, CO 80933-7150

(719) 262-3408
1-800-990-8227 ext 3408

FAX: (719) 262-3100
busadvsr@mail.uccs.edu

Standards of Performance — Graduate

No individual grade below a C may count towards M.B.A. requirements.

To be in good standing, students must have an overall grade point average of not less than 3.0 for all degree program course work attempted.

1. The academic performance of each student will be reviewed at the end of each semester. Upon the completion of nine semester hours, any student who has a grade point average less than 3.0 in M.B.A. course work will be placed on probation immediately. In general, students will not be placed on probation until a minimum of nine semester hours has been completed.

2. After a student has been placed on probation, the student has a maximum of one calendar year to raise his or her grade point average to 3.0. Courses taken to raise the cumulative grade point average must be applicable to the degree, and must be taken in the three semesters (including summer) immediately following the semester in which the cumulative grade point average fell below 3.0. Failure to raise the cumula-

tive grade point average to 3.0 in the time period outlined will result in immediate suspension.

3. In the event a student attains probationary status more than one time, the same time limits shall apply.

4. A suspended M.B.A. student is eligible to petition the dean for readmission after one calendar year.

Graduate Certificates

Graduate certificates are available to students who have already completed a bachelor's degree (not necessarily in a business field) at a regionally accredited institution and have demonstrated their admissibility to the graduate program. Graduate certificates consist of 12 hours of course work beyond any prerequisites. Certificates are offered in accounting, finance, health care administration, information systems, international business, leadership and human resource management, marketing, services management, operations and technology management, and technology management.

For additional information or an application for the certificate program, please contact the M.B.A. advising office, or see the website:http://web.uccs.edu/business.

Distance M.B.A. Program

The Graduate School of Business Administration offers M.B.A. students the opportunity to earn their degrees from a distance. This program consists of 36 hours of course work delivered through a combination of web-based materials and video presentation, and communication among students and faculty. Students with undergraduate degrees in non-business areas may be required to take up to 4 courses of pre-M.B.A. preparatory course work. For additional information on this program, please visit our web site at http://web.uccs.edu/business/ or contact the M.B.A. Advising Office by phone at 1-800-990-8227, ext. 3408, or by e-mail at busadvsr@mail.uccs.edu. An application can be downloaded from our web site.

Application Requirements

Completion of application package with accompanying nonrefundable fee ($75)

Official transcripts from all institutions attended

A four-year baccalaureate degree from a regionally accredited institution

Acceptable GMAT results. Results of other standardized graduate admissions tests may be used with the approval of the M.B.A. Advising Office.

Current resume

Letters of recommendation (recommended but not required)

Technology Requirements

Access to a Pentium or better computer with minimum 28.8 KBPS modem, sound card, speakers, and web access (Netscape Navigator 7.0 or higher, or Internet Explorer 4.0 or higher).

Television and VCR

Course Requirements

Preparatory courses (offered on line)

BUAD 209
Macroeconomics for Managers 3

BUAD 569
Business, Government and Society 3

BCOM 559 Professional Business
Communication 3

Statistics (not offered on line)

Core Courses (21 hours)

ACCT 639 Contemporary Issues in
Accounting 3

BUAD 629 Strategic Management 3

FNCE 639
Corporate Financial Management 3

INFS 619 Information Systems 3

LHRM 619 Leading and Managing in
Changing Times 3

MKTG 629 Marketing Management 3

OPTM 609 . Operations: Competing through
Capabilities. 3

Distance students may complete a General area of emphasis by choosing 15 hours of M.B.A. 600-level electives beyond the core courses. Students may also choose to complete an area of emphasis in Finance by completing 9 hours of course work in the finance area and 6 hours of 600-level M.B.A. electives.

Elective Courses (15 hours)

BUAD 619 Service Management. 3

BUAD 669 Managing Technology for Strategic
Advantage. 3

BUAD 699
Regional Business Environment Europe . . 3

HRMG 619 . . . . . .
Human Resources Management 3

INFS 659 E-commerce Practice 3

INTB 619 Managing in Global Markets. . . . 3

LHRM 629 . . . . . .
Managing Organizational Change. 3

QUAN 619 Research Tools for Managers . . 3

Finance Area of Emphasis

Complete the following courses:

FNCE 629
Investment Management and Analysis. . . . 3

FNCE 649
International Financial Management 3

FNCE 659
Managerial Economics and the
Business Cycle 3

College of Education

David Nelson, Dean

Room 3023 Columbine Hall
Telephone: (719) 262-4996
Fax: (719) 262-4110

The College of Education offers post baccalaureate and undergraduate licensure preparation as well as Master of Arts degrees. Within the Department of Teaching, Special Education, and Curriculum (TSEC), undergraduate and graduate pre-service teacher licensure programs in elementary, secondary, and special education are available. Students may earn a Master of Arts degree in Curriculum and Instruction in specialty areas of technology, gifted and talented, reading, and science. Another option is a Master of Arts degree in Special Education. Within the Department of Counseling and Leadership (COLE), a Master's Degree in Counseling and licensure are available within specialty areas of school counseling and community counseling. Additional programs available are: Counseling and Leadership and Student Affairs in Higher Education. Principal Licensure and a Master of Arts in Curriculum and Instruction with an Educational Leadership specialty are offered within the Leadership Program.

College of Education programs, both initial licensure and graduate, are fully accredited by the North Central Association of Colleges and Secondary Schools and the National Council for the Accreditation of Teacher Education and are approved by the Colorado Department of Education.

PLEASE NOTE: Many courses formerly listed as Curriculum (CURR), Educational Computing (Ed C), Instructional Technology (ITEC), and Reading (RDG) have been renumbered as four digit Curriculum (CURR) courses. Please note these changes when referring to programs begun under older versions of this bulletin. A list of renumbered courses is available in the College of Education Office.

Faculty

Professors: David Fenell, Jerry Flack, Mark Malone, Barbara Swaby; Research Professor: Peter Matthews; Associate Professors: Margaret Bacon, Nadyne Guzman, Stacey Nelson, Al Ramirez, Beverly Snyder; Director of Teacher Education and Assistant Professor: Sylvia Nolte; Assistant Professors: Michael Brunn, Gail Coulter, Randall De Pry, Catherine Kelly, Donna Kelsch; Instructor: Nellie Graber

Programs of Study

Licensure and Endorsement Programs

General Licensure Requirements

The Colorado Educator Licensing Act of 1991 contains a testing process Program for Licensing Assessment for Colorado Educators (PLACE). All students must pass the PLACE content test prior to student teaching. Request specific information from the College of Education or the Colorado Department of Education.

The Licensing Act of 1991 requires the completion of a background check. All students admitted into licensure programs must pass a background check as a condition of admission. Request specific information from the College of Education or the Colorado Department of Education.

Provisional Licensure

All teachers initially licensed in Colorado first receive a provisional license. Provisional licensure through the Teacher Education Program (Elementary/Secondary) requires two semesters of study during the professional year plus one course during the prior summer session and additional course work before the professional year. TEP and SELP coursework for undergraduates is included as a part of a four-year degree program in the College of Letters, Arts and Sciences, or may be pursued after a bachelor of arts has been earned in a liberal arts program. Provisional licensure through the Alternative Licensure Program requires two years and a bachelor of arts degree.

Provisional Principal Licensure and Administrative Licensure are provided as a graduate program.

Additional Endorsement

Certified/Licensed teachers seeking an additional teaching area endorsement to an existing credential should see a TEP adviser to determine the requirements. Special programs can be developed to meet the requirements. Certain of the PLACE assessments are required.

Changes of Program Requirements
Program requirements may change without notification due to changes in licensure standards or state statutes.

Teacher Education Program (TEP)

The Teacher Education Program leads to initial licensure in elementary teaching or secondary teaching in the fields of English, foreign language (Spanish), mathematics, science or social studies.

Students who wish to enter the Teacher Education Program (TEP) should request information from the College of Education office during the freshman year, if possible. Students planning on either elementary or secondary education must complete an undergraduate degree in the College of Letters, Arts and Sciences as well as TEP. Students with undergraduate degrees, from an accredited institution must meet similar requirements. Before applying to enter the program, students must attend a group-advising meeting for a full explanation of the nature of the program and the admission process.

Central features of the Teacher Education Program are the integration of education courses with field experiences. The program requires students to have experiences with diverse populations and in diverse settings. The professional year preparation portion of the program is full-time, (fall and spring) consisting of 26- 27 semester hours. Students participate in the professional year as a cohort group beginning the professional year with one course in the summer, completing the program the following spring semester. The 35-38 semester hours requirement consist of professional course work (foundations of education,

educational psychology, curriculum, methods) and field experiences (observations, co teaching and student teaching) in Professional Development Schools. Additional coursework may be required to meet all of the program requirements.

Course Requirements for Elementary Education Students

The specific course requirements for elementary education students fall into three categories: (1) general education, (2) subject specialization, and (3) professional courses.

General Education

Students should see the Letters, Arts and Sciences (LAS) undergraduate requirements list for the roster of courses which will fulfill the requirements for the 12 hours in three of the areas of general education identified below.

1. Humanities: 13 semester hours.

2. Social Sciences: 13 semester hours.

3. Natural Sciences: 13 semester hours, including a laboratory experience.

4. Mathematics: two courses in mathematics, Math 301 and 302, are required. Students must receive a grade of at least a C in each course.

5. English Language: All students must complete English 131- Composition I and English 141 – Composition II.

Subject Specialization for Elementary Education Students

To ensure that they have adequate background in the subjects they will teach in elementary school, students interested in elementary education must complete a major in an academic subject area. Appropriate majors for elementary teachers are English, geography, history, biology, and Spanish. Students must meet the College of Letters, Arts and Sciences (LAS) requirements. The LAS adviser will assist students in this process.

Professional Courses

Teacher Education courses required for an elementary emphasis are:

SPED 300-2, Introduction to Special Education

T Ed 300-3, Contemporary American Education

T Ed 301-1-3, Early School Experience

T.Ed. 441-1. Children's Literature

T.Ed. 452-2. Educational Psychology

T.Ed. 460-4. School Experience

T.Ed. 461-1-4. Methods for Elementary Education

T.Ed. 462-3. Elementary Reading Methods

T.Ed. 463-(8-14). Student Teaching Elementary

T.Ed. 464-3. Elementary Math Methods

T.Ed. 465-2. Elementary Science Methods

T.Ed. 466-1. Elementary Social Studies Methods

T.Ed. 467-1. Elementary Language Arts Methods

T.Ed. 469-1. Elementary Curriculum, Instruction and Evaluation

Course Requirements for Secondary Education Students

The specific course requirements for secondary education emphasis areas fall into three categories: (1) general education, (2) subject specialization, and (3) professional courses.

General Education

Students should see the Letters, Arts and Sciences Undergraduate Requirement List and an advisor in the Student Success Center for the courses which will fulfill the requirements for the 12 hours in three of the areas of general education identified below.

1. Humanities: 12-13 semester hours

2. Social Sciences: 12-13 semester hours

3. Natural Sciences: 12-13 semester hours

4. English Language: English 131- Composition I and English 141- Composition II

5. Quantitative: 3 semester hours

Subject Specialization for Secondary Education Students

Secondary students must complete a major in their field. This may be in an individual discipline (e.g., English, history, biology, physics, chemistry, Spanish, or mathematics.)

Individual requirements for licensure in particular subject areas are available with either LAS or College of Education advisers. Completion of a major does not meet all the teaching field requirements. Students must see the subject field advising sheets for the specific certification field requirements.

Professional Courses

Teacher education courses required for secondary education majors are:

SPED 300-2, Introduction to Special Education

T Ed 300-3, Contemporary American Education

T Ed 301-1-3, Early School Experience

T.Ed. 452-2. Educational Psychology

T.Ed. 470-2-6. Field Experience

T.Ed. 471-1-3. Methods for Secondary Education

T.Ed. 472-3. Teaching Reading and Writing in the Content Area

T.Ed. 473-(8-14). Student Teaching

T.Ed. 474-3-4. Secondary Methods (Special for the field).

T.Ed. 479-3-4. Secondary Curriculum, Instruction and Evaluation

TEP Admission Requirements

Admission to the TEP is a selective process. Students are admitted twice a year, in November and April.

Undergraduate Admission

The undergraduate program has an admission process beyond the admission requirements of the University. Applications for teacher education must be submitted to the College of Education by September 15 for spring admission and April 15 for fall admission.

Prerequisites/requirements: Appropriate core courses for major and level in order to meet content requirements. Undergraduates planning to apply to the undergraduate TEP Introductory Year will be required to complete the following core courses before being admitted:

T Ed 300 – 3, Contemporary American Education

T Ed 301 – 1-3, Early School Experience Practicum

All courses taken for completion of TEP and licensure must be completed with a grade of B- or better and the stated level of achievement on all levels of performance demonstration assessments. Courses receiving a grade of less than B- and/or the stated level of achievement must be repeated.

First Tier: Introductory Year Criteria

Upper division status or consent of TEP Director

Appropriate major for content and level

SAT or ACT scores

Scholarship: GPA 2.5 or better in all course work

Completion of T Ed 300-3

Experience — Completion of T Ed 301 or 45 hours of early school experience. . . . . 0-10 points

References: Two references from teacher(s)

with whom applicant worked in T Ed 301 or early school experience. . . . . 0-10 points

Background check with CDE

Second Tier Professional Year (Set sequence of courses from June to May)

27 CH for Secondary; 31 CH for Elementary

Fall: Deadline to apply – September 15; Acceptance – November 1

Spring: Deadline to apply – February 15; Acceptance – April 1

Second Year Professional Year Criteria:

Career Goals Statement (describing motivation, interest, decision, and personal qualities) . . . . . 0-20 points

Interview with SOE and PDS team . . . . . 0-20 points

Additional experience with children or youth . . . . . 0-10 points

Additional reference (a minimum of 1, a maximum of 3) . . . . . 0-10 points

Completion of or enrollment in all core courses:

SPED 300-2, Introduction to Special Education

T Ed 452-2, Educational Psychology

Current GPA: 2.5 or better in all college course work . . . . . 0-20 points

PLACE Content Test must be taken by the student teaching experience.

Secondary students should plan to take their PLACE Content Test at the May Test Date at the end of their Junior year, prior to beginning TEP. Elementary students should plan to take the PLACE Elementary Content Test in May prior to beginning TEP or October during the fall TEP semester. Additional Testing requirements may need to be met. It is essential to keep in contact with the College of Education and the Student Success Center to learn what these requirements may be.

Post-baccalaureate Admissions

Process:

- Attend Group Advising Session
- Individual transcript review and advising appointment
- Application
- Interview

Prerequisites/requirements:

Appropriate courses for major and level in order to meet content requirements for licensure. A checklist will be completed by the appropriate TEP content advisor.

Admission dates:

Fall: Deadline to apply – October 1; Acceptance – November 15

Spring: Deadline to apply – February 15; Acceptance – April 1

Post-baccalaureate Selection Criteria:

Academic Degree completed or nearly completed

G. P. A. of 2.5 or better . . . . . 0-20 points

Experience with children and youth (45 hours) . . . . . 0-20 points

Recommendations (minimum of 3, maximum of 5). . . . . 0-20 points

Career Goals Statement (describing motivation, interest, decision, and personal qualities) . . . . . 0-20 points

Content area requirements met or timeline for completion before licensure (TEP Checklist)

Timeline for completion of prerequisites (TEP checklist)

Background check (CDE Educator Licensing)

Completion of the PLACE Content Test and scores. If PLACE Content Test has not been taken by application date the candidate must furnish a copy of the confirmation of Registration. Applicants should plan to take the PLACE Content Test in October or January prior to applying to the program.

Completion of, enrollment in, or timeline for completion for all core courses:

T Ed 300-3, Contemporary American Education

SPED 300-2, Introduction to Special Education

T Ed 452-2, Educational Psychology

No graduate credit is given for course work in the Teacher Education Program

Extended Support Program

Although the initial preparation that TEP teachers receive from TEP is excellent, the challenges of the first year of teaching are considerable and may often extend beyond the ability of even the best first year teacher. The Extended Support Program (ESP) is a special program provided by The College of Education to assist any first year TEP teacher who requests help from the CU-Colorado Springs faculty. There is no cost to the TEP teacher, school, or district. ESP will provide the edge necessary to make the first year experience a more positive experience and provide a better foundation for the future years of teaching. Students will be the ultimate beneficiaries of ESP.

Alternative Licensure Program (ALP)

Students who wish to enter the Alternative Licensure Program (ALP) should request information from the College of Education office. Students planning on either elementary or secondary licensure must have completed an undergraduate degree. Before applying to enter the program, students should attend a group-advising meeting for a full explanation of the program and the admission process.

The professional preparation program in ALP is part-time and consists of coursework during fall, spring and summer semesters with classes in the evenings and on weekends. During the second fall and following spring, the program is school-based and full-time. Additional classes are offered in a seminar format along with the student teaching (5 months) or resident teaching experience (9 months). All of the classes consist of a combination of professional coursework, which includes foundations of education, educational psychology, curriculum and methods, and field experiences. The program emphasizes a commitment to working with at-risk students. Currently, the program is an intensive two-year program consisting of 24 semester hours. Students are admitted as a cohort group to begin the program during the fall semester and complete the program at the end of the following school year. The program is moving toward the performance-based standards required in Colorado. The program hours may increase as changes to courses occur.

A feature of ALP is the option to obtain alternative licensure and to serve as a resident teacher/learner for an entire school year having full classroom responsibility with supervision and assistance by a support team from the university and the district.

The ALP leads to provisional licensure. Selected coursework from the ALP may be used as a part of the Master of Arts in Curriculum and Instruction. Students planning on pursuing the master's degree should see a graduate advisor in the College of Education early in the program. (See Graduate Programs section.)

Alternative Licensure Program Admission Requirements

Admission to the ALP program is a selective process. Students must submit completed applications by April 1, using

the ALP application packet, which includes the standard graduate application process for the College of Education. A complete application includes records (transcripts) of all previous work, a career goals statement, references, and evidence of experience with children and youth. In addition, students must hold at least an undergraduate degree and be able to meet Colorado Department of Education subject area review requirements. Individual interviews are scheduled for selected applicants during May and June.

Students who pursue the master's degree may apply 24 hours from the ALP. The degree involves 10 additional hours of 3 hours of a core course and 6 hours of elective hours. A research paper/project is required for one hour.

Admission is based on a combination of the following factors:

1. Past academic record, including G.P.A.

2. Personal commitment and motivation for teaching, ability to adapt quickly to the school setting, and capability of completing a rigorous fast-paced program, as determined by an interview, the career goals statement, and the quality of the candidate's references.

3. Experiences with children and youth.

4. Individual interview with a team of professional educators.

Elementary Education Program Requirements

Students planning to work toward elementary teaching licensure (K-6) must have the following:

1. Proficiency in mathematics. Students are required to take Math 301-3, and Math 302-2, Math for Elementary Teachers

2. Confirmation by the Colorado Department of Education after a transcript review as having the necessary knowledge of the subject matter to teach in the appropriate endorsement area.

Professional Course Requirements Elementary Education

Courses required for an elementary emphasis are:

Professional Courses-Elementary

CURR 5011 - 3 The Education Profession: Its Bases and Contexts (was CURR 590)

CURR 5012 - 3 Understanding Learners and Learning (was CURR 591)

CURR 5013 - 6 Instructional and Classroom Management Strategies I – Elementary (was CURR 592)

CURR 5013 - 3 Instructional and Classroom Management Strategies II – Elementary (was CURR 592)

CURR 5017 - 6 School Residency and Teaching Seminar - Elementary (Resident Teacher Option) (was CURR 596)

CURR 5019 - 3 School Residency and Teaching Seminar in Elementary Education (was CURR 598)

or

T. Ed. 463 - 8 Student Teaching Elementary (Student Teaching Option)

Secondary Education Program Requirements

Students planning to work toward secondary teaching licensure (grades 7-12) in English, social studies, science, Spanish or math, must complete the following requirement: confirmation by the Colorado Department of Education after a transcript review as having the necessary knowledge of the subject matter to teach in the appropriate endorsement area (generally a major in the endorsement area).

Secondary Education Professional Course Requirements

Professional Courses - Secondary

CURR 5011 - 3 The Education Profession: Its Bases and Contexts (was CURR 590)

CURR 5012 - 3 Understanding Learners and Learning (was CURR 591)

CURR 5014 - 6 Instructional and Classroom Management Strategies I – Secondary (was CURR 593)

CURR 5016 - 3 Instructional and Classroom Management Strategies II – Secondary (was CURR 595)

CURR 5018 - 3 School Residency and Teaching Seminar - Secondary (Resident Teacher Option) (was CURR 597)

CURR 5020 - 3 School Residency and Teaching Seminar in Secondary Education (was CURR 599)

or

T. Ed. 473 - 8 Student Teaching - Secondary (Student Teaching Option)

Special Education Programs

The Special Education Program at the University of Colorado at Colorado Springs provides professional programs that prepare undergraduate and graduate students as special education teachers through exemplary teaching, scholarship, and community service for the purpose of increasing the quality of life for individuals with disabilities and those at risk for societal failure. The Special Education program offers programs leading to licensure in Special Education. Students are eligible for licensure in Moderate Needs, Severe Affective, and Severe Cognitive Disabilities upon completion of either an undergraduate or graduate degree program. A non-licensure option is also available. Application packets are available from the College of Education. The G.R.E. or MAT exam is not required. The MA in Special Education is also available (see Graduate Programs section.)

Philosophy

The CU-Colorado Springs Special Education Program is devoted to preparing students to assume the professional role of a special education teacher. To do this the courses, field experiences, and the scholarly work and service activities are guided by the following set of beliefs and principles. We believe that:

- Students with learning and behavior problems are more alike than different. As a result, the most effective educational approach is determined by individual need and not driven by diagnostic labels.

- To learn basic and advanced academic and social skills, students with learning and behavior problems need to be taught with the most effective, yet parsimonious procedures. As a result, assessment utilizing repeated measures and intervention are combined, then infused across content areas.

- Students with learning and behavior problems need to gain a sense of personal destiny. As a result, self-management, problem solving, critical thinking, and decision-making strategies are taught in our courses, and researched in our demonstration projects.

- Learning should occur in the least restrictive environment with an emphasis on multicultural and global concerns. As a result, teachers are taught to serve as consultants, draw curriculum content from the greater community, and teach students in the mainstream of life.

- Students with learning and behavior problems must learn the skills to be successful and enjoy life after leaving school. As a result, career education and transition is a crucial course. Career education and transition concepts are also infused into numerous courses.

- Services for children are most appropriately delivered in a problem-solving model committed to resolving education-

al challenges. As a result, our program emphasizes an ecological perspective to identify problems and potential solutions.

■ All children must be educated under a unified system of educational services. As a result, the traditional dual model of general and special education must combine resources to provide educational services to all students.

■ Best educational practices do not discriminate against economic, ethnic, or cultural groups. However, teachers' attitudes and personal beliefs do. As a result, we attempt to teach our graduate students to respect and understand individual differences.

Undergraduate Special Education Licensure Program (SELP)

The College of Education, in collaboration with the College of Letters, Arts, and Sciences has adopted a program of study that allows undergraduate teacher candidates to major in one of five content areas: Biology, English, Geography, History, or Spanish. Students who are accepted into the undergraduate special education program will choose their undergraduate major and complete degree-related coursework (79-80 hours), complete core course in special education (17 hours), and take courses from one of the following endorsement areas: Track 1-Moderate Needs and Severe Affective Disabilities (23 hours); Track 2-Moderate Needs and Severe Cognitive Disabilities (23 hours); or Track 3-Severe Affective and Severe Cognitive Disabilities (26 hours). The undergraduate SELP allows all teacher candidates to complete a content major within the College of Letters, Arts, and Sciences and two endorsement areas in special education in 4 years (119 to 123 hours). The special education core courses and endorsement areas are outlined below:

SPED Core Courses

SPED 300 Introduction to SPED 3
SPED 401 Policies and Procedures. 3
SPED 405 Applied Behavior Analysis. 3
SPED 410 Assessment and Instructional Monitoring 3
SPED 428 Self-Determination and Transition 3
SPED 452 Educational Psychology. 2

17 hours

Track 1: Moderate Needs and Severe Affective Endorsements

SPED 407 Language Arts I 3
SPED 455 Language Arts II 3
SPED 420 Behavior and Social Skills I. . . . 3
SPED 421 Behavior and Social Skills II . . . 3
SPED 471 Practicum 3
SPED 436/437 Elementary and Secondary Student Teaching 4

23 hours

Track 2: Moderate Needs and Severe Cognitive Endorsements

SPED 407 Language Arts I 3
SPED 455 Language Arts II 3
SPED 416 Significant Support Needs 3
EDC 469 Technology for Learners with Special Needs 3
SPED 471 Practicum 3
SPED 436/437 Elementary and Secondary Student Teaching 4

23 hours

Track 3 Severe Affective and Severe Cognitive Endorsements

SPED 407 Language Arts I 3
SPED 420 Behavior and Social Skills I. . . . 3
SPED 421 Behavior and Social Skills II . . . 3
SPED 416 Significant Support Needs 3
SPED 469 Technology for Learners with Special Needs 3
SPED 471 Practicum 3
SPED 436/437 Elementary and Secondary Student Teaching 4

26 hours

Student Teaching Experience Descriptions

1. Student Teaching. Participants must complete two- sixteen week experiences (16 weeks in an elementary setting and 16 weeks in a secondary setting). Student teaching placements cannot be completed during summer semester.

2. Paraprofessionals. Students employed as special education paraprofessionals may complete a student teaching experience in their place of employment. The special education teacher and principal must agree that opportunities are available for you to complete the course competencies with students in your targeted licensure areas. Paraprofessionals are required to complete a 16-week experience including a minimum of 5 visits to special education classrooms in other schools, and a second 16-week student teaching experience at a different level. Student teaching must be completed with a 50-mile radius of the CU-Colorado Springs main campus.

Graduate Special Education Licensure Program

Students in the graduate SELP receive their MA in Special Education after successfully completing a minimum of 33 hours of specified courses. Students may also work on licensure courses in the following endorsement areas: Moderate Needs, Severe Affective, and Severe Cognitive Disabilities. To enter the program:

Request a graduate application and information packet from the College of Education

Schedule an appointment with a special education faculty member to develop a graduate plan.

Application deadlines: Spring Semester-October 15; Summer Semester-April 1; and Fall Semester-June 15.

Student Teaching Experience Descriptions

1. Student Teaching. Participants who do not hold a valid Colorado teaching certificate must complete a minimum 16-week experience in an elementary setting and 16 weeks in a secondary setting. Student teaching placements cannot be completed during summer semester.

2. On-the-Job Student Teaching. Participants who are employed as teachers and hold a current TTE may complete a 16-week OTJ student teaching experience. OTJ teachers must work with special education students in their targeted endorsement areas and be evaluated by a District special education supervisor. To qualify for K-12 special education licensure, OTJ teachers must also complete: 1) a minimum of 5 visits to special education classrooms in other schools, and 2) a second student teaching experience during summer semester.

3. Paraprofessionals. Students employed as special education paraprofessionals may complete a student teaching experience in their place of employment. The special education teacher and principal must agree that opportunities are available for you to complete the course competencies with students in your targeted licensure areas. Paraprofessionals are required to complete a 16-week experience including a minimum of 5 visits to special education classrooms in other schools plus a second student teaching experience during summer semester at a different instructional

level. Student teaching must be completed within a 50 mile radius of the CU-Colorado Springs main campus.

Reading Endorsement

The professional endorsement program provides the graduate training necessary for state endorsement as a grades K-6, 7-12, or K-12 reading teacher.

The program requires the completion of the master's degree requirements. The elementary reading option leads to grades K-6 endorsement. The secondary reading option leads to 7-12 endorsement. The elementary/secondary reading option leads to K-12 endorsement.

In addition, K-6 endorsement requires a 3-credit practicum at the elementary level, 7-12 endorsement requires a 3-credit practicum at the secondary level and K-12 endorsement requires two 3-credit practicum, one at the secondary level and one at the elementary level. The College of Education office should be contacted for information concerning application to this program.

Core M.A. requirements

CURR 5000 (was SFND 500), CURR 5001 (was REM 501), CURR 587-3 — 9 hours

Special methods, electives — 5 hours

Program Options

Elementary Emphasis

Core Courses

CURR 5401 Teaching Reading in the Elementary School (was CURR 504) 3

CURR 5410 Diagnosis and Remediation of Reading Difficulties (was CURR 510) 3

CURR 5420 Children's Literature (was CURR 541) 3

CURR 5411 Psycholinguistics and Reading (was RDG 511) 3

CURR 5430 Elementary Reading Clinic (was RDG 570) 4

CURR 5413 Organization & Management of Reading Programs (was RDG 517) 3

CURR 5400 Teaching Reading & Writing in Content Areas (was RDG 502) 3

or

CURR 5431 Secondary Reading Clinic (was RDG 571) 4

CURR 5001 Introduction to Research and Statistics (was REM 501) 3

Minor Concentration - 9 credit hours from any one graduate field.

Six credit hours of student's choice

Secondary Emphasis

Core Courses

CURR 5400 Content Area Reading (was RDG 502) 3

CURR 5413 Organization and Management of Reading Programs (was RDG 517) 3

CURR 5410 Diagnosis and Remediation of Reading Difficulties (was RDG510) 3

CURR 5421 Adolescent Literature (was RDG 545) 3

CURR 5411 Psycholinguistics and Reading (was RDG 511) 3

CURR 5431 Secondary Reading Clinic (was RDG 571) 4

CURR 5001 Introduction to Research and Statistics (was REM 501) 3

Minor Concentrations 9 credit hours from any one graduate field

Six credit hours of student's choice

Elementary/Secondary Emphasis

Core Courses

CURR 5401 Teaching Reading in the Elementary School (was RDG 504) 3

CURR 5410 Diagnosis and Remediation of Reading Difficulties (was RDG 510) 3

CURR 5400 Teaching & Writing in Content Areas (was RDG 502) 3

CURR 5420 Children's Literature (was RDG 541) 3

or

CURR 5421 Adolescent Literature (was RDG 545) 3

CURR 5413 Organization & Management of Reading Programs (was RDG 517) 3

CURR 5411 Psycholinguistics and Reading (was RDG 511) 3

CURR 5430 Elementary Reading Clinic (was RDG 570) 4

CURR 5431 Secondary Reading Clinic (was RDG 571) 4

Minor Concentration - 9 credit hours from any one graduate field.

Three credit hours of student's choice

All three options (elementary emphasis, secondary emphasis, and elementary/secondary emphasis) culminate in a written comprehensive examination. This examination may be taken when all core courses have been completed.

Principal Licensure/ Administrator Licensure

The curriculum of the CU-Colorado Springs Educational Leadership Program has been carefully designed to ensure the development of school leaders. The program is designed for individuals who wish to become eligible for Principal Licensure or Administrator Licensure through the Colorado Department of Education or for individuals who wish to serve as non-administrator leaders in the schools and school community. Specific eligibility requirements for licensure should be discussed with a faculty advisor prior to enrollment. The program's underlying philosophy is that quality instructional leaders, whether classroom teachers or administrators, are essential to effective schools.

The curriculum of the program has been aligned with the requirements of the Colorado Commission on Higher Education, the Colorado standards for principal and administrator licensure, the NCATE Curriculum Guidelines, and the AASA Professional Standards for the Superintendency.

Principal Licensure

Eligibility criteria for the Principal Licensure program are:

1. Eligibility for the M.A. in Curriculum and Instruction with an emphasis in Educational Leadership;

2. Documented successful experience as a licensed professional in education;

3. Demonstrated motivation and involvement in leadership activities; and

4. Field recommendations.

Administrator Licensure

Eligibility criteria for the Administrator Licensure program are:

1. M.A. degree from an accredited institution;

2. Demonstrated motivation and involvement in leadership activities;

3. Field recommendations; and

4. Completion of an approved Principal Licensure program.

Individual questions about these criteria should be discussed with a faculty advisor.

Principal licensure with an M.A. degree in Curriculum and Instruction requires 42 semester hours of coursework. Administrator Licensure requires 9 semester hours beyond the Principal Licensure. Individual exceptions can be discussed for students with extended previous coursework.

Master of Arts — Curriculum and Instruction

The Curriculum and Instruction master's degree is primarily designed for licensed, practicing teachers who desire to continue developing their professional expertise. The program is also open to students in the Alternative Licensure

Program (ALP), above, who may use selected coursework as part of their degree plan. The College offers a master of arts degree with six areas of emphasis including: General C&I Emphasis, Gifted and Talented Education Emphasis, Instructional Technology Emphasis, Leadership Emphasis, Reading Emphasis, and Science Education Emphasis. A minimum of 33 semester hours of coursework is required for the degree. Some emphasis areas require more hours.

Most courses in this master's degree program emphasize the application of electronic technology in teaching. Students entering the program must be proficient in using electronic technology in curriculum and instruction. Students who do not have adequate skills in word processing, Internet access, e-mail, and making electronic presentations, etc. are advised to seek out remedial training before beginning the program. All students complete a core of work that asks them: (1) to examine educational issues from the perspective of their social context; (2) to become intelligent consumers of research and apply research to their instructional settings. To this end the degree requires these core courses:

CURR 5000-3. Social Foundations and Trends

CURR 5001-3. Introduction to Research & Statistics

CURR 5090-3. Research Project (Should be taken near the end of the degree program. Replaces comprehensive exams.)

General C&I Emphasis

The General C&I Emphasis is designed for students with broad interests in the field of education as opposed to those who wish to concentrate in a particular area of the curriculum. Students in this area of emphasis are required to take CURR 5002-3 (Issues, Strategies and Models in Curriculum Design) to further their understanding of curricular design and models of teaching.

The selection of a cognate field allows the student to concentrate their coursework in an area of instruction in which they wish to develop their expertise while allowing them to use elective from other areas of the school curriculum to pursue a broad array of interests.

Cognate Fields 9 semester hours

Students may choose their cognate field from the following programs: Counseling and Human Services, Gifted and Talented, Instructional Technology, Instructional Technology, Leadership, Math, Reading, Science Education, Special Education,Electives 12 semester hours

The 12 semester hours of elective courses may come from either the College of Education or the College of Letters, Arts, and Sciences.

Gifted and Talented Education Emphasis

M.A. candidates may elect to study the emphasis area of gifted child education in pursuit of either a Curriculum and Instruction or Special Education/ non-endorsement degree. A program description is available upon request from the College of Education office.

The gifted and talented program provides educators with a broad background and sound foundation in current educational research, theory, and practice serving the need of children and adolescents whose primary area of exceptionality is gifted and talented. No Colorado certification or endorsement is available at this time.

Instructional Technology Emphasis

The Instructional Technology emphasis within the Curriculum and Instruction Master's Degree seeks to serve educators who wish to become knowledgeable about computers and related technologies, to learn and teach with the computer, to create various learning environments in which students can utilize technology in their learning, and to provide leadership in the effective use of technology in education. This area of emphasis is designed to serve professional educators. It emphasizes classroom applications of computing and technology and has the following objectives:

1. The student will acquire broad technological background in the application of information processing technologies to the classroom curriculum.

2. The student will acquire a sophisticated understanding of the use of computers for computer assisted learning in a wide variety of fields of study, including design considerations, selection, and evaluation of software and educational programs, the planning of lessons and instructional units based on computer-assisted instruction, and the legal rights and responsibilities of the computer educator.

3. The student will examine technological developments and the results of research on the effectiveness of various programs and systems.

4. The student will discuss the social, economic, educational, and political impact of computers and related technologies.

5. The student will examine a broad spectrum of educational research and outline studies and projects appropriate to the field.

6. The student will conduct an in-depth investigation of the application of various educational technologies in specialized areas.

7. The student will examine management and maintenance strategies for programs, software, and hardware at either the classroom or building level.

8. The student will successfully integrate and apply theoretical knowledge of instruction with computers to modern issues, and maintain a base of current information on developments in the field.

9. The student will select and design appropriate solutions to meet the needs of learners with special needs.

The program requires 33 hours of coursework including the following courses: CURR 5001 (was REM 501), CURR 5001-3, CURR 5090-3 (taken near the end of your program), CURR 5150 (was ITEC 530), CURR 5151 (was ITEC 540), CURR 5152 (was ITEC 550), CURR 5123 (was ITEC 570).

Leadership Emphasis

Eligibility criteria for the Master's degree emphasis in Educational Leadership are listed in the College of Education Graduate Admission Requirements. The program requires 42 semester hours of coursework. Requirements for completion of the program include a prescribed portfolio (described in the student handbook) and a final research paper. The master's degree program is combined with the program for principal licensure.

Reading Emphasis

Refer to Reading Endorsements in Licensure and Endorsement section, above.

Science Education Emphasis

The Master of Arts program in Science Education is designed primarily for teachers who wish to improve their science teaching skills or become leaders in the field of science education. The program is appropriate for teachers at all levels (K-12) who wish to learn more about applying contemporary science teaching strategies in their schools.

The program is designed to provide classroom teachers with a sound background in current science education research, theory and practice. Emphasis is placed on utilization of inquiry strategies, manipulative activities, and science process skills as a basis for science instruction. Teachers completing this program will be prepared to: teach science in a self-contained setting, serve as science teachers for schools utilizing departmentalization, serve as a science resource teacher at the school or district level, or pursue an advanced degree in science education.

The Science Education program requires a total of 33 semester hours of coursework. A thesis option is available but not required. Coursework hours required include:

12 to 18 hours of science education (offered through the College of Education)

12 to 18 hours of other College of Education courses

0 to 6 hours of courses for the College of Letters Arts and Sciences (300 or level or above)

Additional requirements:

Core courses of the Curriculum and Instruction Degree: CURR 5000-3 (was SFNF 500), CURR 5001-3 (was REM 501), and CURR 5090-3 (was CURR 587).

Master of Arts — Special Education

Students may earn the Master of Arts degree in Special Education after completing a minimum of 33 specified semester hours as outlined in their graduate plan. In the final course (SPED 550 Applied Research Project) students complete a field-based research project and present data to faculty and peers. Students must complete additional coursework as outlined on their graduate plan to be eligible for licensure.

Emphasis in Gifted and Talented Education

The Master of Arts degree in Special Education emphasis in Gifted and Talented Education is awarded after the completion of 30 hours of courses with an average grade of B or better. In addition, each student must pass a written comprehensive exam. Students may transfer up to 9 hours of recent comparable graduate course work.

Master of Arts — Counseling and Human Services

The primary purpose of the graduate programs in Counseling and Human Services is to prepare counselors and other human services personnel to serve as competent school counselors and community counselors. Two tracks are available for students in the Counseling and Human Services Program. Track One is designed to prepare professionals for work as school counselors. Track Two is designed to prepare professionals for work in mental health centers, agencies, business and industry, and private practice.

The Counseling and Human Services Program stresses the importance of the growth and development of the student throughout life and includes coursework that emphasizes the personal and professional growth of the student in addition to the traditional graduate courses emphasizing counseling theory and practice.

The Professional Core is a six course (18 semester hour) sequence lasting one full academic year (2 semesters + summer). Students admitted to the program must commit to completing these courses in sequence beginning the fall semester of their first year in the program. Students are also required to complete a Practicum of 100 clock hours and a two-semester Internship of 600 clock hours in a school or agency.

School Counseling Emphasis

The College of Education offers a Counseling and Human Services Program with an emphasis in School Counseling. The School Counseling program meets the requirements of the Colorado Department of Education and is based on the national standards recommended for the preparation of school counselors. In accordance with these standards, the school counselor program requires the completion of 48 semester hours of appropriate academic credit.

School counselors are specifically credentialed professionals who work in school settings with students, parents, educators, and others within the community. They design and manage comprehensive developmental guidance programs to help students acquire skills in the social, personal, educational, and career area necessary for living in a multicultural society. School counselors accomplish this by employing such interventions as guiding and counseling students individually or in small groups, by providing information through group guidance, by contributing to the development of effective learning environments, by providing student advocacy and by providing consultation with others.

The CU-Colorado Springs School Counselor program is designed to prepare students to work in elementary, middle or secondary levels. Students are endorsed in either elementary or secondary counseling depending on their career goals and through the appropriate selection of practicum and internship sites. School counseling graduates may meet the academic requirements for licensure as a professional counselor in Colorado.

Community Counseling Emphasis

The College of Education also offers a Community Counseling area of emphasis within the Counseling and Human Services Program. This emphasis is designed to prepare graduate students to assume positions as counseling professionals in mental health centers, community agencies, business and industry and in private practice. Students are prepared in the areas of human development, research and testing, professional ethics, career development, theories and practice of individual group and marriage and family counseling, conflict resolution, and the etiology of mental illness and dysfunctional behavior. They may provide professional services to individuals, couples, families and groups, for the purposes of treating psychopathology and promoting optimal mental health. Promotion and enhancement of healthy, self-actualizing, and satisfying life-styles are the primary goals of community counseling.

The Community Counseling program is based on national training standards and

is designed to meet the academic requirements for licensure as a professional counselor in Colorado. To prepare Community Counselors for licensure a sixty-one semester-hour training program is required.

Through the appropriate selection of electives, the student in the Community Counseling program may develop a specialization area such as addictions counseling, conflict resolution, play therapy, hypnotherapy, marriage and family counseling or counseling in business and industry. Students with specialized interests should make these known to their adviser for inclusion in degree planning.

The Counseling and Leadership track within the Counseling and Human Services Program is designed to prepare community, business and military leaders to effectively apply counseling and leadership skills to their professional work settings. This 45 semester hour track does not lead to licensure as a professional counselor but offers considerable flexibility in course scheduling and in the selection of electives.

The Student Affairs in Higher Education track is offered to students who wish to work in a counseling/administrative capacity in higher education. This includes Admissions, Student Success, Financial Aid, the Counseling Center, Housing and other areas. This program leads toward licensure as a professional counselor and requires a total of 700 hours of field experiences. Characteristics of college student populations are considered as well as overall characteristics of student affairs in higher education. Topics include but are not limited to models of organizational behavior, consultation theories, historical and contemporary trends, program management and evaluation of higher education programs.

Application Procedures

The Counseling and Human Services program begins with a new entering class each fall. Admission to the program is a selective process with limited enrollment. Students are selected in the spring semester for admission the following fall.

Complete applications must be submitted by February 28th for consideration. These must include:

1. official transcripts of all previous academic work;

2. career goals statement and self-evaluation;

3. scores from the Miller Analogies Test (MAT) or the Graduate Record Exam (G.R.E.);

4. the Minnesota Multiphasic Personality Inventory (MMPI);

5. four letters of recommendation; and

6. an admissions interview and other admissions activities.

Applicants will be notified of the results of this review by May 31st each year.

Admission Requirements

Teacher Education Program (TEP)

Please refer to TEP Admission Requirements under Licensure and Endorsement section, above.

Alternative Licensure Program (ALP)

Please refer to ALP Admission Requirements under Licensure and Endorsement section, above.

Special Education Licensure Program (SELP)

Undergraduate SELP students should refer to the admission requirements listed for Letters, Arts, and Sciences Distributed Studies Majors. Graduate SELP students' requirements are listed below.

Graduate Programs

An applicant to the Graduate School must:

1. Hold a baccalaureate degree from a college or university of recognized standing and equivalent to the degree given at this University or have done work equivalent to that required for such a degree and have completed at least 96 semester hours of work that would be acceptable toward a corresponding degree at this University.

2. Show promise of ability to pursue satisfactorily advanced study and research, as reflected by previous scholastic records and other data.

3. Have an adequate preparation to enter graduate study in the field chosen.

Specific Graduate Admission Requirements of the College of Education

In addition to the general requirements, the student admitted to regular graduate standing in the College of Education must meet the following requirements.

1. Satisfactory Graduate Record Examination (G.R.E.) or Miller Analogies Test (MAT) scores. Special Education does not require G.R.E. or MAT tests.

2. Attainment of an undergraduate grade point average of 2.75 or higher on a 4.0 scale for regular admission. Occasionally students with an undergraduate grade point of 2.74 or below may be admitted provisionally if other factors warrant acceptance. These may include marked improvement in upper division work compared with lower division work, high G.R.E. or MAT scores, excellent references from paid or volunteer work experiences relating to the area of proposed graduate study, and/or well articulated verbal and written statements of goals. A student who seeks admission but does not have an acceptable grade-point average may take graduate course work as an unclassified student to demonstrate ability to do graduate work. A maximum of 9 credits may apply toward the degree.

3. Preference will be given to students who have a sound program of undergraduate work in the liberal arts and in a teaching field, a valid teaching certificate, and teaching experience (with the exception of counseling students).

4. An interview with at least one faculty member prior to applying is required.

Transfer Students

Students transferring from accredited collegiate institutions must meet the same requirements as students entering teacher education. Formal application along with the required documentation must be made both to the University and to the College of Education within the stated deadlines.

College work more than seven years old may not count or may require updating, especially in the teaching field and in professional education.

Credits transferred from other institutions to the University of Colorado will be limited to the type and amount of credit given for similar work in the University of Colorado. A maximum of

10 semester hours of education credit may be transferred to the Teacher Education Program. The TEP Director will determine transfer of education credit.

Unclassified Students Graduate Programs

Many persons professionally engaged in education feel the need to update their competence or are required to complete a specified amount of graduate study for certificate renewal, advancement in salary, change of assignment, or the like. If they are not interested in earning a graduate degree, they should apply to the Office of Admissions (not the College of Education) for admission as University unclassified students. Upon admission they may enroll, and after the term receive an official record of work completed. They may confer with College of Education faculty about courses in which to enroll. If unclassified students should decide at a later date to apply for graduate student status they should know that only 9 hours taken in unclassified student status may apply toward a graduate degree.

Academic Policies

Transfer Credit

Work already applied toward a master's degree received at another institution cannot be accepted for transfer toward a master's degree at the University of Colorado; extension work completed at another institution cannot be transferred; and correspondence work, except to make up deficiencies, is not recognized. Course work completed at another CU campus will most likely transfer.

All work accepted by transfer must come within the six-year time limit or be validated by special examination.

Credit will not be transferred until the student has established, in the Graduate School of this University, a satisfactory record of at least one semester in residence. Such transfer will not reduce the residence requirement at this University but it may reduce the amount of work to be done in formal courses.

Excess undergraduate credits from another institution may not be transferred to the Graduate School. Seniors in this University may, however, transfer a limited amount of advanced resident work (up to 9 semester hours) provided such work:

1. Is completed with distinction in the senior year at this University.

2. Comes within the six-year time limit.

3. Has not been applied toward another degree.

4. Is recommended for transfer by the department concerned and is approved by the dean of the Graduate School. To be eligible for courses to be considered for transfer, a student must have an overall B average in all courses taken at the University of Colorado in Graduate School.

Special Sources of Credit

Transfer of Unclassified Student Credit

A department may recommend to the graduate dean the acceptance of as much as 9 hours of credit toward the requirements for a master's degree for courses taken either as a student at another recognized graduate school, as an unclassified student at this University, or both.

Extended Studies Courses

Students may take graduate courses through Extended Studies in the pursuit of graduate study if they obtain prior academic approval from the major department and the dean.

Computer Literacy Requirements

All students admitted into College of Education programs after January 1, 1983 must demonstrate proficiency in computer literacy prior to graduation or completion of certification.

Access to Teacher Education Courses

The following 300-level courses in teacher education may be taken by students who are at least at the sophomore level.

T.Ed. 300-3. Contemporary American Education.

T.Ed. 940.1-6. Independent Study.

All other T.Ed. courses may be taken only by students who have been accepted into the Teacher Education Program of the College of Education or who have received special permission from the Teacher Education Program Director.

Graduate Program Policies

Course Descriptions

The value of each course in semester hours is given as part of the identifying department number; for example, Ed.Psy. 500-3 identifies Advanced Psychological Foundations of Education as a 3-semester-hour graduate course.

With some exceptions, courses numbered 400 to 499 are usually taken during the senior year and may not be applied toward a graduate degree.

Course Load

No graduate student may receive graduate credit toward a degree for more than 15 hours in a regular semester.

The maximum number of graduate credits that may be applied toward a degree during a summer session is 6 hours per 5-week term, 9 hours per 8-week term, and 10 hours per 10-week summer session.

Graduate level courses

Courses numbered 500 and above are graduate courses and are primarily for students at the graduate level. Occasionally senior undergraduate students may obtain permission from their advisor to take graduate level coursework. Courses applied to the undergraduate degree may not be used as part of master's degree requirements.

Course prerequisites for undergraduate programs are outlined earlier in this bulletin. Additional prerequisites are noted in the listing of courses that follows. Note also the statements in the Schedule of Courses issued each semester.

The Schedule of Courses generally is available several weeks before the beginning of each semester. It provides a complete list of offerings and a statement of time and place.

Time Limits

Master's degree programs must be completed and the degree conferred within six years of the date of first registration for the program. Credit for work taken at the University of Colorado that becomes outdated may be validated by special examination.

Graduate degree students are expected to be continuously enrolled until the degree is completed. Students who can-

not be continuously enrolled should notify an advisor.

Master's theses and professional reports are due in final form signed by supervising professors and ready in every respect to be handed in before the deadline specified for each semester.

Final Comprehensive Examinations

A final comprehensive examination is administered to candidates for master's degrees during the term in which they are enrolled for their last courses, unless indicated otherwise in specific program descriptions. (Students may postpone the final examination to the next term after completion of course work, but they must register for it and pay the required fee.) The examination pertains to the student's field of specialization and is prepared and evaluated by three professors. Generally, no oral examination is given, although one may be requested in addition to the written examination. A student who does not pass the examination may request permission to be examined again after three months. A student may take the comprehensive examination only twice.

Quality of work

For all master's degrees an average of B or better is required in all work offered for the degree. Transferred credits are not included in calculating an average.

In general, any graduate course in which a mark of C or lower is reported as failed and must be repeated and passed if it is required in a student's degree plan. Programs may have additional requirements.

Students who do not maintain a B average or better may be suspended by the dean of the Graduate School upon the recommendation of their advisor and the dean of education, or suspended from the Graduate School for continued failure to maintain satisfactory progress toward the degree sought.

Graduation Procedures

Please contact the College of Education at the end of the semester prior to the intended semester of graduation for appropriate paper work. Failure to submit required graduation materials prior to the first day of classes in the semester of intended graduation may result in a delay of graduation.

Course Fees

All students taking the following courses within the College of Education will be charged course fees associated with each course:

COUN 570 Internship in Sch. Coun. . . $100

COUN 572 Internship in Comm. Coun. $100

CURR 4101/5101 Intro Micros in Education Lab $25

CURR 4130/5130 Multimedia Development $25

CURR 4140/5140 Graphics Design. $25

CURR 5017 Sch.Res. & Tchg. Sem., Elem. $25

CURR 5018 Sch.Res. & Tchg. Sem., Sec. $25

CURR 5019 Teaching Seminar – Elem. . $25

CURR 5020 Teaching Seminar – Elem. . $25

CURR 5153 Authoring $25

CURR 5501 Exploring the Science Curriculum $10

CURR 5502 Developing Manipulative Materials for Science Teaching. $10

CURR 5503 Integrating Reading and Science $10

CURR 5510 Science and Environmental Education for Gifted Students $10

CURR 5511 Teaching Energy and Environment $10

CURR 5512 Energy and Environmental Activities $10

CURR 5513 Activities for Teaching Earth Science. . . $10

CURR 5514 Activities for Teaching Weather $10

CURR 5520 Activities for Teaching Physical Science $10

CURR 5521 Activities for Teaching Electricity and Magnetism . . . $10

CURR 5530 Cutting-Edge Science for Cutting-EdgeTeachers $10

LEAD 682 Practicum: The Principalship $100

SPED 410/510 Academic Assessment and Instruction $35

SPED 428/528 Self-Determination and Transition I $35

SPED 436/536 Student Teaching Elem. $100

SPED 437/537 Student Teaching Sec. $100

SPED 471/585 Practicum II $100

SPED 576/576 & 477/577 Student Teaching $100

T ED 460 School Experience – Elem. . . $25

T ED463 Student Teaching – Elem. . . . $100

T ED 464 Elem. Math Methods $25

T ED 465 Elementary Science Methods $25

T ED 470 School Experience – Sec. $25

T ED 473 Student Teaching – Sec. $100

NOTE: Fees listed above are based on the best information available at the time of publication. Actual fees may differ.

College of Engineering and Applied Science

Ronald M. Sega, Dean

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Vision

To be an active and respected leader in the education, research and production community in the region.

Mission

Support the needs of the region by providing unparalleled undergraduate and graduate engineering and applied science education and by engaging in research of international stature which supports these needs.

Academic Programs

Bachelor of Arts
- Mathematics

Bachelor of Science
- Computer Engineering
- Computer Science
- Electrical Engineering
- Mathematics
- Mechanical Engineering

Master of Science
- Applied Mathematics
- Computer Science
- Electrical Engineering
- Mechanical Engineering

Master of Engineering – Options
- Aerospace and Information Operations (pending)
- Engineering Management
- Information Engineering & Operations (pending)
- Manufacturing
- Remote Sensing
- Software Engineering
- Space Operations

Doctor of Philosophy
- Computer Science
- Electrical Engineering

Common Freshmen Year

The College of Engineering and Applied Science has implemented a common freshmen year for entering freshmen students. This program allows the student to explore foundational material in science, mathematics, computer science, and engineering problem solving that are common to all of the majors offered by the College. The curriculum of the Common Freshmen Year does allow a change of major within the College to occur during the Freshmen Year without loss of credit or delay in graduation. During the first year, the academic work and, hopefully, an exposure to the industrial or governmental workplace should help the student decide on a major. A major must be declared before attaining Sophomore status. Details are provided in the Academic Policies section.

Advisory Board

The College of Engineering and Applied Science (EAS) has an Advisory Board, which consists of leaders (Chief Executive Officers, Presidents, Engineering Managers, etc.) of many of the largest electronics/ computer/aerospace companies in the region. In addition, there are representatives from organizations such as Air Force Space Command, Economic Development Corporation, Air Force Academy and Chamber of Commerce. This Advisory Board works closely with the Dean and faculty of the College to develop first-class programs to meet present and future needs of the region. The Board helps provide the financial and human resource support to the College. The Board also advises the College on areas of excellence to be developed, degree programs needed, courses needed, equipment available, joint research areas, and cooperative faculty and student programs.

The Engineering Profession

Engineering is the application of scientific theories and resources of nature for the benefit of humanity. Mathematics provides the fundamental theories and basis for all of the sciences. Computer science provides the essential computational and process control tools for nearly every aspect of modern society. The disciplines of computer science, computer engineering, electrical engineering, and mechanical engineering all require a significant study in mathematics. Computer engineering offers a mixture of half computer science and half electrical engineering. Graduates of all five disciplines work primarily in technical careers, either public or private, but some also become teachers, managers, or entrepreneurs with their own businesses.

Requisite Qualifications

The prospective computer scientist, engineer or mathematician should appreciate mathematics and have a keen interest in science and its methods. The ability to express ideas in both written and verbal form is of primary importance. The ability to understand problems and produce creative and innovative solutions is also a necessary prerequisite.

Personal qualities such as initiative, energy, willingness to take responsibility, reliability, honesty, good judgment, the ability to work and cooperate with others, and to work through to the conclusion of an assignment are important. Obviously, the fundamentals of sound citizenship are necessary in any profession.

Employment

Employment demand for computer scientists, computer engineers, electrical engineers, mechanical engineers, and mathematicians is expected to grow faster than the average of all professions well into this century. Abundant opportunities will present themselves to graduates of these disciplines, in both public and private laboratories, in industry, and in commercial enterprises.

Financial rewards to be earned compare favorably with those of other professions; however, no one should enter any profession solely for monetary rewards. Rather, the dominant consideration should be the opportunity to use a lifetime for the advancement of society and the consequent personal satisfaction and enjoyment that come from a well-spent life.

Laboratory Facilities

Computer Science

The Computer Science Department maintains well-equipped laboratories containing a wide variety of computing resources. The Computer Science and Mathematics Hewlett-Packard Laboratories contain over 50 networked microcomputer systems. The Computer Science Advanced Computing Laboratory contains a variety of UNIX and PC workstations including several Silicon Graphics systems. This laboratory supports research in artificial intelligence, databases, graphics, and multimedia. The Software Engineering Laboratory is equipped with four SUN SPARC stations.

Electrical and Computer Engineering

Communications and Signal Processing Laboratory (CSPL)

The Communications and Signal Processing Laboratory (CSPL) provides a focus for sponsored and unsponsored research in communication systems, communication theory, and signal processing. The physical facilities of the laboratory consist of 500 square feet of space, computer facilities composed of several work stations and Pentium-based personal computers, commercially available software (Signal Processing Workstation, BoNES, MATLAB, COMNET), laboratory-developed software, commercially acquired test equipment, and some specialized equipment. The personnel complement involves two full-time faculty and about ten graduate students. Funding sources have included the Office of Naval Research, the National Aeronautics and Space Administration, the National Science Foundation, and several industrial concerns. Research projects have included analyses, computer simulation, and hardware experimentation involving spread spectrum communications, space communications, and wireless mobile communications.

Control-Systems Laboratory (CSL)

The control-systems laboratory (CSL) comprises a number of student and research work centers. Each work center has at least one device to control, which includes Educational Control Products' (ECP) Magnetic Levitation and Control-Moment Gyroscope systems and a Rhino Robotics six-degree-of-freedom robotic arm. Each center has a full complement of test-and-measurement equipment.

The dynamic devices may be configured to study identification and control of linear or nonlinear, stable or unstable, SISO, collocated SIMO, noncollocated SIMO and full MIMO control. Control is accomplished using Comdyna GP-6 analog computers or a digital computer running the Real Time Linux operating system, via MathWorks' Matlab/Simulink/the Real Time Workshop and Quality Real-Time Systems' (QRTS) Real Time Linux Target.

The laboratory provides opportunities for undergraduate and graduate student research in all aspects of control systems. The lab supports undergraduate analog and digital control-systems lab courses, and projects in both undergraduate and graduate control-systems courses. For further information on opportunities for undergraduate and graduate students, please contact Dr. Gregory Plett at glp@eas.uccs.edu. For further information about the CSL, please see the web page at http://mocha-java.uccs.edu/CSL.

Funding sources for the CSL have included substantial discounts from ECP, QRTS and Mathworks, as well as a grant from the National Science Foundation.

Electronics Laboratory (ECL)

The laboratory is used for instruction in basic circuits design, digital circuits design, microcomputer systems design, and electronic circuits design. The laboratory is equipped with power supplies, function generators, oscilloscopes, logic analyzers, and other components needed to support required laboratories in the Electrical Engineering and Computer Engineering curriculum.

Electromagnetics Laboratory (EML)

The Electromagnetics Laboratory (EML) at CU-Colorado Springs supports educational and research programs in the areas of wave propagation, microwaves, antennas, and metrology. Undergraduate and graduate laboratory courses have been developed in the areas of microwaves, millimeter waves, and infrared (IR) diagnostic techniques to support the existing courses in electromagnetic theory.

These laboratory facilities provide students with measurement techniques and skills in the radio frequency (RF), microwave, millimeter wave, and IR wavelength regions. The EML contains a large broadband shielded microwave anechoic chamber.

Other graduate-level courses are also supported by the EML, as well as research-related investigations on advanced electromagnetic systems. Research projects include the use of infrared measurement techniques to detect high-power microwaves, holography, transmission line parameter characterization, and near-field antenna/aperture patterns. Support for the research projects performed in the EML has been provided by the Defense Nuclear Agency (DNA), the Air Force Office of Scientific Research (AFOSR), the Rome Air Development Center (RADC), and the Defense Advanced Research Projects Agency (DARPA).

Microelectronics Research Laboratories (MRL)

The Microelectronics Research Laboratories (MRL) are a group of related laboratories supporting curricula and research in all aspects of microelectronics, including fundamental microelectronic device modeling and processing, integrated circuit design and fabrication.

MRL is staffed by faculty from various departments, graduate students, visiting scholars, research associates from industry, and technicians. Research funds are provided through grants and contracts from industrial and governmental agencies. Financial support is available through the Laboratory.

MRL links the efforts of the following associated laboratories: (1) Advanced Development Laboratory (Class 100 clean room), (2) Device Characterization and Analysis Laboratory, (3) VLSI Circuit Design Laboratory, and (4) Advanced Materials Laboratory for undergraduate and graduate students.

MRL's semiconductor fabrication and processing equipment includes a Class 100 clean room with ion implantation, and one deep uV research mask aligner, furnaces for twelve processes, plasma systems, evaporators, ion milling system, sputtering systems, ellipsometer, HP 4061A semiconductor parameter analyzer, HP 4145 MOSFET D.C. parametric analyzer, faraway protected probe stations, 0.5 microns resolution computerized line width measurement system, DEKTAK profilometer, low voltage Phillips 505 SEM, Dispersive x-ray

analysis and other minor items required for advanced research in materials devices and processes.

VLSI Circuit Design/Embedded Systems Laboratory (VLSI)

The VLSI Circuit Design Laboratory is associated with MRL to provide support for all phases of integrated circuit design. The laboratory is equipped with computer-based engineering workstations with software for designing modern integrated circuits and digital computers. The Laboratory's design suite includes leading edge commercial and public-domain tools for schematic capture, analog and logic simulation, timing analysis and verification, behavior modeling and simulation, fault simulation, test generation, physical layout, design verification, logic synthesis, PLA design, and FPGA design. This laboratory also houses stations for embedded systems design.

Multimedia Laboratory

The ECE Department has a multi-media engineering education classroom/laboratory equipped with 30 Hewlett-Packard personal computers. The laboratory is scheduled for a limited amount of classroom activity, with most hours being available for walk-in use by students.

Mathematics

The Mathematics Department maintains exceptionally well-equipped laboratories containing a wide variety of computing resources. The Mathematics Hewlett-Packard Laboratory contains networked microcomputer systems, running a variety of mathematical computer software such as Maple and Scientific Notebook.

Mechanical and Aerospace Engineering

Flight Dynamics and Control Laboratory

The research in the Flight Dynamics and Control Laboratory (FDCL) is focused on the space program, as well as on aeronautics. Research projects involve both theoretical and applied investigations in flight dynamics, orbit mechanics, optimal flight guidance, and aerospace vehicle flight-control systems. Graduate and undergraduate students in all departments of the College may become involved in research programs funded by NASA, the U.S. Navy, and the Air Force. Topics of investigation range from spacecraft orbit and attitude determination to integrated flight and propulsion control for next-generation aircraft and launch vehicles.

Research in orbit mechanics and space navigation includes the development of advanced estimation techniques, software for spacecraft mission analysis, and improved sensor and environment modeling. Through collaboration with NASA's Goddard Space Flight Center, for example, the FDCL has provided real-time mission support in flight dynamics and space navigation for NASA's SAMPEX mission. Real-time tracking data and sensor telemetry data were acquired and processed for the precise determination of current orbital parameters and spacecraft attitude history. Based on these determinations, predictions of critical events such as ground-station acquisition information, spacecraft lighting status, and predicted orbit vectors were generated and provided to the flight operations team as well as the science team.

In aeronautics research, some activity is focused on the dynamic modeling of flexible, high-speed atmospheric flight vehicles. These projects include collaboration with several NASA programs addressing critical-design issues for next-generation supersonic aircraft and hypersonic launch vehicles. Particular interest lies in the characterization of the dynamics of these vehicles, and in the modification of the dynamics with integrated feedback systems. Here topics of research include synthesis techniques for integrated and decentralized multivariable control, robust control theory, and computer-aided design methods. Also of interest is the determination of optimal launch trajectories for single-stage-to-orbit vehicles, as well as optimal aero-assisted orbital plane changes. These topics include both numerical optimization algorithms as well as vehicle-design sensitivity studies.

The Laboratory research staff includes both undergraduate and graduate students from several departments in the College, a professional research associate, and several members of the faculty of engineering. The computational facilities include Hewlett-Packard 700-Series workstations and a networked cluster of Macintosh, Windows, and Windows NT workstations. A full complement of MATLAB-based CAD tools are available for dynamic-system analysis and control design, along with several state-of-the-art software packages for spacecraft mission analysis and non-linear programming.

For more information on opportunities for undergraduate or graduate students, please contact the director's office at dschmidt@mail.uccs.edu. For further information about the FDCL, see the web page at http://mae.uccs.edu/fdcl.

Space and Flight Systems Laboratory

The Space and Flight Systems Laboratory promotes research in the areas of space and flight systems. The laboratory provides an environment for researchers, graduate students and faculty to join together in meaningful research projects. Electrical engineering, computer science, mechanical engineering, physics and mathematics disciplines are involved.

Laboratory personnel include a part-time director, graduate students working on master and Ph.D. theses, and professors from the various academic departments who work in the laboratory on a part-time basis. For further information contact Dr. Charles Fosha at cfosha@mail.uccs.edu.

The Space and Flight Systems Laboratory supports research in the following areas:

- space defense technology
- artificial intelligence
- software engineering
- aerodynamics and flight control
- space systems

Piezoelectric Actuators Laboratory

The Piezoelectric Actuators Laboratory provides the capability to design, prototype, and test novel fractional-horsepower motor and actuator systems based on piezoelectric materials. Research is being performed in the fabrication and use of both thin-film and machined piezoelectric ceramics and polymers, the design of miniaturized motor systems and high-torque motor systems, and in the testing of several unique motors for space and robotics applications. The research is interdisciplinary with involvement from electrical engineering in power and control circuitry; mechanical engineering in design, vibration, contact mechanics, and structural mechanics; and materials science in anisotropic ferroelectric ceramic material properties and performance. Current topics of research include the design of sub-millimeter piezoelectric motors, the design of high-torque (>1 N-m) motor systems, and the

determination of poling within piezoelectric materials through ultrasound measurements. For further information, please contact Dr. Friend at jfriend@mail.uccs.edu and visit the web site at http://www.uccs.edu/~jfriend/research/index.html.

Laboratory Fees

All students taking computer science courses will be charged a $12 per credit hour fee for all computer science classes up to a maximum of $36.

All students taking electrical and computer engineering courses will be charged an Instructional Fee of $10 per credit hour, up to a maximum of $120 per student per semester, for all its courses (excluding ECE 7000, 8000, 9200, 9300, 9400, 9500, and 9900).

All students taking mechanical or aerospace engineering courses will be charged an Instructional Fee of $10 per credit hour, up to a maximum of $120 per student per semester, for all its courses (excluding MAE 7000, 7500, 9400, 9500, 9520, and 9999).

All students enrolled in any one of the following courses: Math 105, 111, 112, 135, 136, 235, 310, 313, 340, 405/505, 410/510, 448/548, and 511 will be charged $36 as a Mathematics Technology Lab fee. The maximum charge per semester is $36.

These fees are nonrefundable and will be used by the departments for inventory renewal. Students are responsible and liable for damage to equipment caused by neglect, improper use, or failure to follow operating instructions.

Admission Requirements

The college seeks to identify applicants having a high probability of successful completion of their academic programs. Admission is based on evaluation of many criteria; among the most important are the general level of academic performance before admission to the college and other evidence of motivation, potential, scholarly ability, and accomplishment. These are indicated by trends in the student's record, by College Board scores, by letters of recommendation from teachers and others qualified to evaluate the student, by accomplishments outside academic work, and by other relevant evidence.

Freshmen

In order to enroll, the student must meet the requirements of the College of Engineering and Applied Science and the University requirements described in the General Information section of this Bulletin. Students interested in Bachelor of Science and Bachelor of Arts Degrees with a GPA of 2.4 who rank in the upper 50th percentile of their high school graduating class and have test scores of ACT composite score of 20 or above or an SAT composite score of 1080 or above, may be admitted into the college of engineering. Students who rank in the upper 25th percentile of their high school graduating class and have an ACT composite score of 28 or above or an SAT composite score of 1230 or above are **assured admission** to the College.

Students should insure that they are taking the Minimum Academic Preparation Standards (MAPS) for Engineering and Applied Science, as outlined in the General Information Section.

Beginning students in engineering and computer science or mathematics must be prepared to start analytic geometry-calculus. No credit toward a degree will be given for algebra or trigonometry (courses will be offered to allow a student to make up deficiencies). A student who has not had trigonometry or who is not prepared to start calculus should not expect to graduate in four academic years. Such a student should take Elementary Functions of Calculus (MATH 105) in the summer session prior to the freshman year. If the student does not possess the requisite algebra skills to enroll in Math 105, then Math 104 (College Algebra) should be completed prior to Math 105. In order to be prepared for the type of mathematics courses that will be taught, the student must be competent in the basic ideas and skills of ordinary algebra, geometry, and plane trigonometry. These include such topics as the fundamental operations with algebraic expressions, exponents and radicals, fractions, simple factoring, solution of linear and quadratic equations, graphical representation, simple systems of equations, complex numbers, the binomial theorem, arithmetic and geometric progressions, logarithms, the trigonometric functions and their use in triangle solving and simple applications, and the standard theorems of geometry. It is estimated that it will usually take seven semesters to cover this material adequately in high school.

Engineering Prep Program

The Engineering Prep Program is a preparatory program designed for students needing additional math or science background. Students admitted into this program are admitted into the College so that faculty and staff from the College may monitor their progress as they learn to master the math/science fundamentals, which are the basis for success in engineering.

Engineering Prep students are not, however, admitted into their selected major. After these students have successfully completed appropriate background courses of two calculus courses (Math 135 and Math 136) and one of the required basic science courses (PES 111 or CHEM 103) they may initiate a request for acceptance into their selected major by contacting the Engineering Advisor at (719) 262-3427.

Transfer and Former Students

Transfer Students

Students transferring from other accredited collegiate institutions will be considered for admission if they meet the requirements outlined in the General Information section of this bulletin and the freshman requirements for entering the College of Engineering and Applied Science. Transfers from within the University to the College of Engineering and Applied Science will be considered on an individual basis if both of the following conditions are fulfilled:

1. Enrollment quotas permit.

2. The student's prior academic record fulfills the admission requirements of the College of Engineering and Applied Science.

The Admissions Committee sets detailed standards for admission annually and consider applicants on an individual basis.

All transfers are subject to review by the faculty committee, which evaluates the applicant's qualifications for academic success in engineering subjects.

Intercampus Transfer

The acceptance of a student transferring from one campus to another within the University of Colorado System is determined by the College of Engineering and Applied Science.

Intercampus transfer applications are considered on the basis of the student's

University of Colorado system grade point average, grades earned in engineering related courses, grades earned at other institutions, satisfactory academic progress toward degree requirements, course load completed, and the residency requirement of the gaining engineering college.

The student is advised that engineering degree requirements differ from one campus to another, from course selection to the number of credit hours required for the degree. To ensure the maximum acceptance of credit toward degree requirements and minimize the length of time required to complete the degree, the student planning an intercampus transfer must contact the gaining major department as soon as possible once deciding to complete an engineering degree on another campus of the University of Colorado.

Generally, an intercampus transfer should be accomplished at the end of the first year, with some course selection coordination required between the student and the degree granting major department during that year. With increased course selection coordination, some students may be able to delay their transfer until the middle or end of the sophomore year. Beyond that point, the student is most likely to lose extensive course credit and time in completing degree requirements. Students are instructed to secure assistance from the Engineering Advisor on each campus involved.

Any Minimum Academic Preparation Standards (MAPS) deficiencies are to be completed prior to the intercampus transfer.

A sample freshman year for the intercampus transfer student would include the following courses:

First semester	*Second semester*
Calculus I - 4 cr hrs	Calculus II – 4 cr hrs
Chemistry I - 5 cr hrs	Physics I – 4 cr hrs
Comp Sci* - 3-4 cr hrs	Eng Draw/Grap* – 2-3 cr hrs
Hum/Soc Sci* - 3 cr hrs	Hum/Soc Sci* – 3 cr hrs

To assist the prospective intercampus transfer student in contacting a faculty or staff advisor in the gaining major department, the following list is provided.

University of Colorado
Colorado Springs Campus

Dean's Office
Engr Bldg Rm. 201
(719) 262-3543

Mathematics
Engr Bldg Rm. 274
(719) 262-3311

Computer Science
Engr Bldg Rm. 199
(719) 262-3325

Electrical & Computer Engr
Engr Bldg Rm. 299
(719) 262-3351

Mechanical and Aerospace Engr
1867 University
Office Park Rm. 200
(719) 262-3243

For the other University of Colorado Engineering related programs, contact:

University of Colorado
Boulder Campus

Dean's Office
EC AD 1-01
(303) 492-5071

Aerospace Engineering Sciences
EC OT 6-16
(303) 492-6417

Applied Mathematics
EC OT 2-06
(303) 492-4668

Civil, Env. and Arch. Engineering
EC OT 4-21
(303) 492-4193

Chemical Engineering
EC CH 1-43
(303) 492-7471

Computer Science
EC OT 7-08
(303) 492-7514

Electrical Engineering and Electrical & Computer Engineering
EC EE 0-02
(303) 492-7327

Engineering Physics
DUANE E-032
(303) 492-6952

Mechanical Engineering
EC ME 1-19
(303) 492-7151

University of Colorado
Denver Campus

Dean's Office
NC Bldg Rm. 3024
(303) 556-2870

Applied Mathematics
UCD Bldg Rm. 540
(303) 556-4276

Civil Engineering
NC Bldg Rm. 3027
(303) 556-2871

Computer Science
NC Bldg Rm. 2605
(303) 556-4314

Electrical Engineering
NC Bldg Rm. 2615
(303) 556-2872

Mechanical Engineering
NC Bldg Rm. 3502
(303) 556-8516

Students Planning to Transfer to Another School for Their Degree

The College of Engineering and Applied Science has developed a series of courses at the freshman and sophomore level, which meet the requirements for most engineering disciplines at most accredited universities throughout the country. Our advising will follow these generally accepted guidelines.

Since curricula will vary slightly from time to time and place to place, you should check with the college/university to which you plan to transfer to verify that the two-year program suggested here will transfer in its entirety.

Transfer Programs

Chemical Engineering (Sample Program)

Freshman Year

Fall Semester	
Math 135 Calculus I	4
Chem 103 Gen. Chem I	5
CS 115 Principles of Computer Science	3
Soc/Hum	3
Engl 131 Engl. Comp.	3
	18

Spring Semester	
Math 136 Calculus II	4
Chem 106 Gen. Chem. II	5
PES 111 Gen. Physics I	4
PES 115 Physics I Lab.	1
Soc/Hum	3
	17

Sophomore Year

Fall Semester	
Math 235 Calculus III	4
Chem 331 Organic Chem I	3
Chem 333 Org. Chem. Lab. I	2
PES 112 Gen. Physics II	4
PES 115 Physics II Lab.	1
Soc/Hum	3
	17

Spring Semester	
Math 313 Lin. Algebra	3
Math 340 Diff. Equations	3
Chem 332 Organic Chem II	3
Chem 334 Org. Chem. Lab. II	2
Soc/Hum	3
Soc/Hum	3
	17

Civil, Architectural, Environmental (Sample Program)

Freshman Year

Fall Semester

Math 135 Calculus I	4
Chem 103 Gen. Chem. I	5
MAE 2501 Comp. Aid. Drawing and Fab.	3
ENGL 131 English Comp.	3
Soc/Hum	3
	18

Spring Semester

Math 136 Calculus II	4
PES 111 Gen. Physics I	4
PES 115 Physics I Lab.	1
CS 105 Fortran Prog.	3
Soc/Hum	3
Soc/Hum	3
	18

Sophomore Year

Fall Semester

Math 235 Calculus III	4
PES 112 Gen. Physics II	4
MAE 2101 Statics	3
ENGR 342 Engineering Economy	3
ECE 2210 Circuit Analysis I	3
	17

Spring Semester

Math 313 Lin. Algebra	3
Math 340 Diff. Equations	3
MAE 2102 Dynamics	3
MAE 3201 Strength of Materials	3
Soc/Hum	3
Soc/Hum	3
	18

Former Students

Students who have withdrawn from the College of Engineering and Applied Science must secure the permission of the dean to re-enroll. Former students must meet the requirements outlined in the General Information section of this bulletin. Records made at collegiate institutions while the student was a member of the armed forces will not necessarily be a determining factor in a student's readmission to the University of Colorado, but all such records should be submitted. They must then submit applications for admission for consideration by the Admissions Committee of the College.

Students who interrupt their course of study may be required to take any preparatory courses which have been added during their absence or to repeat courses in which their preparation is thought to be weak.

Unclassified Students

Persons who have been admitted to the university in the category of unclassified students may be permitted to register for courses in the College of Engineering and Applied Science upon approval of an advisor and subject to the availability of space in classes. Unclassified students should be aware of the College of Engineering and Applied Science rule that at least the last 30 semester hours must be earned in degree status in the College of Engineering and Applied Science in order to apply toward an engineering degree. A maximum of 12 semester hours of credit earned while in unclassified student status may be carried toward an undergraduate degree at the University of Colorado. High school concurrent students may exceed this 12 hour rule for unclassified students.

Graduate Programs

Every prospective graduate student should consult with the College of Engineering and Applied Science at CU-Colorado Springs prior to submitting an application for admission to the Graduate School. Students wishing to take graduate courses without formally enrolling as graduate students may enroll in the unclassified student category described in the General Information section of this bulletin.

Guaranteed Early Admission

Students who are seniors in any of the undergraduate programs in the College of Engineering and Applied Science at CU-Colorado Springs may be eligible for guaranteed and simplified admission to the graduate programs. Contact the appropriate graduate degree program director for more details.

Fast Track Admission Process for Recent Graduates

Students who graduated within the past 5 years with a degree from the College of Engineering and Applied Science at CU-Colorado Springs are eligible for fast track admission process. Contact the appropriate graduate degree program director for more details.

Normal Admission

Students having an overall undergraduate G.P.A. of 3.0 or better (on a scale of 4.0) in all college-level academic work attempted are normally admitted to regular degree status.

Provisional Admission — Committee Review

Students with a G.P.A. between 2.75 and 3.0 and with strong prospects for success at the graduate level may be admitted to provisional degree status upon the recommendation of the Graduate Committee and the concurrence of the CU-Colorado Springs Graduate School. In special cases, with a G.P.A. of less than 2.75, the student may be accepted provisionally by taking the G.R.E. and earning acceptable scores. Provisional acceptance requires the student to complete a minimum of 9 hours of graduate course work applied to the program with a G.P.A. of 3.0 or better. Students with an undergraduate G.P.A. below 2.5 should take remedial work to raise their G.P.A. to at least 2.5.

Academic Policies

Undergraduate Course Load Policies

Full-Time Students

Students should register for the regular course load as outlined by their advisers. Additional courses may be allowed when there is evidence that a student can carry these courses successfully. Permission to take more than 18 semester hours may be granted only after approval, using an Overload Approval Form, submitted to the Engineering Advisor (for 19-21 hours) or, the chair of the appropriate department (over 21 hours).

Employed Students

Course load guidelines for students employed 10 or more hours per week are as follows:

Employed 40 or more hrs/wk.	2 courses (max of 9 sem. hrs.)
Employed 30 to 39 hrs/wk.	3 courses (max. 12 sem. hrs.)
Employed 20 to 29 hrs/wk.	4 courses (max. 15 sem. hrs.)
Employed 10 to 19 hrs/wk	5 courses (max. 18 sem. hrs.)

The above guidelines result from the experience of those who are both employed and in school. Students who wish to discuss a deviation from these guidelines may call the appropriate department office in the College of Engineering and Applied Science.

Transfer Credit

After a prospective transfer student has made application and submitted transcripts to the CU-Colorado Springs, the Office of Admissions and Records issues a computer generated student transfer credit evaluation listing those courses that are acceptable by University standards for transfer. Once a student receives the transfer evaluations, an appointment should be made with the Engineering Advisor (262-3260) to conduct an evaluation of the transfer credits as applicable to a degree in the College of Engineering and Applied Science.

If at any time a student wishes to have a course not previously accepted considered again for transfer, the student should consult with the Engineering Advisor and complete a petition to the department chairman.

CU-Colorado Springs has established articulation agreements with all two-year colleges in Colorado. For students from such a college, the transfer process to CU-Colorado Springs will be easier. It is, therefore, beneficial for students from two-year colleges in Colorado to check with their administration to see what courses will transfer.

Special Sources of Credit

Advanced Placement

Advanced placement and college credit may be granted on the basis of the College Entrance Examination Board's Advanced Placement Tests or by special examinations administered by the department involved. For students who have taken an advanced placement course in high school and who make scores of 4 or 5 in the CEEB's Advanced Placement Test, advanced placement as well as college credit will be granted. (outlined in General Information, Advanced Placement Program, in the beginning of this Bulletin). All advanced placement and transfer credit must be validated by satisfactory achievement in subsequent courses, in accordance with standard transfer policies of the College.

Advanced placement credit for the freshman mathematics courses in calculus and differential equations will be limited to not more than 4 hours each. Equivalent mathematics courses from other colleges are usually accepted at full value.

Credit by Examination

Prospective students of the College of Engineering and Applied Science may earn college level credit in the following College Level Examination Program (CLEP) subject examinations:

CLEP subject exam	Sem. hrs. credit	CLEP score at 67th percentile
Biology	6	54
General Chemistry	5	54
General Psychology	3	54
Macroeconomics	3	55
Microeconomics	3	55
Intro. Sociology	3	55
Intro. Calculus w/elem. funct.	5	54
Trigonometry	2	59

Generally, College Level Examination Program credit is most appropriate for non-engineering electives, and the number of credits must be within the limits of the elective hours of the individual College of Engineering and Applied Science programs. Prospective University of Colorado students must request that scores be reported to the Office of Admissions and Records, CU-Colorado Springs, Colorado 80933-7150. Notification of approved credit will be sent to participating students so that they may register for the appropriate courses at the appropriate time.

Work Experience

It is the policy of the College of Engineering and Applied Science at CU-Colorado Springs, that any credits accrued in the official records of the student that were awarded for work experience will not apply as part of the 128 semester hours required for an engineering degree in the College.

The grade-point average of an engineering student will include all academic courses attempted at the University of Colorado.

ROTC Credit

Credit from courses completed in the ROTC program will not apply toward fulfillment of the requirements for any degree offered by the Department of Mathematics, the Department of Electrical and Computer Engineering or the Department of Mechanical and Aerospace Engineering. A maximum of 6 semester hours of work from the ROTC program may be applied toward the BS in Computer Science as free elective courses if the student earns their ROTC commission.

Nontransferable Credits

Students desiring to transfer credits from engineering technology programs should note that such credits are accepted only upon the submission of evidence that the work involved was fully equivalent to that offered in this college.

Some technology courses are given with titles and textbooks identical to those of some engineering courses. These may still not be equivalent to engineering courses because of emphasis that is nonmathematical or otherwise divergent.

In order to assist engineering technology students with transfer problems, the following guidelines have been established:

1. Courses on basic subjects such as mathematics, physics, literature, or history may be acceptable for direct transfer of credit if they were taught as part of an accredited program for all students and were not specifically designated for technology students.

2. Students who have taken technology courses (courses with technology designations) that may be valid equivalents for engineering courses have these options:

a. They may petition the department head concerned to waive the course. The requirement for a course can be waived if a student demonstrates that by previous course work, individual study, or work experience he has acquired the background and training normally provided by the course. No credit is given toward graduation for a waived course, but a strong student may benefit from the waiver by being able to include more advanced work later in his or her curriculum. Other students may profit by taking the course at this college instead and thus establishing a fully sound basis for what follows.

b. Credit for a course may be given if the course work was done at an accredited institution of higher education. The University of Colorado department involved may recommend that credit be transferred to count toward the requirements for a related course in its curriculum. Credit cannot be given for vocational technical or remedial courses under rules of the University. (See general section on transfer of college-level credit.)

c. They may seek credit for the course by examination. See Advanced Placement and College Level (CLEP) Credit.

Common Freshmen Year

The College of Engineering and Applied Science has implemented a common freshmen year for entering freshmen students. This program allows the student to explore foundational material in science, mathematics, computer science, and engineering problem solving that are common to all of the majors offered by the College. Though students may declare a major upon acceptance into the College, students are encouraged to delay the selection of a major until the first semester of the Common Freshman Year is completed. The curriculum of the Common Freshmen Year does allow a change of major within the College to occur during the Freshmen Year without loss of credit or delay in graduation. During the first year, the academic work and, hopefully, an exposure to the industrial or governmental workplace should help the student decide on a major. A major must be declared before attaining Sophomore status.

The recommended program for the freshmen year is:

Fall Semester

Math 135 Calculus I	4
English 131 Composition I	3
PES 111 General Physics I	4
CS 115 Prin. Of Computer Science	3
ECE 1010 Problem Solving in Engineering	2
Total Credits	16

Spring Semester

Math 136 Calculus II	4
Humanities/Social Science Elective	3
PES 112 General Physics II	4
Departmental Choice*	3
ECE 1011 Computer Based Modeling and Methods in Engineering	2
Total Credits	16

*For departmental choice

Computer Science

CS 145 - Data Structures and Algorithms

Electrical and Computer Engineering

ECE 2410 - Logic Circuits

Mathematics

CS 145 - Data Structures and Algorithms

Mechanical Engineering

MAE 1003 - Fundamentals of Flight

Requirements for Graduation

Bachelor's Degree

To be eligible for one of the bachelor's degrees in the College of Engineering and Applied Science, a student must meet the following minimum requirements:

1. Satisfactory completion of the prescribed curriculum as determined by a particular department, consisting of 120-128 semester hours depending on degree, of which at least 30 shall be earned after being formally admitted as a degree student at the University of Colorado and the College of Engineering and Applied Science, and compliance with the rules of the College of Engineering and Applied Science.

2. A grade point average of 2.0 for all courses attempted, and a 2.0 in all ECE courses for the B.S.E.E.

3. A grade point average of 2.0 for all courses attempted, and a 2.0 in all MAE courses for the B.S.M.E.

4. A B.S.E.E. or B.S.M.E. student who fails to meet the minimum grade in an ECE or MAE course respectively must repeat the course. If a course is repeated, all grades earned are used in determining the University G.P.A.

5. The recommendation of the faculty of the department offering the degree and the faculty of the College of Engineering and Applied Science.

It is the responsibility of students to be sure they have fulfilled all the requirements, by completing a graduation check in the Engineering Advising office the semester before they anticipate graduating. It is the responsibility of the student to keep the Engineering Advisor and the dean's office informed of any changes in the students' plans throughout the senior year.

Deviations from departmental degree requirements must be approved in advance by petition. Petition forms may be obtained at the Engineering Advising office.

Graduate Degrees

Refer to the appropriate College of Engineering and Applied Science degree programs.

Ethics

As members of the academic community, students have a responsibility to conduct themselves with the highest standard of honesty and integrity. These qualities are also vital to the engineering profession, practicing computer scientists, and mathematicians.

Copies of the campus Policy and Procedures regarding academic honesty are available in the dean's office or in the Student Success Center.

Policy on Cheating

Refer to the General Information Section of this Bulletin, under Student Rights and Responsibilities.

Advising

Undergraduates

Academic advising is available throughout the year. Students with previous college work at other institutions are required to bring their transcripts with them for pre-registration academic advising and for registration unless they have previously had their transcripts evaluated by the College of Engineering and Applied Science. Students should call the Engineering Advising Office at (719) 262-3427, or the Student Success Center, CH 19, at 262-3260, to make appointments for either pre-registration advising or regular academic advising.

Graduate Students

Please refer to the appropriate degree program for information regarding academic advising.

Academic Progress

Undergraduates

An overall semester (full-time status) and cumulative grade point average of 2.0 or better in hours taken at the University of Colorado is necessary to remain in good standing in the College of Engineering and Applied Science. Students whose overall average or full-time semester's GPA falls below 2.0 will be placed on probation for the next semester in which they are enrolled in the College of Engineering and Applied Science and will be so notified. Any student placed on probation must contact the Engineering Advisor for immediate consultation. If, after that semester, the average is still below 2.0 or have repeated semesters below 2.0, the student will be suspended from the college.

Graduate Students

Please check with the Dean for more information.

Grading Policies

Consult the General Information section of this Bulletin for details and more information. An incomplete may be given by the instructor (subject to approval by the appropriate department chair/EAS Dean) for circumstances beyond the student's control, such as a documented medical or personal emergency. When it is given, the student and the dean's office/departmental office are informed in writing by the instructor of what the student is to do in order to remove the incomplete and when the tasks are to be completed. The instructor may assign only the IF grade. The student is expected to complete the course requirements, e.g., the final examination, term paper, etc, within the established deadline and not to retake the entire course. The grade will be converted automatically to a grade of F after one year unless the specified work is completed. The grade I/W may not be given.

No-Credit Courses

Students who register NC (no credit) are expected to attend classes and take all examinations but receive no credit. In the College of Engineering and Applied Science, students may not register NC for a required course or change registration to NC in any course except by petition to the chair/dean. If the student does failing work, the chair/dean may request the Office of Admissions and Records to change the registration from NC to credit, whereupon the student will receive a grade of F. A course previously taken for NC may not be retaken for credit to apply toward an undergraduate or graduate degree awarded by the College of Engineering and Applied Science. Engineering courses completed for NC by students not admitted to the College of Engineering and Applied Science may not be taken again for credit after transferring to the college.

Pass/Fail Option

The primary purpose for offering courses in which undergraduates may be graded pass or fail (P/F) rather than A, B, C, D, or F is to encourage undergraduate students to broaden their educational experience by electing challenging courses without serious risk that their academic records might be jeopardized. Not more than one course per semester or summer session may be taken P/F. Courses which a student may elect to be taken P/F shall be designated by the major department. A student who has not designated a major field will not be allowed the P/F option. In the College of Engineering and Applied Science only social sciences/humanities courses at the 300 level or above may be taken pass/fail.

The maximum number of P/F hours counting toward graduation shall not exceed 16 credit hours, including courses taken in the Honors Program under the program's P/F grading system. A transfer student may count toward graduation 1 credit hour of P/F courses for each 9 credit hours completed in the college. For students who are sophomores, juniors, or seniors at the time this P/F option is first made available, the maximum number of P/F hours will be calculated as though these students had just entered the college as transfer students.

Scholastic Suspension

Students who have been suspended from the University of Colorado cannot register for courses for credit in the College of Engineering and Applied Science unless the suspension has been lifted. Students are responsible for knowing whether or not they are under a current suspension.

Students who have been suspended are suspended indefinitely, may not enroll at any University of Colorado campus during any regular academic year, August through May, but may enroll in summer sessions and/or may take correspondence courses or credit through External Studies programs.

Students who have been suspended may apply for readmission during the second semester following the suspension if they have by then brought their cumulative G.P.A.'s up to 2.00 through summer session, and/or correspondence work applicable to engineering degree requirements as approved by the dean. A student, upon satisfactorily completing at another college, university, or summer school at CU-Colorado Springs a minimum of 15 semester hours of work appropriate to an engineering curriculum subsequent to suspension, may apply for readmission as a transfer student. Prior approval by the dean is required for readmission.

Students who have been indefinitely suspended by the College of Engineering and Applied Science may apply to another school or college within the University for approval to transfer to that school or college. If the student is accepted by another school or college, the College of Engineering and Applied Science will lift the suspension.

Students who are in doubt about their standing with regard to scholastic deficiency are strongly urged to consult with the Engineering Advisor.

Intern Program

The College of Engineering and Applied Science offers an Intern/Co-op Program to assist students in finding positions related to their studies. The Intern Program assists in the placement of students in part-time positions while they are attending school, and the Co-op Program provides alternate semesters of work and study for students. The purpose of the program is to allow qualified students an opportunity to supplement their education with work experience in their major area of study.

To qualify as an intern/co-op applicant, a student must be enrolled in the College of Engineering and Applied Science and maintain a G.P.A. of at least 2.5 to qualify for the program.

Further information may be obtained by calling (719) 262-3347 or writing to: Intern/Co-op Program Coordinator, CU-Colorado Springs, College of Engineering and Applied Science, P.O. Box 7150, Colorado Springs, CO 80933-7150.

Programs of Study

Department of Computer Science

Faculty

Professors: Augusteijn, Badal, Semwal and Shub; Associate Professors: Chow, Kalita, Pinson, Sebesta (Chair), and Wiener; Senior Instructors: Ayen and Nystuen.

Programs coordinated by the department:

Minor in Computer Engineering

Minor in Computer Science

Bachelor of Science in Computer Engineering

Bachelor of Science in Computer Science

Master of Science in Computer Science

Software Engineering Certificate

Master of Engineering in Information Engineering and Operations (pending)

Master of Engineering in Software Engineering

Ph.D. in Computer Science

Computer science encompasses a relatively new body of knowledge that treats both theoretical foundations and practical applications of computers. Since the 1950s, significant human, financial, and physical resources have been directed toward the design and development of both less expensive and more powerful computers. These efforts have resulted in a wide variety of computers ranging from multi-million dollar parallel processors to microcomputers costing a few hundred dollars.

Computer science has applications in virtually every major field including banking, business administration and management, engineering, applied and pure mathematics, physics, chemistry, biology, word-processing, data-base management, simulation, numerical analysis, statistics, games, robotics, and medicine.

The application of digital computers in all phases of our lives has created many career opportunities. The job market for graduates having a degree in computer science is strong and supported by clear trends for continued growth.

The CU-Colorado Springs curriculum in computer science presented in this bulletin is rigorous and modern. The Department of Computer Science takes great pride in emphasizing quality teaching supported by modern computer facilities.

CU-Colorado Springs offers a complete four-year program of study leading to a B.S. degree in computer science. The undergraduate curriculum provides students with theoretical foundations and practical experience in both hardware and software aspects of computers. The curriculum in computer science is integrated with courses in the sciences and the humanities to offer an education that is broad, yet of sufficient depth and relevance to enhance student employment opportunities upon graduation. As a degree program within a professional school of the University, the curriculum is based on the criterion that graduates are expected to function successfully in a professional employment environment immediately upon graduation.

The Departments of Computer Science and Electrical and Computer Engineering jointly offer a B.S. Degree in Computer Engineering. This program is described in detail in the Electrical and Computer Engineering section.

CU-Colorado Springs also offers a flexible minor in computer science. The minor provides students the ability to formally supplement their study in other fields with a rigorous computer science background that will enhance employment opportunities after graduation.

Students who do not intend to major or minor in computer science may take computer science courses to broaden their backgrounds and complement their degree curricula.

Introductory courses CS 100, 103, 104, 105, 106, and 107 are intended to make computer literacy and programming available to a broad class of students. CS115 and 145 are recommended for those who anticipate doing extensive computing in their student or professional careers.

In addition to the University requirement of a 2.0 overall grade point average for graduation, the department requires a minimum 2.0 average in all CS courses taken.

The CU-Colorado Springs curriculum in computer science requires a concentration of related courses chosen by the student. This requirement is intended to insure that the graduates of the program will have a base of knowledge embracing a field where computers are applied.

For more information about these programs, contact the Department of Computer Science, Engineering Bldg. Room 199, or call (719) 262-3325. Send email to csdept@cs.uccs.edu or see our webpage at csweb.uccs.edu.

Accreditation

The B.S.C.S. degree at CU-Colorado Springs is accredited by the Computer Science Accreditation Commission (CSAC) under the Accreditation Board for Engineering and Technology (ABET).

Computer Science News and Information

For current information and news on Computer Science degree programs, visit our web site at csweb.uccs.edu.

Bachelor of Science — Computer Science

Degree Requirements

The degree requirements for the bachelor of science degree in Computer Science are as follows:

Science (14 semester hours):

Physics: PES 111, 112, 115 9

The remaining hours may be selected from: Chemistry: CHEM 103, 106 Biology: BIOL 110 and 111 or 115 and 116 Geology: GEOL 101 and 101L, 102 or additional physics courses that require PES 111 as a prerequisite. 14

Mathematics (21 semester hours)

MATH 135. Calculus I 4

MATH 136. Calculus II 4

MATH 215. Discrete Mathematics 3

MATH 235. Calculus III 4

MATH 313. Introduction to Linear Algebra 3

MATH 381. Probability and Statistics. 3

21

Computer Science Core (35 semester hours)

CS 115. Principles of Computer Science . . 3

CS 145. Data Structures and Algorithms . . 3

CS 202. Programming in UNIX. 2

CS 216. Computer Organization and Assembly Language Programming. . . . 3

CS 306. Object-Oriented Programming in C++ 3

CS 316. Concepts of Programming Languages 3

CS 330. Software Engineering 3

CS 410. Compiler Design I. 3

CS 420. Computer Architecture I 3

CS 450. Operating Systems I 3

CS 470. Computability, Automata, and Formal Languages 3

CS 472. Design and Analysis of Algorithms 3

35

Technical requirements (4 semester hours)

ECE 1010. Problem Solving in Engineering 2

ECE 1011. Computer Based Modeling and Methods Engineering 2

4

Computer Science Electives (9 semester hours)

CS 401-489 or 502-599 9

Technical Electives (9 semester hours)

Computer Science (300 level or above)

Electrical and Computer Engineering (2000 level or above, except ECE 2400).

Mathematics (300 level or above, MATH 465 cannot be taken for degree credit.

Science (additional courses from the list above or courses with prerequisites from above list).

College of Business (300 level or above).

Humanities and Social Science (22 semester hours)

CS 305. 1 credit hour, Social and Ethical Implications of Computing, REQUIRED.

The remaining 24 credit hours involve study in humanities, social sciences, arts, and other disciplines that serve to broaden the background of the student.

Courses in the following departments and programs satisfy this requirement: Anthropology (except courses on Human Biology and Ecology), Art History, Communication, Economics, English (150 or above), Film, Foreign Culture Studies, Foreign Languages, History, Humanities, Music (except university choir and private instruction courses), Philosophy, Political Science, Psychology (except statistical methods, measurement, and experimental design courses), Religious studies, Sociology, and Women's Studies. Students may also petition to include selected courses in Interdepartmental Studies, Theater, or other departments.

Communications Skills (minimum 9 semester hours)

One of either ENGL 131, Composition I, or ENGL 141, Composition II, and

COMM 210. Platform Speech (3 semester hours) and

One of either ENGL 307. Technical and Business Report Writing (3 semester hours) or

ENGL 309. Technical Writing (3 semester hours)

Free Electives (6 semester hours)

Any course that is a prerequisite course for a required course may not be counted as a free elective. A maximum of 3 credit hours of CS courses numbered less than CS 115 can be used as free electives provided they are taken prior to a CS course numbered 115 or greater. A maximum of 6 credit hours of 200-level CS courses may be taken as free electives. At most, 3 credit hours of free electives may be taken in a particular programming language. Students planning to later enter a graduate program in computer science or electrical engineering are advised to take at least 6 hours of CS or ECE electives at the 300 or 400 level. Students who complete their ROTC programs and receive their commissions are allowed up to six semester hours of ROTC course work as free electives toward their computer science degree.

Total Credit Hours 128

Curriculum – B.S.C.S.

Students are required to take the Computer Science Major Field Assessment Test. This test will be given on a Saturday morning about three weeks prior to the end of the fall and spring semesters. A student must have completed 110 credit hours before taking the exam.

Common Freshman Year (for all EAS freshman students)

Fall Semester *Sem. Hours*

CS 115. Principles of Computer Science 3
Math 135. Calculus I 4
ECE 1010. Problem Solving in Engineering 2
PES 111. General Physics I 4
Engl 131. Composition I. 3
Total 16

Spring Semester

CS 145. Data Structures & Algorithms. . . . 3
Math 136. Calculus II 4
ECE 1011. Computer Based Modeling and Methods of Engineering 2
PES 112. General Physics II. 4
Humanities/Social Science Elective 3
Total 16

Sophomore Year

Fall Semester

CS 202. Programming in UNIX. 2
CS 216. Computer Organization and Assembly Language Programming 3
Math 235. Calculus III 4
PES 115. General Physics Laboratory I . . . 1
Technical Elective 3
Communications Skills Elective. 2
Total 15

Spring Semester

CS 306. Object-Oriented Programming Using C++ 3
CS 316. Concepts of Programming Languages 3
Math 215. Discrete Mathematics 3
Science Elective 5
Humanities/Social Science Elective 3
Total 17

Junior Year

Fall Semester

CS 330. Software Engineering 3
CS 472. Design and Analysis of Algorithms 3
CS Elective 3
Math 313. Introduction to Linear Algebra 3
Humanities/Social Science Elective 6
Total 18

Spring Semester

CS 305. Social and Ethical Implication of Computing 1
CS 420. Computer Architecture I 3
CS 470. Computability, Automata and Formal Languages 3
Math 381. Probability and Statistics. 3
Free Elective. 3
COMM 210 3
Total 16

Senior Year

Fall Semester

CS 450. Operating Systems I 3
CS Elective 3
Technical Elective 3
Free Elective. 3
Humanities/Social Science Elective 3
Total 15

Spring Semester

CS 410. Compiler Design 3
CS Elective 3
Technical Elective 3
Humanities/Social Science Elective 6
Total 15

Total Credit Hours 128

Minor in Computer Science

The requirements for a minor in Computer Science are at least 18 credit hours distributed as follows:

Lower Division

CS 145. Data Structures and Algorithms

CS 216. Computer Organization and Assembly Language Programming

CS 202. Programming in UNIX

CS 206. Programming with C

Upper Division (9 hours minimum)

Select from CS 300 or above.

General

1. The student will also be responsible for any prerequisites to chosen courses.

2. All course work towards the minor must be completed with a grade of C or better.

3. At most 9 credit hours of transfer work may be applied to the minor.

Master of Science — Computer Science

The Department of Computer Science offers a program leading to the Master of Science in Computer Science. Courses at the graduate level and the undergraduate courses required for admission to the graduate program are regularly offered in the late afternoon or evening to enable students from local industry to continue their studies.

Admission Requirements

1. An overall undergraduate grade-point average of 3.0 on a scale of 4.0. In special cases a student may be admitted with a lower grade-point average as a provisional degree student. Students with an average below 3.0 who completed their undergraduate degree a significant number of years ago will also be considered on an individual basis.

Students with grade-point average deficiencies who take several undergraduate courses to meet entrance background requirements will have their performance in those courses considered in making the admission decision. Students who recently earned an undergraduate degree in computer science with a grade-point average below 3.0 may be asked to take the general G.R.E. before they can be considered for admission. The Graduate Studies Committee will make the admissions decision on an individual basis.

2. Two semesters of university calculus and one additional course of a mathematical nature. A course in discrete mathematics is also required.

3. Courses in computer science equivalent to the following courses: Principles of Computer Science (Pascal, Java, C or C++), Data Structures and Algorithms, Programming in UNIX, Computer Organization and Assembly Language Programming, Concepts of Programming Languages, and Software Engineering. A student lacking in some of these courses whose background is otherwise satisfactory could be admitted but would still be required to take those courses after admission. Students lacking four or more courses should register as an unclassified student until the courses are completed.

4. Additional requirements may be specified by the Graduate School.

5. Application forms may be obtained in the Engineering Advising Office and in the Computer Science Office.

Degree Requirements

1. A total of 30 semester hours of graduate course work is required. These must include CS 550 (Operating Systems I), CS 570 (Computability, Automata, and Formal Languages) and CS 572 (Design and Analysis of Algorithms) if they have not been taken previously.

2. Up to 6 semester hours of graduate courses can be taken from other departments if first approved by the student's M.S. Advisory Committee. Thesis (plan I) or Non-Thesis (plan II) options are available.

3. Either Plan I or Plan II must be chosen. Plan I requires a thesis worth from 4 to 6 semester hours of credit. Plan II requires a 3 semester hour project. In both cases, an oral presentation and defense is required, which is open to the public and which can include questions over all work presented for the degree.

4. At most four computer science courses may be taken that are cross listed. The three required courses are cross-listed. If taken, they are counted among the four.

All work applied to the degree must be accomplished within a six year time limit.

For more information about these programs, contact the Department of Computer Science, Graduate Program, Engineering Bldg. Room199 or call (719) 262-3325. Send email to csdept@cs.uccs.edu or see our webpage at csweb.uccs.edu.

Master of Engineering — Software Engineering

Complex software-intensive systems permeate every aspect of our lives. These systems are among the most complex products humankind has ever tackled. Software engineering is the disciplined application of proven principles, techniques, and tools to the creation and maintenance of cost-effective, user friendly software systems that solve real problems. To accommodate the demand for well educated software engineers in almost all industries today, CU-Colorado Springs has established the Master of Engineering degree in Software Engineering. CU-Colorado Springs offers a unique environment to study, learn, and share experiences surrounding this special engineering discipline. Our faculty come from a broad spectrum of backgrounds. Many have had years of experience in industry prior to joining the faculty. The result is a diverse melting pot of ideas, technologies, and experiences. Courses at the graduate level (and the undergraduate courses required for admission to the graduate program) are regularly offered in the late afternoon and evening to enable students from local industry to continue their studies.

Admission Requirements

1. A Bachelor of Science or a Bachelor of Arts degree in mathematics, computer science, engineering, information systems, or equivalent.

2. An overall undergraduate grade point average of 3.0 (on a scale of 4.0; awarded within the past five years) or minimum 1800 G.R.E. (verbal + quantitative + analytic). Applicants with a grade point average of less than 3.0 awarded greater than five years ago will be admitted on a case by case basis. Applicants with a grade point average between 2.75 and 3.0 awarded within the past five years may be admitted provisionally.

3. It is recommended that the applicant have two years experience with commercial, industrial or Government software development or maintenance.

4. A concise statement of experience and career goals.

5. Completed Admission Forms include two copies of official transcripts and references from four people sent to the Computer Science Department.

Program Prerequisites

- Knowledge of modern programming language, e.g. Java, C++
- Data Structures and Algorithms (CS 145)
- Discrete Mathematics (MATH 215)
- Software Engineering Basics (CS 330)

Note: Some of these courses may have prerequisites.

Note: Any comparable course from another approved university will suffice.

Degree Requirements

A total of 30 semester hours of graduate course work is required.

Required Courses:

CS-520. Computer Architecture

CS/SE-531. Software Requirements

CS/SE-532. Software Design

CS/SE-533. Formal Methods in Software Systems Engineering

CS/SE-534. Software Maintenance

CS/SE-535. Software Project Management

CS/SE-536. Software Product Assurance

Plus one of the following options:

A. CS/SE 539. Capstone or CS/SE 701 Project

Two elective courses (any CS or SE graduate courses)

B. CS/SE 700. Thesis (6 credits)

One elective course (any CS or SE graduate course)

Additional Graduate Degree Requirements

1. An overall 3.0 grade point average in all graduate work.

2. Advisor appointed during first semester of graduate work.

3. All work applied to the degree must be accomplished within a six year time limit.

4. Up to 9 hours of graduate work may be transferred from an accredited graduate program, provided:

a. course work has not been used for any other degree,

b. grade earned for the course(s) is B or better,

c. the course work has been taken within past six years,

d. the course coverage is equal in level, content, and depth to the course for which it is being substituted.

5. With the exception of CS 520, courses cross-listed with 400-level courses do not qualify for graduate credit in this degree. All courses included to count for this degree must be part of an approved plan of study. This plan must be developed by the student and approved by his/her advisor within the first semester after being admitted to the program.

Master of Engineering in Information Engineering and Operations (pending)

The Master of Engineering in Information Engineering and Operations program focuses on the design, implementation, and operation of information systems that are critical to the businesses they support. The infrastructures to support the national information infrastructure was recently identified as one of the critical issues affecting national economy and security.

This Master of Engineering option will provide graduates with the knowledge and skills to engineer systems involving computer hardware and software, communications systems, space platforms, and other related systems to ensure the availability, integrity, confidentiality, authentication, and non-repudiation of information contained in, processed by, or transmitted by critical information systems. Students will integrate computer science, computer engineering, mathematical, and systems engineering knowledge and skills in their studies.

This program was under development at time of publication of this Bulletin. Please see the website at engineering.uccs.edu for current information.

Certificate in Software Engineering

The College of Engineering and Applied Science offers a Certificate in Software Engineering to qualified students. The program has two purposes: (1) provide employees of local companies with an opportunity to enhance their software engineering skills and their chances for career advancement, and (2) provide students currently enrolled in the Masters of Science in Computer Science (MSCS) with more in-depth knowledge in software engineering to enhance employability and career advancement. Please call or write the Department of Computer Science for more information.

Doctor of Philosophy — Computer Science

The doctor of philosophy degree (Ph.D.) in computer science is offered by the graduate faculty of the Department of Computer Science.

Admission Requirements

An applicant can be admitted as a regular degree student if he or she satisfies the following conditions:

1. Holds a bachelor's degree in computer science or a master's degree in computer science or closely related field from a college or university of recognized standing. A student who is admitted without a master's degree may earn that degree as a part of the Ph.D. studies.

2. At least a 3.3 grade point average (on a scale of 4.0) in all undergraduate and graduate work attempted.

3. If the applicant is not a graduate of a program of recognized standing he/she must take the Graduate Record Examination (both general and computer science specific). G.R.E. scores at or above the 70% level are considered favorable for admission.

4. Has taken at least two semesters of calculus and a course each in discrete mathematics, probability and statistics, and linear algebra, and one course in either modern algebra, graph theory or differential equations.

5. Applicants whose previous education was not in the English language must take the TOEFL examination and receive a score of a least 550 or have been enrolled in an accredited U.S. university for a least one year and have performed satisfactorily.

6. An applicant not satisfying all of these requirements may be admitted as a provisional student.

Degree Requirements

Course requirements: 48 credit hours of formal course work at the 500 level or above for students entering the program with a bachelor's degree in computer science, 24 credit hours of formal course work at the 500 level or above for students entering the program with a master's degree. In addition, 30 semester hours of thesis credits are required for all students. Examinations: qualifying examination, comprehensive examination, and final examination (thesis defense). There is no foreign language requirement.

Department of Electrical and Computer Engineering

Faculty

Professors: Alspector (Endowed Chair), Araujo, Ciletti, Dandapani (Chair), Kalkur, Kwor, Norgard, Sega, Wickert, and Ziemer; Associate Professors: Oleszek and Wang; Assistant Professor: Plett; Professor Adjoint: Kanoand, Petritz

Programs coordinated by the department:

Minor in Computer Engineering

Minor in Electrical Engineering

Bachelor of Science in Computer Engineering

Bachelor of Science in Electrical Engineering

Master of Science in Electrical Engineering

Ph.D. in Electrical Engineering

Electrical and computer engineering harnesses the properties of electricity and materials to make possible a variety of devices and systems used for communication, computation, robotic control, navigation, remote sensing, medical imaging, and power generation and transmission. In today's world, engineers are involved in a host of design activities. They design complex integrated circuits used in computers and communications equipment, as well as the processes that fabricate arrays of transistors in materials such as silicon and gallium arsenide. They develop the control logic that determines how industrial robots operate and create sophisticated computer programs that allow computers and robots to behave as though they have vision. Electrical engineers play a key role in the design of radar equipment used for navigation in virtually all spacecraft, aircraft and ships, as well as the brains found in microwave ovens and automobile engines. Some specialize in the engineering of modern, high-speed, digital computers. Many also function

effectively in management, marketing and sales efforts of corporations that create technical products. Others pursue advanced studies and participate in the education of other engineers.

The Department of Electrical and Computer Engineering (ECE) offers course work leading to undergraduate (B.S.E.E.) and graduate (M.S.E.E. and Ph.D.) degrees in electrical engineering and undergraduate degree in computer engineering. The B. S. degree in computer engineering (B.S.Cp.E.) is offered jointly with the Computer Science Department.

For more information about these programs, contact the Department of Electrical and Computer Engineering, Engineering Bldg. Room 299, or call (719) 262-3351. Send email to eas.uccs.edu or see our webpage at http://eceweb.uccs.edu.

Bachelor of Science Degree Programs

The educational objectives of the Department of Electrical and Computer Engineering are that it's B.S.E.E. and B.S.Cp.E. degree graduates are able to:

■ Read, interpret, and critically assess literature in electrical engineering and evaluate its impact on current issues in engineering and society.

■ Write technical reports and other documentation and to present oral reports of a technical nature.

■ Use basic knowledge in science and mathematics as well as knowledge and tools in engineering disciplines to analyze and synthesize real-world engineering problems.

■ Design processes, devices, circuits or systems using engineering knowledge and tools while considering economics, safety, ethics, ergonomics, and aesthetics.

■ Function in an effective manner, alone or as part of a team, in an engineering capacity.

■ Appreciate the importance of keeping up with the engineering field.

The common first year of the B.S.E.E. and B.S.Cp.E curricula at CU-Colorado Springs includes courses in mathematics, basic sciences, composition, social sciences/humanities, computer programming, and introduction to computer-based engineering problem solving methods.

In the B.S.E.E. curriculum, the second year continues with additional courses in these areas and presents courses in electrical engineering science. The last two years of B.S.E.E. curriculum build on the first two with additional required courses and electives aimed at providing technical breadth and depth and a background in design.

In the B.S.Cp.E. curriculum, the second year continues with additional courses in mathematics and presents courses in electrical engineering and computer science which form the computer engineering degree lower division core. The last two years of B.S.Cp.E. curriculum presents additional required courses in electrical engineering and computer science, and allows students to adjust their curriculum by selecting from a large offering of hardware and software courses primarily in more advanced aspects of computer engineering.

In the senior year, participation in a design project and a design seminar is required of all E.E. and Cp.E. majors.

The ECE department has state-of-the-art laboratories for digital logic and microcomputer systems, circuits, electromagnetics, electronics, VLSI circuit design, microelectronics, analog and digital control systems, integrated circuit design, communications and signal processing systems. During the course of studies for the B.S.E.E. degree, students will take at least 8 semester credits of E.E. laboratories, and for B.S.Cp.E degree, students will take at least 3 semester credits of E.E. laboratories, in addition to being able to select laboratories from several other areas such as computer-aided design, communications, controls, electromagnetics, micro-electronics, and signal processing. Laboratories are used extensively in the curriculum to reinforce the student's understanding of theoretical concepts, but more importantly, to provide an opportunity for the student to participate in the design and synthesis of new circuits and systems. For the B.S.Cp.E. degree, courses in computer science require extensive use of computing facilities available in the Computer Science department. Please see the section on Laboratory Facilities for laboratories and facilities available to computer engineering students.

In addition, each senior student must complete three semester hours of a senior design project and make oral reports on their work in a senior design seminar. The purpose of this design experience is to give the student an opportunity to apply knowledge gained in basic sciences, mathematics, and engineering and computer science in producing a feasible solution to an open-ended problem, accounting for such factors as state of technology, economics, safety, reliability, ethics, social impact, and aesthetics. Also required as part of the design experience is team-work in establishing objectives and criteria, synthesis, analysis, construction, testing, and evaluation for a proposed solution.

Although the programs are integrated, it is possible for a transfer student with the proper background to obtain a degree after four semesters. Such a student would need to have completed the mathematics and basic sciences of the freshman and sophomore years and to have a total of approximately 66 credit hours acceptable to the department.

In addition to the university requirement of a 2.0 overall grade point average for graduation, the ECE Department requires a minimum 2.0 average in the E.E. major as well as a minimum 2.0 in both ECE 2210 and ECE 2410.

Accreditation

The B.S.E.E. degree at CU-Colorado Springs is accredited by the Engineering Accreditation Commission of the Accreditation Board for Engineering and Technology (ABET). CU-Colorado Springs started offering the B.S.Cp.E. degree in the Spring 2000 semester, and intends to seek ABET accreditation when the program becomes eligible to apply.

Bachelor of Science — Electrical Engineering

Degree Requirements

The requirements for the Bachelor of Science degree in Electrical Engineering are as follows:

Mathematics

MATH 135, 136, 235. Calculus I, II, III . . 12

MATH 340. Introduction to Differential Equations. 3

Mathematics Elective (>300 level, excluding MATH 301, 302). 3

Total 18

Basic Science

CHEM 103. General Chemistry I or Science Elective with Laboratory 5

PES 111. General Physics I 4

PES 112. General Physics II 4
PES 213. General Physics III 3
Total 16

General Engineering and Computer Background

CS 115. Principles of Computer Science . . 3
ECE 1010. Problem Solving in Engineering 2
ECE 1011. Computer-Based Modeling & Methods of Engineering 2
MAE 2102 Dynamics or MAE 2301. Thermodynamics 3
Total 10

Social Sciences and Humanities

(See Social Sciences/Humanities Requirements below) 15
Total 15

Communication Skills

ENGL 131. Composition I or ENGL 141. Composition II. 3
ENGL 309. Technical Writing 3
Total 6

Core ECE Courses

ECE 2210, 2220. Circuit Analysis I, II 6
ECE 2230. Circuits Laboratory 1
ECE 2410. Logic Circuits 3
ECE 2420. Logic Circuits Laboratory 1
ECE 3050. Introduction to Physical Electronics 3
ECE 3110. Electromagnetic Fields I. 3
ECE 3210, 3220. Electronics I, II. 6
ECE 3230, 3240. Electronics Laboratory I, II. 2
ECE 3420. Microprocessor Systems Laboratory 1
ECE 3430. Introduction to Microcomputer Systems. 3
ECE 3510. Linear System Theory 3
ECE 3610. Engineering Probability & Statistics 3
ECE 4890. Senior Seminar. 1
ECE 4899. Electrical Engineering Design Project 3
Total 39

Technical Electives

(See Technical Elective Requirements below). 24
Total 128

Curriculum — B.S.E.E.

Common Freshman Year (for all EAS freshman students)

Fall Semester

MATH 135. Calculus I 4
ENGL 131. English Composition I 3
PES 111. General Physics I 4
ECE 1010. Problem Solving in Engineering 2
CS 115. Principles of Computer Science. 3
Total 16

Spring Semester

MATH 136. Calculus II 4
PES 112. General Physics II. 4
ECE 1011. Computer-Based Modeling & Methods of Engineering 2
ECE 2410. Logic Circuits 3
Social Sciences/Humanities Elective 3
Total 16

Sophomore Year

Fall Semester

MATH 235. Calculus III 4
CHEM 103. General Chemistry I or Science Elective with Laboratory. 5
ECE 2210. Circuit Analysis I 3
Social Sciences/Humanities Elective 3
ECE 2420. Logic Circuits Laboratory 1
Total 16

Spring Semester

MATH 340. Introduction to Differential Equations. 3
PES 213. General Physics III 3
MAE 2102. Dynamics or MAE 2301. Thermodynamics 3
ECE 2230. Circuits Laboratory 1
ECE 2220. Circuit Analysis II 3
ENGL 309. Technical Writing 3
Total 16

Junior Year

Fall Semester

ECE 3110. Electromagnetic fields I 3
ECE 3210. Electronics I 3
ECE 3230. Electronics Laboratory I. 1
ECE 3510. Linear Systems Theory 3
ECE 3420. Microprocessor Systems Laboratory 1
ECE 3430. Introduction to Microcomputer Systems. 3
ECE 3050. Introduction to Physical Electronics 3
Tota 17

Spring Semester

ECE 3220. Electronics II 3
ECE 3240. Electronics Laboratory II 1
ECE 3610. Engineering Probability and Statistics 3
Social Sciences/Humanities Elective 3
Technical Electives. 6
Total 16

Senior Year

Fall Semester

Mathematics Elective 3
Technical Electives. 9
ECE 4890. Senior Seminar. 1
Social Sciences/Humanities Elective 3
Total 16

Spring Semester

ECE 4899. Electrical Engineering Design Project 3
Social Sciences/Humanities Elective 4
Technical Electives. 9
Total 16
Total Hours. 128

Social Sciences/Humanities Requirements for B.S.E.E. degree

Studies in the humanities and social sciences serve not only to meet the objectives of a broad education, but also to meet the objectives of the engineering profession. E.E. students at CU-Colorado Springs are required to take at least 15 credits of social sciences and humanities so that they can be more aware of their social responsibilities and better able to consider related factors in the decision making process. The courses selected must provide both breadth and depth and not be limited to a selection of unrelated introductory courses. To ensure this, a minimum of nine hours in social sciences and six hours in humanities, or vice versa, must be taken; at least six of these hours must be beyond the introductory level.

For a list of humanities and social sciences recommended courses, refer to http://eceweb.uccs.edu.

Senior Seminar in E.E. and Senior Design Project Requirements for B.S.E.E. degree

Students in E.E. are required to take the one-credit hour class, ECE 4890 Senior Seminar, as well as ECE 4899, Electrical Engineering Design Project (3 hours). ECE 4890 must be taken the semester before ECE 4899.

Technical Elective Requirements for B.S.E.E. degree

All E.E. students are required to take 24 hours of technical electives to satisfy requirements for technical breadth and depth. These technical electives must include the following:

Any four of the following six three-credit hour courses:

ECE 4340. VLSI Circuit Design I (Fall)

ECE 4480. Computer Architecture and Design (Spring)

ECE 4625. Communication Systems I (Fall)

ECE 4510. Feedback Control Systems (Fall)

ECE 3120. Electromagnetic Fields II (Spring)

ECE 4020. Principles of Semiconductor Devices

Total Specified Technical Electives. 12

Any three of the following one-credit hour specialty labs:

ECE 3440. Microcomputer Systems Laboratory (Spring)

ECE 4040. Introductory VLSI Fabrication Laboratory (Spring)

ECE 4150. Microwave Measurements Laboratory (Fall)

ECE 4200. Advanced Digital Design Laboratory (Spring)

ECE 4530. Control Systems Laboratory (Fall)

ECE 4560. Digital Control Laboratory (Spring)

ECE 4670. Communications Laboratory (Fall)

ECE 4680. Signal Processing Laboratory (Spring)

Total Specialty Labs 3

Other technical elective courses must be upper division — numbered 3xxx and above in ECE and 3xx and above in other departments.

Total Other Technical Electives 9

Total Technical Electives 24

Minor in Electrical Engineering

The requirements for a minor in Electrical Engineering are at least 20 credit hours distributed as follows:

Required lower division (8 hours)

ECE 1010. Problem Solving in Engineering

ECE 1011. Computer Based Modeling & Methods in Engineering

ECE 2210. Circuit Analysis I

ECE 2230. Circuits Laboratory

Choose one of the following areas:

Computers (12 hours)

ECE 2410. Logic Circuits

ECE 2420. Logic Circuits Laboratory

ECE 3420. Microprocessor Systems Laboratory

ECE 3430. Introduction to Microcomputer Systems

ECE 3440. Microcomputer Systems Laboratory

ECE 4480. Computer Architecture and Design

Electronics (14 hours)

ECE 2220. Circuit Analysis II

ECE 3210. Electronics I

ECE 3220. Electronics II

ECE 3230. Electronics Laboratory I

ECE 3240. Electronics Laboratory II

ECE 3050. Introduction to Physical Electronics

Electromagnetics (12 hours)

ECE 2220. Circuit Analysis II

ECE 3110. Electromagnetic Fields I

ECE 3120. Electromagnetic Fields II

ECE 4110. Electromagnetic Theory and Applications

Systems (12 hours)

ECE 2220. Circuit Analysis II

ECE 3510. Linear Systems Theory

ECE 3610. Engineering Probability & Statistics

One of the following:

ECE 4510. Feedback Control Systems

ECE 4610. Analysis of Random Signals

ECE 4625. Communication Systems I

General

a. The students will be responsible for any prerequisites to chosen courses.

b. All course work towards the minor must be completed with a grade of C or better.

At most 9 credit hours of transfer work may be applied to the minor.

Bachelor of Science — Computer Engineering

Degree Requirements

The requirements for the Bachelor of Science degree in Computer Engineering are as follows:

Mathematics

MATH 135, 136, 235. Calculus I, II, III . . 12

MATH 340. Introduction to Differential Equations. 3

MATH 215. Discrete Math. 3

ECE 3610. Engineering Probability & Statistics or MATH 381. Introduction to Probability and Statistics 3

Total 21

Basic Science

PES 111. General Physics I 4

PES 112. General Physics II. 4

Science Electives (See Science Requirements below) 6

Total 14

Basic Engineering

ECE 1010. Problem Solving in Engineering 2

ECE 1011. Computer-Based Modeling & Methods of Engineering. 2

Total 4

Social Sciences and Humanities

(See Social Sciences/Humanities Requirements below) 15

Total 15

Communication Skills

ENGL 131. Composition I or

ENGL 141. Composition II. 3

ENGL 209. Technical Writing 3

Total 6

Computer Engineering Core (Lower Division)

ECE 2210. Circuit Analysis I 3

ECE 2410. Logic Circuits 3

ECE 2420. Logic Circuits Laboratory 1

CS 115. Principles of Computer Science . . 3

CS 145. Data Structures & Algorithms. . . . 3

CS 202. Programming in UNIX. 2

TotaL 15

Computer Engineering Core (Upper Division)

ECE 3210. Electronics I 3

ECE 3420. Microcomputer Systems Laboratory 1

ECE 3430. Introduction to Microcomputer Systems. 3

ECE 3440. Microcomputer Systems Laboratory 1

ECE 4330. Embedded Systems Design. . . . 3

ECE 4242. Advanced Digital Design Methodology 3

ECE 4480. Computer Architecture and Design or CS 420. Computer Architecture I. 3

CS 306. Object-Oriented Programming Using C++. 3

CS 330. Software Engineering 3

CS 450. Operating Systems I 3

CS 472. Design and Analysis of Algorithms 3

ECE 4890. Senior Seminar. 1

ECE 4892. Computer Engineering Design Projects or CS 409. Selected Topics in Computer Science 3

Total 33

Technical Electives

(See Technical Elective Requirements) . . 15

Free Electives. 5

Total Hours. 128

Curriculum - B.S.Cp.E.

Common Freshman Year (for all EAS freshman students)

Fall Semester

MATH 135. Calculus I 4

ENGL 131. English Composition I 3

PES 111. General Physics I 4

ECE 1010. Problem Solving in Engineering 2

CS 115. Principles of Computer Science . . 3

Total 16

Spring Semester

MATH 136. Calculus II 4

PES 112. General Physics II 4
ECE 1011. Computer-Based Modeling & Methods of Engineering 2
CS 145. Data Structures & Algorithms. . . . 3
Social Sciences/Humanities Elective 3
Total 16

Sophomore Year

Fall Semester

MATH 235. Calculus III 4
ECE 2210. Circuit Analysis I 3
ECE 2410. Logic Circuits 3
CS 202. Programming in UNIX. 2
Science Elective 3
Total 15

Spring Semester

MATH 215. Discrete Math. 3
ECE 2420. Logic Circuits Laboratory 1
CS 330. Software Engineering 3
ENGL 309. Technical Writing 3
Science Elective 3
Social Sciences/Humanities Elective 3
Total 16

Junior Year

Fall Semester

ECE 3210. Electronics I 3
ECE 3420. Microprocessor Systems Laboratory 1
ECE 3430. Introduction to Microcomputer Systems. 3
ECE 4242 Advanced Digital Design Methodology 3
CS 306. Object-Oriented Programming Using C++ 3
Social Sciences/Humanities Elective 3
Total 16

Spring Semester

MATH 340. Introduction to Differential Equations. 3
ECE 3440. Microcomputer Systems Laboratory 1
ECE 3610. Engineering Probability & Statistics or MATH 381. Introduction to Probability & Statistics. 3
ECE 4480. Computer Architecture and Design or CS 420. Computer Architecture I. 3
CS 472. Design and Analysis of Algorithms 3
Technical Elective 3
Total 16

Senior Year

Fall Semester

ECE 4330. Embedded Systems Design. . . . 3
ECE 4890. Senior Seminar. 1
CS 450. Operating Systems I 3
Technical Electives. 6
Free Elective. 3
Total 16

Spring Semester

ECE 4892. Computer Engineering Design Projects or CS 409. Selected Topics in Computer Science 3
Technical Electives. 6
Social Sciences/Humanities Electives. 6
Free Elective. 2
Total 17
Total Hours. 128

Science Requirements for B.S.Cp.E. degree

Students must choose 6 credit hours from: CHEM 103, CHEM 106, BIOL 110, BIOL 111, BIOL 115, BIOL 116, GEOL 101, GEOL 102, PES 115, PES 213, PES 215, PES 300 or above.

Social Sciences/Humanities Requirements for B.S.Cp.E. degree

Studies in the humanities and social sciences serve not only to meet the objectives of a broad education, but also to meet the objectives of the computer engineering profession. CpE students at CU-Colorado Springs are required to take at least 15 credits of social sciences and humanities so that they can be more aware of their social responsibilities and better able to consider related factors in the decision making process. To satisfy the social sciences/humanities requirements, 15 credit hours must be chosen from the following list:

COMM 210, ECON 100, ECON 101, ECON 102, ECON 301, ECON 302, ENGL 150, ENGL 251, ENGL 290, ENGL 338, ENGL 397, ENGL 242, HIST 154, HIST 311, PHIL 102, PHIL 112, PHIL 115, PHIL 208, PHIL 344, PHIL 440, PHIL 443, P SC 110, P SC 435, PSC 448, PSY 100, PSY 393, SOC 111, SOC 317, SOC 438.

Senior Seminar in Cp.E. and Senior Design Project Requirements for B.S.Cp.E. degree

Students in CpE are required to take the one-credit hour class, ECE 4890 Senior Seminar, as well as ECE 4892, Computer Engineering Design Projects or CS 409, Selected Topics in Computer Science. ECE 4890 must be taken the semester before ECE 4892 or CS 409.

Technical Elective Requirements for B.S.Cp.E. Degree

All Cp.E. students are required to take 15 hours of technical electives to satisfy requirements for technical breadth and depth. These technical electives must be chosen from the following:

ECE 2220. Circuit Analysis II
ECE 2230. Circuits Laboratory
ECE 3110. Electromagnetic Fields I
ECE 3050. Introduction to Physical Electronics
ECE 3220. Electronics II
ECE 3240. Electronics Laboratory II
ECE 3510. Linear System Theory
ECE 4200. Advanced Digital Design Laboratory
ECE 4211. Rapid Prototyping with FPGAs
ECE 4220. Analog IC Design
ECE 4320. Fault Detection & Design for Testability
ECE 4362. Synthesis with Verilog HDL
ECE 4460. Design for Testability & Built-In Self Test
ECE 4640. Introduction to Digital Signal Processing
CS 316. Concepts of Programming Languages
CS 410. Compiler Design I
CS 438. Object-Oriented Software Construction: Foundations of OOP
CS 442. Data Base Systems I
CS 460. Numerical Computing
CS 470. Computability, Automata and Formal Languages
CS 480. Computer Graphics
CS 482. Artificial Intelligence I
MATH 313. Introduction to Linear Algebra

Other upper division courses with CS, ECE, MAE, MATH and PES designations may be taken if approved by the Chair of ECE or CS departments.

Minor in Computer Engineering

The requirements for a minor in Computer Engineering are 23 credit hours given below:

ECE 1010. Problem Solving in Engineering
ECE 1011. Computer Based Modeling and Methods in Engineering
ECE 2410. Logic Circuits
ECE 2420. Logic Circuits Laboratory
ECE 3420. Microprocessor Systems Laboratory
ECE 3430. Introduction to Microcomputer Systems
CS 115. Principles of Computer Science
CS 145. Data Structures & Algorithms

CS 202. Programming in UNIX

CS 330. Software Engineering

Course descriptions are given in a separate section of this Bulletin.

Master of Science — Electrical Engineering

The Department of Electrical and Computer Engineering offers coursework and thesis supervision leading to the degree Master of Science in Electrical Engineering (M.S.E.E.) Courses at the graduate level are ordinarily taught at 8:00 a.m. or after 4:30 p.m. to enable students from local industry to continue their studies.

Admission Requirements

Regular admission to the M.S.E.E. program requires a 3.0 undergraduate grade-point-average (G.P.A.) The Graduate Records Examination (G.R.E.) is required of any student whose G.P.A. falls below this average, is not a graduate of an ABET accredited undergraduate program in electrical engineering, or who is a graduate of a foreign university. If the student has an unacceptable undergraduate G.P.A., but has achieved a graduate G.P.A. of 3.25 or better on a minimum of 15 semester hours of relevant graduate work (e.g., taken as an unclassified student, or at another university), then the student may be accepted into the program. Note that units completed before admission may not all be transferable into a graduate degree program.

Students not admitted on a regular basis may be admitted on a provisional basis depending on their overall application file, including G.P.A., G.R.E., letters of recommendation, etc. Students admitted on a provisional basis are often required to take remedial courses (these are specified in the letter of acceptance). Registration for such remedial courses must commence with the first semester of a student's program with at least three credits completed per semester until all remedial requirements are satisfied.

For more information about these programs, contact the Department of Electrical and Computer Engineering, Graduate Program, Engineering Bldg. Room 299, or call (719) 262-3351. Send email to ecedept@eas.uccs.edu or see our webpage at eceweb.uccs.edu.

Duration of Program

The completion of the M.S.E.E. degree is normally accomplished in one to three years, and must be accomplished in six years, commencing with the beginning of course work.

A student who is not continuously enrolled (having missed a fall- and/or spring-semester registration) becomes inactive and is subject to the rules governing Readmission of Former Students in the graduate school procedures.

Degree Requirements

Thesis option:
30 semester hours total.

- 24 semester hours of course work.

At least 18 semester hours must be ECE courses. The remaining 6 semester hours may be replaced by allied department courses (e.g., computer science, mathematics, physics, mechanical and aerospace engineering, etc.).

At most 6 semester hours may be independent study courses.

- 6 semester hours of thesis credit.

All course work must be numbered 5000 and above if ECE, or 400(0) and above if non-ECE. Up to nine semester hours of accepted course work may be transferred from another university or from course work taken as an unclassified student.

Non-Thesis option:
30 semester hours total.

- All 30 semester hours are course work.

At least 24 semester hours must be ECE courses. The remaining 6 semester hours may be replaced by allied department courses (e.g., computer science, mathematics, physics, mechanical and aerospace engineering, etc.).

At most 6 semester hours may be independent study.

All course work must be numbered 5000 and above if ECE, or 400(0) and above if non-ECE. Up to nine semester hours of accepted course work may be transferred from another university or from course work taken as an unclassified student.

The student takes a final examination consisting of two parts:

1. An oral presentation and a written report on a subject chosen by the student and approved by the advisory committee, and

2. A written examination in his or her concentration area.

There are no additional requirements as to which specific courses a student must take. The student's selection of courses need only meet the above requirements and be approved by the student's academic advisor and the departmental graduate studies committee

Grades

The student must have an overall graduate G.P.A. of 3.0 in order to graduate. The student must have a grade of C or better in all courses applied toward the M.S.E.E. degree.

Program Options

Defined Master's

The defined M.S.E.E. provides options leading toward a M.S.E.E. in two years by two courses per semester. This program has been designed for graduate students who work full-time. All courses listed in the defined master's are offered in the evening and will generally be scheduled from 4:30 to 7:05 p.m. There are three different emphasis areas available: Circuit Design, Communications and Signal Processing, and Controls and Signal Processing. The courses shown in the following list will be offered at least once every two years. Students may begin these programs in the Fall semester. The actual schedules for each option are available on our web site at http://eceweb.uccs.edu.

Circuit Design

ECE 5242. Advanced Digital Design Methodology

ECE 5340. CMOS VLSI IC Design

Spring 2001

ECE 5270. CMOS RF Circuit Design

ECE 5220. CMOS Analog IC Design

ECE 5260. Mixed-Signal IC Design

ECE 5450. Computer Architecture

ECE 5362. Synthesis with Verilog HDL

ECE 5160. Electromagnetic Effects in IC Design

ECE 7000. Master's Thesis Research

Communications and Signal Processing

ECE 5610. Analysis of Random Signals

ECE 5625. Communication Systems I

ECE 6650. Estimation Theory and Adaptive Filtering

ECE 5630. Communications Systems II

ECE 5650. Modern Digital Signal Processing

ECE 5635. Wireless Communication Systems

ECE 5620. Detection and Extraction of Signals from Noise

ECE 5655. Real-Time Digital Signal Processing

ECE 7000. Master's Thesis Research

Controls and Signal Processing

ECE 5520. Multivariable Control Systems I

ECE 5530. Multivariable Control Systems II

ECE 5540. Digital Control Systems

ECE 5610. Analysis of Random Signals

ECE 6650. Estimation Theory and Adaptive Filtering

ECE 5650. Modern Digital Signal Processing

ECE 5620. Detection and Extraction of Signals from Noise

ECE 5655. Real-Time Digital Signal Processing

ECE 7000. Master's Thesis Research

The M.S.E.E. rules allow a student in the above programs to substitute any given course with other courses and/or choose the non-thesis option.

Doctor of Philosophy — Electrical Engineering

Regular admission to the Ph.D. program requires a 3.3 grade-point-average (GPA) on all previous college work, including both graduate and undergraduate. The Graduate Records Examination (GRE) is required of any student who falls below this average GPA, is not a graduate of an ABET accredited undergraduate program in electrical engineering, or who is a graduate of a foreign university.

Graduates of foreign universities who are applying from outside the USA are required to take the TOEFL exam: A score of 550-600 on the paper-based exam, or of 213-250 on the computer-based exam is required. If the student has completed at least one year full-time academic study at a U.S. institution at the time of application, if English is his or her native language, or if he or she can demonstrate fluency in English in person to the ECE Graduate Program Director, the requirement to take the TOEFL may be waived.

Students not admitted on a regular basis may be admitted on a provisional basis depending on their over-all application file, including GPA, GRE, letters of recommendation, etc. Students admitted on a provisional basis are often required to take remedial courses (these are specified in the letter of acceptance). Registration for such remedial courses must commence with the first semester of a student's program with at least three credits completed per semester until all remedial requirements are satisfied.

Degree Requirements

The Ph.D. degree is awarded to students who have pursued graduate study without serious interruption, who have submitted an acceptable dissertation, and who have passed all prescribed examinations.

For a student entering with a master's degree:

- Complete 30 semester hours of course work.
- At least 15 semester hours must be ECE courses.
- At most 9 semester hours may be independent study courses.
- All 30 semester hours must be numbered 5000 and above if ECE, or 500 and above if non-ECE.

For a student entering without a master's degree:

- Must complete 60 semester hours of course work.
- At least 30 semester hours must be ECE courses.
- At most 15 semester hours may be independent study courses
- All 60 semester hours must be numbered 5000 and above if ECE, or 500 and above if non-ECE.

In either case:

- Cross-listed courses which are offered at the 500(0)/600(0) levels must be taken at the 600(0) level.
- Complete 30 semester hours of dissertation research in addition to course work.
- Have an overall graduate G.P.A. of 3.0 in order to graduate.
- Have a grade of B- or better in all courses applied toward the Ph.D. degree.
- Pass Preliminary Examination, Comprehensive examination, and final defense of dissertation
- No foreign language is required.

ECE Department Faculty and their Research Areas

Dr. Joshua Alspector — Electronics, Neural Networks

Dr. Carlos A. Paz de Araujo — Microelectronics

Dr. Michael D. Ciletti — Computer-Aided Design, Computer Engineering

Dr. Ramaswami Dandapani — Computer-Aided Design, Computer Engineering

Dr. T.S. Kalkur — Microelectronics, VLSI Circuit Design

Dr. Richard Y.C. Kwor — Microelectronics

Dr. Gerald M. Oleszek — Microelectronics

Dr. John D. Norgard — Electromagnetics

Dr. Gregory L. Plett — Signal Processing and Control

Dr. Ronald M. Sega — Electromagnetics

Dr. Chia-Jiu (Charlie) Wang — Computer Engineering

Dr. Mark A. Wickert — Communications, Signal Processing

Dr. Rodger E. Ziemer — Communications, Signal Processing

A research emphasis in allied areas will be accommodated by allowing the student to take up to half of his/her course work in the allied area as along as it is related to the research area. The research can be advised by a faculty member from the allied department, but the committee will be chaired by an ECE faculty member. To apply, prospective students should write to the ECE Department at least three months before they anticipate beginning their course of study. Limited fellowships and assistantships are available.

Department of Mathematics

Faculty

Professors: Abrams, Carlson, Daly, Haefner (Chair), Phillips, Rangaswamy, Rebman and Schinazi; Associate Professors: Morrow and Zhang; Assistant Professor: Chakravarty; Instructor: Michaux; Director of MLC: Schumann.

Programs coordinated by the department:

Minor in Mathematics

Minor in Statistics

Bachelor of Arts in Mathematics

Bachelor of Science in Mathematics

Industrial Mathematics Certificate

Applications in Technology in Mathematics Education Certificate

Master of Science in Applied Mathematics

Master of Basic Science with Mathematics Emphasis

The Department of Mathematics at CU-Colorado Springs offers a wide range of

courses, degrees, and programs to meet the needs of a diverse constituency in the Pikes Peak Region. The degree programs include Bachelor of Arts in Mathematics, Bachelor of Science in Mathematics, and Master of Science in Applied Mathematics. A Mathematics option is also available through the Master of Basic Science degree offered through the College of Letters, Arts and Sciences. The department offers minors in both Mathematics and Statistics. In addition, the department supports the Certificate Program in Industrial Mathematics, and the Certificate Program in CATME (Center for Applications and Technology in Mathematics Education).

The Bachelor of Arts Degree in Mathematics is a traditional degree in mathematics. Most students choose this degree in order to prepare themselves for a career as a mathematics teacher or to prepare themselves for a graduate program in pure mathematics. The Bachelor of Arts students follow the general education requirements of the College of Letters, Arts and Sciences.

The Bachelor of Science Degree in Mathematics is well-suited for those students aiming towards a career in applied mathematics or planning upon attending graduate school in applied mathematics. This program is also appropriate for those mathematics students who have not yet decided between a teaching career or a career in industry. The B.S. students follow the general education requirements of the College of Engineering and Applied Science.

For information about these programs, contact the Department of Mathematics, Engineering Bldg. Room 274, or call (719) 262-3311. Send e-mail to mathinfo@math.uccs.edu or see our webpage at mathweb.uccs.edu.

Mathematics Learning Center

The Mathematics Learning Center (MLC) is located in the EAS Building, Room 129. The MLC began operation in the fall of 1990 as part of a federally funded Title III initiative known as Project Excel. The Math Learning Center provides drop-in mathematics tutoring for students, supports the individualized mathematics courses offered through the Extended Studies program, and provides student access to approximately forty PC computers for use in mathematical endeavors. The machines run on a common network and carry Maple V, a computer based algebra system. As the role of computer technology in the classroom continues to grow, so too does the importance of the MLC as a vital student resource.

The Goals of the MLC are:

- to provide tutoring opportunities to CU-Colorado Springs students,
- to support the implementation of technology into the mathematics curriculum,
- to provide placement testing support for CU-Colorado Springs Mathematics Placement Exams, and
- to provide support for the Center of Applications and Technology in Mathematics Education (CATME).

Academic Policies

Prerequisite Policy

For the courses Math 104, 105, 111, 112, and 135 the following Prerequisite Policy applies. For all other courses, listed prerequisites are advisory only.

If a student has not achieved a passing grade in a listed prerequisite course, the student must demonstrate that he/she possesses an appropriate level of competence in the prerequisite topics before enrolling in the subsequent course. Such students must satisfactorily complete either the Algebra Diagnostic Exam or Calculus Readiness Exam as is warranted. Students enrolled in any one of the courses Math 104, 105, 111, 112, 135 who have not either met the course prerequisite or the exam prerequisite by the second week of the semester must disenroll from the course.

Students who are interested in enrolling in any of Math 104, 105, 111, 112, or 135 are strongly encouraged to take the appropriate placement exam well before the start of the semester, for pedagogical, advising and administrative purposes. To make an appointment to take a placement exam, or for more information, contact the Testing Center at 262-3260.

Calculator Policy

The Department of Mathematics Department Policy on Calculators: Calculator usage on exams is limited to a basic scientific calculator with a minimal number of storage registers and no graphing capability.

Bachelor of Arts — Mathematics

Students in the Bachelor of Arts Degree in Mathematics must complete the following, all with grades C or better.

MATH 135, 136, 235.Calculus I, II, III . . . 12
MATH 215. Discrete Mathematics 3
MATH 310 or Math 381.
Statistics for the Sciences or Intro to Probability and Statistics 3
MATH 313.
Introduction to Linear Algebra. 3
MATH 340.
Introduction to Differential Equations 3
MATH 414.Modern Algebra 1 3
MATH 431. Modern Analysis I 3
MATH 448. Mathematical Modeling 3
MATH 495. Senior Seminar 1

Students must take at least 43 hours of Mathematics courses numbered 135 and above, excluding Math 301 and 302.

Students interested in teaching careers in secondary education should take Math 311 – Number Theory and Math 421 – Higher Geometry as part of their program. They should also contact a faculty advisor in the College of Education as soon as possible to construct a schedule of their education courses.

Students should take a number of courses in computer science to prepare them for the various career options in mathematics. Foreign languages are encouraged for students interested in research.

Bachelor of Arts majors are required to fulfill the general education requirements of the College of Letters, Arts, and Sciences. These requirements include English 131 and 141, and 12 hours each of humanities, natural science and social science. The quantitative requirement is fulfilled by mathematics major requirements. Note that Philosophy 344 or 443 must be taken as part of the 12 hours humanities requirement. See the area requirements in the College of Letters, Arts, and Sciences section for specific courses that satisfy these requirements. A total of 120 hours is required for graduation.

It is imperative that students majoring in mathematics contact a math advisor. This should be done in the freshman or sophomore year to avoid graduation delays. Examine the Department's website at http://mathweb.uccs.edu for a suggested program and sequence of mathematics courses.

Secondary Teaching Option

MATH 135 Calculus I 4
MATH 136 Calculus II 4
MATH 215 Discrete Math 3
MATH 235 Calculus III 4
One of the following: 3

- MATH 310 Stats for the Sciences
- MATH 381 Intro to Probability & Statistics

MATH 311 Number Theory 3
MATH 313 Intro to Linear Algebra 3
MATH 340 Intro to Differential Equations . 3
MATH 421 Higher Geometry 3
MATH 431 Modern Analysis I 3
MATH 448 Mathematical Modeling 3
Mathematics elective 3
MATH Capstone Course 1
Total 40

General Education Requirements

Humanities Area Requirement

Core Humanities (HUM prefix, numbered 300 and above) 3
PHIL 100 Intro to Philosophy or PHIL 102 Ethics 3
PHIL 344 Symbolic Logic or PHIL 443 Logical Theory 3
Remaining hours from approved LAS General Humanities list (no more philosophy) 3
Natural Science Area Requirement . . . 12-13
One of the following:

- PES 111, 115, 112, 215 General Physics I and II and Labs, plus 2 hours from the approved LAS Natural Science list, or
- 12 hours from the approved LAS Natural Science list to include one lab

Social Science Area Requirement

PSY 100 General Psychology 4
Remaining hours from approved LAS Social Science list 8
Composition Requirement . . . . . .
ENGL 131 English Composition I 3
ENGL 141 English Composition II 3
Teacher Education Program (See College of Education for specific courses) 34
TOTAL CREDITS 119

Bachelor of Science — Mathematics

The Department of Mathematics offers a curriculum leading to the degree of Bachelor of Science in Mathematics. The student must have a secondary emphasis area in a specific engineering, computer science, or applied department. The choice of secondary area must be approved by the student's faculty advisor.

Modern industrial and scientific enterprises are so dependent on advanced mathematical concepts that applied mathematicians are needed today by almost all concerns that are engaged in such work. The undergraduate curriculum is designed to give training in mathematics and in engineering and science. The use of numerical methods and computers is included.

Foreign languages are encouraged for students interested in research. A maximum of 8 hours of foreign languages may be taken and applied to the approved electives requirements. German, French and Russian are the approved languages.

All B.S. Mathematics majors must plan a complete program and obtain the approval of a departmental advisor at the beginning of the sophomore year.

The B.S. degree in Mathematics requires the completion of a minimum of 120 credit hours of course work with an average grade of C or better (a 2.0 grade point average) and a grade of C or better in all mathematics courses.

Degree Requirements

The requirements for the B.S. degree in Mathematics are as follows:

MATH 135, 136, 235. Calculus I, II, III 12
MATH 215. Discrete Mathematics 3
MATH 310 or Math 381. Statistics for the Sciences or Intro to Probability and Statistics 3
MATH 313. . . . . Introduction to Linear Algebra. 3
MATH 340. . . . . Introduction to Differential Equations 3
MATH 431. Modern Analysis I 3
MATH 448. Mathematical Modeling 3
MATH 495 Senior Seminar. 1

One of the following restricted mathematics elective sequences:

(i)Analysis: (a) MATH 445. Complex Variables and (b) MATH 443. Ordinary Differential Equations, or MATH 447. Partial Differential Equations,

(ii) Optimization and Numerical Analysis:(a) MATH 442. Optimization and (b) MATH 465. Numerical Analysis,

(iii)Statistics; two of MATH 482. Introduction to Mathematical Statistics, MATH 483. Linear Statistical Models, MATH 485. Stochastic Modeling. 6

Mathematics electives (numbered 310 or higher) 6
Total 43

Basic Science and Technology

CS 115. Prin. of Computer Science 3
CS 145. Data Structures & Alg 3
CS 460 or MATH 465 Numerical Computing or Numerical Analysis 3
ECE 1010. Problem Solving in Engineering 2
ECE 1011. Computer Based Modeling 2
PES 111. General Physics I 4
PES 112. General Physics II 4
PES 115. General Physics Lab I 1
Total 22

Humanities and Social Sciences

Comm 210 and Engl 307 or 309 6
Engl. 131 or 141 3
Additional social science-humanities electives 15
Total 24
Secondary Area and Technical Electives 28/29
Free Electives 3
Total Hours 120

Secondary Area Requirement

Normally a graduate of mathematics who accepts a position in the private or public sector will be working as part of a team to solve applied problems outside of mathematics. Seldom is this problem purely one in mathematics. Because of this, an applied mathematician needs a working knowledge of another discipline, and so the Mathematics Department requires each graduate of the B.S. in Mathematics program to satisfy a secondary area requirement. This may be done in any one of the following ways:

1) Departmental Coursework

Complete 18 hours of coursework, including at least 9 hours at the 300 level or above, from one of the following departments: Biology, Chemistry, Computer Science, Economics, Electrical and Computer Engineering, Mechanical and Aerospace Engineering, Physics, or Psychology. Courses used for general education requirements may be counted towards this requirement.

2) Interdisciplinary Secondary Areas

Complete one of the interdisciplinary secondary area programs that have been approved by the department. At present, there are two such programs: System Science and Engineering and Actuarial Science.

Concentration in System Science and Engineering

Systems science is an approach that views an entire system of components as

an entity rather than simply an assembly of individual parts; each component is designed to fit properly with the other components rather than to function by itself. The engineering and mathematics of systems is a rapidly developing field. It is one of the most modern segments of applied mathematics, as well as an engineering discipline. It is concerned with the identification, modeling, analysis, design, and control of systems that are potentially as large and complex as the U.S. economy or as precise and vital as a space voyage. Its interests run from fundamental theoretical questions to the implementation of operational systems. In its mathematical aspects it draws on the most modern and advanced areas of mathematics. At the application end of the spectrum, the systems scientist is an scientist/engineer with a unique and indispensable viewpoint. For example, in the aerospace industry, the systems engineer devises the control and guidance laws, navigational systems, trajectory tracking, and estimating algorithms - indeed the total coordinated structure of complex aerospace undertakings.

Mathematics Requirement

As mathematics electives, complete 2 of the following 3 courses

MATH 442. Optimization

MATH 448. Math Modeling

MATH 485. Stochastic Modeling

Secondary Area Requirements

ECE 2210. Circuits 1

CE 213. Applied Mechanics

ECE 3510. Linear Systems Theory

ECE 4510. Feedback Controls

ECE 4530. Control System Lab

MAE 4506. Engineering Simulation

or ECE. 4540 Digital Control

MAE 3401. Modeling & Simulation of Dynamic Systems

Concentration in Actuarial Science

Actuarial Science is a professionally oriented program combining business, economics, and mathematics, and is designed to prepare students to begin careers as actuaries. Actuaries are experts in risk management. Graduates of this program are prepared for the first three professional actuary exams and have a solid base of preparation for further exams. These first three exams are: Exam 100-Calculus and Linear Algebra, Exam 110-Probability and Statistics, and Exam 135-Numerical Analysis. See the Society of Actuaries web page, http://www.soa.org, for additional information concerning these exams and a career in Actuarial Science.

To provide a solid foundation for this career and prepare for these three exams, the student should complete the following program:

Mathematics Requirement

MATH 381. Introduction to Probability and Statistics

MATH 465. Numerical Analysis 1

MATH 482. Introduction to Mathematical Statistics

One of MATH 483. Linear Statistical Models, or MATH 485. Stochastic Modeling

Secondary Area Requirements

Economics

ECON 101. Introduction to Microeconomics

ECON 102. Introduction to Macroeconomics

ECON 301. Intermediate Microeconomic Theory

ECON 481. Introduction to Econometrics

Business

ACCT 201. Introduction to Financial Accounting

BUS 200. Business Law

FIN 334. Risk and Insurance Principles

or

3) Personalized Secondary Program

Design a personalized secondary area program that may include courses from departments other than those listed in (1) above, and/or may be interdisciplinary in nature. Such a program MUST have the approval of the faculty advisor from the Mathematics Department and consist of at least 18 hours of course work with 9 hours at the 300 level or above.

Technical Electives

In addition to course work in the secondary area, a student wishing to obtain a B.S. degree in mathematics must also complete 13/14 semester hours of technical electives, which must be approved by the faculty advisor. These courses will normally be selected to broaden the student's exposure to fields of science or engineering. Foreign languages are acceptable.

At least 6 hours must be from courses numbered 300 or above. Semester hours exceeding the required 18 in the secondary area may be applied to the technical elective requirement. Courses counted toward the basic science requirement do not apply, and at most 4 semester hours of computer languages may be used. A maximum of 8 semester hours of foreign languages may be applied to this requirement.

Minor in Mathematics

A student wishing to complete a minor in mathematics must complete at least 24 hours of courses given by the Department of Mathematics. All such courses must be completed with a grade of C or better. Of these 24 hours, the following requirements must be met:

MATH 135, 136, 235 . . . . . 12 hours

MATH 215, 311, 341, 350, 351, 414, 421, OR 431 . . . . . 3 hours

A total of at least 9 additional hours of approved math courses numbered above 3023 . . . . . 9 hours

It is imperative that a student intending to minor in mathematics plan her/his program and obtain the approval of a departmental advisor before the end of her/his sophomore year.

Minor in Statistics

A student wishing to complete a minor in statistics must complete at least 21 hours of approved math courses given by the Department of Mathematics. All such courses must be completed with a grade of C or better. Of these 21 hours, the following requirements must be met:

MATH 310 or its equivalent . . . . . 3 hours

MATH 381 or its equivalent . . . . . 3 hours

one of: MATH 482, 483,485, 487 . . . 3 hours

It is imperative that a student intending to minor in statistics plan her/his program and obtain the approval of a departmental advisor before the end of her/his sophomore year.

Certificate Programs

Industrial Mathematics Certificate Program

The College of Engineering and Applied Science offers a Certificate in Industrial Mathematics to qualified students. The program endeavors to prepare students for careers in the applications of Mathematics in Industry by emphasizing mathematical modeling, courses in traditional applied mathematics, and work on actual industrial problems with the cooperation of representatives from industry. The certificate is awarded at three levels. It is available for undergraduate students in both the colleges EAS and LAS and for graduate students in

EAS. Please call or write the Department of Mathematics for more information.

Applications and Technology in Mathematics Education Certificate Program (CATME)

The College of Engineering and Applied Science offers a Certificate in Applications and Technology in Mathematics Education to qualified students. The purpose of the program is to train teachers (and potential teachers) in the use and methodology of applications and technology in the mathematics classroom. The program emphasizes courses that train the instructor on the use of graphing calculators, computer algebra and geometry systems, as well as the applications of mathematics that use those technologies. It is available to all registered students at CU-Colorado Springs. Please visit the Department of Mathematics website http://mathweb.uccs.edu/catme for more information.

Master of Science — Applied Mathematics

The Department of Mathematics offers a strong graduate program leading to the Master of Science in Applied Mathematics. Specific areas of study currently available include astrodynamics, statistics, probability, differential equations, applied analysis, computer vision, algebra, and coding theory.

Tracks

To respond to the needs of both students and employers, the Department has organized this degree program into a system of four tracks, which are intended to help students develop their programs of study. The tracks are 1) K-14 education, 2) Ph.D. preparation, 3) applied and computational mathematics, and 4) business and management. Detailed information about the tracks may be found at the department web site, http://mathweb.uccs.edu. Customized programs of study are also available.

Admission Requirements

B.S. degree in mathematics (or a B.S. degree in some other field, with extensive coursework in mathematics), including a course in real analysis comparable to the CU-Colorado Springs course Math 431. A minimum grade point average of 3.0. Under special circumstances students may be admitted with a lower grade point average (or without a course in real analysis) as provisional degree students. (Please refer to the Graduate School admissions requirements.)

Degree Requirements

1. 3.0 grade point average in all course work applied towards the degree.

2. An advisor is appointed during the first semester of graduate work; usually this initial advisor is the chairman of the mathematics department graduate committee. The advisor must approve the student's course of study.

3. 30 semester hours of approved graduate work. This must include Linear Algebra (Math 513) and Modern Analysis II (Math 532). All students must pass comprehensive examinations in these two subjects. Approved mathematics graduate courses must be at the 500-level or higher. Students completing one of the four tracks of study will automatically fulfill the requirements for the M.S. Applied Math degree. Students may select a thesis or non-thesis option. Students in the thesis option will replace up to 6 hours of courses with Master's thesis.

4. All students are required to make an oral presentation regarding some aspect of advanced mathematics. For students pursuing the thesis option, the thesis defense will qualify as such a presentation.

5. Courses will have graduate rank only if they are taught by members of the graduate school faculty and are at the 500 level or above. All courses intended to count for the degree must be part of an approved plan of study. This plan must be developed by the student and approved by the advisor within the first semester after being admitted to the program. This plan may be revised at any time with the approval of the advisor. The plan will require students to demonstrate some cohesiveness in the courses chosen, or to demonstrate a clear subject area of concentration.

6. A student may complete up to 12 hours of appropriate graduate coursework in departments other than the department of mathematics, as part of the "tracks" program. Such courses MUST be PRE-approved by the advisor.

7. Students must demonstrate basic competency in computing.

8. The department graduate committee must approve exceptions to these requirements.

For more information about these programs, contact the Department of Mathematics, Graduate Programs, Engineering Bldg. Room 274, or call (719) 262-3311. Send email to mathinfo@math.uccs.edu or see our webpage at mathweb.uccs.edu.

Graduate Teaching Fellowships

A limited number of teaching assistantships are available. For information contact the graduate advisor of the Department of Mathematics. Typically, students requesting assistantships should indicate this three months prior to the application deadline for the intended semester.

Department of Mechanical and Aerospace Engineering

Faculty

Professor: Schmidt; Associate Professor: Gorder (Chair); Assistant Professor: Friend; Senior Instructors: Fosha and Rappold.

Programs coordinated by the department:

Minor in Aerospace Engineering

Bachelor of Science in Mechanical Engineering

Master of Science in Mechanical Engineering

Master of Engineering in Aerospace and Information Operations (pending)

Master of Engineering in Engineering Management

Master of Engineering in Information Engineering & Operations (pending)

Master of Engineering in Manufacturing

Master of Engineering in Remote Sensing

Master of Engineering in Space Operations

MAE News and Information

Information and news published by the Department of Mechanical and Aerospace Engineering (MAE) can be obtained from the Department's web site at http://mae.uccs.edu.

Bachelor of Science — Mechanical Engineering

Mechanical Engineering is a core discipline, encompassing mechanics, materials science, thermal science, dynamics and controls, design, and manufacturing. Career opportunities are open to mechanical engineers in industry, government, and universities, as well as in other professions including business, law, and medicine. Mechanical

engineers are employed in a wide range of industries including aerospace, automotive, chemical, computing, electronics, industrial machinery, manufacturing, mining, oceanography, petroleum, pharmaceuticals, power, printing, publishing, and textiles. Mechanical engineers usually engage in research, development, design, testing, manufacturing, operations and maintenance, marketing and sales, and administration.

The undergraduate curriculum incorporates mathematics, physics and chemistry, humanities/social sciences, business, engineering science, electrical theory, measurement science, mechanical engineering core courses (computer-aided drafting, dynamics and controls, solid and fluid mechanics, thermodynamics, materials science, and heat and mass transfer) and selected elective courses in the following areas:

Aerospace Engineering

Automation, Controls and Robotics

Dynamic Systems and Control

Materials Science

Manufacturing

Mechatronics/MEMS

Process Engineering

Many of the elective courses are interdisciplinary in nature and are taught in other departments and colleges to provide a balanced education on the fundamentals of the profession. These electives are designed to meet the needs of the industrial, commercial, governmental, and military communities and to serve students' professional objectives. Undergraduate students can participate in internship and cooperative educational programs with a variety of high-tech companies along the front-range, which may include Agilent Technologies, B.F. Goodrich, Boeing, Lockheed-Martin, Hewlett-Packard, Quantum, Sturman Industries, SuperFlow Corporation, Transportation Technology Center/AAR, and TRANE. Further, currently enrolled undergraduate students with exceptional academic records may obtain guaranteed early enrollment in mechanical and aerospace engineering graduate programs. Undergraduate students also have many opportunities to become involved in discipline-related activities outside the classroom. The MAE Department has active chapters in the American Society of Mechanical Engineers (ASME) and the American Institute of Aeronautics and Astronautics (AIAA), and the Society of Automotive Engineers (SAE).

For more information about these programs, contact the Department of Mechanical and Aerospace Engineering, University Office Park 1867 Room 200, or call (719) 262-3243. Send email to mae@mail.uccs.edu or see our webpage at mae.uccs.edu.

Degree Requirements

The requirements for the Bachelor of Science degree in Mechanical Engineering (B.S.M.E.) are as follows:

Mechanical Engineering majors are required to take 16 hours in basic engineering, 36 hours in core courses, and 12 hours of technical electives. Students may choose elective courses in automation and robotics, dynamics and controls, materials science, manufacturing and process control, mechatronics/MEMS, and aerospace engineering.

Communication Skills

ENGL 131 Composition I 3

ENGL 309 Technical Writing 3

Total Communication Skills 6

Humanities and Social Sciences

(Choose three courses, one 200-level or greater)

Courses must be socially and culturally broadening. Acceptable subject matter: Literature, Language, History, Economics, Music, Psychology, Sociology, Political Science, Visual or Performing Arts, Ethnic Studies, Communications, Film Studies, Fine Art History, Music Appreciation, Philosophy, Women's Studies, Professional Writing, or Anthropology

Total Humanities/Social Sciences 9

Basic Science

CHEM 103 General Chemistry 5

PES 111, 112 General Physics I and II 8

Total Science 13

Business – Entrepreneurial Track (Complete three courses from the following list)

ACCT 201 Intro to Financial Accounting . . 3

BUAD 100 Survey of Contemp Bus Issues and Concerns 3

ORMG 330 Intro to Management and Organization 3

MKTG 300 Principles of Marketing 3

ENGR 342 Engineering Economy 3

Total Business 9

Mathematics

MATH 135, 136, 235 Calculus I, II, III . . . 12

MATH 313 Linear Algebra 3

MATH 340 Differential Equations 3

MATH 381 or ECE 3610 Statistics 3

Total Mathematics 21

Basic Engineering and Computer Background

CS 115 Principles of Computer Science . . . 3

ECE 1010 Problem Solving in Engineering 2

ECE 1011 Computer Based Modeling & Methods 2

ECE 2210 Circuit Analysis I 3

ECE 3210 Electronics I 3

MAE 2501 Computer Aided Drawing/Fabrication 3

Total Basic Engineering/Computer Background 16

Mechanical Engineering Core Courses

MAE 1003 Fundamentals of Flight 3

MAE 2101 Statics 3

MAE 2102 Dynamics 3

MAE 2301 Engineering Thermodynamics . 3

CHEM 301 Materials Science (CHEM 106 prereq. waived) 3

MAE 3010 Mechanical Engineering Lab . . . 2

MAE 3005 Engineering Measurement Lab . 3

MAE 3130 Fluid Mechanics 3

MAE 3201 Strength of Materials 3

MAE 3310 Heat and Mass Transfer 3

MAE 3401 Modeling and Simulation of Dynamic Systems 3

MAE 3420 Feedback Control 3

MAE 4402 System Dynamics 3

Total Core 38

Mechanical Engineering Technical Electives and Final Design

Technical Electives

(4 courses, 2 at 300/3000 level, 2 at 400/4000 level) 12

MAE 4510 Engineering Design I 1

(choose one of the two below:)

MAE 4511 Engineering Device Design 3

MAE 4512 Engineering Systems Design . . . 3

Total Specialty Areas 16

Curriculum for B.S.M.E.

Common Freshmen Year (for all EAS freshman students)

Fall Semester

MATH 135. Calculus I 4

ENGL 131. English Composition I 3

PES 111. General Physics I 4

ECE 1010. Problem Solving in Engineering 2

CS 115. Principles of Computer Science . . 3

Total 16

Spring Semester

MATH 136. Calculus II. 4

PES 112. General Physics II 4

ECE 1011. Computer-Based Modeling & Methods of Engineering 2
MAE 1003. Fundamentals of Flight 3
Social Sciences/Humanities Elective 3
Total 16

Sophomore Year

Fall Semester
MAE 2101 Statics 3
MAE 2501. Engineering Graphics (CAD) . . 3
MATH 235 Calculus III 4
ENGL 309 Tech Writing & Presentation . . 3
CHEM 103 General Chemistry I 5

Spring Semester
MAE 2102 Dynamics 3
MATH 340 Intro to Diff. Eqns. 3
CHEM 301 Materials Science 3
ECE 2210 Circuit Analysis I 3
Business Elective 3
Total 33

Junior Year

Fall Semester
MATH 313 Intro to Linear Algebra. 3
ECE 3210 Electronics I 3
ECE 3610 or MATH 381. Engineering Probability and Statistics 3
MAE 3401 Modeling and Simulation 3
MAE 2301 Engineering Thermodynamics . 3

Spring Semester
MAE 3420 Feedback Control 3
MAE 3130 Fluid Mechanics 3
MAE 3310 Heat and Mass Transfer. 3
MAE 3201 Strength of Materials. 3
MAE 3005 Engineering Measurement Lab . 3
Total 30

Senior Year

Fall Semester
MAE 4402 System Dynamics 3
MAE 4510 Engineering Design I. 1
SS/Humanities Elective 3
Business Elective 3
Technical Area Elective 3
Technical Area Elective 3
MAE 3010 Mechanical Engr Lab 2

Spring Semester
SS/Humanities Elective 3
Business Elective 3
Technical Area Elective 3
Technical Area Elective 3
Choose either
MAE 4511 Engineering Device Design II 3
or
MAE 4512 Engineering System Design II. 3
Total 33
Total Hours. 128

Course descriptions are given in a separate section of this Bulletin.

Minor in Aerospace Engineering

Any student admitted to an undergraduate program in the College of Engineering and Applied Science may pursue a minor in aerospace engineering by successfully completing the following 22 credit hours of course requirements, including all necessary pre-requisites for these courses:

MAE 3135 Aerodynamics or MAE 4410 Astrodynamics
MAE 3120 Aerospace Structures
MAE 3401 Modeling and Simulation of Dynamic Systems
MAE 3420 Feedback Control of Aerospace & Mechanical Systems
MAE 4415 Flight Dynamics
MAE 43XX Airbreathing Propulsion or
MAE 4316 Rocket Propulsion or
MAE 4455 Flight Mechanics
MAE 4510 Engineering Design I with focus on Aerospace Vehicle
MAE 4512 Engineering Design II with focus on Aerospace Vehicle

General

The student will be responsible for any pre-requisites to chosen courses.

All course work towards the minor must be completed with a grade of C or better.

At most 6 credit hours of transfer work may be applied to the minor.

Master of Science — Mechanical Engineering

The Department of Mechanical and Aerospace Engineering offers a program leading to the Master of Science in Mechanical Engineering (M.S.M.E.) This research-oriented academic degree is appropriate either as a terminal degree or in preparation for doctoral studies in mechanical and aerospace engineering. Courses at the graduate level are offered in the late afternoon or evening to enable students from local industry to complete their studies. Graduate students take courses in the following tracks:

Aerospace Engineering
Automation, Controls and Robotics
Dynamic Systems and Control
Materials Science
Manufacturing
Mechatronics/MEMS
Process Engineering

In addition, pre-approved graduate "tracks of study" exist in Manufacturing, Remote Sensing and Space Operations.

Interdisciplinary research programs are available to graduate students. Graduate students can participate in ongoing research programs through independent study projects or as research assistants on sponsored research projects.

Admission Requirements

The minimum requirements for regular admission into the M.S.M.E. program are:

1. Baccalaureate degree (B.S.) in engineering, applied mathematics, or physics from an accredited institution. Currently enrolled undergraduate engineering students with exceptional academic records may qualify for guaranteed early admission to the M.S.M.E. graduate program - please contact the MAE department for more information.

2. An undergraduate grade point average of 3.0 or higher on a scale of 4.0 in all college level academic work attempted.

3. Evidence of mathematical maturity equivalent to the completion of the following university-level coursework:

- Three semesters of calculus
- At least one semester beyond calculus (advanced calculus or ordinary differential equations)
- Linear algebra
- Probability and statistics
- Knowledge beyond the introductory level in mechanical engineering, either through prior undergraduate coursework and/or professional experience.

4. Official transcripts from all academic institutions attended, including CU-Colorado Springs itself if applicable.

5. Three letters of recommendation, mailed to the MAE Department Office.

Applicants who do not meet these requirements for regular admission may be admitted on a provisional basis subject to the recommendations of the MAE graduate committee.

For more inforamtion about these programs, contact the Department of Mechanical and Aerospace Engineering, Graduate Programs, University Office Park 1867 Room 200, or call (719) 262-3243. Send email to mae@mail.uccs.edu

or see our webpage at mae.uccs.edu.

Transfer Credits

Course credit between the CU-Boulder, CU-Denver, and CU-Colorado Springs courses in mechanical or aerospace engineering will be fully transferable. A table of University of Colorado System course equivalencies is contained in the CU-Boulder Bulletin.

Up to nine hours of graduate work may be approved for transfer from other established graduate programs, subject to the following conditions:

- The course has not been used for any other degree.
- The grade earned for each course is B (3.0) or better.
- The course is equivalent in level and content to the course for which it is being substituted.

Program Requirements

The M.S.M.E. program consists of coursework and research in advanced mechanical engineering, allowing emphasis in one more of the following areas: aerospace engineering, automation and robotics, dynamic systems and control, materials science, manufacturing, mechatronics/MEMS, and process engineering.

Degree Requirements

The curriculum for the degree will total thirty semester hours of graduate study, with a minimum of six hours of coursework in graduate-level pure or applied mathematics. Each M.S.M.E. student will select either the thesis option (Plan I) or the non-thesis option (Plan II), subject to their advisor's approval. Both options require a minimum of thirty hours of study to complete the master's program.

During the first semester of enrollment, each student will prepare a Plan of Study and choose either Plan I (thesis option) or Plan II (non-thesis option). The choice of Plan I or Plan II will determine the nature of each student's program requirements. The Plan of Study, which must be approved by the student's graduate advisor and the MAE graduate studies committee, will specify the student's selected area of interest and list courses related to that area. Any subsequent changes to the Plan of Study must also be approved by the student's advisor and the MAE graduate studies committee.

The student and advisor will select an advisory committee, which will provide assistance in formulating and executing the student's graduate program. The committee shall consist of at least three full-time faculty members selected from the College of Engineering and Applied Science at CU-Colorado Springs; the advisor must be a tenured or tenure-track faculty member of the Department of Mechanical and Aerospace Engineering. Eligibility to serve on the graduate committee shall be determined by the policies and procedures of the Graduate School.

Plan I (Thesis Option)

At least twenty-four hours of graduate coursework and up to six hours of thesis/research credit is necessary to satisfy the thirty credit hour requirement. The thesis/research credit will be provided for research and preparation of the student's thesis, and defense of the thesis is required for completion of the program. The thesis committee will review drafts of the M.S.M.E. thesis and conduct the comprehensive examination upon completion of the thesis. The thesis defense will be based on the thesis and related materials and will be open to the public. Any student who does not pass the thesis defense may attempt the examination a second time. The second failure of the defense will result in dismissal from the M.S.M.E. program.

Plan II (Non-Thesis Option)

A student choosing the non-thesis option (Plan II) will be required to complete at least thirty hours of graduate coursework and pass a comprehensive examination to complete the program. The comprehensive examination, to be conducted by the advisory committee, must be taken after all other requirements have been satisfied or in the last semester of study. Any student who does not pass the comprehensive examination may attempt the examination a second time. The second failure of the examination will result in dismissal from the M.S.M.E. program.

Please see the course descriptions for a complete list of graduate courses in mechanical and aerospace engineering.

Master of Engineering

The Master of Engineering degree is a practice-based graduate degree and is ideally suited for practicing engineers in the areas of space systems analysis, software engineering, manufacturing, and related endeavors. The Master of Engineering program currently offers specialty options in:

Aerospace and Information Operations (pending)

Engineering Management

Information Engineering & Operations (pending) - See CS Department

Manufacturing

Remote Sensing

Software Engineering - See CS Department

Space Operations

In each option, a series of required courses are specified leading to a capstone course. The program provides an opportunity to combine electives from a variety of fields including business, electrical engineering, computer science, mathematics, and aerospace engineering.

Admission Requirements

1. A Bachelor of Science degree in engineering, or a closely related field, from an accredited college or university.

2. Normal Admission. Students having an overall undergraduate G.P.A. of 3.0 or better (on a scale of 4.0) in all college-level academic work attempted are normally admitted to regular degree status.

3. Provisional Admission - Committee Review. Students with a G.P.A. between 2.75 and 3.0 and with strong prospects for success at the graduate level may be admitted to provisional degree status upon the recommendation of the Graduate Committee and the concurrence of the CU-Colorado Springs Graduate School. In special cases, with a G.P.A. of less than 2.75, the student may be accepted provisionally by taking the G.R.E. and earning acceptable scores. Provisional acceptance requires the student to complete a minimum of 9 hours of graduate course work applied to the program with a G.P.A. of 3.0 or better. Students with an undergraduate G.P.A. below 2.5 should take remedial work to raise their G.P.A. to at least 2.5.

Application Forms

Application materials can be obtained from the Department of Mechanical and Aerospace Engineering (MAE) at the address below or by accessing the website http://mae.uccs.edu. Students are encouraged to submit program application materials promptly.

Also required are:

a. Two copies of official transcripts, and

b. Three references (with at least one from a former instructor)

Graduate Advisor/Plan of Study

A graduate advisor will be selected immediately after admission to the program. All courses taken for the degree must be part of an approved plan of study. This plan must be developed by the student and his/her advisor and approved by the Graduate Committee.

Degree Requirements

1. Overall 3.0 or better grade point average.

2. Thirty hours of graduate course work consisting of, for the non-thesis option, 24 hours of required courses and an additional 6 hours of electives; or, for the thesis option, 24 hours of required courses, and 6 hours of thesis. The degree must be completed within six years

1. Up to 9 hours of graduate work may be transferred into this program, provided:

a. the course was not used for any other degree,

b. the grade earned was a B or better,

c. course was completed within the last 6 years,

d. the course coverage is equal in level, content, and depth to the University of Colorado course for which it substitutes, or petition can be made to the Graduate Committee for work in other specialization areas.

Aerospace and Information Operations (pending)

The Master of Engineering in Aerospace and Information Operations integrates the areas of Aerospace Operations and Information Engineering and Operations into a program that recognizes that the distinction between Space Operations and Air Operations no longer exists and that these operations can only be conducted if authenticated information is available. This program draws on the strengths of the Space Operations and Information Engineering and Operations options of the Master of Engineering program to provide graduates with the knowledge and preparation to design, implement, and operate future aerospace systems.

This Master of Engineering program was developed to meet the needs of industry and government/military organizations for engineers who understand the major systems, the environments they operate in, and the interdependencies created by the need to share information across them. Graduates will be prepared to address and solve issues inherent in the engineering of complex systems involving aerospace vehicles, communications, information storage, sensors, and human interfaces. Thesis and project options allow students to investigate future system concepts directly related to their careers.

The Master of Engineering degree in Aerospace and Information Operations is administered and taught in full at the CU-Colorado Springs campus. The degree program consists of 8 courses and a thesis, or 10 courses including a written, creative, investigative report with an oral defense. The majority of courses are offered in the evening to accommodate the schedules of working students.

Program Prerequisites

Two semesters of calculus-based physics; a programming course in a higher order language; linear systems theory; engineering probability; linear algebra; and differential equations are required for admission to the program.

Substitution of Refresher Course

MAE 4001. Engineering Analysis.

The purpose of this course is to assist students who require a prerequisite or who are looking for a refresher course in engineering analysis prior to entering the Master of Engineering program at CU-Colorado Springs. The class will review mathematics, computer programming, numerical analysis methods, and dynamics, with emphasis on applications to dynamical problems.

Program Requirements

Core Courses (24 Required Hours)

MAE 5410. Fundamentals of Astrodynamics

MAE 5090. Space Mission Operations

MAE 5495. Launch, On-Orbit and Entry Dynamics

MAE 5594. Space Communications Systems Design

MAE 5091. Space Environment

MAE 5092. Remote Sensing

CS 522. Computer Communication Nets

CS 509. Information/Network Security

Thesis Option (6 Hours)

MAE 7000. Master's Thesis (6 Hours)

Non-Thesis Option (6 Hours)

Systems Analysis and Design

MAE 5595. Space Mission Analysis

MAE 5596. Space Mission Design

or

Modeling & Simulation

MAE 5093. Systems Engineering

MAE 5596. Engineering Simulation

This program was under development at time of publication of this Bulletin. Please see the webpage, engineering.uccs.edu for information.

Engineering Management

The primary objective of this degree program is to integrate knowledge and skills from engineering and business disciplines to allow students to develop effective responses to rapidly changing technological and business environments. The program recognizes that many engineers evolve into management/ supervisory roles and require a blend of technical advanced engineering and business/management education to succeed in today's technical marketplace.

The program prepares engineers for effective participation in management of technology, management of technology-based organizations, and management of technological change. This focus is achieved through a careful balance of graduate course work in business, management, and a technical area of the student's work/academic interests.

The degree program consists of 30 semester hours divided between core courses (15 hours) and a specialization area (15 hours). The required courses provide the basics of effective business/management education necessary for engineers migrating into management or supervisory roles and the conceptual underpinning of the systems engineering process. The emphasis areas offer a student the opportunity for graduate course work in a technical area of his/her choosing. Degree requirements also include a written, creative research report that reflects course material from both required courses and a specialization area.

Program Prerequisites

1. An accredited BS degree in an engineering or science discipline or:

2. Experience in a commercial, civil, or government engineering/science career field.

Program Requirements

Core Courses (15 required hours)

Student must take the following three courses:

BCOM 550. Professional Business Communication

LHRM 600. Leading & Managing in Changing Times

MAE 5093. Systems Engineering

Student must select any two courses from the following:

ACCT 600. Contemporary Issues in Accounting

BUAD 556. Business, Government & Society

FNCE 600. Financial Management

INFS 620. Information Systems

MKTG 620. Marketing Management

OPMG 600. Contemporary Issues in Operations Management

Specialization Areas (15 elective hours)

Select five courses from any one-specialization area. The courses should be consistent with the student's academic background and work environment. An academic advisor must approve the course selections.

1. Computer Science/Software Systems

2. Electrical and Computer Engineering

3. Manufacturing Engineering

4. Mechanical Engineering

5. Space Systems

Manufacturing

The primary objective of this degree program is to provide the fundamental course work that couples theory with practice to educate technical personnel in the principles and applications of Manufacturing.

The primary focus of the program is on techniques for improvement of total quality and the attainment of a competitive edge in the manufacturing process. This focus is achieved through the integration of fundamental principles, current techniques and future approaches to the implementation of world class manufacturing systems.

The degree program was patterned after recommendations of a select committee of the Society of Manufacturing Engineers (as described in the Curricula 2000 report), and was developed as a cooperative university-industry effort. As a result, the program emphasizes written and oral communication skills throughout the program.

The degree program consists of 30 semester hours divided between core courses (21 hours) and nine hours in a specialization track emphasizing a technical area of the student's choice. Degree requirements also include a written, creative, investigative report with an oral defense. The majority of the courses meet one evening a week to allow working students to attend class and complete degree requirements.

Program Prerequisites

The prerequisites include at least one semester course in probability theory, engineering economy, and computer programming in a higher order language.

Program Requirements

Core courses (21 required hours)

MAE 5095. Engineering Simulation

MAE 5570. Design for Manufacturability

MAE 5571. Analysis and Design of Experiments

MAE 5574. Cellular Manufacturing

MAE 5575. Contemporary Issues in Manufacturing

MAE 5559. Technology and the Factory of the Future

MAE 5560. Manufacturing Eng Project Management

Specialization Areas (9 elective hours)

Select three courses from any area. The courses should be consistent with the student's academic background and work environment. An academic advisor must approve the course selections.

The three elective courses should be selected from any one of the listed tracks:

a. Computer Science/Software Systems

b. Electrical and Computer Engineering

c. Management and Information Systems

d. Mechanical Engineering

Remote Sensing

This Master of Engineering degree with a concentration in Remote Sensing is particularly well suited for both newly-graduated engineers just beginning their careers and for established engineers, managers, and military officers presently employed in a variety of space-related concerns. The amount and variety of uses of remotely sensed data are increasing rapidly, with new platforms, sensors, and applications being developed almost daily. Rapid advances in sensor and data processing technologies have made remote sensing data increasingly valuable for a wide range of applications, some traditional, some innovative. Keeping abreast of the latest advances in remote sensing tactics and trends, and networking with those in a variety of fields, are vital for both the new hire and the experienced professional.

The Master of Engineering degree in Remote Sensing consists of 30 semester hours. The graduate coursework provides an integrated knowledge base for engineers migrating into either the military or commercial world of remote sensing. Degree requirements also include a written, creative research report that addresses a current issue related to remote sensing and reflects the integrated coursework of the program. Most of our courses are offered in the evenings so that working professionals can attend.

Program Prerequisites

Two semesters of calculus-based physics; a computer programming course in a higher order language; linear systems theory; engineering probability; linear algebra; and differential equations.

Possible Substitution for Above Prerequisite:

MAE 4001. Engineering Analysis

The purpose of this course is to assist a student who requires a prerequisite or who is looking for a refresher course in engineering analysis prior to entering the Master of Engineering program at CU-Colorado Springs. This class will review mathematics, computer programming, numerical analysis methods, and dynamics, with emphasis on applications to dynamical and astrodynamical problems.

Program Requirements

Core Courses (30 required hours)

MAE 5091. Space Environment

MAE 5092. Remote Sensing

MAE 5093. Systems Engineering

MAE 5460. GPS Principles and Applications

MAE 5593. Space Sensor Systems

MAE 5595. Space Mission Analysis

BUS XXX. Space Economics and Commerce

CS 584. Computer Vision

GEOG 505. Geographic Information Systems

GEOG 506. Advanced Remote Sensing

Software Engineering

The program offers the disciplined application of proven principles, techniques,

and tools to the creation and maintenance of cost-effective, user friendly software systems that solve real problems. Interested persons are referred to the Computer Science Department.

Space Operations

The Master of Engineering degree with an option in Space Operations is ideally suited for working professionals involved in civil, military, or commercial space operations, payload and mission support, space systems analysis, design specifications, or management. Students take a sequence of core and elective courses leading up to a capstone design course or a Master's thesis. An area of specialty can be selected in Astrodynamics, Aerospace Vehicle Control, Space Systems Modeling, Space Systems Applications, or selected courses from the Departments of Mathematics, Computer Science or Electrical and Computer Engineering.

The Master of Engineering degree in Space Operations is administered and taught in full at the CU-Colorado Springs campus. The degree program consists of 8 courses and a thesis, or 10 courses including a written, creative, investigative report with an oral defense. The majority of courses are offered in the evening to accommodate the schedules of working students.

Program Prerequisites

Two semesters of calculus-based physics; a programming course in a higher order language; linear systems theory; engineering probability; linear algebra; and differential equations are required for admission to the program.

Substitution of Refresher Course

MAE 4001. Engineering Analysis

The purpose of this course is to assist students who require a prerequisite or who are looking for a refresher course in engineering analysis prior to entering the Master of Engineering program at CU-Colorado Springs. The class will review mathematics, computer programming, numerical analysis methods, and dynamics, with emphasis on applications to dynamical problems.

Program Requirements

Core Courses (15 Required Hours)

MAE 5410. Fundamentals of Astrodynamics

MAE 5090. Space Mission Operations

MAE 5495. Launch, On-Orbit and Entry Dynamics

MAE 5594. Space Communications Systems Design

MAE 5091. Space Environment

Non-Thesis Option (6 Hours)

MAE 5595. Space Mission Analysis*

MAE 5596. Space Mission Design*

*May be taken as electives if thesis option is selected

Thesis Option (6 Hours)

MAE 7000. Masters Thesis

Specialization Area (9 Elective Hours)

Select 3 courses from any track. Some elective courses may have prerequisites that do not earn credits towards the degree.

Astrodynamics

MAE 5430. Perturbation Theory in Astrodynamics

MAE 5391. Rocket Propulsion

MAE 5411. Space Operations Analysis

MAE 5419. Trajectory Optimization

Aerospace Vehicle Control

MAE 5440. Control/Guidance of Aerospace Vehicles

MAE 5456. Spacecraft Actuators and Sensors

MAE 5190. Vibrations

MAE 5415. Flight Dynamics

MAE 5425. Spacecraft Control

MAE 5493. System Dynamics

Space Systems Modeling

MAE 5093. Systems Engineering

MAE 5596. Engineering Simulation

MATH 542. Optimization

Space Systems Applications

MAE 5460. GPS Principles and Applications

MAE 5092. Remote Sensing in Space

MAE 6432. Space Navigation and Guidance

Student Organizations

The College of Engineering and Applied Science offers a wide range of student organizations for those students interested in science, engineering and technology. There are organizations within the College that represent each discipline and advocate all forms of diversity. The student organizations are involved in arranging speakers/lectures, tours, community service projects, seminars, tutoring, mock interviews, competitions, forums, mentoring, field trips, recruitment, and demonstrations. The student organizations also provide support for the various College activities throughout the year.

For more information about any of these organizations, please contact the Office of Student Support at 262-3347.

Asian Society of Engineers (ASE)

ASE's mission is to promote the development of Asians/Pacific Islanders in engineering, science, and other professions to achieve educational excellence, economic opportunity and social equity.

Association for Computing Machinery (ACM)

ACM was founded in 1947, and is the world's first educational and scientific computing society. ACM has over 80,000 computing professionals and students world-wide.

American Institute of Aeronautics and Astronautics (AIAA)

AIAA is the principal society and voice serving the aerospace profession. Its primary purpose is to advance the arts, sciences, and, and technology of aeronautics and astronautics and to foster and promote the professionalism of those engaged in these pursuits.

American Society of Mechanical Engineers (ASME)

ASME is the premier organization for promoting the art, science, and practice of mechanical engineering throughout the world.

American Indian Science and Engineering Society (AISES)

AISES is a national, nonprofit organization which nurtures building of community by bridging science and technology with traditional Native values.

Colorado Alliance for Minority Participation (CO-AMP)

This program is a collaborative effort by the universities in Colorado and is funded by the National Science Foundation (NSF). CO-AMP's primary goal is to increase the under-represented minority students in the sciences, mathematics, engineering and technology to successfully complete their baccalaureate degrees by offering free tutoring, summer bridge programs, and summer research opportunities.

Institute of Electrical and Electronics Engineers (IEEE)

IEEE helps advance global prosperity by promoting the engineering process of creating, developing, integrating, sharing, and applying knowledge about electrical and information technologies and sciences for the benefit of humanity and the profession.

Eta Kappa Nu (HKN), The Theta Chi Chapter

HKN is the International Honor Society for electrical engineers. Outstanding students are elected to HKN primarily from the junior and senior class. Eligibility depends on marked ability, scholarship, personal character, useful voluntary services, and distinguished accomplishments.

National Society of Black Engineers (NSBE)

NSBE's mission is to increase the number of culturally responsible Black engineers who excel academically, succeed professionally and positively impact the community. NSBE is the largest student-managed organization in the country.

Mathematics Association of America (MAA)/Math Club

MAA is the world's largest organization devoted to the interests of collegiate mathematics. A major emphasis of the MAA is the teaching of mathematics at the collegiate level, but anyone interested in mathematics is welcome to join.

Students for the Exploration and Development of Space (SEDS)

SEDS was founded in 1980 at MIT and Princeton and consists of an international group of high school, undergraduate, and graduate students from a diverse range of educational backgrounds who are working to promote space as a whole.

Society of Automotive Engineers (SAE)

The Society of Automotive Engineers is an international organization oriented towards designing, building, maintaining, and operating self-propelled vehicles for use on land or sea, in air or space. As a student club, they participate in various annual SAE Collegiate Design Competitions to design, build, and test the performance of a race-caliber vehicle. The competitions include all aspects of a design project and incorporate aspects of all majors: design, construction, engineering and business analysis, and product marketing.

Society of Hispanic Professional Engineers (SHPE)

Founded in 1974, SHPE is a national not-for profit organization that promotes Hispanics in engineering, math and science. SHPE is committed to helping our nation to fill a growing need for engineers and scientists in this decade and beyond.

Society of Women Engineers (SWE)

SWE's mission is to stimulate women to achieve full potential in careers as engineers and leaders, to expand the image of the engineering profession as a positive force in improving the quality of life, and to demonstrate the value of diversity.

University Amateur Radio Club (UARC)

The CU-Colorado Springs Amateur Radio Club (UARC) is dedicated to fostering an interest in Amateur Radio among the students, staff, and faculty of CU-Colorado Springs. Club members often assist people interested in obtaining an Amateur Radio license for the first time or upgrading an existing license. UARC operates and maintains an Amateur Radio station for the enjoyment and education of club members. The club also provides a service to the community, especially in times of natural disaster.

GRADUATE SCHOOL

David Schmidt, Dean

Room 36 – Modular Building 993
Telephone: (719) 262-3044
Fax: (719) 262-3037

INFORMATION ABOUT THE SCHOOL

Graduate work at the University of Colorado began on a small scale in 1892. Following some years of development, in 1909 the Graduate School was organized as a University-wide body with a separate faculty. The Graduate School consisted of faculty resident on the several campuses who organized programs within the constituent colleges and schools. This body operated under the leadership of the Vice President for Academic Affairs and System Dean of the Graduate School in conjunction with a University-wide Executive Committee charged with developing and effecting University-wide academic policy.

Effective in 1999, each campus organized its graduate programs within an autonomous Graduate School. CU-Colorado Springs now has its own Graduate School with a Dean and a Graduate Executive Committee, who hold responsibility for the enforcement of Graduate School requirements and policies on this campus and for the development and approval of academic issues.

Anyone wishing further information not given in this bulletin should contact the specific department, or the Graduate School, University of Colorado, P.O. Box 7150, Colorado Springs, Colorado 80933-7150.

Programs of Study

The following programs at the graduate level are available for completion through the Graduate School:

Applied Mathematics (M.S.)	EAS
Basic Science (M.B.S.)	LAS
Business Administration (M.B.A.)	BUS
Communication (M.A.)	LAS
Computer Science (M.S.) (Ph.D.)	EAS
Counseling and Human Services (M.A.)	ED
Criminal Justice (C.M.J.)	GSPA
Curriculum and Instruction (M.A.)	ED
Electrical Engineering (M.S.) (Ph.D.)	EAS
Engineering (Master's of Engineering.)	EAS
History (M.A.)	LAS
Mechanical Engineering (M.S.)	EAS
Nursing (M.S.N.)	BETH-EL
Psychology (M.A.)	LAS
Public Administration (M.P.A.)	GSPA
Sociology (M.A.)	LAS
Special Education (M.A.)	ED

The Department of English offers coursework applicable to a Master of Arts degree in English.

The Master of Engineering degree offers options in engineering management, manufacturing, remote sensing, and space operations.

The Master of Basic Science is a multidisciplinary advanced degree. Options within the Master of Basic Science degree include anthropology, biology, biotechnology/biochemistry, chemistry, exercise science, geography, mathematics, science and mathematics teaching, and physics.

Descriptions of each of the graduate programs are found in the appropriate college, school, and departmental sections of this bulletin.

RULES OF THE GRADUATE SCHOOL

The official policy of the Graduate School is contained in the Rules of the Graduate School. These rules are available in the office of the Graduate School, Vice Chancellor for Academic Affairs, on the CU-Colorado Springs web site, and in each graduate program office.

ADMISSION OF GRADUATE STUDENTS

General Requirements

Students may be admitted to the Graduate School in either of the two categories described below. A student who is granted admission must reflect, in a moral and ethical sense, a personal background acceptable to the University. The University reserves the right to deny admission to applicants whose total credentials reflect an inability to assume those obligations of performance and behavior deemed essential by the University and relevant to any of its lawful missions, processes, and functions as an educational institution.

Regular Admission

An applicant for admission as a regular degree student must meet the following minimum requirements. Some programs may have additional requirements. Qualified students are recommended for admission to regular degree status by the appropriate department.

1. Hold a baccalaureate degree or a master's degree from an accredited college or university, or demonstrate completion of work equivalent to the baccalaureate or master's degree given at this University.

2. Have an undergraduate grade point average of 2.75 or better ("A" is equal to 4.0); or

Have a combined undergraduate grade point average and score on a national standardized admissions test that meet criteria determined by the program; or

Have completed 15 semester hours of relevant graduate course work at an accredited university with a grade point average of 3.25 or better. Note that units completed before admission may not all be transferable into a graduate degree program.

3. Have adequate preparation to enter graduate study in the chosen program, and meet the requirements for admission, as determined by the program faculty.

For students who do not meet the above criteria, program faculty may assign course work and/or examinations that

must be taken in order to make up deficiencies.

Regular degree students must maintain at least a 3.0 cumulative grade point average on all work taken as a graduate student that is applied toward the advanced degree. Students who fail to maintain this standard of performance will be subject to probation or dismissal from the Graduate School.

Provisional Admission

An applicant not meeting the criteria for admission as a regular degree student may be recommended by the faculty for admission as a provisional student. The recommendation must include a statement of the conditions which the student must meet in order to become a regular degree student. When the conditions for regular status are met, the program director has the responsibility to reclassify the student to regular status.

Provisional students are subject to the same standards of performance required of regular degree students, in addition to other requirements a program faculty may impose as conditions of admission.

Graduate Admission Examinations

Graduate programs may require either the Graduate Record Examination (G.R.E.), Graduate Management Admission Test (GMAT), or the Miller Analogies Test (MAT). Applicants must check specific departmental testing requirements. Information regarding the tests, dates scheduled, and procedures for enrolling is available from the Testing Office in the Student Success Center, Cragmor Hall, Room 19.

Admission to the Graduate School is not admission to candidacy for an advanced degree. A student who wishes to become a candidate for a degree must make special application at the time and in the manner prescribed by the requirements for the degree sought.

Application Procedures

Applications for admission to an advanced degree program should be sent to the appropriate CU-Colorado Springs department or program office. The complete application must include:

1. Part I and Part II of the graduate application (including the Residency form)

2. Two official transcripts of all academic work completed to date, sent directly from the academic institutions attended.

3. A nonrefundable application processing fee.

4. Test scores, letters of reference, and other materials as required by specific programs.

5. For international applicants, a score on the Test of English as a Foreign Language (TOEFL).

All credentials presented for admission become the property of the University of Colorado.

Students may apply at any time. Complete applications (including all supporting documentation) submitted to the program office at least 60 days prior to the term for which admission is sought are normally assured full consideration; some programs have established earlier deadlines.

Completed applications for foreign students must be on file in the Office of Admissions and Records prior to April 1 for the fall semester and October 1 for the spring. All foreign students interested in graduate admission must begin the process with the Foreign Student Adviser in the Office of Admissions and Records.

Notification of Acceptance

After the Office of Admissions and Records has received the Graduate School approved departmental recommendation and all required credentials, the applicant will be notified regarding eligibility for admission. If eligible, the applicant will receive a letter of acceptance from the Office of Admissions and Records.

Unclassified Students

A student holding a baccalaureate degree who wishes to take graduate courses but does not wish to earn an advanced degree from the University of Colorado should apply to the Office of Admissions and Records for admission as an unclassified student. (See the Unclassified Student section.)

Readmission of Former Students

A student who was previously admitted to a graduate program, did not complete the degree, and has not been continuously registered at the University, but now wishes to return, must do the following:

1. Clarify status with the program to determine eligibility to return and pursue the same degree.

2. After receiving program approval to continue work on the degree, submit a new Part I of the application to the program office before deadlines have passed for the term of expected return.

A former student will not be charged an application fee unless any coursework to be applied to the degree was taken more than six years prior to the student's return.

A student admitted to the Graduate School for a master's program must reapply for admission for a doctoral program. A student applying to a doctoral program from a master's program in the same department, with no break in attendance, will not be charged an application fee.

A dismissed student is eligible to reapply for re-admission after one year. Approval or rejection of this application rests with the student's major department.

Former students who wish to change from one major to another should consult with their department chairperson and complete the appropriate forms.

Registration

New degree or unclassified students are notified of eligibility to register for course work through the Statement of Eligibility for Admission mailed from the Admissions and Records Office. If this notice has not been received in time for registration, an inquiry should be made to Admissions and Records. Degree and unclassified students who do not stay continuously enrolled (having missed a fall and/or spring semester registration) must check with Admissions and Records 60 days before the next intended registration period to make sure of eligibility to register during regular registration. Former students should follow the same procedure. Degree students changing departments or graduate degree programs should begin the change process with the new department.

Limitation of Registration

Full Load — Graduate students will be considered to be carrying a full load during a regular semester for purposes of determining residence credit if they are registered for not fewer than 5 semester hours in courses numbered 500 (or

5000) or above, or at least 8 semester hours of other graduate work, or any number of thesis hours. A full load for purposes of determining residence credit during the summer session is 3 semester hours of work in courses numbered 500 or above, or 6 semester hours of other graduate work, or any number of thesis hours.

Maximum Load - No graduate student may receive graduate credit toward a degree for more than 15 hours in a regular semester. The maximum number of graduate credits that may be applied toward a degree during a summer session is 6 hours per 4-week term and 9 hours per 8-week summer session.

Courses Applicable to A Degree

Transfer Courses

Work already applied toward a master's degree received at another institution cannot be accepted for transfer toward the master's degree at the University of Colorado; extension work completed at another institution cannot be transferred; and correspondence work, except to make up deficiencies, is not recognized.

Transfer credits may be applied to a graduate degree only with the approval of the program director. Each program will establish, with the concurrence of the Graduate School Executive Committee, the maximum number of semester hours that may be transferred from another accredited institution and applied toward its graduate degree, without special approval of the Graduate Dean. The following provisions will apply:

1. All transfer courses must have a grade of B minus or above.

2. Some programs may require that credit will not be accepted for transfer until the student has established a satisfactory academic record at this university.

3. For master's degree students, all work accepted for transfer must have been completed within the six-year time limit or be validated and approved by program faculty.

4. Courses applied towards one master's degree may not be used towards another master's degree.

5. Requests for transfer of credit must be made on the form specified for this purpose. Official transcripts of credit must accompany requests or be on record.

6. Master's degree students must submit transfer requests to the program director by the beginning of the semester prior to the semester in which they will graduate.

7. Doctoral degree students must submit transfer requests to the Graduate School before making application for admission to candidacy.

Courses Taken During Senior Year

Seniors at the CU-Colorado Springs may transfer up to nine semester hours of coursework, provided such work meets the following requirements:

- is completed with a grade of B minus or above in the senior year at this University.
- comes within the time limit for the completion of the graduate degree.
- has not been applied toward another degree.
- is approved by the program director.

Undergraduate credits from another institution may not be transferred to the Graduate School.

Courses Taken while in Unclassified Status

Credits earned as an unclassified student at the CU-Colorado Springs may be applied to a graduate degree only with the approval of the program director. Each program will establish, with the concurrence of the Graduate School Executive Committee, the maximum number of semester hours taken in unclassified status that may be applied toward its graduate degree, without special approval of the Graduate Dean. Coursework in progress during the semester in which formal admission is granted does not apply to this unclassified total.

Extended Studies Courses

Students may use the resources of the Division of Extended Studies in the pursuit of graduate study only if they obtain proper academic approval from the program director.

Graduate Courses

A graduate level course is any course that bears the graduate number appropriate to the discipline (i.e., 500- 900 or 5000-9000) and is taught by a member of the graduate faculty.

Undergraduate Courses

No lower division course nor undergraduate courses designed to improve basic skills may be used as credit towards a graduate degree.

A program may require a student to take undergraduate courses as a means of making up deficiencies, but the credits generated in these courses may not be counted in the minimum number required for the degree.

Independent Study

Independent study credit hours may not exceed 25% of the minimum number required for the degree.

Requirements on Quality of Graduate Work

Although the work for advanced degrees is specified partly in terms of credit hours, an advanced degree will not be conferred merely for the completion of a specified period of residence and the passing of a given number of courses. A student should not expect to get from formal courses all the training, knowledge, and grasp of ideas necessary to meet the requirements for an advanced degree.

A student is expected to maintain at least a B average in all work attempted in Graduate School. Work receiving a grade of less than C may not be counted toward any graduate degree. An in-progress (IP) grade given for thesis will be valid and must remain unchanged until the thesis has been completed.

A student who receives a grade below B minus in a course may repeat that course once, upon approval by the program director, provided the course has not been previously applied toward a degree. The grade received in a repeated course will substitute for the original grade and only the latter grade will be used in calculating the Graduate Program grade point average required for graduation. However, all grades received will appear on the student's transcript and will be used in calculating the stu-

dent's University grade point average.

A student who fails to do satisfactory work will be subject to probation or dismissal from the Graduate School by the dean with the approval of the major department. Appeal may be made to the campus Graduate Executive Committee, whose decision is final.

A student regularly admitted to the Graduate School and later accepted as a candidate for a master's degree will be recommended for the degree only after the following requirements have been met.

In general, only graduates of an approved institution who have a thorough preparation for their proposed field of study and who do graduate work of high quality are able to attain the degree with the minimum amount of work specified below. Necessary additional work required to make up deficiencies or prerequisites may be partly or entirely undergraduate courses.

The requirements stated below are minimum requirements. Additional conditions set by the department will be found in the announcements of separate departments. Any department may make further regulations not inconsistent with the general rules.

Minimum Degree Requirements — Master's Degree

The minimum requirements of graduate work for a master's degree may be fulfilled by following either Plan I or Plan II below.

Plan I (thesis)

30 semester hours, including 4-6 hours of thesis credit. At least 24 semester hours must be at the graduate level.

Plan II (no thesis)

30 semester hours. At least 24 semester hours must be at the graduate level. (Some interdisciplinary programs may require fewer graduate level units.)

A candidate for the master's degree may be allowed to select Plan I or Plan II only upon the recommendation of the department concerned.

Master's Thesis

Every candidate pursuing a master's degree under Plan I (thesis option) is required to write a thesis, which may be of a research, expository, critical or creative type. Each thesis presented in partial fulfillment of the requirements for a master's degree must satisfy the specifications of the CU-Colorado Springs Thesis and Dissertation Manual, and shall represent 4 - 6 semester credit hours of work. The student may register for any specific number of hours in any semester of residence. The final grade will be withheld until the thesis is completed. If the thesis is not completed at the end of the term in which the student is so registered, an in progress (IP) will be reported.

A thesis advisory committee must be established for each student pursuing a master's degree under Plan I (thesis option). This committee will consist of the thesis advisor, and at least two other members of the graduate faculty, possibly including a member from an allied program. Upon the recommendation of the thesis advisor, the committee is appointed by the program director with the approval of the Graduate Dean.

The thesis must be signed by the student's thesis advisory committee. Two formally approved copies of the thesis must be filed in the Library by the published deadline date.

Master's Degree Examinations

Most master's degree programs require a comprehensive examination or a thesis defense after the other requirements for the degree have been substantially completed. A student must be registered at the time in which the comprehensive examination or thesis defense is held.

Comprehensive Examination

This examination is administered by a committee of at least three graduate faculty appointed by the program director. A majority of the examination committee must vote affirmatively for the student to pass. A student who fails the examination may not attempt it again until at least two months have elapsed. The student may retake the examination only once.

Thesis Defense

After the thesis has been accepted by the student's thesis advisor, a thesis defense will be administered by the thesis advisory committee. A majority of the committee must vote affirmatively for the student to pass. A student who fails the thesis defense may not attempt it again until at least two months have elapsed. A student may have only one additional defense.

Minimum Degree Requirements — Doctoral Degree

75 semester hours of graduate level credit, including dissertation credit. Each doctoral program shall determine how many credits from an earned Master's degree may be included in this total. Ph.D. programs will require 30 units of dissertation credit.

Doctoral Dissertation

Every candidate pursuing a doctoral degree is required to write a dissertation based upon original investigation and showing mature scholarship and critical judgment, as well as familiarity with tools and methods of research. The subject must be approved by the student's program director. Each dissertation presented in partial fulfillment of the requirements for a doctoral degree must satisfy the specifications of the CU-Colorado Springs Thesis and Dissertation Manual. The dissertation shall represent 30 semester credit hours of work for Ph.D. candidates.

A dissertation advisory committee shall consist of five members of the graduate faculty, including one member of an allied department. One of the five members may be from another institution, provided the faculty member has been granted associate membership on the graduate faculty. Upon the recommendation of the dissertation advisor, the committee is appointed by the program director with the approval of the Graduate Dean.

The dissertation must be signed by the student's dissertation advisory committee. Two formally approved copies of the dissertation must be filed in the Library by the published deadline date.

Doctoral Degree Examinations

Each doctoral program will require one or more of the following types of examinations. A student must be registered at the time any of these examinations are taken. Successful completion of either a comprehensive examination or a specialty examination must precede advancement to candidacy.

Preliminary Examination

An examination to ensure that a student is qualified for doctoral study.

Comprehensive Examination

An examination in the field of concentration and related fields. This examination may be written or oral or both, and will test the student's mastery of a broad field of knowledge, not merely the formal coursework which has been completed. The comprehensive examination shall be conducted by an examining board of at least three members appointed by the program director.

Specialty Examination

An examination in a specific area of the general field of concentration. This examination may be written or oral or both, and will test the student's mastery of a single subject that may well go beyond formal coursework that has been completed. The specialty examination shall be conducted by an examining board of at least three members appointed by the program director.

Dissertation Proposal

An examination to determine the preparedness of the student and the appropriateness of the topic, prior to commencing work on the dissertation.

Dissertation Defense

After the dissertation has been accepted by the student's dissertation advisor, a final examination of the dissertation and related topics will be conducted by the Dissertation Advisory Committee. The examination is open to anyone who wishes to attend. A successful candidate must receive the affirmative vote of a majority of the members of the dissertation committee. In case of failure, the examination may be attempted once more after a period of time determined by the committee.

A student must be registered for at least 5 dissertation credit hours during the semester in which the dissertation defense is held. The Graduate School must be notified of the dissertation defense at least two weeks in advance of the scheduled date of the defense, which must be no later than 18 days before the final day of the semester of graduation.

Doctoral Dissertation Credit Hour Requirements

1. A doctoral student may take no more than one half of the total number of dissertation credit hours required for the degree prior to or during the semester in which the comprehensive examination is passed.

2. Following successful completion of the doctoral comprehensive examination, a student must register each fall and spring semester for five to ten semester units of dissertation credit, until the requirements for the degree are completed. A student may register for no more than ten dissertation credit hours in any semester, and for no more than seven credit hours during a summer semester.

3. If, following the completion of the doctoral comprehensive examination, there is a semester during which a student will be using no university resources, the student may petition to register for a minimum of one unit of dissertation credit. Such a request must be approved by the program director.

4. A student must be registered for at least 5 dissertation hours during the semester (or summer session) in which the dissertation defense is held.

Admission to Candidacy

Master's Degree

For each student pursuing a master's degree, an Application for Admission to Candidacy should be filed in the office of the Graduate Dean during the first five weeks of the semester of intended graduation. This application will certify that all requirements for the degree have been met, or are in progress.

Doctoral Degree

A doctoral student who wishes to become a candidate for a degree must file an Application for Admission to Candidacy in the Office of the Graduate Dean. Admission to candidacy will be granted only to students who have completed a significant fraction of the required course work, and have passed the comprehensive examination and language requirement (if any).

Time Limits

Master's Degree

Although students are normally expected to complete a master's degree in one to three years, master's degree students have six years, from the date of the start of course work, to complete all degree requirements (which includes filing the thesis with the Kraemer Family Library if Plan I is followed). A student who fails to complete the degree in this six-year period must file a petition for extension with the Graduate Dean. The petition, giving reasons why the student should be allowed to continue in the program, must be endorsed by the program director.

The program director must approve applying any course to the degree that was taken more than six years prior to the semester of graduation, and all such courses must be validated by special examination.

Doctoral Degree

Doctoral students are normally expected to complete all degree requirements within seven years from the date of the start of coursework in the doctoral program. A student who fails to complete the degree in this seven-year period must file a petition for extension with the Graduate Dean. The petition, giving reasons why the student should be allowed to continue in the program, must be endorsed by the program director or by three members of student's dissertation advisory committee. If the Graduate Dean approves, the student may continue studies for one additional year. If the Graduate Dean does not approve, the Dean, with the concurrence of the program director, may dismiss the student from the program. If the Graduate Dean and the program director do not agree on whether a student should be continued, the Graduate School Executive Committee shall make the final decision.

Student Ethics

Students are expected to adhere to the highest codes of personal and professional ethics, as set forth by the Honor Code of CU-Colorado Springs, which appears each semester in the Schedule of Courses. Students who do not meet these standards may be dismissed from the Graduate School by the Graduate Dean upon recommendation of the director of the student's graduate program. A student may appeal such action under the provisions described below.

Graduate Student Appeals

Student Appeal Procedures

The procedures for a student appeal to the Graduate Dean and the Graduate School Executive Committee are:

1. An appeal will be officially accepted from a student only after it has been determined that the student has exhausted the appeals process in effect in the department.

2. If a resolution to the problem identified in the student's appeal cannot be reached on the department or unit level, the student may submit a written appeal to the Dean of the Graduate School. The written appeal must describe in detail the basis in fact for the opinion that the student has been treated unfairly and must describe actions taken to resolve the problem at the departmental level.

3. Upon receipt of a written appeal from a student, the Dean will contact the appropriate departmental officer to get a response to the questions or objections raised by the student. In some cases, a written response from the department may be requested. The response and appeal is then sent to the Student Affairs Subcommittee of the Graduate School Executive Committee. This committee acts in an advisory capacity to the Graduate Dean and will forward their findings and recommendations to the Dean.

4. The Graduate Dean will make a decision in the case. This decision may be appealed by either party to the dispute to the full Graduate School Executive Committee, but only if the decision of the Dean is in disagreement with the recommendation of the Student Affairs Subcommittee.

Final Responsibility

All appeals regarding course grades shall follow the procedures established by the school or college in which the course was taken. Final authority on appeals submitted by graduate students concerning actions (other than grading) taken by faculty members, program directors, the Graduate Dean, or other administrative officials) rests with the Graduate School Executive Committee.

Graduate School of Public Affairs

Kathleen M. Beatty, Dean

Room 1025 - Columbine Hall
Telephone: (719) 262-4182
Fax: (719) 262-4183

Established in 1972, the Graduate School of Public Affairs (GSPA) provides graduate level, professional training for managers and policy-makers in public, nonprofit, and criminal justice organizations. Accredited by the National Association of Schools of Public Affairs and Administration, the School offers the Master of Public Administration (M.P.A.) and the Master of Criminal Justice (M.C.J.) degrees. While all coursework for the M.C.J. degree may be completed on the Colorado Springs campus, the degree is awarded through the University of Colorado at Denver. For the benefit of many public affairs professionals, GSPA is regionalizing the program. This revolutionary model calls for professors — instead of students — to commute between campuses, making a far wider range of coursework accessible to students and practitioners. GSPA also offers students the opportunity to pursue a more limited course of study, earning Certificates in Public Management, Nonprofit Management, or Criminal Justice.

Inquiries about application procedures and degree requirements should be directed as follows:

Graduate School of Public Affairs
University of Colorado at
Colorado Springs
P. O. Box 7150
Colorado Springs, CO 80933-7150
(719) 262- 4182 OR
(800) 990-8227 ext. 4182

Mission

The mission of the Graduate School of Public Affairs is to improve the quality of public service in the Pikes Peak Region and throughout Colorado. GSPA offers an excellent program of professional education and training that prepares public and nonprofit managers for leadership in a rapidly changing environment. Resident GSPA faculty have earned doctorates in their fields of specialization and are nationally recognized scholars. They conduct research of interest to scholars and practitioners in the field, as well as research on issues of concern in Southern Colorado. GSPA also invites practitioners who are recognized leaders in their area of expertise to teach selected courses in GSPA's degree programs.

GSPA offers a select group of students opportunities to enhance their potential for executive leadership and success in public service careers. The curriculum reflects the philosophy that management in public and nonprofit organizations presents unique challenges and opportunities because of our obligation to serve the public interest. All students take a common core of courses, then take electives focusing on public, nonprofit, or criminal justice management. Students graduate with a sophisticated understanding of the public and nonprofit sectors and their interdependence, and of contemporary principles of organizational development and management.

During their course of study, students learn to perform research, to utilize new technological resources, to manage organizational finances, and to fully utilize and manage human resources. Emphasis is placed on the theoretical foundations of public service and the special ethical considerations of work in the public and nonprofit sectors. Elective courses address specific student interests.

GSPA is a place where the University meets and exchanges ideas and information with the local, state, and national communities. GSPA's Research Center provides applied research services to agencies and organizations, and it conducts scholarly research supported by outside funders. The Graduate School of Public Affairs also sponsors conferences, training programs, and other opportunities for lifelong learning. These activities help to create a community of public servants, and they ensure that the University and the community share their rich resources.

Faculty

Dean and Professor: Kathleen Beatty;
Associate Dean: Fred Rainguet;
Professor: Mark McConkie;
Associate Professor: Jody Fitzpatrick;
Assistant Professor: Michael McLeod;
Senior Instructor: Terry Schwartz.

Programs of Study

Master of Public Administration Degree

The Master of Public Administration (M.P.A.) program serves the needs of preservice students who wish to begin a career in the management of public or nonprofit organizations, mid-career public or nonprofit sector professionals who wish to enhance their potential for career advancement, and people from the private sector who intend to move into the public or nonprofit sectors. The M.P.A. is a broadly recognized credential for public service management at all levels of government and in many nonprofit organizations. It also serves as a foundation for doctoral work in the field of public administration.

The curriculum of the M.P.A. program provides students with a range of theoretical and practice-based concepts in topical areas such as the field of public administration, leadership, public policy, methods of conducting research, and human resources and financial management. The curriculum also includes a variety of elective courses that allow students to tailor their programs to their particular career interests.

Minimum Requirements for the M.P.A. Degree

1. Completion of a minimum of 36 semester hours of graduate work. A grade point average of B (3.0 on a 4-point scale) or better is required for degree candidacy, and students must earn grades of B- or better in all required courses. Credit will not be counted for any course in which a student earns a grade of C- or lower.

2. Completion of six core courses or approved equivalents: PAD 5001 Governance & Institutions; PAD 5002 Organizational Management & Change; PAD 5003 Information & Analytic Methods; PAD 5004 Economics & Public Finance; PAD 5005 The Policy Process and Democracy; PAD 5006 Ethics & Leadership. **Students are expected to complete PAD 5001 within their first two semesters of enrollment.**

3. Completion of fifteen semester hours of electives. Elective courses include a mixture of specialized courses, workshops, and other formats. Students may choose to use these elective hours to build an area of concentration designed to meet individual needs. Where appropriate, students may include specialized courses offered by other departments and schools of the University, with prior written approval of the faculty advisor or dean.

4. Completion of the Advanced Seminar/Professional Practicum. This course presents students with the opportunity to apply knowledge gained in coursework to a question of interest drawn from their future or current careers in public or nonprofit organizations. The Advanced Seminar/Professional Practicum is taken in the final semester of the student's program. It allows the student to apply the knowledge and skills gained in his or her coursework through in-class discussions and individual or group projects. **All core courses must be completed before a student enrolls in the advanced seminar.**

5. Field study in public administration. Students who have limited experience (generally defined as less than one year of experience) in public or nonprofit organizations must complete an internship. Students register for PAD 6910 for three credit hours while completing the internship, which includes a minimum of 300 hours of supervised work and study. This requirement raises the total semester hours needed to earn the M.P.A. degree to 39. Applicants to the program will be reviewed, and those who must complete internships will be notified. Students ordinarily begin an internship following completion of core and related elective courses.

6. Additional internship opportunities: Students who satisfy the field study requirements above may nevertheless opt to participate in a field experience as an independent study and may earn credit for doing so. Those who wish to pursue this opportunity should contact the GSPA Internship Coordinator.

Master of Criminal Justice Degree

The Master of Criminal Justice (M.C.J.) program is designed for students interested in comprehensive professional graduate education in the field of criminal justice. It is intended to develop in the student a fundamental understanding of the basic fields within criminal justice and of background material from supporting disciplines which would enable the student to adapt to many operational specializations. As an academic and professional field of study, this program is dedicated to preparing men and women not only to administer the system as it presently exists but also to evaluate, to analyze and to change — to become pioneers in accelerating the shaping of a rational and responsive criminal justice system.

To deal with this system effectively, research design capability must be developed along with the skills required for the ordering and analysis of empirical data. This course of study will also prepare the student to be an innovator in crime control and prevention through course work dealing with strategies and skills for promoting individual, organizational, and social change.

Minimum Requirements for the M.C.J. Degree

1. The program leading to the M.C.J. degree requires a minimum of 36 semester credit hours. A grade point average of B (3.0 on a 4-point scale) or better is required for degree candidacy, and students must earn grades of B- or better in all required courses. Credit will not be counted for any course in which a student earns a grade of C- or lower. No more than six credit hours of independent study can be applied toward the degree.

2. Completion of four core courses or approved equivalents: CJ 5000 Law and Social Control; CJ 5100 Administration of Criminal Justice; CJ 5120 Nature and Causes of Crime; CJ 5321 Research Methods in Criminal Justice.

3. Completion of twenty-one semester hours of electives. Elective courses include a mixture of specialized courses, workshops, and other formats. Students may choose to use these elective hours to build an area of concentration designed to meet individual needs. Where appropriate, students may include specialized courses offered by other departments and schools of the University, with prior written approval of the faculty advisor.

4. Students must complete a minimum of 27 semester credit hours of coursework in criminal justice. The remaining courses for the degree may be under the criminal justice heading or under another discipline, with prior written approval of the faculty advisor.

5. Field study in criminal justice. Students who have not had criminal justice experience are required to complete CJ 6910 (Field Study in Criminal Justice). A minimum of 240 hours of supervised work is required to earn three hours of credit.

6. Completion of the Advanced Seminar/Professional Practicum. This course presents students with the opportunity to apply knowledge gained in coursework to a question of interest drawn from their future or current careers in criminal justice. The Advanced Seminar/Professional Practicum is taken in the final semester of the student's program. It allows the student to apply the knowledge and skills gained in his or her coursework through in-class discussions and individual or group projects. **All core courses must be completed before a student enrolls in the advanced seminar.**

Admission Requirements

1. Applicants must have completed a bachelor's degree from a college or university of accredited standing, with grades sufficiently high to indicate ability to pursue graduate work. The applicant may have majored in any field for the undergraduate degree. Two sets of official transcripts are required from all higher education institutions.

2. Applicants for admission must submit three recommendations by qualified references that establish applicants' personal qualifications for graduate work. Recommendations may be from professors, employers, and/or others who are acquainted with the prospective student's professional and/or academic work.

3. Applicants are required to take the Graduate Record Examination (G.R.E.), Graduate Management Aptitude Test (G.M.A.T.), or the Law School Admissions Test (L.S.A.T.) unless they meet the requirements for waiver as stated below. Standard graduate admission test scores are normally waived when the candidate already has a master's degree in another field. M.P.A. applicants may have test scores waived if: 1) they have an undergraduate grade-point-average of 3.0 or better **and** 2) can demonstrate significant professional accomplishment. Students admitted

without the G.R.E. or equivalent examination may be admitted on a provisional basis until they have completed 12 semester hours in the M.P.A. core with a grade-point average of B or better.

4. Applicants should submit all admissions materials by July 1 for the fall semester, November 1 for the spring semester, and April 1 for the summer term.

5. Students who have missed the deadline for the upcoming semester may register as nondegree students. Up to twelve credit hours of public administration or criminal justice coursework taken as a nondegree student may be applied to the master's degree program.

Academic Policies

Transfer of Credit

Up to nine semester hours of appropriate graduate work from an accredited college or university may be credited toward the master's degree in Public Administration or Criminal Justice. Courses to be transferred should have been taken within five years of the request for transfer of credit. All transfer work must be approved in writing by the dean.

Standards of Performance

To be in good standing, students must have an overall grade point average of not less than a 3.0 in all coursework. The academic performance of each student will be reviewed at the end of each semester. A student who has a grade point average less than 3.0 will, at the dean's discretion, be placed on probation or suspended from the program. Nondegree students who do not maintain a 3.0 grade point average may not be allowed to enroll in any additional GSPA courses. Any student receiving a grade of F in any course is automatically placed on probation.

After a student has been placed on probation, the student has a maximum of two semesters (fall and spring) to raise his or her grade point average to 3.0. Courses taken to raise the cumulative grade point average must be applicable to the degree and must be taken in the two semesters (spring and fall) immediately following the semester in which the cumulative grade point average fell below 3.0. Failure to raise the cumulative grade point average to 3.0 in the time period outlined will result in immediate suspension from the program.

Time Limit

Master's degree students must complete all coursework and degree requirements within six years of registration in their first course. Exceptions must be approved in writing by the dean.

Certificate Programs

Students who wish to sharpen their knowledge and skills without committing to the full M.P.A. or M.C.J. degree programs may earn a certificate in one of three areas by completing four designated courses. Students who complete a certificate and later enter the M.P.A. or M.C.J. program may count all credits toward the respective degree.

The Certificate in Public Management

This certificate, awarded to students interested in public sector management, focuses on the key areas of expertise required of public management. Required courses include the following:

PAD 5001 Governance & Institutions

PAD 5002 Organizational Management & Change

PAD 5220 Human Resources Management

PAD 5502 Financial Management

The Certificate in Nonprofit Management

This certificate program provides present and potential nonprofit managers with the opportunity to improve their managerial skills as well as their knowledge of nonprofit administration. The following courses are required:

PAD 5001 Governance & Institutions

PAD 5110 Seminar on Nonprofit Management

PAD 5140 Nonprofit Financial Management

PAD 5220 Human Resources Management OR PAD 5350 Program Evaluation

The Certificate in Criminal Justice

This certificate focuses on the development of managerial skills for law enforcement, corrections, and other professionals in the field of criminal justice. Required courses include:

CJ 5100 Administration of Criminal Justice

CJ 5120 Nature and Causes of Crime

Plus 2 of the following courses:

CJ 5000 Law and Social Control

CJ 5320 Seminar in Police Administration

CJ 5520 Seminar in Corrections

CJ 5551 Judicial Administration

Certificate Eligibility Requirements

Any person with a bachelor's degree from an accredited institution may apply to the certificate program by submitting to the Graduate School of Public Affairs official college transcripts from each institution attended and one letter of recommendation written by a supervisor or co-worker. Before enrolling for courses, students must submit an application for unclassified student status and pay the required $20 unclassified student application fee. Students who have been admitted to the M.P.A. or M.C.J. program may also earn a certificate by completing the course requirements listed above.

Rocky Mountain M.P.A. (Distance Learning)

The Rocky Mountain M.P.A. provides a unique opportunity for students with complicated and busy schedules, or those who live at a distance from the University, to obtain a Master of Public Administration (M.P.A.) degree. Designed to serve students who need an alternative to traditional classroom instruction, the Rocky Mountain M.P.A. allows students to complete their degree by combining Internet-based learning with intensive classroom experiences. Call (303) 556-5970, or visit the GSPA website at http://carbon.cudenver.edu/public/gspa/ for more information.

Doctor of Philosophy Degree in Public Affairs

The Graduate School of Public Affairs offers the Doctor of Philosophy (Ph.D.) in Public Affairs at its Denver campus. For further information or application materials, write or call:

Graduate School of Public Affairs
University of Colorado at Denver
1380 Lawrence Street, Suite 500
Denver, Colorado 80204
(303) 556-597

College of Letters, Arts and Sciences

Elizabeth S. Grobsmith, Dean

Room 2025 - Columbine Hall
Telephone: (719) 262-4550
Fax: (719) 262-4200

The College of Letters, Arts, and Sciences at CU-Colorado Springs is a community of teaching scholars whose mission is to advance an understanding of the human condition and the natural world, and communicate this understanding to the people of Colorado, and the world at large.

The College affirms and accepts the ideal purposes and traditional goals of all great universities: the creation, interpretation, dissemination, and application of knowledge. The College strives to maintain these goals while formulating and forging innovative and creative programs. The College provides collaborative programs that enrich the community, promote the creation of a vibrant and creative cultural life, strengthen and sustain a productive and responsible economic sector, facilitate the solution of community and regional problems, increase the safety, health and welfare of individuals and groups, sustain scientific and technological innovation, and enhance the understanding and practice of civic duty and responsibility.

The College of Letters, Arts and Sciences provides breadth of instruction for all students of the CU-Colorado Springs campus, including those in professional schools and colleges. This breadth exposes all students to the challenge, excitement and demands of clear self-expression, analysis, reasoning, comparison, experimentation, and awareness of alternative perspectives. The College also provides depth in specific academic disciplines for majors within the college. This specialization is important not only for skills, perspectives, and knowledge gained, but is also the key to success in subsequent education and careers.

The College offers bachelor's degrees in a full range of traditional liberal arts majors and minors, and selected graduate programs. We also offer a certificate program in gerontology and cooperative degree options for students seeking licensure in elementary teaching, secondary teaching or Special Education (with the College of Education).

Center Programs and Facilities

Center on Aging

According to the U.S. Census, more than 12 percent of Americans are age 65 or older. The elderly comprise a growing segment of the population, and estimates are that the percentage of elderly will rise to 18 to 20 percent by the year 2020. Increasing national awareness of this trend is changing the scope of social planning and policy-making. Despite the public's increased awareness of the aging of our population, much myth and mystery still surround the aging process.

The Center on Aging has been established in the College of Letters, Arts and Sciences with a three-fold purpose:

1. to foster research in gerontology and about the aging process,

2. to provide students an opportunity to study the processes of aging and the problems of the aged, and

3. to be a community resource for dealing with social policy issues and programs for the aged.

Students may earn a minor in gerontology or take courses as a way of understanding both our own future and that of our aging society. Gerontology study is also a way of preparing for careers in working for or with the elderly. Students gain an understanding about aging as a process, about problems of the elderly, and about ways to address these problems in meaningful and effective ways. Studies include classroom-based instruction in a variety of academic disciplines and work in the field with the elderly. Students will become informed about the network of social agencies providing services to older persons and will also become familiar with basic research in the field of aging.

Center for Economic Education

This Center, established in 1978, is sponsored by and affiliated with the National Council on Economic Education (New York City) and the statewide Colorado Council on Economic Education (Denver).

The Center engages in programs and activities designed to raise the general level of economic understanding. Special emphasis is given to working with school teachers and school districts in Colorado; however, Center activities have been and are being conducted for the state legislature, the clergy, and businesses in and out of Colorado.

The National Council on Economic Education is an independent, nonprofit, nonpartisan, educational organization incorporated in 1949 to encourage, improve, coordinate and service the economic education movement. There are now 50 state councils (one in each state) and 270 Centers for Economic Education.

The Center is located in Room 1055, Columbine Hall, (719) 262-4033.

Center for the Study of Sport and Leisure

The Center for the Study of Sport and Leisure offers a variety of physical activity courses. One 3-credit course under the S L 220 number, in addition to 1-credit hour courses, are available. These courses are taught by qualified members of the athletic department staff and by recognized experts in the local community. The 1-hour courses are offered under the S L 270, S L 271, S L 275 and S L 279 numbers.

Center for Women's Studies

The Center for Women's Studies was founded in 1991 as an interdisciplinary center that coordinates the Women's Studies minor, sponsors colloquia and lectures, fosters curriculum and faculty development, and encourages students to fully explore their potential.

Students may earn a minor in Women's Studies or include Women's Studies as part of a Distributed Studies degree. Courses in this program are concerned with the new scholarship on gender which reflects the growing influence of women in all aspects of our society and examines issues such as: the state of women's public and private lives; women and the law; gender, race, and class; women's ethnic and cultural diversity;

women's historical contributions; women's art and literature; women's scholarship in the humanities and the natural and social sciences; and gender and men's lives.

The Center, through the Women's Studies minor, promotes areas of knowledge that are central to Women's Studies and encourages the study of women and gender across the curriculum.

Extended Studies Program

The College of Letters, Arts and Sciences Extended Studies Program (LAS/ES) was developed to provide a variety of accessible educational opportunities in traditional and non-traditional formats. LAS/ES is based on the premise that learning is a lifelong endeavor, and individuals need to continue their educations for career preparation or advancement, enhancement of personal knowledge and experience, and gaining additional university credit or CEU's for licensure and certification purposes. Most LAS/ES credit classes are also transferable to CU-Colorado Springs degree programs.

LAS/ES serves as an educational outreach arm to the community with on-campus credit courses, correspondence, video and cable, and non-credit courses as well as private music instruction, and individual consultation programs. Students have outstanding instructors and the additional benefit of participating in a university program with a combination of individuals from diverse backgrounds and perspectives.

LAS/ES is a self-funded program and is located in Room 2040, Columbine Hall, telephone (719) 262-4071. Additional program information and a list of courses can be found at the web site, http://web.uccs.edu/lasdean/lases.

Gallery of Contemporary Art

The Gallery of Contemporary Art, located in the Science Building on the campus of CU-Colorado Springs, was created in 1981 as a service to the University and the Pikes Peak region. The major goal of the Gallery of Contemporary Art is to provide quality art exhibitions and related programs which would otherwise be unavailable to the University community and State populace. Utilizing the expertise of a full-time professional staff and university faculty, special emphasis is given to the educational interpretation of each exhibition. Gallery exhibitions and programs are offered both as a community service and as adjuncts to the instructional function of the University.

Throughout the year the gallery displays approximately six exhibitions which contain works by artists of regional, national and international reputation. More than 28,000 people visit the Gallery of Contemporary Art each year to view the exhibitions and participate in the gallery's programs, including lectures, workshops, and tours for both children and adults. The gallery is also available on a rental basis for community and campus events.

A nonprofit organization, the gallery receives its funding through the University, memberships, corporate and private donations, and state and federal grants. Volunteers and students participate in gallery activities as docents and as members of the Gallery of Contemporary Art Advisory Council.

Assistant Professor Riggs offers two consecutive three credit courses (G M 404 and 405) in Gallery Management, and internships are available by special arrangement, leading toward a Museum Studies minor.

For further information contact the Gallery at the University of Colorado, P.O. Box 7150, Colorado Springs, CO 80933-7150; (719) 262-3567.

Theatreworks

Theatreworks is the regional producing theatre sponsored by CU-Colorado Springs. Founded in 1975, it has produced more than 150 different plays over the last 25 years, winning a Governor's Award for Excellence in the Arts in 1994. Theatreworks normally produces 5-7 professional productions each year, including the nationally recognized summer Shakespeare Festival.

Theatreworks productions are often directly linked to the university curriculum, and students may attend productions at discount prices. In addition, university students regularly participate in Theatreworks productions, either backstage or in the cast, giving them the opportunity to work with guest artists from around the country. Theatreworks works directly with the academic theatre program providing artistic and technical support, and frequently mounts co-productions with the student theatre. For further information please call Drew Martorella, Producing Director, at 262-3275.

Academic Programs

The College of Letters, Arts, and Sciences offers the Bachelor of Arts degree in the following fields: Anthropology, Art History, Biology, Chemistry, Communication, Economics, English, Geography and Environmental Studies, History, Philosophy, Political Science, Psychology, Sociology, Spanish and Visual Arts. The College offers Bachelor of Science degrees in Chemistry and Physics.

The College also offers course work, but not degrees, in: Ethnic Studies, Energy Science, Film Studies, French, Gallery Management, German, Professional Writing, Religious Studies, Leadership Studies, Theatre, and Women's Studies. Courses in some of these areas can be used for formal academic minors, and in some cases they can provide the core for a distributed studies major (see Distributed Studies section in this Bulletin).

A student who holds a Bachelor of Science (B.S.) degree may earn, in addition, a Bachelor of Arts (B.A.) degree. All college degree requirements must be met. Transferable courses from the B.S. degree may count toward satisfaction of all such requirements except the 30 hour residency requirement. A student who is taking a second major must take all 30 hours in residence as a degree student in the College of Letters, Arts and Sciences. The student will be required to take at least 30 resident hours in the major of the second degree.

A student who holds a Bachelor of Arts degree may earn a second B.A. or a B.S. degree. In addition to satisfying all college and departmental degree requirements with either transferable courses or coursework taken in the College, the student will be required to take 30 resident hours in the major of the second degree. Required major courses which were taken for the firstB.A. need not be repeated but may not count toward these 30 required hours.

Students working toward a second degree must be registered with the Office of Admissions and Records as degree students. Questions regarding the requirements for a second bachelor's

degree should be addressed to the academic advisers in the Student Success Center.

Students may also enroll in Letters, Arts and Sciences for varying periods of time to prepare themselves for admission to one of the professional schools of the University.

Requirements for Admission

Candidates for regular admission to the College of Letters, Arts and Sciences are expected to meet the general requirements for admission to the University.

Freshmen

Freshmen must rank in the upper 40 percent of their high school graduating class, must have 15 units of acceptable high school work (referred to as the Minimum Academic Preparation Standards, or MAPS), and have the following minimum test scores: American College Test (ACT) 24 or Scholastic Aptitude Test (SAT) 1,080

Acceptable high school courses in each academic field are as follows:

English: courses in the history and appreciation of literature, composition (including all composition given as part of a basic English course), grammar, speech, and journalism will be accepted as English units.

Mathematics: courses in algebra, plane and solid geometry, trigonometry, analytic geometry, calculus, and other courses designed especially for college preparation and emphasizing basic concepts and principles of deductive reasoning will be accepted as mathematical units. Courses designed for other purposes (e.g., consumer mathematics, business mathematics, many courses entitled General Mathematics) are not acceptable as mathematics units.

Natural Science: courses in physics, chemistry, biology, zoology, anatomy, physiology, general science, astronomy, and geology are acceptable as natural science units.

Social Science: acceptable units include courses in American government, civics, economics, general sociology, geography, history, problems of democracy, psychology, social science, and social problems.

Freshman applicants for admission will normally be required to present the following high school units:

English (2 units of the 4 must be composition)	4
Foreign language (in one language)	2
Natural science	3
Mathematics	3
Social science	2
Academic electives	1
	15

Students seeking admission who do not meet the normal admission requirements may receive consideration for admission by the Dean of the College of Letters, Arts and Sciences. Inquiries concerning such admissions should be made to the Office of Admissions and Records.

Transfer and Former Students

Students who have attended another college or university are expected to meet the general requirements for admission of transfer students to the University of Colorado. (Students should refer to the General Information section.)

A grade of C- or better is required in any course for which credit may be granted in transfer from another institution to the University. HOWEVER, grades received at another institution will not be used in computing the student's grade point average at the University of Colorado, except for the averaging of all college work attempted by the time of graduation for possible special recognition, such as graduation with distinction and Latin honors.

Transfer students who were graduated from high school in 1988 and later are subject to the Minimum Academic Preparation Standards (MAPS) previously described. Transfer coursework will be applied to meet MAPS deficiencies as outlined in the College policy and in accordance with existing transfer agreements.

Former students who have attended another college or university where they have completed 12 or more semester hours, must reapply as transfer students and must present a 2.0 cumulative grade point average on all college work attempted to be eligible for readmission. Once readmitted, these students must fulfill the College requirements that are in effect at the time of readmission. This policy also applies to students in the College of Letters, Arts and Sciences who transfer into another college on the CU-Colorado Springs campus and then transfer back into LAS to complete their undergraduate degrees.

Community/Junior College Transfer Students

The College of Letters, Arts and Sciences will accept in transfer an Associate of Arts or Associate of Science degree from any public two-year institution in the state of Colorado which includes the following: 60 hours of coursework, completion of the prescribed community college core curriculum, and elective and/or major courses selected only from among the core curriculum offerings.

Upon enrollment, students are guaranteed completion of a four-year degree with no more than two years of additional full-time study, provided students select courses with care to fulfill remaining College and major requirements. For students who have not completed the core, additional graduation requirements, such as English and reasoning skills competency testing, must also be met by transfer students from two-year institutions.

Unclassified Students

Students admitted to the University in unclassified student status may enroll in courses offered by the College of Letters, Arts and Sciences. Application for this status should be submitted to the Office of Admissions and Records. A student may change from unclassified to degree status and apply appropriate coursework taken as an unclassified student toward a degree.

A maximum of 12 semester hours completed as an unclassified student may apply toward a degree in Letters, Arts and Sciences. No student may change from degree status to unclassified status. Students possessing a bachelor's degree who wish to register for classes are designated as unclassified students unless they have been accepted in the College for a second bachelor's degree or have been admitted to a graduate program.

Academic Policies

Course Load

The minimum full-time course load is 12 hours. The normal maximum is 18 hours. If a student wishes to take more than 18 hours per semester,

special permission must be obtained from the dean of the College, through the Student Success Center. These totals include all courses taken for credit at any of the University's three campuses but do not include correspondence courses, noncredit courses, or courses taken at other institutions. To receive credit, the student must be officially registered for each course.

Students who hold or expect to hold full- or part- time employment while enrolled in the college must register for course loads they can expect to complete without unusual difficulty. Recommended course loads are given below, but students must weigh their own abilities and assess the demands of each course in determining an appropriate schedule.

Employed	Semester Hours
40 hrs. per week	6-9
30 hrs. per week	8-11
20 hrs. per week	10-13

Transfer Credit

A maximum of 72 semester hours taken at community/junior colleges and/or a maximum of 94 semester hours taken at four-year institutions may be applied toward the baccalaureate degree in the College of Letters, Arts and Sciences.

Students should consult the General Information section of this Bulletin for the guidelines according to which transfer credits are evaluated. Because the initial evaluation of transfer credits is completed by the Office of Admissions, transfer students are encouraged to apply early and to have their transcripts sent to the Office of Admissions as soon as possible. Academic advisers will not be able to assess transfer credit applicability to graduation requirements until the admissions evaluation is complete.

Special Sources of Credit

Advanced Placement

See the General Information section of this Bulletin for Advanced Placement score requirements, course equivalencies, and credit hour values.

College Level Examination Program (CLEP)

College credit for the following CLEP subject examinations will be accepted if scores are at the 67th percentile or above: Biology, General Chemistry, History, General Psychology, Macroeconomics, Micro-economics, Introductory Sociology, Introductory Calculus with elementary functions, French, German, and Spanish.

Credit for these CLEP exams will be treated as transfer credit without grades and may be applied toward requirements at the discretion of the student's dean's office. Official test scores must be submitted to the Office of Admissions. For further information concerning CLEP credit, students should contact the Office of Admissions.

International Baccalaureate (IB)

For specific applicability, see the table on page 6 of this Bulletin, or contact the Student Success Center, Room 19, Cragmor Hall.

Electives in Professional Schools

Students may apply a maximum of 30 credits toward the bachelor's degree from coursework taken outside the College of Letters, Arts and Sciences. Coursework taken from the professional schools at CU-Colorado Springs and transfer coursework labeled "non-LAS electives" will be included in the 30 hour maximum.

Independent Study

Students who have completed with distinction a considerable portion of their undergraduate studies may register for independent study with the approval of the appropriate department. The amount of credit to be given for an independent study project shall be arranged with the instructor.

Not more than eight hours of independent study may be credited toward the major, and not more than 16 hours toward the bachelor's degree. No student may register for more than eight hours of independent study in any one term (summer, fall, or spring).

Correspondence Study Division of Extended Studies

A maximum of 30 semester hours may be taken through the Colorado Consortium for Independent Study via correspondence. Those courses indicated as CU-Boulder and CU-Denver carr resident credit.

No more than nine semester hours of regular coursework may be taken from the Division of Extended Studies and applied toward the degree. ENGL 099 (formerly ENGL 121), 125 and courses numbered below 100 will not count toward the required 124 hours for graduation, nor will they count in the College of Letters, Arts and Sciences grade point average.

Military Science/ROTC Credit

Students may apply a maximum of 15 semester hours of ROTC credit toward elective requirements and toward the 124 semester hour total degree requirements for the B.A. degree in the College of Letters, Arts and Sciences.

Grading Policies

Students should familiarize themselves with the General Information section of this Bulletin, as well as with the introductory pages of each semester's official Schedule of Courses, for information about the University grading system, current procedures for registering on a pass/fail basis, for dropping and adding classes, and for withdrawing from the University.

Repetition of Course

When a student takes a credit course more than once, all grades are used in determining the grade point average. However, if a student has passed the same course more than one time, the College will count that course only once when calculating the student's credit hours earned toward graduation. The only exception to this rule will be in cases where a course is designated in this Bulletin as "may be repeated for credit."

Pass/Fail

Students in Letters, Arts and Sciences may not use the pass/fail option for courses taken to fulfill the area requirements, the composition requirement, the quantitative and qualitative reasoning requirement, or the major requirements.

Students may take up to 16 hours of elective credit on a pass/fail basis. Transfer students may take one hour of pass/fail credit for every eight hours of credit attempted at the University of Colorado. For full-time students, no more than six hours of pass/fail credit may be taken during fall or spring semesters, and no more than three hours of pass/fail credit may be taken during summer semester. For part-time students, no more than 50 percent of total credit hours may be taken pass/fail in a given semester. If only one course is taken in a semester, it may be taken

pass/fail. The P grade is not included in the student's grade point average; the F grade is included. A pass/fail designation may not be reversed.

For further information concerning the pass/fail option, see the General Information section of this Bulletin.

Academic Probation

Students who have attempted at least 12 hours at CU-Colorado Springs and whose University of Colorado cumulative grade point averages fall below 2.0 will be placed on academic probation. While on probation students will be required to achieve a minimum acceptable grade point average each term (determined by the individual academic record) or be subject to academic suspension. Students placed on probation will be informed in writing concerning their academic status and the conditions of continued attendance.

A more comprehensive statement on the academic probation policy is available in the Student Success Center, Room 19, Cragmor Hall.

Scholastic Suspension

The normal suspension period in the College of Letters, Arts and Sciences is one academic year, excluding summer semester. Students suspended for the first time will be reinstated after the normal suspension period has been served upon reapplying for admission to the University.

Students suspended for the first time may be reinstated before the end of the normal suspension period by:

1. Achieving a 2.5 grade point average on all summer, extended studies, or correspondence work attempted at the University of Colorado since suspension. Six hours minimum must be completed.

2. Raising the cumulative University of Colorado grade point average to at least 2.0 by completing summer, correspondence, or extended studies coursework at the University of Colorado.

3. Achieving a cumulative grade point average of at least 2.0 by attending another institution. The cumulative grade point average in this instance is the grade point average at the University of Colorado combined with coursework taken at all other institutions.

4. Appealing the suspension in writing to the dean.

5. Being recommended for reinstatement by the Coordinator of Academic Probation and Suspension for the College of Letters, Arts and Sciences in the student Success Center, Cragmor Hall, Room 19.

Students eligible for reinstatement before serving the normal suspension period must notify the Student Success Center. Reinstated students absent for either fall or spring semesters or who complete 12 or more hours at another institution must reapply for admission to the University.

Students suspended for the first time will be reinstated on probation and will be informed in writing of their academic status and the conditions of continued attendance. Students not meeting conditions of continued attendance will again be subject to academic suspension. Reinstatement after a second suspension requires approval of the dean of Letters, Arts and Sciences. Requests for reinstatement must be made in writing.

A more comprehensive statement on the academic suspension policy is available in the Student Success Center, Room 19, Cragmor Hall.

Committee on Academic Progress

The Committee on Academic Progress (CAP) is a review board that handles student petitions for exceptions to the academic policies and requirements of the College. The committee is made up of faculty of the College, and makes recommendations to the Dean. The committee evaluates, for example, petitions for exceptions to the residency requirement, acceptance of more than the maximum number of major hours, and substitution of courses fulfilling the area requirement. It also considers certain requests for reinstatement from suspension and matters of academic honesty. Petition forms may be obtained from the Student Success Center, Cragmor Hall, Room 19.

President's and Dean's List Criteria

The criteria for the President's and Dean's lists are as follows:

1. President's list — 4.0 grade point average.

2. Dean's list — 3.75 to 3.99 grade point average.

3. Students must be enrolled in a minimum of 12 graded hours during a regular semester (fall or spring).

The dean notifies eligible students by letter.

Latin Honors

In order to graduate with Latin Honors, a student must complete a minimum of 45 semester hours on this campus and achieve a cumulative grade point average of: 3.5 for cum laude; 3.7 for magna cum laude; 3.9 for summa cum laude.

ALL post-secondary work (including transfer work) is included in this cumulative grade point average.

Academic Advising

Students are expected to assume responsibility for planning their academic programs in accordance with College rules, policies and major requirements. Advisors in the Student Success Center (CH 19) can answer questions about College policies and graduation requirements, and will assist students in course selection. Walk-in advising is available daily. Students expecting to graduate within one or two semesters should schedule a senior advising appointment by calling 262-3260 or by going to the Student Success Center. Although the advisers provide summary sheets of major requirements, it is the Letters, Arts and Sciences faculty who are responsible for major advising. It is the student's responsibility to arrange such faculty consultation for questions involving major requirements and Graduate School applications.

Students should schedule appointments to discuss their questions well in advance of registration or attend one of the Letters, Arts and Sciences orientation meetings prior to each semester.

General Education Requirements

The College of Letters, arts and Sciences will accept in transfer, courses from the community college "general education core," substituting these credits for credits required within the 124 hours needed for the B.A. or B. S. degree in whatever manner is most advantageous to the student. (Note: 124 is decreasing to 120 in summer, 2001.) The College will also accept non-core academic courses in transfer, i.e., courses that are not considered to be vocational or technical in nature.

The College requires all students to complete an English composition

requirement, a reasoning proficiency requirement and area requirements. Assuming that a student does not test out of the writing and reasoning requirements, the total number of credit hours needed to complete the College general education requirements is 45.

English Composition Requirement

Placement

All students who transfer into the College of Letters, Arts and Sciences, and who have not taken any college level composition courses, will be placed into the appropriate course (ENGL 099, 131, or 141) based on their ACT or SAT English scores. If neither test has been taken, students will submit a writing sample for placement purposes prior to registering for composition. Contact the Writing Program for information at (719) 262-4040.

Quantitative and Qualitative Reasoning Proficiency Requirement

This requirement may be satisfied in one of the following ways:

By successfully completing the course ID 105, Qualitative and Quantitative Reasoning Skills.

By successfully completing the course ID 200, Mathematics: A Human Endeavor.

By completing college algebra or higher and one course in statistics, or one course in logic.

By passing the proficiency exam with a score of 60 or higher. Credits are not awarded but the requirement is completed.

By successfully completing the two courses:

MATH 301, Mathematics for Elementary Teachers I and

MATH 302, Mathematics for Elementary Teachers II

Area Requirements

Each prospective graduate is expected to have completed 12 semester hours in each of three areas — Humanities, Social Sciences, and Natural Sciences. The total requirement is 36 hours, and, with the exception of the core humanities course, can be satisfied entirely by lower division (freshman/sophomore) courses.

Specific Limitations:

No more than two courses from any one discipline may be applied to the area requirements.

With the exception of Distributed Studies, courses in a student's primary major may not be applied to the area requirements.

Courses may not be taken pass/fail.

Humanities: The 12 hour Humanities requirement must be satisfied in part by successful completion of one CU-Colorado Springs 300 level Humanities course. The remaining 9 hours may be selected from the list below, or may be satisfied by community college humanities courses that are equivalent or similar in content to those listed below.

ART HISTORY

100-3 Languages of Art

280-3 Survey: Ancient Art

281-3 Survey: Medieval Art

282-3 Survey: Renaissance, Baroque & Rococo Art

283-3 Survey: 19th and 20th Century Art

285-3 Survey: American Art

COMMUNICATION

400-3 Rhetorical Dimensions

ETHNIC STUDIES

200-3 Introduction to Ethnic Studies

ENGLISH

150-3 Introduction to Literature for Non-majors

241-3 Understanding Literature: Fiction

242-3 Understanding Literature: Drama

260-3 Great Books I

261-3 Great Books II

332-3 Masterpieces of American Literature

FILM STUDIES

100-3 Introduction to Film Studies

200-3 Narrative Film

HISTORY

103-3 Modern Europe 1648-1848

111-3 Southeast Asia

114-3 Asian History: Japan

140-3 Latin American History To 1810

141-3 Latin American History Since 1810

151-3 U.S. History: Birth of a Nation

LANGUAGES AND CULTURES

F CS 319-3 20th Century German/Austrian Civilization & Culture

F CS 323-3 Southwest Culture and Civilization

F CS 325-3 Culture and Civilization of Spain

FR 326-3 20th Century French Civilization & Culture

F CS 369-3 Hispanic Culture Through Film

F CS 389 1-6 Field Studies in Foreign Cultures

MUSIC

100-3 Introduction to Music

205-3 Introduction to Jazz

PHILOSOPHY

100-3 Introduction To Philosophy

102-3 Ethics

104-3 Philosophy & Society

112-3 Critical Thinking

373-3 Philosophy and Literature

RELIGIOUS STUDIES

100-3 Introduction To Religious Studies

310-3 Comparative Religions

THEATRE

100-3 Introduction to Theatre

320-3 History of Theatre I

321-3 History of Theatre II

VISUAL ARTS

101-3 Beginning Studio - 2D

102-3 Beginning Studio - 3D

WOMEN'S STUDIES

200-3 Introduction to Women's Studies

Social Science: The 12-hour social science area requirement may be met by the lower and upper division courses, which are listed below. Students who transfer to CU-Colorado Springs from community colleges may fulfill this area requirement by substituting courses that are equivalent or similar in content to those listed below.

ANTHROPOLOGY

104-3 Introduction To Cultural Anthropology

220-4 Survey of Prehistory

240-3 Survey of Cultural Anthropology

280-3 The Nature of Language

307-3 Darwinism

326-3 Agricultural Origins

COMMUNICATION

102-3 Interpersonal Communication

215-3 Male/Female Communication

420-3 Persuasion

425-3 Advanced Interpersonal Communication: Conflict Management

ECONOMICS

100-3 The Economics of Social Issues

101-3 Introduction To Microeconomics

102-3 Introduction To Macroeconomics

315-3 Great Books of Economics

371-3 Comparative Economic Systems

GEOGRAPHY AND ENVIRONMENTAL STUDIES

198-3 World Regional Geography

199-4 Introduction To Human Geography

GERONTOLOGY

300-3 Introduction To Gerontology

PHILOSOPHY

320-3 Social and Political Philosophy

POLITICAL SCIENCE

101-3 Introduction To Global Politics

110-3 The American Political System

210-3 Politics and Policy in State & Local Government

330-3 The Bureaucrats

421-3 International Politics

447-3 Introduction To Constitutional Law

PSYCHOLOGY

100-4 General Psychology

SOCIOLOGY

111-4 Introduction To Sociology

212-4 Introduction To Social Research

220-3 Introduction To Racial & Ethnic Groups

222-3 Environment & Society

250-3 Social Problems

WOMEN'S STUDIES

225-3 Images of Women in Society

Natural Science: The 12-hour natural science area requirement must include at least one laboratory science course and may be satisfied by the lower and upper division courses listed below. (Laboratory science courses are indicated by an asterisk.) Community College students transferring to CU-Colorado Springs may fulfill this requirement by substituting courses that are equivalent or similar in content to those listed below.

ANTHROPOLOGY

103-3 Introduction To Human Origins

230-3 Survey of Biological Anthropology

332-3 Primatology

334-3 Human Evolution

337-3 Human Biology & Ecology

BIOLOGY

* 100-3 Biology in the Modern World; Lab (BIOL 106-1)

105-3 Personal Nutrition

114-3 Introduction To Health and Exercise Science

* 151-3 Environmental Science I Lab (BIOL 153-1)

CHEMISTRY

* 100-3 Chemistry in the Modern World (CHEM 110-1)

* 101-4 Introduction To Chemistry

* 103-5 General Chemistry I

* 106-5 General Chemistry II

121-3 Introduction To Physical Science (CHEM 124-1)

ENERGY SCIENCE

150-3 Introduction To Energy Science I

151-3 Introduction To Energy Science II

* 160-3 Solar Energy & Lab (ENSC 162-1)

GEOGRAPHY AND ENVIRONMENTAL STUDIES

100-4 Environmental Systems: Climate, Vegetation and Soils

101-4 Environmental Systems: Landforms

*105-4 Map & Compass

320-4 Practical Meteorology

325-4 Geography of Climate Change

GEOLOGY

* 101-4 Physical Geology

102-4 Historical Geology

* 153-4 Geological Development in Colorado and the West

317-3 Geology of Our National Parks

370-4 Environmental Geology

466 1-3 Field Study in Geology

INTERDEPARTMENTAL STUDIES

120-3 Personal and Technological Risk

205-3 Beyond the Finite

PHYSICS AND ENERGY SCIENCE

* 100-3 Physics in Everyday Life; Lab (PES 114-1)

104-3 Physics in Science Fiction

* 105-3 General Astronomy I & Lab (PES 109-1)

* 106-3 General Astronomy II & Lab (PES 110-1)

* 121-3 Intro to Physical Science (PES 124-1)

131-3 A Lab of Her Own - Science and Women

PSYCHOLOGY

327-3 Biopsychology

Major Requirements

Note: Individual departments may require more than these minimum standards.

1. A total of 30-54 hours in major courses.

2. A total of 30 hours of C grade or better in major courses.

3. A 2.0 grade point average in all required major courses.

4. A minimum of 16 hours of upper-division major courses.

5. Special requirements as stipulated by the department.

Note: Not more than 54 hours in one discipline and not more than 30 hours outside the College of Letters, Arts and Sciences may be counted toward graduation requirements.

Students may also complete a second major concurrently or at a later time. To do so, the student will be required to take at least an additional 30 hours, of which a minimum of 16 hours must be upper-division. All other major requirements apply.

Minor Opportunities and Requirements

The College of Letters, Arts and Sciences has approved the opportunity for students to take optional minors in various disciplines, including Business Administration. Additional information is available from the academic advisers in either the College of Letters, Arts and Sciences or in the College of Business. For information about optional minors, please refer to the appropriate program sections in this Bulletin.

The following College guidelines have been established for minor programs:

1. A minimum of 18 credit hours of C-grade or better must be taken in a minor area, including a minimum of nine upper-division credit hours.

2. Minor requirements may not be taken pass/fail.

3. Students will be allowed no more than nine credit hours, including six upper-division credit hours, of transfer work toward a minor.

4. Coursework applied toward a minor may also be applied toward general education requirements.

Program requirements other than those above may be established by departments and program directors. Departments will ensure that minor requirements are consistent with their major requirements.

Upper-Division Requirement

Students must complete at least 45 hours of upper- division work (courses numbered 300 and above) to be eligible for the bachelor's degree. Students may register for upper-division courses if prerequisites have been met or departmental approval has been obtained. Courses transferred from a junior/community college carry lower-division credit.

Writing Competency and Course Requirements

To qualify for a bachelor's degree from the College of Letters, Arts and Sciences, a student must complete course requirements and demonstrate competency by

successfully passing the writing portfolio assessment. Students may meet these requirements in the following ways:

1. Successfully complete ENGL 131 and 141 at CU-Colorado Springs and then pass the portfolio assessment.

a. To be admitted to ENGL 131, the student must complete one of the following requirements:

- score 19-28 on the English ACT.
- score 450-640 on the English SAT.
- Complete ENGL 099, Components of Writing, offered through LAS Extended Studies or an equivalent course completed elsewhere. (Does not count toward graduation.)
- Students without ACT or SAT scores, must submit a writing sample to the Writing Program, Columbine 1041 for placement purposes.

b. To be admitted to ENGL 141, students must meet one of the following requirements:

- Complete ENGL 131 at CU-Colorado Springs.
- score 29+on the English ACT.
- score 650+on the English SAT.
- score 4 on the CEEB Advanced Placement English Language and Composition Exam.
- score 4 on the CEEB Advanced Placement Language and Literature Exam.
- score 5 on the IB English exam.
- Successfully complete a first-semester composition course (equivalent to ENGL 131) at an accredited college or university with a C- or better.

c. To demonstrate writing competency after course completion, students must pass the writing portfolio assessment administered by the Writing Program. Students who choose not to demonstrate competency by earning a pass on their writing portfolio may meet the competency requirement by successfully completing a 300-level, advanced composition course at CU-Colorado Springs with a C- or better. The "final" composition course for each undergraduate program is listed below:

For LAS and Nursing students: ENGL 141

For BUS students: ENGL 141 or ENGL 307 or COMM 324

For EAS students ENGL 307 or 309

2. Students may transfer equivalent composition coursework taken elsewhere by successfully completing one or two semesters of composition at an accredited college or university with a C- or better. Transfer students must also demonstrate competency by passing the writing portfolio assessment after completing their final composition course at CU-Colorado Springs, or upon transfer of their complete composition requirements from an accredited college or university. Students must demonstrate competency within 30 hours of completion or transfer of their final composition course. Students who do not pass the portfolio assessment within 30 hours of completion of their final composition course must complete an additional writing course at the 300-level, a course beyond those stipulated within their degree plan.

3. Qualify for a waiver of composition coursework through the CEEB Advanced Placement Examination.

a. Score 4 on the AP English Language and Composition to receive credit for ENGL 131, successfully complete ENGL 141, and then pass the portfolio assessment.

b. Score 5 on the AP English Language and Composition to receive credit for both ENGL 131 and ENGL 141, then pass the portfolio assessment.

c. Score 4 on the AP English Composition and Literature to receive credit for ENGL 131, successfully complete ENGL 141, and then pass the portfolio assessment.

d. Score 5 on the AP English Composition and Literature, and then pass the portfolio assessment.

4. Qualify for a waiver of composition coursework through the International Baccalaureate higher level English exam.

a. Score 5 to receive credit for ENGL 131, successfully complete ENGL 141, then pass the portfolio assessment.

b. Score 6 or 7 to receive credit for both ENGL 131 and 141, and then pass the portfolio assessment.

To take the writing portfolio assessment, contact the Writing Program, Columbine 1045 or 1041. Students who would like to take the CLEP English Composition Exam to earn credit for ENGL 131, or both ENGL 131 and ENGL 141, should contact the Testing Office, 262-3255. The CLEP English Composition exam is scheduled to begin during the summer 2001 semester.

Oral Communications Requirement

Students are required to take a course with a substantial component involving oral communication. This course may be within a student's major department, an elective, or an approved general education (area requirements) course. Approved courses are currently:

COMM 210 Public Speaking

COMM 324 Business and Professional Communication

COMM 410 Advanced Public Speaking

ENGL 420 The Eighteenth Century British Novel: Defoe to Austin

ENGL 421 The Nineteenth Century British Novel

ENGL 423 Development of the American Novel I

ENGL 424 Development of the American Novel II

ENGL 425 Contemporary Novel

ENGL 430 Studies in American Literature and Culture

ENGL 440 Genre Studies

ENGL 450 Studies in Anglo-Saxon and Medieval Literature

ENGL 483 Rhetoric and Writing

ENGL 495 Seminar in Literary Topics

ENGL 498 Seminar in Major Author

FR 301 French Conversation and Composition I

FR 302 French Conversation and Composition II

FR 303 Advanced French Conversation and Composition

FR 304 Advanced Pronunciation and Phonetics

GER 301 German Conversation and Composition I

GER 302 German Conversation and Composition II

PES 481 Senior Physics Seminar

SPAN 301 Spanish Conversation and Composition I

SPAN 302 Spanish Conversation and Composition II

SPAN 391 Spanish Theatre Workshop

SPAN 403 Advanced Conversation and Composition

Please check with the college or the Student Success Center for additional approved courses.

Cultural Diversity Requirement

While fulfilling their general education requirements, students are required to

take a course which increases their awareness of cultural diversity. Approved courses are currently:

ANTH 104 Introduction to Cultural Anthropology

ANTH 240 Survey of Cultural Anthropology

EST 200 Introduction to Ethnic Minority Studies

ENGL 261 Literature: The Global Perspective II

ENGL 290 Topics in Literature

ENGL 332 Born in the USA: Masterpieces of American Literature

ENGL 390 Topics in Literature

FCS 323 Southwestern Culture Studies

GES 198 World Regional Geography

HIST 111 Asian History: Southeast Asia

HIST 114 Asian History: Japan

HIST 140 Latin American History to 1810

HIST 141 Latin American History since 1810

SOC 220 Introduction to Racial and Ethnic Groups

WMST 200 Introduction to Women's Studies

WMST 225 Images of Women in Society

Please check with the college or the Student Success Center for additional approved courses.

Global Awareness Requirement

While fulfilling their general education requirements, students are required to take a course which increases their awareness of global issues. Approved courses are currently:

ANTH 104 Introduction to Cultural Anthropology

ANTH 240 Survey of Cultural Anthropology

ECN 371 Comparative Economic Systems

ENGL 260 Literature: The Global Perspective I

ENGL 261 Literature: The Global Perspective II

FCS 319 20th Century German and Austrian Civilization and Culture

FCS 324 Modern French Culture and Civilization

FCS 325 Spanish Culture and Civilization

FCS 389 Field Studies in Language and Culture

GES 198 World Regional Geography

GES 199 Human Geography

HIST 103 Modern Europe, 1648 - 1848

HIST 111 Asian History: Southeast Asia

HIST 114 Asian History: Japan

HIST 140 Latin American History to 1810

HIST 141 Latin American History since 1810

P SC 101 Global Politics

P SC 421 International Politics

Please check with the college or the Student Success Center for additional approved courses.

Qualitative and Quantitative Reasoning Proficiency Requirement

Well-educated people should be able to think at a certain level of abstraction and to manipulate symbols. This requirement has two principal objectives. The first is to provide students with the analytical tools used in core curriculum courses and in their major areas of study. The second is to help students acquire the reasoning skills necessary to assess adequately the problems that confront them in their daily lives. Students completing this requirement should be able to: construct a logical argument based on the rules of inference; analyze and interpret numerical data; obtain exact results when appropriate; and apply Mathematical methods to solve problems in their university work and in their daily lives.

There are three ways in which students can fulfill this requirement:

1. Pass the CU-Colorado Springs Qualitative and Quantitative Reasoning Exam. This exam is offered by the Office of Student Support Services, Main Hall, Room 132. A $10 test fee must be paid in advance. Credit hours are not awarded to those who meet the requirement by passing the proficiency examination.

Well-educated people should be able to think at a certain level of abstraction and to manipulate symbols. This requirement has two principal objectives. The first is to provide students with the analytical tools used in core curriculum courses and in their major areas of study. The second is to help students acquire the reasoning skills necessary to assess adequately the problems that confront them in their daily lives. Students completing this requirement should be able to: construct a logical argument based on the rules of inference; analyze and interpret numerical data; obtain exact results when appropriate; and apply Mathematical methods to solve problems in their university work and in their daily lives.

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2. Successfully complete I D 105 (Quantitative and Qualitative Reasoning Skills) OR I D 200 (Mathematics: A Human Endeavor).

3. Successfully complete College Algebra (MATH 104) or a mathematics course that has College Algebra as a prerequisite, or score a 17 or above on the Algebra Diagnostic Exam and a course in statistics or a course in symbolic logic.

4. Successfully complete MATH 301 and MATH 302.

Statistics Courses

ANTH 300 - Quantitative Methods in Anthropology

CHEM 417 - Analytical Chemistry I

COMM 250 - Problems in Communication - Research

Methods

ECON 381 - Economic Statistics & Quantitative Methods

GES 400 - Introduction to Probability and Statistics

MATH 310 - Statistics for the Sciences

MATH 381 - Probability Theory

PES 315 - Modern Physics Laboratory

PSC 250 - Introduction to Political Inquiry

PSY 210 - Introduction to Psychological Statistics

SOC 317 - Social Statistics

Logic Courses

PHIL 112 - Critical Thinking

PHIL 344 - Symbolic Logic

PHIL 443 - Logical Theory

Foreign Language Requirement

As of January 1, 1993, the College of Letters, Arts and Sciences no longer has a foreign language requirement. However, a variety of language classes will continue to be offered for students who wish to study a foreign language. Students contemplating graduate school should be aware that many graduate schools do require proficiency in a foreign language.

Newly admitted freshmen are still required to have completed two units of foreign language at the high school level. Freshmen admitted who are deficient in this requirement may make up the deficiency as outlined in the beginning of the College of Letters, Arts and Sciences

section of this Bulletin. The foreign language placement examination will continue to be administered for those students wishing to determine their level of placement in a foreign language course. Contact Language Technology Center, 262-3691, Dwire Hall 311.

Students are urged to continue language study in a timely manner, as proficiency declines rapidly without application of skills.

Note: If coursework in foreign language taken at other institutions is repeated at the same level at CU-Colorado Springs, academic credit for any hours duplicated will not be counted toward graduation.

Senior Requirements

Early in the first semester of the senior year or, preferably, toward the end of the junior year, each student must schedule a senior audit with the academic advisers for the College to determine status with respect to the above requirements.

No fewer than 90 days prior to the date of commencement, seniors are required to file a diploma card with the academic advisers in the Student Success Center, giving notice of intention to complete graduation requirements. Failure to complete the diploma card in time may delay a student's graduation.

Residence Requirements

A candidate for a degree from the College of Letters, Arts and Sciences must earn the last 30 hours in residence in the College. During these 30 hours the student must be registered in Letters, Arts and Sciences. All 30 hours must be taken on the Colorado Springs campus. Students wishing to attend another university or college simultaneously with CU-Colorado Springs during the last 30 hours must have prior approval of the Dean of Letters, Arts and Sciences in order to count these transfer hours as part of the last 30 hours.

Special Study Programs

Freshman Seminar

The freshman seminar (I D 101) at CU-Colorado Springs helps prepare entering students for an exciting and successful college experience. I D 101 is an innovative, three credit, multidisciplinary course that helps students succeed in college by refining their speaking, writing, and technology skills; building relationships with faculty and other students; and integrating into academic life. Students may elect one of six compelling topics to pursue in I D 101: The Mating Game, The American Dream, The Incredible Shrinking Universe, Life and Death, Crime and Punishment, or Utopia. (Some topics rotate each year.) All entering freshmen are encouraged to enroll in Freshman Seminar. For further information, call Dr. Constance Staley, Program Director, at (719) 262-4123 or the Student Success Center (719) 262-3260.

Study Abroad Programs

Opportunities for study abroad are offered for selected students in the College, usually in formal programs in foreign universities under the direction of faculty members from this University or institutions cooperating with the University of Colorado. Normally, these programs accept students for the junior year. They carry full credit toward graduation from the University of Colorado. Inquiries may be addressed to the University's Language Technology Center, Dwire Hall 311.

Programs of Study

Department Programs, Requirements, and Course Descriptions

Course numbers are an approximate reflection of academic level. Freshman courses are indicated as 100-199, sophomore courses as 200-299, etc. Students are strongly urged to consult with the department prior to registration before signing up for any upper-division course (300 or 400 level) in a field in which they have not had lower-division (100 or 200 level) preparation.

ANTHROPOLOGY

Professor: Wynn (Chair); Associate Professors: Broce, Tierson and Watts; Senior Instructor: Church; Instructors: Palmer; Research Instructor: Arbogast.

Bachelor of Arts — Anthropology

Major Requirements

The Bachelor of Arts in Anthropology requires 36-54 credit hours of course work in Anthropology. In order to expose majors to the variety of perspectives incorporated in the discipline, the following department courses are required for graduation: Survey of Prehistory (ANTH 220), Survey of Biological Anthropology (ANTH 230), Survey of Cultural Anthropology (ANTH 240), and Nature of Language (ANTH 280). Majors must also take History of Anthropology (ANTH 397) and Senior Seminar (ANTH 498). Students must take ANTH 397 before they take ANTH 498.

Students interested in specializing in archaeology should consider taking the following courses offered by other departments: Beginning Drawing (V A 104), Environmental Systems: Landforms (GES 101), Introduction to Cartography (GES 305), Introduction to Geographic Information Systems (GES 405), Introduction to Remote Sensing (GES 406), Principles of Geomorphology (GES 431), and Soils (GES 434). Indeed, students interested in pursuing a career in archaeology are urged to consider completing a minor in Geography and Environmental Studies.

Minor Requirements

Students interested in a minor in Anthropology are required to complete three of the following four 200 level courses: ANTH 220, ANTH 230, ANTH 240, and ANTH 280. They must also meet the Letters, Arts, and Sciences minimum requirements for minor programs (18 hours, with 9 hours in the upper division).

Honors Program

In addition to the regular undergraduate curriculum in Anthropology, the department offers students an honors program. Before or during the first semester of the junior year, interested students should contact any anthropology faculty member about this program.

Bibliography

Senior Instructors: C. Martinez and Rice-Jones.

BIOLOGY

Professors: Burke; Professor Emeritus: Mattoon; Associate Professor: Berry-Lowe (Chair); Assistant Professors: Berning, Guerra, Newell; Senior Instructor: Pigage.

Bachelor of Arts — Biology

Major Requirements

1. The student must complete at least 30 hours of coursework in biology including

a minimum of 16 hours in upper-division (300- or 400-level) courses. A grade of C or above must be attained in all required courses. NOTE: 54 hours in the major is the maximum towards fulfilling the 124 hour graduation requirement.

2. The three semester sequence required in chemistry is General Chemistry (CHEM 103 and 106) and Organic Chemistry (CHEM 330/340). It is strongly advised that general chemistry be taken in the first year and organic chemistry in the second year. The two semester sequence of organic chemistry (CHEM 331/333 and 332/334) is required for students planning to enter medical or graduate school.

3. The two semester sequence required in physics is Physics for Life Sciences (PES 101-115/102-215). General Physics is acceptable (111-115/112-215).

4. Competency in Calculus I (MATH 135) is required. It can be met by scoring 4 or 5 in the AP Math-Calculus test or a 3,4, or 5 in the AP Math-Calculus BC test. The one-semester course Statistics for the Sciences (MATH 310 or equivalent) is also required.

5. The major in Biology recognizes that required departmental courses (Biology I and II, Cell Biology, Genetics, Biochemistry and Biology Seminar) and certain biology area requirements are needed for the development of competence in the biological sciences. The major must take all required courses and at least one course from each of the three biology area requirements (listed below).

6. A maximum of 8 hours of credit taken in BIOL 940-949 (Independent Studies) and Externship in BIOL 471-474 count toward the major.

Biology I (Introduction to Cell Biology)
BIOL 110-3

Introduction to Cell Biology Lab
BIOL 111-1

Biology II (Organismic Biology)
BIOL 115-3

Organismic Biology Lab
BIOL 116-1

Cell Biology
BIOL 302-3

Genetics
BIOL 383-3

Biology Seminar
BIOL 401-1

Biochemistry
BIOL 481-3 or 482-4

One year of General Chemistry
CHEM 103/106

One semester of Organic Chemistry
CHEM 330/340

One year of Physics
PES 101/102, 115/215

One semester of Calculus
MATH 135

One semester of Statistics
MATH 310 or equivalent

Area Requirements

Human Biology

Human Anatomy and Physiology
201-4, 202-4

Biomedical Aspects of Aging 204-3

Nutrition for Health Sciences 205-3

Exercise Physiology 330-3

Histology and Lab 360-3, 365-1

Vertebrate Embryology 361-4

Health and Fitness 403-3

Advanced Nutrition 430-3

Biomechanics/Kinesiology 455-3

Human Metabolism 477-3

Pathobiology 490-4

Tumor Biology 496-3

Molecular, Cellular and Developmental Biology

Microbiology 203-4

Microbiology: Bacteriology/Mycology and Lab 310-3, 311-1

Microbiology: Virology and Lab 314-3, 315-1

Histology 360-4

Vertebrate Embryology 361-4

Genetics Laboratory 384-2

Immunology 391-3

Biochemistry 481-3 or 482-4

Molecular Genetics 484-3

Molecular Biology Laboratory 485-4

Biochemistry Laboratory 486-3

Principles of Flow Cytometry 488-3

Advanced Flow Cytometry 489-3

Biotechnology I 491-4

Biotechnology II 492-4

Organismic and Environmental Biology

Plants of Colorado 313-3

Animal Physiology 322-3

General Ecology 370-3

Evolution 425-3

Biogeography 426-4

Plant Communities of Colorado 429-4

Mammalogy 428-4

Plant Physiology 440-4

Animal Ecology 443-4

Winter Ecology 444-3

Graduate Courses

Seminar in Biology 501-1

Health and Fitness 503-3

Scientific Basis of Athletic Performance 510-3

Injury Prevention and Treatment 523-3

Advanced Exercise Physiology 530-3

Biomechanics/Kinesiology 555-3

Externship in Biology 571-1 to 12

Human Metabolism 577-3

Basic Laboratory Methods in Sports Physiology 579-3

Analytical Methods in Sports Physiology 580-3

Biochemistry 581-3, 582-4

Molecular Biology 584-3

Molecular Biology Laboratory 585-4

Biochemistry Laboratory 586-3

Biochemistry and Molecular Biology of Lipids and Membranes 587-3

Principles of Flow Cytometry 588-3

Advanced Flow Cytometry 589-3

Pathobiology 590-4

Biotechnology I 591-4

Biotechnology II 592-4

Advanced Biomechanics 636-2

Tumor Biology 696-3

Suggested 4-year Curriculum for a B.A. in Biology

The following is a suggested four-year curriculum for a student wishing to obtain a degree in Biology. The department also offers four areas of emphasis: Biotechnology/Biochemistry, Organismic Biology, Exercise Science, and Health Sciences. A degree option is available for elementary, secondary and special education teachers. Please contact the Student Success Center or the College of Education for further information.

Freshman Year

BIOL 110, 111 and 115, 116
General Biology and Labs 8

CHEM 103, 106 General Chemistry
and Labs 10

MATH 135, Calculus I 4

College/Department Requirements/
Electives 8

30

Sophomore Year

BIOL 302 Cell Biology 3

MATH 310 Statistics 3

CHEM 330/340 Organic Chemistry
(or 331/333) 5

PES 101, 102, 115, 215 10

College/Department Requirements/
Electives 11

32

Junior Year

BIOL 383 Genetics 3

College/Department Requirements/
Electives 25

20

Senior Year

BIOL 401 Seminar 1
BIOL 481 Biochemistry 3
College/Department Requirements/ Electives 26
30
Total Hours 120

Course Suggestions for Biology Majors with Various Interests

Biotechnology/Biochemistry Course Suggestions

Advisers: Berry-Lowe and Guerra

Freshman Year

BIOL 110, 111 and 115, 116 General Biology and Labs. 8
CHEM 103, 106 General Chemistry and Labs. 10
MATH 135, Calculus I 4
College/Department Requirements/ Electives 6
32

Sophomore Year

BIOL 302 Cell Biology 3
CHEM 331-334 Organic Chemistry 10
PES 101, 102 Physics for Life Science . . . 8
PES 115,215 Physics for Life Science Labs 2
MATH 310 Statistics 3
College/Departmental Requirements/ Electives 6
32

Junior Year

BIOL 383 Genetics 3
BIOL 384 Genetics Lab 2
BIOL 481, 482 Biochemistry 7
BIOL 486 Biochemistry and Molecular Biology Laboratory. 3
College/Departmental Requirements/Electives 17
30

Senior Year

BIOL 391 Immunology 3
BIOL 401 Biology Seminar 1
BIOL 484 Molecular Genetics 3
BIOL 384 Genetics Laboratory 2
BIOL 485 Molecular Biology Laboratory . . 4
CHEM 451 Physical Chemistry 4
College/Departmental Requirements/Electives 13
30
Total Hours 120

Recommended But Not Required.

Microbiology
Analytical Chemistry
General Ecology
Computer Science
Biotechnology I, II

Health Sciences Course Suggestions

Adviser: Pigage

Freshman Year

BIOL 110, 111 and 115, 116 General Biology and Labs 8
CHEM 103, 106 General Chemistryand Labs. 10
MATH 135, Calculus I 4
College/Departmental Requirements/ Electives 10
32

Sophomore Year

BIOL 302 Cell Biology 3
MATH 310 Statistics 3
PES 101, 102, 115, 215 Physics for Life Sciences and Lab 10
CHEM 331-334 Organic Chemistry 10
College/Departmental Requirements/Electives 6
32

Junior Year

BIOL 360 Histology 4
CHEM 481, 482 Biochemistry 7
BIOL 383 Genetics. 3
College/Departmental Requirements/Electives 12
26

Senior Year

*BIOL 361 Vertebrate Embryology 4
BIOL 401 Seminar 1
College/Departmental Requirements/Electives 25
30
Total Hours 120

*Required by some veterinary schools

Organismic Biology Course Suggestions

Adviser: Pigage

Freshman Year

BIOL 110, 111 and 115, 116 General Biology and Labs 8
CHEM 103, 106 General Chemistry and Labs 10
MATH 135 Calculus I 4
College/Departmental Requirements/Electives 10
32

Sophomore Year

BIOL 302 Cell Biology 3
MATH 310 Statistics 3
CHEM 331-334 Organic Chemistry 10
PES 101, 102, 115, 215 Physics for Life Sciences and Lab 10
College/Departmental Requirements/Electives 6
32

Junior Year

BIOL 383 Genetics 3
College/Departmental Requirements/Electives 27
30

Senior Year

BIOL 401 Seminar 1
BIOL 481 Biochemistry 3
College/Departmental Requirements/Electives 26
30
Total Hours 120

Exercise Science Course Suggestions

Advisers: Burke and Berning

Freshman Year

BIOL 110, 111 and 115, 116 General Biology and Labs 8
CHEM 103, 106 General Chemistry and Labs 10
MATH 135 Calculus I 4
College/Departmental Requirements/Electives 10
32

Sophomore Year

BIOL 201, 202 Human Anatomy and Physiology 8
BIOL 302 Cell Biology 3
MATH 310 Statistics. 3
CHEM 330/340 Organic Chemistry 5
PES 101, 102, 115, 215 Physics for Life Sciences and Lab 10
College/Departmental Requirements/Electives 3
32

Junior Year

BIOL 383 Genetics 3
BIOL 455 Kinesiology/Biomechanics 3
BIOL 481, 482 Biochemistry 7
College/Departmental Requirements/Electives 13
26

Senior Year

BIOL 330 Exercise Physiology 3
BIOL 401 Seminar 1
BIOL 403 Health and Fitness 3
BIOL 423 Injury Prevention & Treatment 3
BIOL 477 Human Metabolism 3
College/Departmental Requirements/Electives 17
30
Total Hours 120

Recommended But Not Required:

Biomedical Aspects of Aging
Nutrition for Health Sciences
Laboratory Methods in Sports Science
Pathobiology

Pre-Allied Health Advisory Program (PAHAP) Administered by the Department of Biology

Adviser: Pigage

Choice of Profession

A student should make an appointment with the PAHAP adviser and provide a transcript of any previous college work. The PAHAP adviser will introduce the student to the various professions which are available and appropriate for each individual student. The adviser will discuss, in detail, the programs in which the student has an interest. The student may be asked to read and study material from a number of sources before committing himself or herself to a given profession.

Establishment of a Curriculum

Once a student has chosen a profession, the student and the PAHAP adviser will prepare a tentative academic program with the following considerations:

1. Major field.

2. Core curriculum for the major.

3. Electives within the major.

4. Lower- and upper-division requirements for the degree.

5. Lower- and upper-division electives for the degree.

6. Courses and units needed for admission into allied health programs at other institutions where the student will further his or her training.

Special Considerations

The variation in preparation for the large number of allied health programs may dictate that a student fulfill requirements other than those of the regular University curriculum. These requirements may include practical experience through externships, previous certification, or technical training. In such cases, the student will be advised and such special considerations will be included in the student's overall pre-allied health career program.

Note: A laboratory fee is charged for all biology courses with formal laboratories and/or field work.

Note: All 300 level courses and above presume having General Biology, General Chemistry, Organic Chemistry and General Physics.

Honors Program

The Department of Biology offers a program for honors in biology to outstanding senior students at the University of Colorado at Colorado Springs. Individuals wishing to take advantage of this program should contact the department no later than the beginning of their final semester.

Qualifications for admission to the departmental honors program shall consist of a minimum grade point average of 3.5 in Biology and a minimum of 3.0 overall. The qualified student must complete BIOL 949 to be eligible for the Honors Program. Through the recommendation of the faculty of the Department of Biology, the successful honor student's degree diploma will bear the citation "With Distinction (High Distinction, Highest Distinction) in Biology"

Students are encouraged to consult a faculty adviser in the department for help in planning their individual programs.

Master of Basic Science (M.B.S.) — Biology

The Department of Biology is part of the Masters of Basic Science (MBS) program. For applications and initial advising contact the Biology Graduate Coordinator. The Department of Biology offers two areas of emphasis within the MBS program.

The Exercise Science program is the only one of its kind in the country organized by cooperative efforts between a university and amateur sports. The Exercise Science option is offered in conjunction with the U.S. governing bodies for U.S.O.C. Coordinators for this option are Drs. Berning and Burke.

The Biochemistry program offers the opportunity for students to carry out research with faculty active in the fields of molecular biology, immunology, biotechnology, and biochemistry. The coordinator for this option is Dr. Guerra.

Students enrolled in the MBS program will have the opportunity to take courses in a variety of disciplines, which may include Biology, Chemistry, Computer Science, and Engineering. Upon successful completion of the program, the degree of Master of Basic Science (MBS) is conferred. For application information contact the Graduate School (http://web.uccs.edu/gradschl/gradpage.html).

Graduate School Application Information

An applicant for admission to the Graduate School must obtain an application packet from the office of the program to which application for an advanced degree is being made. Admission to the Graduate School is not admission to candidacy for an advanced degree. A student who wishes to become a candidate for a degree must make special application at the time and in the manner prescribed by the requirements for the degree sought. For complete information refer to the current Bulletin or contact the following:

Dean, Graduate School
University of Colorado
at Colorado Springs
1420 Austin Bluffs Parkway
Colorado Springs, CO 80918

(719) 262-3121

Chemistry

Professors: Eberhart, Ruminski and Schoffstall (Chair); Associate Professor: Anderson; Assistant Professor: Pyati; Weiss. Professor Adjunct: Kresheck; Professor Adjoint: Askill; Instructors: Barta, Dymek; Johnson.

Two programs (B.S. and B.A.) of study are open to students wishing to major in Chemistry. The program leading to the degree of Bachelor of Science in Chemistry is intended for those who plan to choose chemistry as a profession. This program should be elected by students who plan to go on to graduate school in Chemistry. This program is certified by the American Chemical Society (ACS). The Department of Chemistry at CU-Colorado Springs is one of 600 in the United States that is approved by the ACS. Many B.S. graduates gain employment as chemists upon completion of their B.S. degree program. Some go on to graduate studies.

Students wishing a less comprehensive program in Chemistry, such as premedical students, should elect the Bachelor of Arts degree with a major in Chemistry. Judicious selection of additional courses permits the B.A. major to satisfy prerequisites for admission to graduate study in chemistry or related fields of study. There are five options for the B.A.: a general option, an environmental chemistry option, a biochemistry option, a pre-health professional option and a teacher education option.

Several chemistry courses are offered as a service to students majoring in other science fields and in social sciences and arts and humanities fields. CHEM 151 (Environmental Science) is a beginning-level course that has no chemistry prerequisites. CHEM 100 (Chemistry in the Modern World) is offered for non-science majors. CHEM 121 Introduction to Physical Science is an integrated science course with a focus on chemistry for non-science majors. CHEM 301 (Materials Science), CHEM 484 (Molecular Genetics), CHEM 385 (Chemical Origins of Life), are offered as elective courses for science majors. A degree option is available for secondary education teachers. Please contact the Student Success Center or the College of Education for further information.

Advising and Additional Departmental Rules

Students majoring in Chemistry should obtain a copy of the Department of Chemistry Advising Brochure that is in effect when they enroll. This brochure will be referred to throughout the student's career. Students are bound to the rules in effect when they first enroll. This is important because the rules and course requirements may change somewhat from year to year. Chemistry majors should consult regularly with departmental faculty advisers, and in particular with the department chair, as outlined in the advising brochure. Academic advising is a very important aspect of one's education. Decisions on application to medical schools and graduate schools and on employment are also critical.

Students who complete a Chemistry degree may count 10 semester hours of PES 111, 112, 115, and 215 as part of their natural science area requirement. Since PES 111, 112, 115, and 215 are not on the approved list of courses, students not completing a Chemistry degree cannot count these courses toward their area requirement for a non-Chemistry Letters, Arts and Sciences degree.

All students intending to elect CHEM 103 will complete a diagnostic examination to cover math skills. Students in many chemistry courses will be examined using standardized subject exams. Students who have not taken chemistry in high school should take CHEM 115.

Bachelor of Science — Chemistry

The B.S. in Chemistry is a professional degree program accredited by the American Chemical Society, designed to prepare the student for a career in chemistry, including those anticipating admission to graduate study in chemistry. The program is not intended as a preparation for the study of medicine. Premedical students who wish to major in Chemistry should elect the B.A. degree with a major in Chemistry.

The B.S. in Chemistry requires more breadth and depth in Chemistry, Mathematics, and Physics than the B.A. Students desiring a B.S. in Chemistry are typically planning graduate studies in chemistry and/or careers as professional chemists in industry, private laboratories, and government agencies.

The program features courses from each of the main areas of chemistry: analytical, inorganic, organic, physical and biochemistry. Aspects of analytical and biological chemistry are introduced in General Chemistry and Organic Chemistry. They are then treated in detail advanced courses in analytical chemistry. Inorganic Chemistry is introduced in General Chemistry. A two-semester lecture-laboratory sequence course is taken by seniors after they have had Physical Chemistry. The inorganic courses are founded upon modern theories of bonding and orbital symmetry.

Organic Chemistry is covered in a one-year sequence featuring a rigorous laboratory program where synthetic and spectroscopic methods are introduced. A comprehensive treatment of the principles of thermodynamics, quantum mechanics, kinetics, and spectroscopy is encompassed in the two-semester physical chemistry sequence.

The B.S. in Chemistry program requires a strong preparation in mathematics through calculus and three semesters of physics.

Students wishing to pursue graduate study in chemistry should select independent study projects involving laboratory work by their junior year.

Suggested four-year sequences of courses are shown below. The courses required for the B.S. degree are implicit in this sequence. Students who have started their programs by taking CHEM 100 or 101, and who decide to major in Chemistry or another science, should take the CHEM 103-106 sequence. Students electing the B.S. degree who have taken CHEM 331, 332, 333, 334 before deciding to major in Chemistry should take two hours of credit in CHEM 940 (Independent Study) in organic chemistry or CHEM 338.

Students are required to select upper-division electives in chemistry.

B.S. in Chemistry

Freshman Year

CHEM 103, 106 (108 also recommended)	10
MATH 135, 136	8
ENGL 131, 141	6
C S 101, 105, 106 or 107 (recommended)	(3)
BIOL 110, 111	4
Elective	3
	31

Sophomore Year

CHEM 331, 332	6
CHEM 337, 338	4
PES 111, 112, 115, 215	10
MATH 235, (340 recommended)	4 (7)
Electives	6
	30

Junior Year

CHEM 451, 452, 455	8
CHEM 417, 418, 420	9
PES 213	3
CHEM 483	3
Electives	6
	29

Senior Year

CHEM 401, 402	7
CHEM 495, 496	2
Chemistry electives (upper-division)	9
Electives	12
	30
Total Hours	120

All chemistry core courses are offered every year. Not all chemistry elective courses are offered each year. Consult the Schedule of Courses for offerings available each semester.

Bachelor of Arts — Chemistry

This degree program is suitable for students wishing a major in Chemistry and is limited to fewer credit hours in chemistry, physics, and mathematics than the B.S. major. B.A. graduates may be students interested in a more general degree and others such as premedical or

predental students, students having an interest in both biology and chemistry or chemistry and some other discipline, students who switch over to a Chemistry major during their third or fourth year of college careers, and students who are unsure of their goals early in college. Many B.A. students do choose to go on to graduate school in chemistry and prepare themselves by taking sufficient elective courses in chemistry and related disciplines in order to qualify for acceptance.

Additional elective courses for B.A. Chemistry majors are CHEM 940 or other upper-division electives.

The year-by-year curriculum for the general option is shown here.

Degree Options

General Option

Freshman Year

CHEM 103, 106 (108 also recommended) 10
MATH 135, 136 8
ENGL 131, 141. 6
Electives 6
30

Sophomore Year

CHEM 331, 332 6
CHEM 337, 338 4
PES 111, 112 8
PES 115, 215 2
BIOL 110, 111 4
Electives 6
30

Junior Year

CHEM 417, 418, 420 9
CHEM 451, 452, 454 7
CHEM 483 3
Electives 12
31

Senior Year

CHEM 401 3
CHEM 495, 496 2
Chemistry electives (upper-division) 6
Electives 18
29

Total Hours 120

Environmental Chemistry Option

This B.A. program is designed for those students having an interest in environmental processes and problem solving from a chemical perspective. Many environmental issues are multi-dimensional and require the application of chemical principles, processes, and techniques within other disciplines. The strength of this program option is the combination of chemical principles with those of other earth systems. This degree program will give the student a solid foundation in chemistry while pursuing a multi-disciplinary approach that includes coursework in Biology, Ecology, Geography, and Economics.

Freshman Year

CHEM 103, 106 (108 also recommended) 10
MATH 135, 136 8
ENGL 131, 141. 6
BIOL 110, 111 4
LAS area requirement 3
31

Sophomore Year

CHEM 331, 332 6
CHEM 337, 338 4
PES 111, 112 8
PES 115, 215 2
BIOL 370 3
GES 100 4
Elective. 3
30

Junior Year

CHEM 341 3
CHEM 417 4
CHEM 451, 452, 454 7
CHEM 483 3
ECON 101 3
GES 441 3
Electives 6
29

Senior Year

CHEM 495, 496 2
CHEM 401 3
CHEM 418 3
CHEM 420 2
GES 450 or GES 451 3
Chemistry Elective 3
Electives 14
30

Total Hours 120

Biochemistry Option

This B.A. program has been established particularly for those students having an interest in Biological Chemistry and Biochemistry. Biochemistry students really need a large part of two majors, one in Chemistry and one in Biology. The Biochemistry Option was designed to include as requirements those courses that are fundamental to the field of Biochemistry.

The most important feature of the program is that two semesters of Biochemistry are required as well as a biochemistry laboratory course. Genetics and molecular genetics are also required. The program requires two semesters of Physical Chemistry.

Freshman Year

CHEM 103, 106 (108 also recommended) 10
MATH 135, 136 8
BIOL 110, 111 4
ENGL 131, 141. 6
Elective. 3
31

Sophomore Year

CHEM 331, 333 5
CHEM 332, 334 5
BIOL 302 3
PES 111, 112 8
PES 115, 215 2
Electives 6
29

Junior Year

CHEM 417 4
CHEM 451, 452, 454 7
CHEM 481, 482 7
CHEM 455 or 486 . . . . . 2 or 3
Electives 9
30

Senior Year

CHEM 495, 496 2
BIOL 383 3
Electives 19
CHEM Electives 6
30

Total Hours 120

Pre-Health Professional Option

The B.A. degree in Chemistry with Pre-Health Option is designed for students who are interested in chemistry and who plan a career in a health-oriented profession such as medicine or dentistry. This option requires courses similar to those required by medical and dental schools. It requires 36 credit hours of chemistry. The degree program allows for 36 elective credit hours.

Freshman Year

CHEM 103, 106 (108 also recommended) 10 (11)
MATH 135, 136 8
BIOL 110, 111, 115, 116 8

ENGL 131, 141. 6
32

Sophomore Year

CHEM 331, 332 and 333, 334, or 337, 338. 10
ENGL 150. 3
PES 101, 102, 115 or 111, 112, 115, 215 10
Elective or area requirements 6
29

Junior Year

CHEM 417, 451, 452*, 483 13
Electives or area requirements. 18
31

Senior Year

CHEM 401 3
Electives or area requirements. 25
28

Total Hours 120

*CHEM 454, 495, & 496 may be taken in lieu of CHEM 452.

It is recommended that students take one or two chemistry elective courses or independent study in addition to the required courses, e.g., CHEM 418 and 420 or a chemistry elective course such as CHEM 301, 341 or 531, etc.

Students who wish to work as chemists or to pursue graduate studies in chemistry should elect one of the other program options (either B.S. or B.A. in chemistry.

Teacher Education Option

The B.A. degree in Chemistry with Teacher Education Option is designed for students wishing to be high school chemistry teachers. This program has very specific requirements and no room for elective courses that will count towards graduation. It is important to consult with advisors for the Department of Chemistry and the College of Education.

Freshman Year

CHEM 103, 106 (108 also recommended) 10 (11)
MATH 135 4
ENGL 131, 141. 6
PHIL 100 or 102. 3
Electives or area requirements. 9
32

Sophomore Year

CHEM 331, 332 and 333, 334 or 337, 338 10
BIOL 110, 151 6
PES 101, 102 or 111, 112 and 115 and 105 or 106 12
PSY 100 4
32

Junior Year

CHEM 401, 417, 451, 454, 483, 495, 496 16
PES 215 1
GEOL 101 4
Humanities 300 level course 3
Electives or area requirements and an Education course 8
32

Senior Year

Required education courses (Consult with the College of Education) . 31
31

Total Hours 127

This curriculum allows for little flexibility for completion in 127 credit hours. However, it is recommended that students take one or two chemistry elective courses or independent study in addition to the required courses. Be aware that taking these additional courses will require more hours for graduation than 127 credit hours.

Students who wish to work as chemists or to pursue graduate studies in chemistry should elect one of the other program options (either B.S. or B.A.) in chemistry.

Industrial and Engineering Chemistry

Materials Science (CHEM 301) is offered in alternate years.

Honors Program

In addition to the normal undergraduate curriculum in chemistry, the department offers interested and qualified undergraduates an opportunity to increase further the breadth and depth of their chemical training through the Departmental Honors Program. Prior to or during the first semester of the junior year, interested students should contact any chemistry faculty member regarding the prospect of departmental honors work. Graduation with departmental honors requires students to have achieved at least a 3.4 grade point average, and to carry out an independent study project, which is to be reported in both written and verbal forms (seminar).

Minor in Chemistry

A student may complete a Minor in Chemistry by finishing the following coursework with grades of C or better: one year of General Chemistry (CHEM 103 and 106), one year of Organic Chemistry (the sequence CHEM 331, 332, 333, 334, or the sequence CHEM 335, 336, 337, 338), and two courses selected from Modern Inorganic Chemistry (CHEM 401), Analytical Chemistry I (CHEM 417), Physical Chemistry I (CHEM 451) and Biochemistry. Chemistry 330 does not satisfy any portion of the required one year of the Organic Chemistry sequence. Students should familiarize themselves with the prerequisite requirements for these courses.

Undergraduate Research

All chemistry majors are strongly encouraged to enroll for independent study and to become engaged in one or more research experiences. Numerous opportunities for summer research with stipends exist at many neighboring universities and sometimes at CU-Colorado Springs. Many students start on their research in the sophomore year and definitely in the junior year.

Breakage Deposit/Usage Fee

There is a total charge of $25 for each laboratory course: one course, $25; two courses, $50; etc. $20 of the $25 charge is a fee and $5 is a deposit against breakage. If breakage charges do not exceed the breakage deposit, any balance up to $5 will be refunded at the end of the term. Students who drop or withdraw before any liability accrues against this deposit will receive a $5 refund at the time they drop. The policy for fee refunds for dropping or withdrawing is described in the General Information Section. Independent study courses are considered to be lab courses.

Graduate Studies in Chemistry

Master of Basic Science

Students wishing to do most or all of their graduate work at CU-Colorado Springs, as well as those students wanting a general science master's program, can choose to work toward the M.B.S. degree, which is described at the end of the Letters, Arts and Sciences section in this Bulletin. Professor Schoffstall is the Chemistry Option advisor.

Several chemistry courses are not offered every year. Check the Schedule of Courses for offerings available each semester.

Communication

Professors: Hackman (Chair), Morley, Staley, Shockley, and Walker; Associate Professor: Gomez; Assistant Professors: Ellis, Nelson and Wanca-Thibault; Instructors: Baker, Blackmann, and Harrison-Miller; Oral Communication Lab Director: Karch.

Bachelor of Arts — Communication

A Bachelor of Arts in Communication requires a minimum of 36 and a maximum of 54 hours in Communication: degree options include Organizational Communication, Media Management, Recording Arts, and General Communication. The first three options are specialized areas of study. The General Communication option allows a student to prepare for a career in communication with courses tailored to the individual student's interests and career objectives.

Students pursuing a degree in Communication prepare themselves for a broad range of employment opportunities in both the public and private sectors. An internship for advanced students majoring in Organizational Communication, Media Management, or Recording Arts helps focus career objectives. Internships are not available for General Communication students or students minoring in Communication.

Organizational Communication majors must fulfill a portfolio requirement as a condition of graduation. The purpose of the project is to evaluate the progress of Organizational Communication majors at the time they complete their core area of study. The portfolio is comprised of separate assignments completed during the core courses. The assignments include a case study analysis (COMM 224), a written business proposal and a current business resume (COMM 324), and an audit case project (COMM 424). Students will be responsible for providing original copies of these assignments to the organizational communication faculty who will evaluate the work prior to graduation. For more information the Communication Department provides a handout entitled "Organizational Communication - The Portfolio Project Requirement."

All graduating communication majors must take an exit exam which samples the student's understanding of the major concepts of his/her content area. Students will take the exam during their last semester. Graduating seniors will receive information regarding test times, dates, and locations.

General Requirements:

The following degree requirements apply to all Communication majors:

1. Minimum of 36 (maximum 54) communication hours for all majors

2. Minimum grade of C (2.0) or better in all communication courses

3. At least half of major coursework must be upper division (18 hours minimum)

In addition to these minimums and the specific degree requirements outlined below, all communication majors must demonstrate computer competency by passing (with a C or better) one of the following courses. Other comparable courses may be approved by the departmental advisor.

C S 107 Introduction to Programming with Visual Basic

I S 100 Information Technology & Business Problem Solving

PSY 384 SPSS and Other Statistical Packages

V A 210 Introduction to Computer Art

or V A 310 Advanced Computer Art

COMM 651 Intermediate Quantative Methods for Communication Research (with instructor approval)

Degree Options

General Communication (36 hours)

Communication majors who do not specify a special area of interest must take a minimum of 36 hours of communication coursework, including the following core requirements:

COMM 102 Interpersonal Communication

COMM 103 Principles of Communication

COMM 210 Public Speaking

COMM 250 Problems in Communication: Research Methods

COMM 400 Rhetorical Dimensions in Communication

Organizational Communication (42 hours)

Organizational Communication majors must take a minimum of 42 hours of communication coursework, including the following requirements:

Core Requirements

COMM 224 Introduction to Organizational Communication

COMM 324 Business and Professional Communication

COMM 424 Advanced Organizational Communication (Spring only)

COMM 469 Internship in Communication

Additional Course Requirements

COMM 102 Interpersonal Communication

COMM 103 Principles of Communication

COMM 210 Public Speaking

COMM 250 Problems in Communication: Research Methods

COMM 315 Group Processes

COMM 328 Intercultural Communication

COMM 344 Leadership Communication

COMM 400 Rhetorical Dimensions in Communication

COMM 451 Quantitative Methods in Communication Research (Fall only)

Other Required Course (one from among the following):

One College of Business course from either Marketing, Human Resources, or Organizational Management

OR

COMM 461 Principles and Practice of Public Relations

Media Management (42 hours)

Media Management majors must take a minimum of 42 hours of communication coursework, including the following requirements:

Core Requirements

COMM 100 Contemporary Mass Media

COMM 103 Principles of Communication

COMM 225 Introduction to Film and Video

COMM 227 Beginning Television Production

COMM 469 Internship in Communication

Additional Course Requirements
(9 of the following courses, including 5 of those noted with an "*")

COMM 250 Research Methods*

COMM 290 Writing for Media

COMM 310 Directing Studio Performance

COMM 327 Intermediate Television Production

COMM 330 Scriptwriting

COMM 365 Mass Media and Society*

COMM 427 Advanced Television Production

COMM 445 Advertising Media*

COMM 450 Media Management*

COMM 461 Principles and Practice of Public Relations*

COMM 940 Independent Study

V A 103 Introduction to Photography

MKTG 300 Principles of Marketing*

MKTG 330 Marketing Research*

Recording Arts (42 hours)

Recording Arts majors must take a minimum of 42 hours of communication coursework, including the following requirements:

Core Requirements

COMM 100 Contemporary Mass Media

COMM 103 Principles of Communication

COMM 225 Introduction to Film and Video

COMM 227 Beginning Television Production

COMM 469 Internship in Communication

Additional Course Requirements
(9 of the following courses, including 5 of those noted with an "*")

COMM 290 Writing for the Media*

COMM 310 Directing Studio Performance*

COMM 327 Intermediate Television Production*

COMM 330 Scriptwriting*

COMM 350 American Cinema*

COMM 365 Mass Media and Society

COMM 427 Advanced Television Production*

COMM 445 Advertising Media

COMM 450 Media Management

COMM 461 Principles and Practice of Public Relations

COMM 940 Independent Study

V A 103 Introduction to Photography*

V A 210 Introduction to Computer Art

V A 310 Advanced Computer Art

For more information on the undergraduate program contact:

Dr. Adelina Gomez
Director of Undergraduate Studies
Department of Communication
CU-Colorado Springs
P.O. Box 7150
Colorado Springs, CO 80933-7150

Minors in Communication

Students may elect to minor in Communication by using one of the following four options (each requires a concentration of 18 hours; nine of which must be upper division):

General Communication Minor

COMM 102 Interpersonal Communication

COMM 103 Principles of Communication OR

COMM 460 Contemporary Theories of Human Communication

COMM 210 Public Speaking

COMM 400 Rhetorical Dimensions of Communication

AND any two upper division Communication courses.

Organizational Communication Minor

COMM 102 Interpersonal Communication

COMM 224 Introduction to Organizational Communication

COMM 324 Business and Professional Communication

COMM 424 Advanced Organizational Communication (Spring)

And two of the following five courses:

COMM 315 Group Processes

COMM 328 Intercultural Communication

COMM 344 Leadership Communication

COMM 365 Mass Media and Society

COMM 425 Advanced Interpersonal Communication:

Conflict Management

Media Minor

COMM 225 Intro to Film and Video

COMM 227 Beginning Television Production

COMM 290 Writing for the Media

COMM 365 Mass Media and Society

And two of the following four courses:

COMM 350 American Cinema

COMM 445 Advertising Media

COMM 450 Media Management

COMM 461 Principles and Practice of Public Relations

Leadership Studies Minor

Students may also pursue the minor option in Leadership Studies. The minor is designed to facilitate and enhance the transformation of students as they discover their full potential and become enlightened leaders within a democratic society. Core and elective faculty are drawn from the Colleges of Letters, Arts & Sciences; Business; and Education.

Requirements for leadership studies minor option:

- Completion of 18 credit hours
- 3 core courses in Leadership Studies
- 1 elective from each Leadership Content Area

All courses must be completed with a grade of "C" or better.

Courses taken as part of the leadership studies minor may not be counted toward a major or minor in any other degree program.

Leadership Studies Core Requirements:

COMM 111-3 Introduction to Leadership

LEAD 211-3 Profiles of Leadership

LEAD 411-3 Experiences in Leadership

Leadership Content Area Electives:

Understanding Diversity

COMM/WMST 215-3 Male/Female Communication

COMM 328-3 Intercultural Communication

PSC/WMST 301-3 Women in Politics

PSY 345-3 Psychology of Diversity

PSY/WMST 355-3 Psychology of Women

SOC/EST 329-3 Race and Ethnic Relations

SOC/EST 220-3 Intro to Racial and Ethnic Groups

Management & Organizational Leadership

COMM 344-3 Leadership Communication

ORMG 335-3 Groups & Teams in Organizations

ORMG 437-3 Organizational Development & Change

PAD 5270-3 Workshop in Management Development

PHIL 416-3 Business & Management Ethics

Social and Political Applications of Leadership

ECON 330-3 Environmental Economics

ID/GES/EST 366-3 Community Service

LEAD 400-3 Principles of Student Leadership

PAD 5006-3 Ethics and Public Management

PHIL 414-3 Environmental Philosophy

P SC 439-3 The Presidency

SOC 222-3 The Environment and Society

For more information on the minor option in Leadership Studies contact:

Dr. Michael Hackman
Department of Communication
CU-Colorado Springs
P .O. Box 7150
Colorado Springs, CO 80933-7150

Master of Arts — Communication

The Department of Communication also offers the Master of Arts degree. Students may engage in advanced study in General Communication with an option to specialize in Organizational Communication: Organizations, Technology and Change, or Instructional Communication: Development and Assessment. Both thesis and non-thesis options are available. Applicants are admitted based on the following criteria: acceptable undergraduate G.P.A., satisfactory scores on the Graduate Record Examination, four letters of recommendation from instructors or employers, a written statement of educational objectives and professional goals, and a sample of scholarly writing.

Degree Options

General Communication

Core requirements: COMM 551, 560,580, 601, and 651. Two plans lead to the degree. Plan I is with thesis. This plan involves 33 hours of coursework, among which up to six hours may be thesis credit. Plan II is without thesis and involves a minimum of 36 hours of coursework.

Coursework Requirements:

Plan I (Thesis)

1. five core courses (15 credits)

2. minimum of three (maximum of five) graduate elective courses in communication (9-15 credits)

3. one graduate level course from outside the department (3 credits)

4. maximum of six hours of thesis credit (6 credits)

Plan II (Non-thesis)

1. five core required courses (15 credits)

2. six graduate elective courses in communication (18 credits)

3. one graduate level course from outside the department (3 credits)

Organizational Communication: Organizations, Technology and Change:

Core requirements: COMM 551, 560, 580, 601, & 651.

Area requirements: COMM 524, 626, and 699

Two plans lead to the degree. Plan I is with thesis. This plan involves 33 hours of coursework, among which up to six hours may be thesis credit. Plan II is without thesis and involves a minimum of 36 hours of coursework.

Coursework requirements:

Plan I (Thesis)

1. five core required courses (15 credits)

2. three core area courses (9 credits)

3. minimum of none (maximum of two) graduate elective courses in communication (0-6 credits)

4. one graduate level course from outside the department (3 credits)

5. maximum of six hours of thesis credit (6 credits)

Plan II (Non-thesis)

1. five core required courses (15 credits)

2. three core area courses (9 credits)

3. three graduate elective courses in communication (9 credits)

4. one graduate level course from outside the department (3 credits)

Instructional Communication: Development and Assessment

Core requirements: COMM 551, 560, 580, 601, & 651

Area requirements: COMM 515, 570, and 699

Two plans lead to the degree. Plan I is with thesis. This plan involves 33 hours of coursework, among which up to six hours may be thesis credit. Plan II is without thesis and involves a minimum of 36 hours of coursework.

Coursework requirements:

Plan I (Thesis)

1. five core required courses (15 credits)

2. three core area courses (9 credits)

2. minimum of none (maximum of two) graduate elective courses in communication (0-6 credits)

3. one graduate level course from outside the department (3 credits)

4. maximum of six hours of thesis credit (6 credits)

Plan II (Non-thesis)

1 five core required courses (15 credits)

2. three core area courses (9 credits)

3. three graduate elective courses in communication (9 credits)

4. one graduate level course from outside the department (3 credits)

Under all plans, no more than six hours of graduate coursework may be transferred from other universities to fulfill the degree requirements for the M.A. in Communication.

For information and/or application for the master's program, write to:

Dr. Michael Hackman
Director of Graduate Studies
Department of Communication
CU-Colorado Springs
P. O. Box 7150
Colorado Springs, CO 80933-7150

Distributed Studies Program

Students who are working toward a B.A. degree may elect a major in a Distributed Studies Program. Distributed studies is probably the most misunderstood degree at CU-Colorado Springs. It is not a "general studies" degree with assorted coursework in a variety of subjects. Instead, it is a large major, requiring 60 semester hours, with at least 30 hours in a primary area and the other 30 hours in one or two secondary subjects. Distributed studies was initiated before we offered minors at CU-Colorado Springs; it served the need of students who wanted a concentration of courses outside the major. Now that we offer minors, most students complete a major and minor rather than distributed studies.

Distributed Studies is a degree that is structured out of courses offered by two or more programs. There are two approaches to a distributed studies degree - structured programs and programs built from stand-alone minors. Courses taken as part of a distributed studies major can be counted toward the college area requirement.

Structured Interdisciplinary Program Options

These include Business Economics, Justice Studies, Public Administration, and Special Education. These programs include a standard set of courses and options. Students should check with department advisors before enrolling.

Business Economics

The Department of Economics offers a Distributed Studies major in Business Economics.

Primary Area: Economics (30 Hours)

General Requirements:

You must complete a minimum of 30 hours in economics courses, at least 18 hours must be for courses numbered 300 and above.

Math Requirements

MATH 111 Topics in Linear Algebra and either

MATH 112 Calculus for Business and Economics

or

MATH 135 Calculus I.

Economics Requirements:

ECON 101 Introduction to Microeconomics

ECON 102 Introduction to Macroeconomics

ECON 301 Intermediate Microeconomic Theory

ECON 302 Introduction to Macroeconomic Theory

ECON 281 Introduction to Economic Statistics & Quantitative Methods

Each of these five required courses should be completed before the beginning of your senior year.

Economics Electives:

Any five additional upper division courses in Economics (no ECON 100)

Recommendations

It is recommended that you take at least one 400 level economics course, and preferably one of the following concentration areas (which include a 400 level course):

International Economics (ECON 341 International Economics and Econ 441 International Trade)

OR

Economics of Government (ECON 321 Economics of the

Public Sector and ECON 423 Policy Analysis)

Secondary Area: Business (30 Hours)

Business Requirements:

ACCT 201 Introduction to Financial Accounting

ACCT 202 Introduction to Managerial Accounting

FIN 305 Basic Finance

FIN 401 Business Finance I

FIN 402 Business Finance II

Business Electives:

Choose five courses from the following:

FIN 433 Investment and Portfolio Management

FIN 440 International Financial Management

FIN 453 The Management of Financial Intermediaries

MK 300 Principles of Marketing

MK 330 Marketing Research

MK 480 Marketing Policies and Strategies

ORMG 330 Management and Organization

ORMG 335 Groups and Teams in Organizations

ACCT 301 Intermediate Accounting

B L 200 Business Law

Comments:

1. Economics is both a social science and a business field (or discipline). On many campuses students can choose to major in Economics in either the business school or in arts and sciences. However, here at CU-Colorado Springs a student interested in both business and economics must choose between these interests by majoring in Economics (LAS) or majoring in Business (COB). This proposed distributed studies major in Business Economics would be one way to give students a formal opportunity to pursue both interests. Note that the proposed distributed studies major does not require the creation of any new courses.

2. The requirements for a distributed studies major involve a primary subject area with at least 30 semester hours of required course work of which at least 15 hours must be at the upper division level, and also a secondary subject area with at least 30 hours of course work of which at least 15 hours must be at the upper division level. The major requires at least 60 hours of course work total. The proposed distributed studies major in Business Economics is consistent with this framework. The primary area will be economics, and it will require at least 30 semester hours of economics courses. The secondary area will be business and it will require 30 semester hours of business courses. In both primary and secondary areas, the minimum number of upper division hours will also be satisfied.

3. In choosing the requirements in the primary area of economics the idea was to make this part of the distributed studies major in Business Economics be as close as possible to the regular major in Economics, the required courses and the math requirements are identical. The only change is from the minimum 36 hours for the regular major to a minimum of 30 hours in economics for the major in Business Economics.

4. In choosing the requirements in the secondary area of business the idea was to emphasize courses that fit with both students' interests in Business Economics as well as the nature of many of the employment opportunities for business, economics majors, i.e., in the financial sectors of the economy.

5. This proposed distributed studies major in Business Economics means that students would choose to enroll in CLAS. Of course, some students may be interested in the curriculum found in the College of Business. The Department of Economics is also pursuing opportunities with the College of Business to make it possible.

Justice Studies

The program in Justice Studies promotes a curriculum in the broad area of studies in legal and social justice. The program requires a total of 60 semester hours to be selected from the areas described below.

Part I. Legal and Justice Studies (30 hours: Primary Area)

This area of study provides breadth of content and general learning within the academic disciplines which are generally acknowledged as most basic to understanding law, society, and legal institutions and culture. Thirty hours of credit must be selected from this list of courses, and one course must be selected from each of at least four different disciplines.

Course list

B L 200 Business Law

COMM 210 Public Speaking

COMM 420 Persuasion

PHIL 112 Critical Thinking

PHIL 115 Ethics in the Professions

PHIL 320 Social/Political Philosophy

PHIL 322 Philosophy of Law

P SC 435 Environmental Policies & Administration

P SC 446 Administrative Law

P SC 447 Introduction to Constitutional Law

P SC 448 Constitution & Individual Rights

P SC 449 The Judicial system

PSY 348 Forensic Psychology

PSY 394 Psychology & the Law

PSY 395 Applied Psychology

PSY 444 Drugs & Behavior

SOC 250 Social Problems

SOC 340 Criminology

SOC 341 Sociology of Law

SOC 496 Juvenile Delinquency

Part II. Analysis, Application, and Work Force Preparation (15 hours: Secondary Subject)

Courses within this area provide skills of analysis and evaluation which promote understanding of the law in action as well as an opportunity to apply these skills in the criminal justice setting in the community. Students must select a minimum of six hours from part B, for a total minimum of 15 hours in this broad area.

Analysis and Evaluation (minimum of six hours)

One course in social research methods:

Examples are COMM 250, P SC 250, PSY 211, SOC 212, GES 305, and GES 405.

One course in Social Statistics:

Examples are ANTH 300, COMM 451, ECON 281, PSY 210, and SOC 317.

Pre-Professional and Work Force Preparation (minimum of six hours)

(Prerequisites for each) Senior standing and progress toward completing major.

P SC 948 Pre Law Internship

SOC 356 Internship in Criminal Justice Programs

SOC 358 Internship in Correctional Programs

SOC 442 Senior Seminar in Criminal Justice (required)

Part III. Emphasis Area (15 hours: Secondary Subject)

In consultation with the advisor, a minimum of 15 hours must be selected which comprise an academically integrated area of emphasis related to justice studies. Although there is much discretion in how this area of emphasis is created, three general approaches can be suggested:

Select an additional 15 hours of credit from any one discipline

Select 15 hours from those recommended for existing interdisciplinary studies programs, such as Ethnic Studies, Environmental Studies, Women's Studies, etc.

3. Create an "individualized" course of study which will promote understanding of a specific area of justice studies, i.e., business crime, hate crimes, environmental crime, cross cultural/comparative approaches, jurisprudence, deviance, crime and corrections, etc.

Public Administration

Students taking a distributed studies major in Public Administration must complete 45 semester hours of required courses (or suitable substitutes) and must choose, with advice and consent of the Chair of the Public Administration Program, an additional 15 semester hours of coursework in a primary subject field so that a total of 30 semester hours is accumulated in one primary subject (either Economics, Political Science or Sociology).

ECON 101-3 Introduction to Microeconomics

ECON 421-3 Economics of the Public Sector and Fiscal Policy

ECON 422-3 Economics of Federalism

ECON 423-3 Public Expenditures Evaluation and Policy Analysis

ECON 425-3 Urban Economics

P SC 110-3 The American Political System

P SC 404-3 Political Interest Groups

P SC 407-3 Urban Politics

P SC 432-3 Public Administration

P SC 446-3 Administrative Law

SOC 111-4 Introduction to Sociology

SOC 212-3 Introduction to Social Research

SOC 317-3 Statistics

SOC 322-3 Urban Sociology

SOC 431-3 Social Inequalities

In addition to the above requirements, it is highly recommended that Public Administration students also take as many of the following courses as possible:

ACCT 200-3 Introduction to Financial Accounting

COMM 102-3 Interpersonal Communication

COMM 365-3 Mass Media and Society

COMM 424-3 Advanced Organizational Communication

MATH 104-3 College Algebra

PSY 100-4 General Psychology

PSY 340-3 Social Psychology

SOC 435-3 Formal Organization

Individualized Distributed Studies Built on Stand-alone Minors

Students may design a Distributed Studies major around a core curriculum provided by the following stand-alone minors:

Energy Science	German
Ethnic Studies	Professional Writing
Film Studies	Theatre
French	Women's Studies

In this option a stand-alone minor becomes the primary curriculum for the degree. Because a minor requires only 18 credit hours, the student must negotiate the remaining 12 hours of primary subject with the director of the minor program. 30 hours of course work must carry grades of C or better, and at least 15 hours must be from upper division courses. No more that 8 credit hours of Independent Study can be applied to the primary area of concentration.

The student, in consultation with the director of the primary subject, would then select a secondary subject area in which he or she would complete 30 credit hours (these cannot include credit hours taken to complete the primary subject requirement). The secondary concentration will consist of 30 credit hours in one discipline, or 30 credit hours divided between two (15 and 15, or 18 and 12).

The degree requires 60 total credit hours, and students must maintain a 2.0 grade point average in all course work included in the program.

Before embarking on such a program of study, a student must negotiate a distributed studies contract with the director of the stand-alone minor that will constitute the primary area of the program.

Economics

Professors: Ballantyne and Greenwood; Professor Emeritus: Tregarthen; Associate Professors: DeBoer (Chair) and Eubank; Senior Instructor: Brock;

Bachelor of Arts — Economics

General Requirements

Students majoring in economics must complete a minimum of 36 hours of economics courses, at least 18 hours must be for courses numbered 300 and above. All courses taken for the economics major must be completed with a grade of C or better.

Math Requirements

MATH 111 and either MATH 112 or MATH 135. Ideally, these math requirements should be completed before taking any of the upper division economics core requirements.

Economics Core Requirements

ECON 101, 102, 281, 301 and 302. Each of these required courses should be completed before the beginning of the student's senior year.

Recommendations

It is recommended that you take at least one 400 level course and preferably one of the following concentration areas: International Economics (341 and 441), or Economics of Government (321 and 423).

Major Options

Economics and Business

Students interested in integrating an Economics major with an interest in a career in the business world are encouraged to choose the Distributed Studies Major in Business Economics. Requirements for the Distributed Studies

Major in Business Economics are listed under the Distributed Studies section of this Bulletin, and they can also be obtained from the Economics Department Office.

Economics and Government

Students interested in integrating Economics with a career in the public sector should consider a double major with Political Science or the Political Science minor in Public Policy. Of course they should also complete the concentration in the Economics of Government (ECON 321 and 423) and consider taking ECON 330 and 361.

The Economics Minor

The minor in Economics requires the completion of 18 credit hours in Economics. This work must include ECON 101 and 102, either ECON 301 or 302, and 9 additional hours of 300 or 400 level economics courses. Students in the business school are encouraged to minor in Economics since part of the core business curriculum requires ECON 101 and 102. Students interested in government can emphasize this interest by taking 321, 330, 361 and/or 423. Students interested in international affairs or international business can emphasize this interest by taking 341, 371, and/or 441.

Advising and Curriculum Planning

All new Economics majors are required to meet with the Department Chair for general advising concerning economics requirements. Students interested in graduate study in economics should talk with the Chair and other economics faculty about recommended courses. A schedule of planned course offerings by semester for the next few years is available from the Department Chair.

Economics Courses

There are no prerequisites for 100 level courses. Courses at the 300 level require a prerequisite of either 101 or 102 or both, while courses at the 400 level require a 300 level course as prerequisite. In general, students without the relevant prerequisites may still be allowed to enroll in a course with consent of the instructor.

Energy Science

Professors: Blade, Burkhart, Gruntfest and Huber; Associate Professors: Christensen (Program Director), and Grogger. Instructor: Prigmore

The Energy Science Program is intended to be taken as a minor with various technical and non-technical degrees. Energy science courses are also intended to supplement degree programs including but not limited to geography, geology, engineering and economics. Interested students are urged to discuss the program with their major advisers.

The Energy Science Program is designed to prepare students to appreciate (and possibly find jobs in) alternate energy sources. Specifically, courses are offered in solar energy, wind energy, nuclear energy, and related fields such as remote sensing and climatology.

Depending on a student's background, a minor may be obtained which requires knowledge of calculus or courses may be selected to provide a less mathematical minor.

Students must take either ENSC 150/151 or ENSC 250.

Students must take ENSC 160 and 162.

Students must select additional courses from the following list of electives. The combination of required courses and electives must total a minimum of 18 credit hours, of which, at least 9 credit hours must be upper division.

Elective courses

PES 213 General Physics III. 3

PES 313 Modern Physics 3

PES 318 Instrumentation Lab II 2

PES 341
Thermodynamics and Statistical Mech. . . . 3

ENSC/PES 361 Solar Energy Design. 3

ENSC/PES 365
Nuclear Physics and Energy. 3

ENSC/PES 367
Alternative Energy Sources 3

ENSC/PES 460
Advanced Solar Energy 3

ENSC/GEOL 312
Structural Geology I. 5

ENSC/GES 320
Practical Meteorology. 4

ENSC/GES 406
Introduction to Remote Sensing 4

ENSC/GES 409
Advanced Remote Sensing. 4

English

Professors: T. Napierkowski, Pellow, Ray (Chair) and Rubin-Dorsky; Associate Professor: Herrera; Assistant Professors: Dew (Director of Campus Writing Program), Ginsberg, LaRoche, and Taylor; Senior Instructors: Johnson, Kilduff, Malek and Timm; Instructors: Fallon, Flint, Loterbauer; Director of Professional Writing and Technology: H. Napierkowski.

Bachelor of Arts — English

The English major requires 39-54 hours of English courses, including the following specific requirements:

ENGL 131 and 141
(These courses are not counted, however, toward the major requirement of 39 hours, minimum, of English courses.)

ENGL 190, Intro to Literacy Studies (prerequisite to all other literacy courses).

ENGL 251, ENGL 252, ENGL 253, and ENGL 254 (may be taken in any order / British literature)

ENGL 338 and ENGL 339 (may be taken in any order / American literature)

ENGL 300 (literary criticism)

ENGL 395 (Chaucer)

Either ENGL 397 or ENGL 398 (Shakespeare)

One 400-level course in literature (excludes ENGL 483, ENGL 485, or any other non-literature 400-level course)

All English majors are required to pass the Senior Comprehensive Essay Exam prior to graduating. No course will count toward the major if the grade is below C-. Finally, students who wish to apply a correspondence course towards their English major must secure written permission of the English Department Chair.

Bachelor of Arts — English Elementary Teaching

Students wishing to major in English to prepare for careers in elementary school teaching take a minimum of 30 hours of English, including the following specific requirements:

ENGL 131 and 141
(These courses are not counted, however, toward the major requirement of 30 hours minimum, of English courses.)

ENGL 190
(designed for English majors and a prerequisite to all other literature courses offered by the department)

Either ENGL 251 or ENGL 252
(British literature)

Either ENGL 253 or ENGL 254
(British literature)

Either ENGL 260 or ENGL 261 (World/Global literature)

ENGL 301 (Advanced Composition)

ENGL 311 (Advanced Grammar)

ENGL 338 and ENGL 339 (may be taken in any order / American literature)

Either ENGL 320, or ENGL 346, or ENGL 355, or ENGL 360 (Each of these courses deals with ethnicity and/or gender.)

Either ENGL 395, or ENGL 397, or ENGL 398 (Chaucer / Shakespeare).

All English majors, including students in English Elementary Teaching, are required to pass the Senior Comprehensive Essay Exam prior to graduating. No course will count toward the major if the grade is below C-. Finally, students who wish to apply a correspondence course towards their English major must secure written permission of the English Department Chair.

Bachelor of Arts — English Secondary School Teaching

Students wishing to major in English to prepare for careers as secondary school teachers of English must take a minimum of 39 hours of English, including the following specific requirements:

ENGL 131 and 141
(These courses are not counted, however, toward the major requirement of 39 hours, minimum, of English courses.)

ENGL 190
(designed for English majors and a prerequisite to all other literature courses offered by the department)

Either ENGL 251 or ENGL 252 (British literature)

Either ENGL 253 or ENGL 254 (British literature)

Either ENGL 260 or ENGL 261 (World/Global literature)

ENGL 300 (literary criticism)

ENGL 338 and ENGL 339 (may be taken in any order / American literature)

Either ENGL 320, or ENGL 346, or ENGL 355, or ENGL 360 (Each of these courses deals with ethnicity and/or gender.)

Either ENGL 395, or ENGL 397, or ENGL 398 (Chaucer / Shakespeare)

ENGL 301 and ENGL 483
(Advanced Writing courses)

ENGL 311 and ENGL 485
(Grammar and Language courses)

All English majors, including students in English Secondary School Teaching, are required to pass the Senior Comprehensive Essay Exam prior to graduating. No course will count toward the major if the grade is below C-. Finally, students who wish to apply a correspondence course towards their English major must secure written permission of the English Department Chair.

Transfer Students

Transfer students pursuing a major in English are required to complete a minimum of nine credit hours in the CU-Colorado Springs Department of English, three of which must be a 400 level seminar in literature.

The Minor in English

To complete a minor in English, a total of 21 credit hours is required. A student must pass (with a grade of C- or better) each of the following courses: ENGL 190 (a prerequisite to all other literature courses designed for English majors), ENGL 251 or 252 (Survey of British Literature I or II), ENGL 253 or 254 (Survey of British Literature III or IV), ENGL 338 or 339 (Survey of American Literature I or II), either ENGL 395, 397, or 398 (Chaucer, Shakespeare I or Shakespeare II), ENGL 300, and any 400 level Seminar in Literature.

The Professional Writing Program

Minor / Emphasis / Certificate

The Professional Writing Program, housed in the English Department, is intended for those individuals who wish to pursue writing related careers in business and industry. The Program provides students with an excellent opportunity to enhance their credentials and career marketability. In addition, the Program makes available to those already involved in writing for business and industry the opportunity to further develop professional skills important to their careers.

English majors may select an Emphasis in Professional Writing. Besides completing 18 credits in Professional Writing courses, English majors choosing the Emphasis also take ENGL 190, 251, 253, 254, 338, 339, Chaucer or Shakespeare, and Senior Seminar.

Other students in the College of Letters, Arts and Sciences, and students in the College of Business and the College of Engineering and Applied Sciences may select a minor in Professional Writing.

Unclassified students and students with a baccalaureate degree may select a certificate in Professional Writing.

To complete the Program, students complete 18 credit hours with a C or better from among the following courses:

ENGL 301-3 Advanced Composition

ENGL 307-3
Administrative and Business Writing

ENGL 309-3
Technical Writing and Presentation

ENGL 311-3 Advanced Grammar

ENGL 312-3 Technical Editing and Style

ENGL 313-3 Designing Documents for Business and Industry

ENGL 314-3 Managing Writing Projects for Business and Industry

ENGL 315-(1-3)
Professional Writing Internship

ENGL 316-3
Tools for Technical Writers

Prerequisites

ENGL 131 or transfer credit or a baccalaureate (for ENGL 301, ENGL 141 is also a prerequisite). Students must complete 9 credits in the Program to enroll in ENGL 315.

Upon approval from the Program Director, 3 credits may be applied towards completion of the Program from among the following courses in other departments: IS 100, CS 100, VA 210, JOUR 290, COMM 324, and BCOM 555. Students cannot apply one of these courses both to the Program and to another requirement they may need to fulfill.

Honors Program

To graduate with Departmental Honors in English, a student must compile a 3.75 grade point average in the major; compile a 3.5 grade point average overall; and receive a grade of "Outstanding" on the Senior Comprehensive Exam.

Students Who Contemplate Teaching

Statements of curriculum requirements for a teaching certificate in English may be obtained from the College of Education. Students planning to teach should also confer with a member of the College of Education faculty about the Teacher Education Program. Since requirements for Education and English make a very tight schedule, students should be fully informed as to both departmental and certification requirements by the beginning of the sophomore year.

Academic Policies

Levels of Courses

Ordinarily, 100 level courses are taken prior to 200 level courses, and so on. Unless otherwise indicated, courses have general prerequisites as follows: for 200 level courses, 24 prior college credits; for 300 level courses, 30 college credits; for 400 level courses, 45 college credits.

Prerequisite for All English Courses

Students must fulfill the ENGL 131 requirement prior to taking any other English course beyond 131. For English majors, ENGL 190 is a prerequisite for all other literature courses offered through the Department of English. For non-majors, ENGL 150 is a prerequisite for all other literature courses.

Graduate Course Offerings

In general, courses numbered 400 may also be taken for graduate credit as a 500 numbered course. See instructor for details. Courses numbered 500 and 600 are for graduate students only.

The Writing Program

Any student who wishes to take ENGL 099, ENGL 131 or ENGL 141 must meet the following placement requirements:

ENGL 099: Students may enroll without having an ACT or SAT score. Placement criteria: ACT of 18 or below, SAT of 449 or below. Contact LAS Extended Studies, Columbine 2040, 262-4071, to enroll in ENGL 099.

ENGL 131: To be admitted to ENGL 131, students must meet one of the following requirements:

- Score 19-28 on the English ACT.
- Score 450-640 on the English SAT.
- Complete ENGL 099 or an equivalent course completed elsewhere, but not counted toward graduation.

Students without ACT or SAT scores, must submit a writing sample to the Writing Program, Columbine 1041 for placement purposes.

ENGL 141: To be admitted to ENGL 141, students must meet one of the following requirements:

- Complete ENGL 131 at CU-The Springs
- Score 29+ on the English ACT.
- Score 650+ on the English SAT.
- Score a 4 on the CEEB Advanced Placement English Language and Composition Exam.
- Score a 5 on the IB English Examination
- Successfully complete a first-semester composition course (equivalent to ENGL 131) at an accredited college or university with a C or better.

For additional information on required courses and the writing portfolio assessment, refer to “Writing Competency Requirement,” in this bulletin. For other questions concerning placement criteria, contact the Writing Program at 262-4038 or 262-4040.

Composition Program

Any student who wishes to take an English composition course-ENGL 099 (offered through Extended Studies), ENGL 131, or 141 must comply with these placement requirements:

ENGL 099 (formerly ENGL 121): Students may enroll without having an ACT score or taking the TSWE. Those students who have an ACT score of 18 or below or who take the TSWE and score 41 or less must either enroll in ENGL 121 or be prepared to complete work elsewhere to bring their TSWE scores up to at least 42. For information about enrolling in ENGL 099 (formerly ENGL 121), contact the LAS Office of Extended Studies, 262-4071.

ENGL 131: To be admitted to ENGL 131, the student must complete one of the following requirements:

- score 19-28 on the ACT test.
- score 42-58 on the TSWE.
- score 450-640 on the SAT
- complete Extended Studies ENGL 099 (offered through CU-Colorado Springs Extended Studies.)
- complete three semester hours of college composition elsewhere (not counted toward graduation).

Students who have scored 29 or above on the ACT or 59+ on the TSWE or 4 on the AP examination are exempted from ENGL 131 and may register for ENGL 141.

ENGL 141: To be admitted to ENGL 141, the student must complete one of the following requirements:

- successfully complete ENGL 131 at CU-Colorado Springs.
- score 29 or above on the ACT.
- score 59+ on the TSWE.
- score 650+ on the SAT
- score 4 on the CEEB Advanced Placement Examination.
- successfully complete a first semester composition course (equivalent to ENGL 131) at an accredited college or university, then either score 50+ on the TSWE or pass the ENGL 131 exit portfolio.

For further information on writing requirements and transfer credit, refer to "Writing Competency Requirement" in this Bulletin.

Note: All composition students must be able to pass a diagnostic essay given during the first two weeks of class to remain in the class.

All composition courses (131, 141), Advanced Comp. (301), and courses in the Professional Writing Program (307, 308,309, 311, 312, 313, 314) will be taught on computers, using word-processing technology. The English Department will assist students unfamiliar with this technology.

Ethnic Studies Program

Professor Andrea Herrera, Director

The Ethnic Studies Program was established in 1995 as an interdisciplinary program leading to a minor. The program promotes curricular and faculty development and sponsors lectures and colloquia. Courses offered through the program focus primarily on the experiences and cultural expressions of the four main ethnic minority communities in the United States: African Americans, Native Americans, Asian Americans and Latinos/Hispanics. These experiences and cultural expressions include, but are not limited to, economic, political, legal, historical and cultural dimensions of life in the United States. An important goal of the program is to build on the knowledge grounded in the experiences of racial/ethnic groups that have been marginalized and excluded from full participation in society.

Students may earn a minor degree in Ethnic Studies or include Ethnic Studies as part of a Distributed Studies degree. The purpose of courses in Ethnic Studies is to synthesize knowledge in terms of ethnic minority perspectives. The Ethnic Studies minor at the College of Letters,

Arts and Sciences will, therefore, provide a basis for:

1. examining knowledge from specific U.S. racial/ethnic minority perspectives;

2. examining relationships among racial/ethnic groups and the processes of racial/ethnic formation - and its intersections with class, gender and sexuality - at the personal and collective levels;

3. developing competencies for working with people of different racial/ethnic backgrounds and fostering an understanding of racial/ethnic diversity;

4. fostering in students critical perspectives regarding Euro-centric, indigenous and other forms of knowledge constructions.

Ethnic Studies also provides students a forum for exploring the realities of their own experiences and discussing those realities in a systematic, informed manner. Courses are designed to facilitate this exploration process in a supportive context and to empower students to live their own cultures, and view others' cultures, in a new light.

Requirements for the Minor

The minor may be earned by students enrolled in any undergraduate program. Students must take at least 18 semester hours of designated Ethnic Studies courses for the minor. EST 200 (Introduction to Ethnic Studies) and EST 400 (Seminar in Ethnic Studies) are the only required courses for the minor. It is strongly recommended that EST 200 be taken before other EST coursework is completed, and that EST 400 be taken during a student's senior year. The remaining 12 credit hours may be chosen from the courses listed below. Overall, 12 of the 18 hours earned for the minor must be through upper division courses. A minimum grade of C (2.0) must be received for any course to be counted toward the completion of the minor. Courses taken on a pass/fail basis will not be accepted. Transfer credits are limited to 9 hours and must be approved by the Program Director.

Required Courses

EST 200-3 Introduction to Ethnic Studies.

EST 400-3 Seminar in Ethnic Studies.

Elective Courses

All courses listed below are cross-listed with Ethnic Studies.

ANTH 325-3 The Prehistory and History of Native American Cultures of the Southwest

ANTH 342-3 North American Indians

ANTH 440-3 Indigenous Peoples and Cultures of the Southwest

A H 343-3 African American Art

ENGL 346-3 Race, Writing and Difference: Contemporary American Literature

ENGL 355-3 Native American Literature

ENGL 360-3 African American Literature

EST 290-3 Special Topics

EST 310-3 Women of Color: Image and Voice

EST 366-3 Ethnic Minority Communities: Service and Learning

EST 372-3 From Slavery to Freedom: Slavery & the African-Amer Experience in Colonial Antebellum Amer.

EST 390-3 Special Topics

EST 401-3 Special Topics

EST 440-3 Indigenous Peoples and Cultures of the Southwest

EST 940-1-3 Independent Study in Ethnic Studies

HIST 351-3 Chicana/o History since 1910

HIST 372-3 From Slavery to Freedom: The African American Experience, 1607-1877

PHIL 363-3 Gender and Race in Biblical Literature

PSC 305-3 Race and Ethnicity in American Politics

SOC 220-3 Introduction to Racial and Ethnic Groups

SOC 323-3 The Chicana/o Community

SOC 324-3
The African American Community

SOC 328-3 The Asian American Community

SOC 329-3 Perspectives on Race and Ethnic Relations

SPAN 433-3 Hispanic U.S. Drama

SPAN 442-3 US Latino/Hispanic Literature

SPAN 443-3 U.S. Latina/o Drama

SPAN 444-3 Hispanic, Chicana/o, and Mexican American Literature

SPAN 445-3 U.S. Cuban Literature

THTR 211-3 Introduction to Teatro Chicano

Portfolio Requirement

In addition to completing 18 credit hours, each student will be asked to compile an academic portfolio under the Director's guidance, which will consist of the following materials:

1. an entry paper (written when the student declares the minor) discussing why s/he has chosen to enroll in the EST program and what s/he hopes to learn;

2. several assignments, including a reflective exit essay, from EST 200 (all of which require the student to reflect upon racial/ethnic formation and cultural identity;

3. at least two substantive written assignments selected from two separate upper-division EST elective courses, at least one of which should be a research paper. At the time of submission, the student will be asked to write a brief statement explaining why s/he selected each respective paper;

4. the final piece in the portfolio will be the exit paper, which the student will write in EST 400.

The student will also be encouraged to include any additional work that reflects his/her training in Ethnic Studies.

The portfolio will not be graded; however, it will be reviewed by the Director at the time of the senior audit and by a faculty Review Committee. The purpose of the portfolio is to provide the student with a tool to reflect upon his/her undergraduate education and to allow the faculty teaching in the Ethnic Studies minor the opportunity to assess and improve the academic program. At regular intervals, therefore, a Review Committee will be constituted and charged with the task of assessing student achievement in relation to the Program's educational objectives and making recommendations to the Director. Copies of the reviewer's written comments will be maintained in the Director's office.

Ethnic Studies is located in Columbine Hall, Room 1001, (719) 262-4001. Advisors for the program are: Herrera (EST/ENGL), Dickson (SOC), Gomez (COMM), Ferber (SOC/WMST), Warner (SOC), and Watts (ANTH).

Geography and Environmental Studies

Professors: Gruntfest, T. Huber and Larkin (Chair); Professor Emerita: Beyer; Associate Professor Jennings; Assistant Professors: Harner and Holder; Senior Instructor: Poulton; Instructor: C. Huber.

Bachelor of Arts — Geography

A geography major will require five courses: GES 100, 101, 198, and 199, plus a "tools" course from GES 305, 400, 406, or 411.

Note: GES 105 will not count as credit towards this tools requirement. A minimum of 16 hours of upper-division coursework is required for the degree. A maximum of 54 credit hours may be taken by a major in GES. All students must take an exit exam before graduation.

Minor in Geography and Environmental Studies

A minor requires a total of 18 credit hours of GES courses; at least nine of these must be at the upper-division level. A student pursuing a minor must take GES 100 or 101, GES 199 or 198, and a tools course (GES 305, 400 or 406). A degree option is available for elementary and special education teachers. Please contact the Student Success Center or the College of Education for further information.

Master of Basic Science — Geography and Environmental Studies

The Department of Geography and Environmental Studies (GES) is a part of the Masters of Basic Science (M.B.S.) program. For applications and initial advising contact the M.B.S. director. GES has a separate option under the M.B.S. program. See the description of the M.B.S. degree program later in the catalog for general questions. Entry into the GES option requires a 3.00 G.P.A. in undergraduate work or higher; 40 hours of science, mathematics, or computer science; and requires the G.R.E. exam. Students may substitute a college level statistics course and a computer intensive (i.e., GIS, image processing, programming, or other computer science) in lieu of any other math entrance requirements. Once accepted into the GES Option, each student will take GEOG 501-Seminar: Geographic Research in their first fall semester. Graduation requirements are the same as for the other M.B.S. options - a thesis plus 24 credit hours or 30 credit hours and a research paper.

Geology Program

Associate Professor: Grogger. Instructor: Bolling.

Geology courses offer a unique opportunity for students. Credits earned in Geology will count toward a degree in Letters, Arts and Sciences as electives. Courses are listed which have been offered in the past. Selected courses will be offered each semester.

Gerontology

Minor and Certificate in Gerontology

A minor and an academic certificate in Gerontology may be obtained through the College of Letters, Arts and Sciences. This program is offered by the Center on Aging and is designed to provide students and practitioners with knowledge and skills necessary for work in the aging field. The minor and certificate in Gerontology may be pursued by students enrolled in any undergraduate program in the College of Letters, Arts and Sciences. The certificate is also available to students in other colleges, and to individuals possessing a baccalaureate degree. It therefore makes available to those already involved in work with the elderly and/or possessing professional degrees the opportunity to acquire basic information and professional skills important to gerontology careers.

The minor and certificate in Gerontology certifies the successful completion of at least 21 credit hours of required and elective courses. A grade point average of at least 2.0 (C) is required for the certificate to be awarded. All courses applied to the minor must be completed with a grade of C- or better. The program includes the five required courses noted below and at least two electives.

Required Core Courses:

GRNT 300 Introduction to Gerontology

GRNT 498 Professional Field Experience in Gerontology (3 hours minimum)

GRNT 351 Psychology of Aging (Also may be taken as PSY 351)

GRNT 462 Sociology of Aging (Also may be taken as SOC 462)

GRNT 204 Biomedical Aspects of Aging (Also may be taken as BIOL 204)

An individually planned field experience will be required. This experience will be under the direct supervision of experienced personnel in an approved agency or institution dealing with the special concerns of older persons.

Elective Courses:

COMM 260 Family Communication

ECON 466 Health Economics

PSY 306 Psychology and Health

PHIL 417 Medical Ethics

PHIL 316
Philosophical Issues in Death and Dying

SOC 467 Sociology of Death and Dying

GRNT 498
Professional Experience in Gerontology

GRNT 940 Independent Study

For further information about the Center on Aging, or the minor or certificate in Gerontology, contact the Director of the Center. The Center on Aging is located in Columbine Hall, Room 4037, (719) 262-4179.

History

Professors: Hill (Chair) and Wunderli; Professor Emeritus: Bender; Associate Professors: Harvey, Sackett (Graduate Adviser) and Sheidley; Assistant Professor: Jimenez; Instructors: Janet Myers and Judy Price

Bachelor of Arts — History

The student majoring in History must complete a minimum of 36 (maximum of 54) hours of history courses (19 hours of which must be upper-division courses). All majors must select six hours each from any two of the following survey sequences: Western Civilization (HIST 101, l02, 103, 104); American Civilization (HIST 151, 152, 153, 154); Latin American Civilization (HIST 140, 141); or Asian Civilization (HIST 111, 112, 113, 114). These survey sequences may be waived by the department only on adequate proof that the student has had equivalent education in these fields. Majors must also take HIST 499 (Senior Thesis) during their junior or senior year. Majors may choose any history faculty member as a counselor to advise them on the distribution of their courses. Majors are required to have a grade of C (not C-) or better in their history courses.

A student with a double major (History and another major) must complete 30 hours of history courses, meeting the same course and grade requirements as above.

Requirements for a Minor in History

The minor in History consists of 21 hours of coursework, nine of which must be upper-division courses. At the lower division, students must take 12 hours, six hours each from any two of the following sequences: Western Civilization (HIST 101, 102, 103, 104); American Civilization (HIST 151, 152, 153, 154); Asian Civilization (HIST 111, 112, 113, 114); or Latin American Civilization (HIST 140,141). Students are required to have a grade of C (not C-) or better in history courses counted toward the minor. A degree option is available for elementary, secondary and special education teachers. Please contact the Student Success Center or the College of Education for further information.

Master of Arts — History

The Master of Arts degree in History can be obtained at CU-Colorado Springs. The History Department processes applications for admission to the program, offers all the courses required for the M.A. degree, and administers the final oral examination. See also Requirements for Advanced Degrees and the general requirements of the Graduate School.

The student should have a good foundation in history and a sufficient knowledge of the allied social sciences to afford an adequate background for graduate work. A candidate may be required to remove any apparent deficiencies. Residence of at least one academic year is required.

General requirements

The following departmental rules with respect to the Master of Arts degree supplement, but in no way supersede, the requirements of the Graduate School of the University of Colorado as set forth in the Graduate School section.

1. All graduate applications must be completed by March 15 for admission for the following Fall semester, and by October 15 for admission for the following Spring semester. Exceptions require the approval of the History Department Graduate Faculty Committee.

2. For purposes of admission to the graduate program, a writing sample will be required.

3. All coursework must be taken within the Department of History; exceptions may be granted by the department graduate faculty and according to graduate school regulations.

4. Thirty credit hours are required for the M.A. degree.

5. HIST 600, Historiography (3 credit hours) is required of all graduate students.

6. Students must take 24 credit hours in any of the specific historical fields offered by the History Department (see a list of the historical fields below). Seminars in a historical field are offered over two consecutive semesters: "Readings" in a specific field will be offered one semester (with a 600 number); and "Research" in the same field will be offered only in the following semester (with a 700 number). A "research" course at the 700-level may not be taken without having completed the prerequisite of the corresponding 600-level "readings" course. Students must complete the readings and research in at least three historical fields for 18 credit hours, and preferably four historical fields for 24 credit hours. Students who take only three historical fields must take an additional 6 credit hours in two 600 level readings seminars. No course may be taken twice for credit. Exceptions to the above requirements require the approval of the History Department Graduate Faculty Committee.

Historical fields and their course numbers are as follows:

European History

Readings/Research in Medieval European History, c. 300 - c 1300 a.d. (HIST 611/711)

Readings/Research in The Renaissance and Late Medieval Europe, c. 1300 - c. 1500 a.d. (HIST 615/715)

Readings/Research in the Reformation and Counter-Reformation, c. 1500 - 1648 (HIST 622/722)

Readings/Research in the Old Regime, 1648 - 1789 (HIST 625/725)

Readings/Research in the Age of Revolution, 1789 - 1870 (HIST 631/731)

Readings/Research in Modern Europe, 1870 - the Present (HIST 635/735)

United States History

Readings/Research in U.S.: the Birth of a Nation, 1763 - 1815 (HIST 655/755)

Readings/Research in U.S.: Division and Reunion, 1815 - 1877 (HIST 661/761)

Readings/Research in U.S.: Emergence of Modern America, 1876 - 1918 (HIST 666/766)

Readings/Research in U.S.: The Super Power Era, 1918 to Present (HIST. 671/771)

Readings/Research in U.S.: The Trans-Mississippi West (HIST 676/776)

Asian History

Readings/Research in the Indian Subcontinent since 1556 (HIST 681/781)

Readings/Research in the Pacific Rim since 1600 (HIST 686/786)

Any of the above seminars will be offered only once over a period of several years. In order to plan their graduate careers, students should consult with the History Department chair or graduate adviser to find out when specific historical fields will be taught and who will be offering them. Each year the History Department usually offers a two semester, readings/research sequence in American History, and a two semester, readings/research sequence in a non-American field.

7. Students will also take three credit hours of Independent Study (HIST 960) to prepare for oral exams and presentation of a portfolio of three papers (in triplicate) to the history faculty. (See Number 9 below).

8. In history courses, no grade lower than B- will count toward the completion of coursework for the Master's degree. Candidates must maintain a grade point average of 3.0 in their graduate courses, or face departmental probation.

9. Upon nearing completion of degree work, candidates are required to pass an oral exam that covers the coursework that they have completed. The oral examination committee will consist of three professors. Candidates will also present, and defend, before the history faculty a portfolio of three papers (submitted in triplicate) that they have written in research seminars. Candidates may have no more than six credit hours of coursework pending at the time they attempt this examination. The examination, to be registered for in advance, will be given each semester, including summers, at times agreed upon by candidates and the history faculty.

10. The department offers to evaluate the academic progress of graduate students after two semesters of coursework, if they request this review. The purpose is to apprise students of their progress in professional training as historians.

11. Below is a sample schedule for a full-time graduate student who will complete the M.A. degree in five semesters or two and one-half years. This is an ideal case; most students take slightly longer to complete the degree.

First Year

Fall Semester:

HIST 600 Historiography

HIST 6 Readings in Field #1

Spring Semester:

History 7 Research in Field #1

History 6 Readings in Field #2

Second Year

Fall Semester:

History 7 Research in Field #2

History 6 Readings in Field #3

Spring Semester:

History 7 Research in Field #3

History 6 Readings in Field #4

Third Year

Fall Semester:

History 7 Research in Field #4

History 960 Independent Study; oral exam

National Honorary History Society

A chapter of Phi Alpha Theta, the national honorary History society, is active at CU-Colorado Springs, and history students are welcome to join as associate or regular members. Special departmental honors in history will be awarded at graduation to students who maintain a specified grade point average in history and general studies and who write an undergraduate thesis judged superior by the department.

Humanities

Professor Sackett, Director

All degree students admitted to the College of Letters, Arts and Sciences must fulfill three of the twelve hours of Humanities area requirements by taking one core Humanities courses (three hours) under the departmental heading "Humanities" (HUM). Students may take a second core Humanities in order to satisfy three-credit hours of the General Humanities requirement. Humanities courses are upper-level and as such presume students have senior or junior status and have completed the composition requirement.

The core Humanities courses are multidisciplinary courses that combine the study of Literature, History, Art and Music History, and Philosophy, with an emphasis on the interaction of these fields with social, political, economic, and scientific/technological events. The class format combines lectures, group discussions, slide presentations, guest panels, dramatic performances, and musical recitals. Faculty from the various humanities-related departments join together in teaching the courses to provide students a solid overview of humanities disciplines.

The core humanities courses study the various humanities disciplines by focusing on a specific year or on a specific topic, some with a traditional and some with a non-traditional influence.

There is no guarantee that core humanities courses will be offered.

All course descriptions that appear here are "samples" of previously offered or designed courses and therefore are nonbinding. Since different faculty members may teach in different semesters, they are accustomed to designing courses in light of the interests and expertise of those teaching on a given team.

Any of the "HUM" courses in any given semester's course schedule fulfills the core humanities requirement (3 hours) of the general humanities area requirement (12 hours). Check the Schedule of Courses each semester for additional Humanities courses that may have been developed by the faculty.

Interdepartmental Studies

Professors: Burkhart and Soifer

Interdepartmental Studies offer a unique opportunity for students to experience courses which cover several disciplines. Established in 1976, the program is expected to expand to meet student demands with eventual participation by all departments in the College of Letters, Arts and Sciences. Interdepartmental Studies program also offers a minor in Mathematics as Liberal Arts (see Mathematics.)

Interdepartmental credits earned will count toward a degree in Letters, Arts and Sciences as electives. Students wishing to use I D credits in other colleges should consult with the academic advisers of their respective colleges.

Selected courses will be offered each semester.

Languages and Cultures

Professors: Miller; Professors Emeritus: Dölz-Blackburn and McKay; Associate Professors: Meadows-Jillson and von Dassanowsky (Chair); Assistant Professor: Steen; Senior Instructor: Mistry; Instructors: Glisson, Goni and Zaki-Farrell.

Along with other leading institutions of higher learning, the University of Colorado considers the study of languages an essential part of a sound liberal education. Competence in a language other than English not only promotes international understanding and communication, but also increases student's career opportunities in commerce and finance, diplomacy, library science, education, social work, publishing, communication, scientific and technical research, and the arts, and prepares them for graduate school, which normally requires proficiency in at least one foreign language. Students might consider taking language classes as excellent complements to their major. Consult the Distributed Studies section of this Bulletin. French, German, or Spanish can be used as part of a Distributed Studies degree.

The department offers a complete B.A. degree in Spanish and minor concentrations in French, German, and Spanish. Basic courses are also offered in American Sign Language, Russian, Latin and Japanese. Students desiring to major in French and German may complete a Distributed Studies major; others must complete requirements for the major in French, German, or Classics at the Boulder or Denver campus by approval of the appropriate Boulder or Denver department.

Bachelor of Arts — Spanish

A total of 35 credit hours in Spanish courses (beyond Spanish 102) including the following minimum distribution:

Language: 9 semester hours in advanced language selected from SPAN 293, 300, 301, 302, 401, 402.

Literature: 15 semester hours-319 and 320 are required. Nine additional semester hours in literature.

Culture/Civilization: 325, 425.

Senior Seminar: 497.

Plus Foreign Culture Studies: 6 semester hours in Hispanic topics.

Total: 41 semester hours-35 semester hours in Spanish plus 6 semester hours in F CS.

In some cases these major requirements may result in total credit hours in excess of the Letters, Arts and Sciences 54 hour subject area requirement. Unless the student successfully petitions the Committee on Academic Progress for a waiver, all hours in excess of the 54 hour maximum will be added to the 124 hours needed to graduate. The department strongly recommends that all majors and minors include study in a setting where the language of concentration is spoken. Credit earned will normally count toward satisfaction of the major/minor requirements, but the student must see the department Chair before enrolling in an external study program to assure full transfer of credit. Selected programs are also available through the Office of International Education, Boulder and Denver.

Minor in Spanish

A total of 18 credit hours in Spanish beyond Spanish 102 including the following minimum distribution: Spanish Grammar (300); Spanish Conversation and Composition I or II (301 or 302); Hispanic Culture Studies (325 or 425); Survey Hispanic Literature I (319) and Survey Hispanic Literature II (320).

Language courses at the 100 level introduce students to essentials of grammar, reading, oral fluency, and aural comprehension, as well as to a general understanding of the cultural context. Courses at the 300 and 400 levels are taught almost exclusively in the language.

Minor in French

A total of 18 credit hours in French beyond French 102 including the following minimum distribution: two language based courses from 293, 300, 301, 302 and two literature culture-based courses from 311 and above.

Minor in German

The German minor consists of the following requirements: A total of 18 credit hours in German beyond German 102 including the following minimum distribution: two language based courses from 293, 300, 301, 302, and two literature/culture based courses from 313 and above.

Language Courses

American Sign Language

American Sign Language (ASL) provides a unique modality - visual and gestural rather than the traditional aural/oral approach to modern language teaching. ASL is a fully developed language, containing rich verbal aspects and a classifier system. Elements of deaf culture are also presented through theoretical and applied simulations.

French

As one of the key languages of international diplomatic communication, literary creativity, and artistic achievement, French is a practical and useful language for career, personal and professional travel, and general cultural enrichment.

German

An important language closely related to English, German is the tongue of America's third largest trade partner, of much scientific research, and of international diplomacy. It is also the language of music's "3B's" (plus Wagner, Mozart, and Mendelssohn), of Goethe, Marx, Einstein, Kant, and Freud, spoken not only in Germany, but also in Austria and Switzerland. As such, German is a staple of any sound general education-a language that will enhance a career and enrich personal pleasure and travel.

Japanese

Japanese is the language of contemporary commerce, the literature of Mishima and Nobel Prize winner Kawabata. Its theatrical tradition includes Kabuki, Bunraku, and Noh, while its writing system utilizes Hiragana, Katakana, and Kanji. Japan is the land of flower arrangement and the tea ceremony, the Samurai and "Ran."

Latin

With 50 percent of English vocabulary derived from Latin, it is not surprising to discover that students who have studied Latin score about 150 points more on such standardized verbal tests as the SAT than do students who have not had Latin (Washington Post). Latin is also the basis of the five Romance languages (Spanish, French, Italian, Portuguese, and Rumanian) and as such helps students with further language study.

Russian

Russia, expanding in social and economic importance, has a history of great literature and great art. Turgenev, Dostoyevski and Solzhenitsyn as well as the artistic treasures of the Kremlin are revealed through a study of this language.

Spanish

In the United States, Spanish is fast becoming second to English in usage. A language of practical utility, great literature (Don Quixote), and wide applicability (in North, Central, and South America, as well as in Europe), Spanish is becoming a necessary skill for dealing with today's world. A degree option is available for elementary, secondary and special education teachers. Please contact the Student Success Center for further information.

Foreign Culture Studies

Foreign culture studies courses are designed to give students the opportunity to explore different facets of foreign culture, film, and literature in courses, particularly through on-site experiences.

Mathematics

The Department of Mathematics of the College of Engineering and Applied Science now offers the B.A. degree and the minor in mathematics. Please see the Math listing under the College of Engineering and Applied Science section.

Minor in Mathematics as Liberal Art

A minor in Mathematics as Liberal Art is offered by the Interdepartmental Studies Program of the College of Letters, Arts and Sciences and is designed to give students a special look at mathematics as liberal art. Prime emphasis is on ideas of mathematics rather than on skills, and on aesthetic aspects of mathematics such as beauty, elegance, paradoxy, that bring mathematics so close to the arts. Special attention is paid to the questions of what mathematics is, what mathematicians do, how they pursue their research, and what role intuition plays. Also of interest is the human aspect of mathematics in the life and work of its creator. This program may be of a special interest to students majoring in humanities, mathematical education, and natural sciences. A degree option is available for elementary, secondary and special education teachers. Please contact the Student Success Center or the College of Education for further information. The Colorado Mathematical Olympiad, held annually at CU-Colorado Springs, provides a valuable field experience for the program.

The successful completion of at least 18 credit hours is required with a grade point average of at least 2.0 (C). All courses applied to the minor are to be completed with a grade of at least a C-. At least nine credit hours must carry upper-division credits. The program includes three required courses and at least three electives. A substitution by an equivalent course is subject to approval by Professor Soifer. For further information about the minor, please contact Professor Soifer.

Required Courses:

I D 200 Mathematics: A Human Endeavor

I D 445 Creators of Mathematics: An Historic View

I D 480/580 What is Mathematics?

Elective Courses:

I D 205 Beyond the Finite

MATH 311 Theory of Numbers

MATH 350 Graph Theory

I D 450/550 A Serious Course in Recreational Mathematics

I D 455/555 Geometry as a Study of Transformations

I D 485/585 Geometric Insight in Combinational

Mathematics

I D 490/590 Mathematical Coloring Course

I D 501 Advanced Problem Solving in Secondary Mathematics

Military Science (US Army)

Professor of Military Science: Lieutenant Colonel Goudreau; Assistant Professors of Military Science: Major Overton, Major Gray and Captain Basenspiler; Senior Instructors: Master Sergeant Crowther

The Army ROTC Program

The focus of this program is to recruit, develop, and commission college-educated men and women to serve in the United States Army. Participants in the program are commissioned as a Second Lieutenant in the Army upon graduation with a bachelor's degree. They will be expected to serve in either the active Army or in the Reserve Components (Army Reserves or Army National Guard) after commissioning.

The program is centered on teaching the principles of leadership. These principles can be applied to positions in the military or in civilian careers. All courses of instruction are designed to develop leadership and management skills as well as enhance the self-confidence and initiative of each student.

Military Science is taken in addition to the required courses for each student's major

ROTC is a four-year program that is divided into two phases: the basic Course and the Advanced Course.

A Minor in Military Science is available for qualified students.

The Basic Course

The focus for these lower division courses (MS 100/200 courses) is to lay a foundation for more advanced instruction in the skills needed to be a successful leader. Students may participate even if they do not plan on receiving a commission in order to gain experience in leadership and management.

This phase is open to all qualified students (generally freshmen and sophomores). Students should be aware that there are some physical requirements for successful course completion.

There is no military obligation for participation unless a student is receiving an Army ROTC scholarship.

Sophomores wanting to complete the Basic Course requirements so that they may enter the Advanced Course can compress the Basic Course and/or attend Basic Camp. For further information please contact this department.

The Advanced Course

The Advanced Course (MS 300/400 level courses) is oriented to preparing students who have successfully completed the Basic Course requirements (juniors and seniors) with the skills and knowledge necessary to be commissioned as a Second Lieutenant in the Army.

The focus continues on building on leadership skills and abilities.

Students participating in this phase have a contractual obligation to complete the program and enter the Army upon graduation.

Students must have a minimum of four semesters remaining in their course work before graduation in order to participate and they must be in a full-time status (12 credit hours per semester) during that time.

Basic Course Credit

Credit for the Basic Course for entry into the Advanced Course may be achieved in a number of ways. The normal progression is to successfully complete all four Military Science classes (MS 101, 102, 201 and 202) with a grade of "C" or better. Students can also enter the course laterally by receiving credit for one of the following:

Prior enlisted service in the Army, Air Force, Navy or Marines

Participation of a minimum of three years in JROTC program

At least one year as a service academy cadet

Successful completion of the Army ROTC Basic Camp (Camp Challenge). This training is available to students who did not have the opportunity to participate in any of the above programs. The five-week camp is conducted every summer at Fort Knox, KY. Participants receive pay while attending. The Army pays travel and some other expenses. Students who participate are not obligated to enter the ROTC program. For more information contact this department.

Course Offerings

MS 101
Fundamental Concepts of Leadership 1

MS 102 Basic Leadership 1

MS 201 Advanced Leadership 2

MS 202 Tactics and Officership 2

MS 301 Fundamentals of Military Leadership And Training I 3

MS 302 Fundamentals of Military Leadership And Training II 3

MS 303 Advanced Camp 3

MS 401 Leadership, Management and Ethics 3

MS 402 Transition to Lieutenant 3

MS 498 Special Studies in Leadership 3

The Military Science Minor

A minor in Military Science is available for students participating in the Army ROTC Program. Participants must achieve a minimum of 18 credit hours by graduation, which includes credit for all Advanced Course classes (to include graduation from Advanced Camp) and all of the Professional Military Education (PME) requirements. Recipients must also receive their commission. More information about the minor is available through the Department of Military Science.

Professional Military Education (PME) Requirements

To receive a commission as a Second Lieutenant in the U.S. Army and graduate with a minor in Military Science, students must also complete courses in the following areas to receive credit for their Professional Military Education (PME) requirements. Two of these course areas are also institutional requirements. Further information on this requirement will be provided to students during contracting.

Computer Literacy

Written and Oral Communications

Military History (History 479, The American Military Experience)

Scholarship Information

The Army ROTC Scholarship program provides financial assistance for the education and training of highly motivated men and women who desire to pursue

careers as commissioned officers in the U.S. Army after graduation with a bachelor's degree. Four-, three- and two-year scholarships are available to qualified candidates. The scholarships pay for school tuition, books, certain fees, and provides the student with a monthly, tax-free stipend of not less $250 per month for up to 10 months per year. For more information pertaining to scholarships and enrollment eligibility please contact the Department of Military Science.

PHILOSOPHY

Professors: Bender (Co-Chair), Olkowski (Co-Chair), and Sassower; Professor Emeritus: Francis; Associate Professors: Cutter and Welshon; Senior Instructor: Arangno; Instructors: Clanton, West and Yarnell.

Philosophy teaches analytical and critical thinking, develops oral and written communication skills, and contributes to interdisciplinary understanding. Philosophy as a discipline attempts to answer perennial questions about values, human existence, and the nature of reality. Skills developed in this inquiry help philosophy students to excel in careers in law, medicine, management, education, government, writing, computer science, psychology, sociology, and ministry among many others. Philosophy majors consistently score in the top percentiles for all majors on the GRE, LSAT, GMAT, MCAT and other graduate and professional admissions tests.

B.A. in Philosophy

General Requirements

The Bachelor of Arts degree in Philosophy requires 30 semester hours with grades of C or above; a maximum of 54 hours can be applied to the degree. At least 21 out of the 30 hours must be upper division courses. The Philosophy Minor requires 18 hours of course work. The Philosophy Major may choose either the general requirements or the student may specialize in one of four optional programs.

Required Courses for the Philosophy Major

1. One course in Logic selected from:

PHIL 112 Critical Thinking

PHIL 344 Symbolic Logic

PHIL 443 Logical Theory

2. One course in Social and Political Philosophy/Ethics selected from:

PHIL 316 Death and Dying

PHIL 320 Politics and the Law

PHIL 340 Holocaust

PHIL 360 Philosophy of Religion

PHIL 373 Philosophy and Literature

PHIL 414 Environmental Philosophy

PHIL 415 Ethical Theory

PHIL 416 Business and Management Ethics

PHIL 417 Health Care Ethics

PHIL 425 Selected Topics in Social Theory

PHIL 426 Philosophy of Law

PHIL 455 Feminism, Sexuality, and Culture

3. One course in Metaphysics, Ontology, Epistemology, or Philosophy of Science:

PHIL 317 Theories of Knowledge

PHIL 330 Philosophy of Mind

PHIL 335 Metaphysics

PHIL 339 Philosophy of Psychology

PHIL 370 Aesthetics

PHIL 404 Twentieth Century Philosophy

PHIL 407 Existentialism

PHIL 408 Contemporary Continental Philosophy

PHIL 410 American Pragmatism

PHIL 435 Analytic Philosophy

PHIL 440 Philosophy of Science

PHIL 446 Theories of Human Nature

4. Two courses in the History of Philosophy:

PHIL 348 Philosophies of India

PHIL 349 Philosophies of China

PHIL 351 Ancient Philosophy

PHIL 353 Hellenistic Philosophy

PHIL 354 Medieval and Renaissance Philosophy

PHIL 356 Modern Classical

PHIL 357 Enlightenment and 19th Century

PHIL 358 From Hegel to Nietzsche

5. Senior Seminar and Thesis

PHIL 495 Senior Seminar and Thesis

Philosophy Major Options

The department offers options in areas of philosophy that focus on particular fields of study. Students completing the requirements in any of the options will receive a certificate from the department indicating that they have a major in philosophy with competence in a particular area. To quality for an option, the student must fulfill the requirements for the major including at least 30 hours of course work, 15 hours of which must be in the option area.

Options

1. Philosophy and Religion

PHIL 105 Philosophy and Religion

PHIL 110 Introduction to Religious Studies

PHIL 255 Women and Religion

PHIL 310 Comparative Religions

PHIL 316 Philosophical Issues in Death and Dying

PHIL 340 Holocaust

PHIL 348 Philosophies of India

PHIL 349 Philosophies of China

PHIL 350 Buddhist Philosophy

PHIL 354 Medieval and Renaissance Philosophy

PHIL 360 Philosophy of Religion

PHIL 361 Philosophical Approaches to the Hebrew Bible

PHIL 362 Philosophical Approaches to the New Testament

PHIL 495 Senior Seminar and Thesis

2. Philosophy, Law and Social Justice:

PHIL 102 Ethics

PHIL 104 Philosophy and Society

PHIL 131 Women and Science

PHIL 220 Women's Equality, Women's Difference

PHIL 320 Politics and the Law

PHIL 322 Philosophy of Law

PHIL 340 Holocaust

PHIL 414 Environmental Philosophy

PHIL 415 Ethical Theory

PHIL 417 Health Care Ethics

PHIL 425 Topics in Social Theory

PHIL 455 Feminism, Sexuality and Culture

PHIL 493 Advanced Topics in Philosophy

PHIL 495 Senior Seminar and Thesis

3. Analytic Philosophy:

PHIL 317 Theories of Knowledge

PHIL 330 Philosophy of Mind

PHIL 344 Symbolic Logic

PHIL 420 Consciousness

PHIL 435 Analytic Philosophy

PHIL 440 Philosophy of Science

PHIL 443 Logical Theory

PHIL 449 Philosophy of Language

PHIL 495 Senior Seminar and Thesis

4. Continental Philosophy:

PHIL 340 Holocaust

PHIL 357 Enlightenment and 19th Century'

PHIL 358 From Hegel to Nietzsche

PHIL 370 Aesthetics

PHIL 404 Twentieth Century Philosophy

PHIL 407 Existentialism

PHIL 408 Contemporary Continental Philosophy

PHIL 440 Philosophy of Science

PHIL 455 Feminism, Sexuality, and Culture
PHIL 460 Theory of Film
PHIL 495 Senior Seminar and Thesis

Philosophy Minors

The department offers minors in areas of philosophy that complement various major fields. Minors require 18 hours of course work.

Philosophy Double Majors

Adding a philosophy major to one's major in another discipline, thereby creating a double major is an option for students who wish to obtain a broader perspective in their discipline for post-graduate work. All requirements for the Philosophy major apply to double majors. Students may have two different majors in two different colleges or in the same college.

Physics and Energy Science

Professors: Blade, Burkhart (Chair) and Camley; Associate Professors: Celinski, Christensen and Grabowski; Assistant Professor Adjoint: Klebe; Senior Instructor: Milazzo; Instructors: Hallam and Prigmore.

Bachelor of Science — Physics

The Bachelor of Science program in Physics is designed to help students attain their professional goals in physics. Four options within the Bachelor of Science program enable students to achieve their particular educational objectives. The options are: Traditional Physics, Solid State Physics, Energy Science, and Engineering Physics. A degree option is available for secondary education teachers. Please contact the Student Success Center or the College of education for further information.

Degree Options

Courses in each option are chosen to teach the fundamental concepts on which the field is based. Laboratories are designed to give students practical hands-on experience. Advanced laboratories provide opportunities to study and use state-of-the-art technology in the student's area of interest.

In the case of the Energy Science option, an Educational and Research Facility for Energy Science (ERFES) has been built at CU-Colorado Springs by the Physics and Energy Science Department and is used to teach solar energy courses. The Solid State Laboratory required in the Solid State option is designed to teach the fundamentals of materials technology. Students in each of the three options are required to take the core course requirements as well as the option requirements listed below.

Required Courses for All Four Options

Physics and Energy Science (PES)

PES 111 General Physics I 4
PES 112 General Physics II 4
PES 213 General Physics III. 3
PES 115 Physics Laboratory I 1
PES 215 Physics Laboratory II. 1
PES 313 Modern Physics 3
PES 315 Modern Physics Laboratory 2
PES 317 Instrumentation Laboratory I . . . 2
PES 318 Instrumentation Laboratory II. . . 2
PES 321 Classical Mechanics 3
PES 331 Electricity and Magnetism I 3
PES 341 Thermodynamics and Statistical Mechanics 3
PES 481 Senior Physics Seminar 2
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Other Core Areas

MATH 135, 136 Calculus I, II 8
MATH 235 Calculus III. 4
MATH 340. Differential Equations 3
C S 105, 106, 107 or 115 Programming Language 3
CHEM 103, 106 General Chemistry I, II 10
ENGL 131, 141 Composition I, II. 6
ENGL 307 Business and Administrative Writing 3
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In addition, students must meet the 12 hour area requirements from both Humanities and Social Science. Furthermore, the department requires a grade of C or better in every Physics course that is applied toward the graduation requirements. Students may take a maximum of 54 credits in PES which will apply toward the degree.

In addition to the above core requirements, students will complete one of four options: Traditional Physics, Solid State Physics, Energy Science or Engineering Physics.

Traditional Physics Option

This program is designed for students intending graduate studies in physics or planning to obtain an industrial position with a traditional Physics degree. This option requires a minimum of 18 credit hours of courses in addition to the core.

Required Courses

PES 325 Mathematical Methods of Physics 3
PES 332 Electricity and Magnetism II 3
PES 425 Quantum Mechanics 3
PES 451 Optics 3

Also, the Traditional Physics Option requires a minimum of three upper-division hours of mathematics in addition to MATH 340. A minimum of three credit hours from the following PES courses must be taken:

Elective Courses

PES 306 Astrophysics. 3
PES 365 Nuclear Physics and Energy Technology . . 3
PES 370 Acoustics 2
PES 395, 396, 397 Special Topics (variable credit, maximum of 6 hours allowed)
PES 415 Solid State Laboratory 2
PES 426 Quantum Mechanics II 3
PES 430 Celestial Mechanics 3
PES 446 Solid State Physics. 3
PES 449 Physics of Thin Films 3/4
PES 472 Stellar Structure and Evolution . . 3
PES 485 Senior Project (variable credit, maximum of 6 hours allowed)

Other elective courses may be substituted with the written approval of the department chair.

Solid State Physics Option

This option is designed for students presently employed by or intending employment in the semiconductor industry. It will provide theoretical foundations and practical experience in solid state physics.

This option requires a minimum of 20 credit hours of courses in addition to the core.

Required Courses

PES 325 Mathematical Methods of Physics 3
PES 332 Electricity and Magnetism II 3
PES 415 Solid State Laboratory 2
PES 425 Quantum Mechanics 3
PES 446 Solid State Physics. 3

This option also requires the completion of a minimum of six hours from the following technical electives:

Elective Courses

PES 426 Quantum Mechanics II 3
PES 448 Surface and Interface Physics . . . 3
PES 449 Physics of Thin Films 3/4
CHEM 301 Materials Science 3

CHEM 451 Physical Chemistry I 4
CHEM 452 Physical Chemistry II. 4
ECE 2410 Logic Circuits 3
ECE 2420 Logic Circuits Laboratory 2
ECE 4020 Introduction to Semiconductor Devices 3
MATH 381 Probability Theory 3
MATH 445 Complex Variables 3
MATH 447 Partial Differential Equations . . 3
C S 316 Programming Languages. 3
C S 460 Numerical Computing 3
C S 472 Design and Analysis of Algorithms 3

Other elective courses may be substituted with the written approval of the department chair.

Energy Science Option

This option will prepare graduates for energy-related careers in industry and government and will provide the student with a strong background in the technical, economic, and instrumentation aspects of all energy resources.

This option requires a minimum of 19 hours of courses in addition to the core.

Required Courses

PES 250. Energy Fundamentals 3
ECON 101. Microeconomics 3
GEOL 101. Physical Geology (with lab). . . 4

Students in this option are required to complete 9 hours from the following technical electives.

PES 332 Electricity and Magnetism 3
PES 361 Solar Engineering Design 3
PES 365 Nuclear Physics and Energy Technology . . 3
PES 367 Wind Energy 3
PES 460 Advanced Solar Energy 3
GEOL 312 Structural Geology I. 5
GES 320 Practical Meteorology 4
GES 406 Introduction to Remote Sensing . 4
GES 409 Advance Remote Sensing 4

Other elective courses may be substituted with the written approval of the department chair.

Engineering Physics Option

This option allows students to combine a strong physics preparation with greater coursework in Engineering disciplines. The option is fully compatible with the College of Engineering's Common Freshman Year.

This option requires the following engineering core courses:

C S 115 Principles of Computer Science . . 3
C S 145 Data Structure and Algorithms. . . 3
ECE 1010 Problem Solving in ECE I 3
ECE 1011 Problem Solving in ECE II. 3
ECE 1012 Intro to Engineering Design . . . 3

The computer science courses also satisfy the core computer science requirement.

ENGL 308 Technical Writing (2 credits) may be substituted for ENGL 307.

This option requires the following 9 hours of PES courses in addition to the core.

Required Courses

PES 325 Mathematical Methods of Physics 3
PES 332 Electricity and Magnetism II 3
PES 425 Quantum Mechanics I 3
Total hours in this group: 9

ECE 3110/3120 may be substituted for PES 331 / 332.

This option also requires the completion of a minimum of 3 hours from the following Physics electives:

Elective Courses

PES 415 Solid State Physics Lab 2
PES 446 Solid State Physics. 3
PES 448 Surface and Interface Physics . . . 3
PES 449 Physics of Thin Films. 3
PES 451 Optics 3

This option also requires the completion of a minimum of 3 hours of technical electives from courses offered by the College of Engineering departments, PES, Biology, or Chemistry.

Minor in Physics or Energy Science

Students may earn a minor in physics by taking PES 111, 112, 213, 313 and any other six hours of upper-division physics courses. This is a total of 20 hours. A grade of C or better is required in these courses. A minor in Energy Science is available and is discussed in detail in the Energy Science section of this Bulletin.

Graduate Programs In Physics

There are several options for graduate studies in Physics. Students may obtain a Master of Basic Science (M.B.S.) All of the courses are taken at CU-Colorado Springs, and thesis work may be done with a professor or in conjunction with an adjoint professor who is employed in a local solid state, optics, or space industry. More details on this program follow below.

A Doctor of Philosophy (Ph.D.) in Physics can be obtained from the University of Colorado at Boulder with much of the coursework and the thesis done at CU-Colorado Springs. Each student is evaluated on the basis of his or her experience and academic grades but, in general, will be expected to complete a year of residency at Boulder as well as passing all qualifying, comprehensive, and preliminary exams at Boulder. Application to this program is made to the Boulder Physics Department with the assistance of the CU-Colorado Springs Physics Department.

Admission Requirements

Admission requirements into the M.B.S. program are consistent with those specified by the Graduate School. These admission requirements are: applicants for graduate work in physics will be required to submit two complete official transcripts of all previous graduate and undergraduate work and three letters of recommendation. Application is made directly to the Physics Department at CU-Colorado Springs. Application deadline is May 1st for the fall semester and October 1st for the spring semester.

An applicant for the master's degree should hold a B.S. or B.A. from a college or university of recognized standing or have done work equivalent to that required for such a degree and equivalent to the degree given at this university. He or she should have considerable coursework in physics, sufficient mathematical background, and show promise of ability to pursue advanced study and research. Applicants with a B.A. or B.S. in Physics or in a related area, such as Chemistry, Computer Science, Electrical Engineering or Mathematics, are natural candidates for graduate study in Physics.

A student is considered to have sufficient mathematical background if he or she has taken at least two semesters of Mathematics beyond the normal calculus sequence, such as differential equations and mathematical methods of Physics.

To be admitted into the program on the basis of grade point only, the student should have an undergraduate grade point average of at least 3.0 on a 4.0 scale.

Students with an undergraduate grade point average of under 3.0 but at or above 2.5, or students with an inadequate background, may be allowed into the program provisionally. This decision would be made by the Physics Graduate Student Committee. Provisional status would subsequently be removed and a student given regular standing after completion of nine hours of M.B.S. courses with a 3.0 average (or better).

Regular degree students must maintain at least a 3.0 grade point average each semester or summer term on all work taken, whether or not it is to be applied toward the advanced degree intended. Students who fail to maintain this standard of performance will be subject to suspension from the Graduate School.

Requirements for Transfer Students

Students who are transferring from other Physics graduate programs must meet the minimum standards outlined above and, in addition, have a 3.0 average (or better) in all graduate work done previously. Full credit, up to nine hours (normally one semester of full-time coursework), will be given for coursework done previously, assuming the prior work is done at accredited institutions with approved programs. Course equivalency will be decided by the CU-Colorado Springs Physics Graduate Student Committee after interviewing the student and comparing textbooks, class notes, or any other helpful documentation.

Degree Requirements

A student has the option of taking 24 credit hours of coursework plus six hours of thesis work. This is the Thesis Option. A student can also graduate by taking 30 credit hours of coursework without a thesis. This is the Non-thesis Option.

Master of Basic Science Curriculum

Approved graduate courses include:

PHYS 631 Electromagnetic Theory I 3
PHYS 632 Electromagnetic Theory II 3
PHYS 621 Theoretical Mechanics 3
PHYS 625 Quantum Mechanics I 3
PHYS 541 Statistical Mechanics 3
PHYS 503
Mathematical Methods of Physics 3
PHYS 626 Quantum Mechanics II 3
PHYS 546 Intro to Solid State Physics 3
PHYS 690 Solid State Physics I 3
PHYS 691 Solid State Physics II 3
PHYS 515 Solid State Lab 2
PHYS 549 Physics of Thin Films 4
PHYS 520 Computational Physics 3
PES 451 Optics 3
PHYS 695 Topics in Advanced Physics . . . 3
ASE 510 Astrodynamics I 3
ASE 511 Perturbation Theory in Astrodynamics 3
ASE 560 Space Environment 3
C S 560 Numerical Computing 3
ECE 5020
Principles of Semiconductor Devices 3
ECE 5030
Advanced Semiconductor Device Modeling 3
ECE 5050 Microelectronics IC Fabrication Laboratory 3
ECE 5070
Electronic Properties of Materials 3
MATH 545/562 Functions of a Complex Variable I, II 3

Other elective courses may be substituted with the written approval of the graduate program advisor.

Degree Options

Thesis and Non-Thesis

For the Thesis Option, the student must take 24 credit hours. Thesis work is an additional six hours (three credits per semester) for a total of 30 credit hours.

The Non-thesis Option requires 30 credit hours from the approved courses.

In order to design a more specialized degree, students may concentrate their elective courses in areas outside of Physics. Concentration areas could include space studies, electrical engineering, mechanical engineering, geography, computer science, applied mathematics or other graduate disciplines. These concentration areas might be appropriate for students who have very well-defined career objectives which require a combination of physics with another discipline. Students should consult with the Physics graduate program advisor to establish a course sequence for the M.B.S. degree.

Master's Comprehensive Exam

There is an exit oral exam called the Master's Comprehensive Exam which must be passed by all students. Students electing the Thesis Option may substitute an oral defense of their thesis. The committees for such exit exams will consist of three members of the Graduate Faculty, one of whom is to be the student's adviser. The other two members will typically be from the Physics Department, but one may be selected from a related discipline such as electrical engineering, mathematics, computer science or chemistry.

Political Science

Professors: R. Lorch and Null; Professor Emeritus: Busey; Associate Professors: Moon and Sondrol (Chair); Assistant Professors: Keilbach and Ponder.

Bachelor of Arts — Political Science

Students majoring in Political Science must complete a minimum of 36 semester hours in the discipline, of which 30 hours must be with a grade of C or better. At least 21 hours must be in upper-division courses. The program offers four major tracks, one general and three representing important subfields of political science: American Politics/Public Law, Global Politics, and Public Administration. All four tracks are designed to prepare students for professional careers in the public or private sector, or graduate or professional study. Federal, state and local governments are important employers of political science graduates. In the private sector, including non-profits, the increasing interaction with government creates a growing demand for graduates with an understanding of political systems, domestically and internationally. Political Science, Law, and Public Administration are common graduate fields of study for our graduates.

Degree Tracks

General

Students majoring in the General track are required to take P SC 101 and 110, or equivalent lower-division courses with the approval of the department chair; P SC 250; either P SC 442 or 445; and P SC 450 or an approved equivalent. Students should plan to complete P SC 101, 110 and 250 prior to taking upper-division courses. All students are required to complete a senior thesis prior to graduation, usually as part of P SC 450 near the end of the course of study. In addition, students should plan to take at least one upper-division course from each subfield (American Political Institutions and Behavior, Global

Politics, and Public Administration, Policy and Law).

American Politics/Public Law

Students majoring in the American Politics/Public Law track are required to take P SC 101, 110, and 210 or equivalent lower-division courses with the approval of the department chair; P SC 250; P SC 440; either P SC 442 or 445; P SC 447; and P SC 450 or an approved equivalent. Students should plan to complete P SC 101, 110, 210 and 250 prior to taking upper-division courses. All students are required to complete a senior thesis prior to graduation, usually as part of P SC 450 near the end of the course of study. In addition, students in this track must complete three additional courses from among those listed under American Political Institutions and Behavior or Public Administration, Policy and Law.

Global Politics

Students majoring in the Global Politics track are required to take P SC 101 and 110, or equivalent lower-division courses with the approval of the department chair; P SC 250; P SC 421; P SC 422; P SC 442; and P SC 450 or an approved equivalent. Students should plan to complete P SC 101, 110, and 250 prior to taking upper-division courses. All students are required to complete a senior thesis prior to graduation, usually as part of P SC 450 near the end of the course of study. In addition, students in this track must complete three additional courses from those listed under Global Politics.

Public Administration

Students majoring in the Public Administration track are required to take P SC 110 and 210, or equivalent lower-division courses with the approval of the department chair; P SC 250; P SC 432; P SC 440; P SC 445; P SC 446; and P SC 450 or an approved equivalent. Students should plan to complete P SC 110, 210, and 250 prior to taking upper-division courses. All students are required to complete a senior thesis prior to graduation, usually as part of P SC 450 near the end of the course of study. In addition, students in this track must complete three additional courses from among those listed under Public Administration, Policy and Law.

Minor In Political Science

Students majoring in other Letters, Arts, and Sciences disciplines may elect a minor in Political Science, Global Politics, American Politics and Public Law, or Public Administration. A minor requires a minimum of 18 hours of coursework in political science, to include P SC 101 and P SC 110, except for the minor in Public Administration, which requires P SC 110 and P SC 210. For the general Political Science minor, students must complete at least nine hours of upper-division coursework of their choice. For the Global Politics minor, at least nine hours must be selected from the Global Politics section. For the American Politics and Public Law minor, nine hours of upper-division must come from either American Political Institutions and Behavior or Public Policy, Administration and Law. The Public Administration minor must include nine hours of upper-division coursework from Public Policy, Administration and Law.

Prelaw

Students planning to attend law school should consult with Professor Robert Lorch, prelaw advisor.

Honors Program

Departmental honors are available to graduating majors in political science. In order to be eligible for departmental honors, students must: a) have a 3.0 general grade point average and a 3.5 average in political science; and b) write a senior thesis judged as "meritorious" by the department. Students recommended for departmental honors may be entitled to graduate with distinction, high distinction, or highest distinction.

Internships

The department encourages all students to consider enrolling for an internship during their tenure at the University. Internships give students "hands on" experience in the public sector, giving students a greater appreciation for the complexity of politics and policymaking and of the legal system. The department places students in three kinds of internships: prelaw (P SC 948), legislative, with U.S. or Colorado legislators (P SC 348), and public agency internships in governmental or non-profit agencies (P SC 398). Students may earn up to six credits in P SC 348 or 398, and should see Professor Ponder for more information. The prelaw internship

(P SC 948) may earn up to three hours of credit. Interested students should see Professor Lorch.

Course Offerings

Courses at the 100 level are designed for beginning students and 200 level courses are taught at the sophomore level. Remaining courses are structured in a more advanced manner. Students without previous courses in political science should consult appropriate instructors before attempting to take courses numbered 300 and above.

American Political Institutions and Behavior

P SC 103-3 Colorado Politics

P SC 110-3 American Political Systems

P SC 111-1 to 3. Current Topics

P SC 301-3 Women in Politics

P SC 303-3 Political Parties

P SC 305-3
Race and Ethnicity in American Politics

P SC 348-3 to 6. Legislative Internship

P SC 402-3 The American Congress

P SC 404-3 Political Interest Groups

P SC 405-3
Public Opinion and Political Behavior

P SC 408-3 U.S. Electoral Process

P SC 439-3 The Presidency

P SC 440-3
Government and Society

Global Politics

P SC 101-3 Introduction to Global Politics

P SC 311-3 Emerging Nations

P SC 321-3
Western European Political Systems

P SC 322-3
Eastern European Political Systems

P SC 413-3
Latin American Policies and Development

P SC 421-3 International Politics

P SC 422-3 Comparative Politics

P SC 423-3
The United States in World Politics

P SC 424-3 Russian Foreign Policy

P SC 425-3 International Law

P SC 426-3 International Organizations

P SC 427-3 Latin America in World Politics

P SC 434-3 National Security Organization and Policymaking

Public Policy, Administration and Law

P SC 210-3 Politics and Policy
in State and Local Communities

P SC 330-3 The Bureaucrats

P SC 398-3 or 6
Public Administration Internship

P SC 406-3 State Political Systems

P SC 407-3 Urban Politics

P SC 432-3 Public Administration

P SC 435-3
Environmental Policies and Administration

P SC 446-3 Administrative Law

P SC 447-3
Introduction to Constitutional Law

P SC 448-3
Constitution and Individual Rights

P SC 449-3 The Judicial System

P SC 451-3 Defendant's Constitutional Rights

P SC 948-3 or 6 Prelaw Internship

Political Theory and Methods

P SC 250-3 Introduction to Political Inquiries

P SC 442-3 Political Ideas

P SC 445-3 American Political Thought

P SC 450-3 Senior Research

Other Courses

P SC 498-1 to 3
Special Problems in Political Science

P SC 940-1 to 3 Independent Study

PSYCHOLOGY

Professors: Becker, Coolidge, Davis, Greene, Pyszczynski, Qualls and Wurtele; Associate Professors: Benight, Durham (Chair), and Klebe; Assistant Professors: James, Segal, Widner, and Wood.

Bachelor of Arts — Psychology

The major program consists of at least 36 hours and not more than 54 hours of psychology courses, of which at least 18 must be in upper-division courses (300/400 level). Students should begin their studies with the three required courses: PSY 100 (General Psychology), PSY 210 (Introduction to Psychological Statistics), and PSY 211 (Introduction to Psychological Research and Measurement). Beyond the introduction and methodology courses, students are required to take four of the seven core content courses. The core content courses are PSY 328 (Abnormal), PSY 324 (Personality), PSY 362 (Developmental), PSY 340 (Social), PSY 314 or 320 (Cognition and Learning), and PSY 327 (Biopsychology). Students are also required to take one Advanced Seminar. Psychology majors must earn a grade of at least C- in the three required courses, the four core content courses, and the one Advanced Seminar. Other psychology courses taken by the students should be planned with the student's advisor.

Minor in Psychology

The minor in Psychology consists of at least 20 hours of psychology courses, of which nine must be upper-division courses (300/400 level). Students should begin their studies with two required courses, PSY 100 (General Psychology), and PSY 210 (Introduction to Psychological Statistics). Minor students may substitute an equivalent statistics course taken from another major area for PSY 210. Students are also required to take two of the seven core content courses (Abnormal, Personality, Developmental, Social, Cognitive, Learning, and Biopsychology). Psychology minors must earn a grade of at least C- in the two required and core content courses. In addition to these guidelines, students should follow the general guidelines for minors in the College of Letters, Arts and Sciences.

Honors Program

In addition to the normal undergraduate curriculum in psychology, the department offers interested and qualified undergraduates an opportunity to further increase the breadth and depth of their psychological training through the Departmental Honors Program. Prior to or during the first semester of the junior year, interested students should contact any psychology faculty member regarding the prospect of departmental honors work.

Master of Arts — Psychology

The Department of Psychology offers coursework and thesis supervision for a Master of Arts degree. The program offers two tracks: clinical, and general experimental Psychology with various subspecialties such as neuropsychology, social psychology, program evaluation, psychology and the law, psychometric theory, memory and aging, and cognitive and personality development. Both tracks are designed to prepare students for doctoral programs. A majority of students are subsequently accepted into doctoral programs. The program is designed to be completed in two academic years and includes a thesis requirement. Formal application should be postmarked no later than February 1. Applicants should have the following credentials:

1. A B.S. or B.A. degree or its equivalent from an accredited college or university.

2. An overall average of B or above in all undergraduate courses.

3. Graduate Record Exam scores of at least 1100 cumulative on the verbal and quantitative sections. The advanced psychology test is strongly recommended.

4. An adequate undergraduate program in psychology including college-level mathematics, statistics, experimental psychology, and some background in the biological, physical, and social sciences.

5. Applicants to the clinical track should also have coursework and community experience in applied psychology.

Promising students who do not meet all the requirements may be considered as applicants. Admission to the program is competitive.

For outstanding candidates, graduate stipends, teaching assistantships and research assistantships are available.

For information and/or application for the master's program, write:

Department of Psychology
University of Colorado
P. O. Box 7150
Colorado Springs, Colorado 80933-7150.

RELIGIOUS STUDIES

The Religious Studies Program is coordinated by the Philosophy Department, and it offers a minor in Religious Studies with cross-listed courses across the College. Courses in this program contribute to the enrichment of the University's liberal arts offerings. Religious studies is concerned with the history and phenomenology of religions and religious experience, and it can be a useful course of study for those interested in history, philosophy, and international affairs. This can also be a good basis from which to pursue vocations in various aspects of ministry. The program proceeds from a historical and comparative perspective and is amenable to persons of all faiths.

Religious Studies does not offer an undergraduate major, but students can complete a major in Philosophy with an emphasis on Religious Studies. Out of 36 hours for the major, 18 are in philosophy and 18 are in religious studies. The 18 hours in philosophy are identical to those required of Philosophy majors; the 18 hours in religious studies are the same as those listed for the minor in Religious Studies. In addition, students can add to whatever major (including philosophy) they currently pursue, a minor in Religious Studies (completion of 18 hours).

SOCIOLOGY

Professors: Coakley, Dukes and Hughes (Chair); Professor Emerita: B. Lorch; Associate Professors: Dickson Espinosa, Ferber and Warner; Instructors: Walker.

Bachelor of Arts — Sociology

Majors in Sociology must complete a minimum of 36 hours in Sociology, at least 18 hours of which must be upper-division courses (300 or 400 level). Courses at the 500 level may be taken by qualified undergraduates with the consent of the instructor.

Sociology majors must complete the four basic courses and three substantive upper division classes from the lists below.

Basic Courses
(required of all majors)

111-4 Introduction to Sociology

212-4 Social Research Methods

315 Modern Sociological Theory

317-4 Social Statistics

Substantive requirements
(three courses required of all majors)

322 Urban Sociology

329 Perspectives on Race and Ethnicity

330 Sociology of Sport

331 Sociology of the Family

360 Social Psychology

361 Gender & Social Behavior

341 Sociology of Law

404 Gender and Sexuality

420 Sociology of Poverty

434 Political Sociology

450 Applied Sociology

462 Sociology of Aging

Senior Exam

Each student must complete a standardized, national test in sociology during the last semester of course work. Dates and times for the test will be announced.

Minor in Sociology

Students seeking a minor must complete a minimum of 22 hours in sociology, at least 12 hours of which must be upper-division courses (300 or 400 level). Specific courses which must be completed for the minor include the following: SOC 111 (Introduction to Sociology), SOC 212 (Introduction to Social Research), and either SOC 315 (Modern Social Theory) or SOC 317 (Social Statistics). The remaining 12 hours are to be chosen by the student in accordance with his/her academic interests and goals.

If there are questions about the connection between academic interests and course selection, students should consult faculty in the department.

Master of Arts — Sociology

The Department of Sociology offers a Master of Arts degree in Sociology. All coursework for the M.A. degree can be taken on the Colorado Springs campus, although students may take appropriate and approved courses at the Denver or Boulder campuses. Admission to the M.A. program in Colorado Springs does not constitute admission to the graduate programs at Denver or Boulder.

Course Requirements for the Degree

Core Courses -12 Semester Hours

SOC 505-1 Proseminar in Sociology

SOC 507-4 Seminar in Research Methods

SOC 516-3 Seminar in Social Theory

SOC 517-4 Advanced Statistics and Methods
or

SOC 518-3 Social Analysis of Communities

Options

Plan I - Requirements

A total of 24 hours of approved course work, including the required courses, plus an acceptable thesis for 6 hours of credit.

Plan II - Requirements

A total of 30 hours of approved course work, including the required courses. Students receiving the degree under Plan II are encouraged to complete at least 12 hours in an area of concentration which might lead to a certificate of specialization. Examples of such programs include the Graduate School of Public Affairs Certificate in the Administration of Non-profit Agencies, the College of Education's Certificate in Special Education, or the Department of Sociology's Certificate in Applied Sociology.

Guaranteed Admission Policy

Students who complete a major in Sociology at CU-Colorado Springs and achieve a minimum overall grade point average of 3.0 and a 3.25 in sociology will be guaranteed admission to the Department's M.A. program. For students meeting these requirements the Graduate Record Exam (G.R.E.) will be waived. Students who do not meet these requirements will be guaranteed provisional admission to the M.A. program if:

a) they have at least a 2.75 G.P.A. and

b) an acceptable score on the G.R.E.

Five-Year Program

The traditional M.A. program in Sociology is designed to allow completion in one year (fall, spring and summer semesters) of full-time study by those who have a strong background in Sociology. The possibility of completing the M.A. degree with only a 5th year of study is enhanced for students who complete appropriate graduate level courses while an undergraduate, if these courses are not counted toward the total number of hours required for completing the B.A. degree. Students may apply for up to eight hours of such course work to be counted toward fulfilling the M.A. requirements, in much the same manner as graduate credits earned in graduate programs in other departments may be transferred toward the M.A. degree in Sociology.

Financial Assistance

The Department may award up to four graduate assistantships of $400 each semester, and one assistantship of up to $800 each semester. These assistantships are awarded based on the assessment of both need and merit, and are compensation for assistance which may be provided in the departmental programs of instruction.

Additional Requirements

In addition to obtaining a B or better in each of the courses used to fulfill the degree requirements, the student must pass three stages to complete the M.A. in Sociology.

1. Qualifying review and examination. At the completion of the first six hours of graduate course work, the faculty in Sociology will review the qualifications of each student to proceed in the program. If progress is satisfactory, and if any deficiencies have been removed, and if general ability has been demonstrated that is adequate to complete the program, the student will be notified he/she has passed the qualifying portion of the degree. At this time a student will select a faculty advisor who will work with the

student to create a plan of study which will move him/her toward candidacy for the degree.

2. Preliminary review and examination. When the student has 9 hours remaining (including the thesis) to complete the degree, a preliminary assessment of the overall degree plan and performance will be completed. At this time the faculty member who will serve as Chair of the student's thesis (Plan I) or examining committee (Plan II) must be selected and approve an initial application for candidacy. This review may include approval of a thesis topic and prospectus for Plan I students, or the approval of the overall degree plan and selection of courses for those selecting Plan II.

3. Comprehensive Examination. The final examination for the M.A. degree will be a discussion and defense of the thesis for those under Plan I, or it will be a comprehensive review and evaluation of the program conducted by the student's graduate committee for Plan II. These examinations must be completed at least three weeks prior to the end of the semester of graduation.

Each graduate student also is responsible for maintaining a portfolio of projects, papers, honors and awards, and other evidence of accomplishments, activities and learning experienced in relation to the completion of the graduate program. The materials in the portfolio should be available for review by the faculty at both the preliminary and comprehensive examinations. The department must receive a copy of a completed portfolio for review and evaluation at least one week prior to the comprehensive examination.

For a complete description of the program on this campus, direct inquiries to Associate Professor Abby Ferber, Department of Sociology, University of Colorado at Colorado Springs, P.O. Box 7150, Colorado Springs, Colorado 80933-7150. Applications for admission, references, etc., should be mailed to the same address.

Admission Requirements

General requirements for regular admission are:

1. hold a baccalaureate degree from an accredited college or university or have completed work equivalent for such a degree and equivalent to the degree given at this University;

2. have an undergraduate grade point average of at least 2.75;

3. have adequate preparation to begin graduate study in Sociology;

4. show promise for advanced study and research, as judged by the applicant's previous scholastic record;

5. three letters of recommendation;

6. have completed the Graduate Record Exam; and

7. be recommended for admission to a regular degree status by the Graduate Faculty of the Department of Sociology.

Promising students who do not meet these requirements may be admitted on a provisional basis, and they will be required to take appropriate steps to remove deficiencies and demonstrate their qualifications to proceed in the program. Information and applications for admissions may be obtained from:

Graduate Coordinator
(Attn: Shari Patterson)
Department of Sociology
P.O. Box 7150
Colorado Springs, CO 80933-7150.

Visual and Performing Arts

The Visual and Performing Arts Department administers a range of courses, degrees and minor programs in the disciplines of Art History, Film Studies, Gallery Management, Music, Studio Art and Theatre.

The CU-Colorado Springs Gallery of Contemporary Art and the repertory company Theatreworks are administrative units of this department. Teresa Jillson is Chair

Visual Arts

Professors: Cicotello, Fife; Professor Emerita: Hoerner; Associate Professor: Teresa Meadows-Jillson (Chair); Assistant Professor: Tesman; Assistant Professors Attendant Rank: Andrus, Riggs, and Ross; Senior Instructor: Cannata; Drew Martorella, Producing Director, Theatreworks.

Two Bachelor of Arts degree programs are available within the curriculum offered in the Visual Arts: Studio Art or Art History.

Bachelor of Arts — Studio Art

Students intending to earn a B.A. degree with a concentration in Studio Art must complete a minimum of 45 semester hours in studio courses. A minimum of 25 hours in upper-division courses is required.

V A 101 (Beginning Studio-2D), V A 102 (Beginning Studio-3D), and V A 104 (Beginning Drawing) are considered the foundation core of the studio art curriculum and are required of all studio majors.

V A 398 (Advanced Studio Problems) and V A 498 (Professional Seminar) are also required of all studio majors. Studio Art majors must, in addition, complete 15 hours of art history, to be included among those hours are A H 100 and six hours selected from the survey group of A H 280, 281, 282, 283, 284, 285. Only G M 405 from the G M 404/405 (Gallery Management) sequence can be used to satisfy this 15 hour requirement.

The studio art offerings are listed under three basic categories, giving students more flexibility in planning a program suited to their individual needs. These categories are beginning (100 level), intermediate (200 level), and advanced (300 level). In all areas of study within the studio curriculum, the 100 level (beginning) or its equivalent is prerequisite to any coursework in an area at the 200 (intermediate) or 300 (advanced) levels.

The Department of Visual and Performing Arts maintains the right to retain a limited number of examples of outstanding student work for its permanent collection. Student work and material left in the studios are the responsibility of the student.

Students interested in teaching art should plan to develop a comprehensive undergraduate major in Visual and Performing Arts and check with the College of Education for requirements for certification after graduation. No art education courses are offered at Colorado Springs.

Certain courses, notably some art history classes, are tentative listings only and will be offered when budgeting and staffing allow. Students should check the current Schedule of Courses for specific course times and semester offerings.

After completion of 60 hours of credit (sophomore standing), it is recommended that a student meet with a member of the studio art faculty for counseling in relation to further study and planning a program that will incorporate the indi-

vidual's goals. A number of studio art courses have content determined by the instructor on a semester-by-semester basis, so it is imperative that students check the current Schedule of Courses at the beginning of each semester for specific course content.

TRANSFER STUDENTS NOTE: The department requires nine hours of studio art coursework at CU-Colorado Springs as the minimum component for this concentration in the degree program.

Arts Fee

All students enrolling in studio art courses and certain Art History courses will be assessed fees to help defray the cost of supplies. The fee will be assessed as follows: $20 per class per semester with a $40 maximum total fee per semester, with a fee of $30 per photography class. There is a full refund of the deposit for courses dropped the first two weeks of the term.

The 300 level courses may be repeated once. Not all courses are offered each semester, nor are they always taught by the same instructor. Students should check the current Schedule of Courses.

Bachelor of Arts — Art History

The Art History concentration consists of a lower division requirement of A H 100 and 12 hours selected from the survey group of courses: A H 280, 281, 282, 283, 284, 285.

There is also a 24 hour requirement in upper-division Art History courses, of which the department requires a nine-hour dispersal (three hours each) among the three divisions of ancient, renaissance, and modern art history. All majors must complete A H 400 (Seminar: The Practice of Art History) in addition to the 24 hour upper-division requirement. The minimum Art History degree program is 39 hours. No course from the G M 404/405 (Gallery Management) sequence can be used to satisfy the minimum 39 hours required for a major.

A further requirement is 12 hours of cognate studies in studio art: six hours in basic studio (V A 101 and 102) and six hours of electives in studio art courses.

The faculty considers foreign language study in French or German to be the most appropriate for Art History majors.

Art history courses are offered on a rotating basis; not all courses are available every semester. Students should check the current Schedule of Courses.

TRANSFER STUDENTS NOTE: The department requires nine hours of art history coursework at CU-Colorado Springs as the minimum component for this concentration in the degree program.

Minors in Visual Arts

The Visual Art Division offers minor programs of study in three areas of its curriculum; Art History, Gallery Management, and Studio Art.

Art History

Art History Minor Program Requirements: Any three courses from the Survey Group A H 280, 281, 282, 283, 284, 285, and any three A H 300 or above level courses (18 hours total).

Gallery Management

Gallery Management Minor Program Requirements: Any three A H courses; G M 404 and 405 (Gallery Management I and II); and A H 456 Perspectives of Art. (18 hours total).

Studio Art

Studio Art Minor Program Requirements: Foundation level courses V A 101 or 102, and 104; one V A 200 level course in a media area of the student's choice; and three V A 300 level courses in that media area (18 hours total).

Minor in Film Studies

Associate Professor von Dassanowsky, Director.

The Department of Visual and Performing Arts offers a minor in Film Studies. The purpose of Film Studies is to develop in its students a scholarly and creative approach to the cinematic arts and to provide the theoretical and historical component to the practical media programs offered by the Department of Communication. The program in film offers a critical methodology and an exploration of ideas and expression that enriches many academic subjects and majors.

Requirements

The minor requires 18 hours of coursework, 12 of which must be in upper division credits. Two required courses, FILM 100 and FILM 200, offer the basics of film analysis in dominant and avant-garde cinema. Elective courses focus on national cinemas, current topics and genre/auteur study. Most electives are cross-listed and students may refer to the cross-listing for a description of the course.

Required Courses.

FILM 100-3. Introduction to Film Studies.

FILM 200-3. Narrative Film.

Elective Courses:

FILM 280/ENGL 280-3. Film and Fiction.

FILM 345/GER 345/FCS 345-3.
German and Austrian Film.

FILM 350/COMM 350-3 American Cinema.

FILM 369/SPAN 369/FCS 369-3.
Hispanic Culture Through Film.

FILM 371-3, Great European Film Directors.

FILM 372-3. Russian Avant-Garde Cinema.

FILM 373-3. Russian Art Cinema.

FILM 390-3. Special Topics in Film.

FILM 398/HIST 398-3.
The Vietnam War Through Film.

FILM 399/HIST 399-3.
European Film/European History.

FILM 411/FRENCH 411/FCS 399-3.
French or Francophone Film.

MUSIC

Senior Instructor: Smith.

Minor in Music

The minor in music requires nine lower and nine upper division credits. Six lower division credits are required with three credits of music elective. Three hours of upper division credits are required with six electives.

Curriculum requirements:

Lower division:
MUS 101, Music Theory
MUS 201, Music Theory

Upper division:
MUS 315, Non-Western Music

Curriculum electives:

Lower division
MUS 100, Intro to Music
MUS 205, Intro to Jazz
MUS 210, Rock and Roll Music

Upper division:
MUS 375, 20th Century Music
MUS 385, Symphonic Literature
MUS 493 or 495, Special Topics

Premusic Program

Students are referred to the College of Music section of the University of Colorado at Boulder Bulletin for information concerning admission policies and details of the curriculum leading to the

bachelor's degree in music. Students who wish to apply the following program as a possible first year of a music major in the College of Music in Boulder will need to audition in person or by tape with representatives of the Boulder music faculty. The audition is necessary for admission and also serves to certify proficiency from coursework in applied music.

Courses

Music Theory - 8 credits

MUS 101, Music Theory I, and MUS 102, Music Theory II will fulfill 6 of these credits. The other 2 credits (1 per semester) will be offered as 1 credit ear training laboratories (either through the regular class schedule or through Extended Studies).

Music History - 6 credits

MUS 185, Introduction to Music, counts for 3 credits. The other 3 may be elected from MUS 205, Introduction to Jazz; MUS 215, Introduction to Non-Western Music; MUS 375, 20th Century Music; or MUS 385, Symphonic Literature.

Applied Music - 4-6 credits

Music majors receive 2 credits a semester for a half-hour lesson a week (15 weeks) and 3 credits a semester for a one-hour lesson a week (15 weeks). Proficiency will be examined by representatives of the Boulder music faculty upon admission to the program.

Ensemble - 2 credits

MUS 131. University Choir (1 credit per semester). MUS 331. Community Orchestra (available through Extended Studies). MUS 330. Community Band (available through Extended Studies). When offered, these classes may be scheduled through the regular academic program or extended studies.

Theatre

Assistant Professor: Tesman, Assistant Professor Attendant Rank: Ross; Producing Director, Martorella

The Theatre division of the Department of Visual and Performing Arts offers minor programs and a basic sequence of courses designed to develop performing skills and introduce the various elements of theatre. The academic theatre program will normally sponsor a student production and a theatre festival every spring semester. Students also have the opportunity to participate in productions of Theatreworks, the regional repertory company at CU-Colorado Springs. Students are advised that theatre courses, especially acting courses are progressive and should be taken in sequence.

Minor in Theater

Minor programs with a concentration in either General Theatre or Acting are offered, each requiring a minimum of 18 hours of coursework, 9 of which must be upper division credit. The following courses are required of both programs: THTR 100, one acting class (choice of THTR 202, 203, 303, 310, 337 or 350) and one history/survey class (choice of THTR 220, 320, 321 or approved special topic). In addition the General Theatre Emphasis requires THTR 200, 406 and the Acting Emphasis THTR 204, 250 and 302.

Women's Studies

Associate Professor Ferber, Director

Minor in Women's Studies

The minor may be obtained by students enrolled in any undergraduate program. Students must take at least 18 semester hours of designated Women's Studies courses with grades of C or better. WMST 200 (Introduction to Women's Studies) is the only course required for the minor degree. The remaining 15 hours may be chosen from designated courses. Transfer credits are limited to nine hours.

The minor in Women's Studies also constitutes the basis for a major in Distributed Studies with a concentration in Women's Studies.

The Women's Studies office is located in Columbine Hall 4005. The office phone number is (719) 262-4139.

Preprofessional Curricula of the Professional Schools

Health Fields

Professional programs are offered at facilities such as the Health Sciences Center in Denver, with preprofessional programs at Colorado Springs. Admission to a preprofessional program does not imply acceptance into the professional program; for example, more stringent residency requirements are common, and many professional programs are very selective because of enrollment limitations.

The course requirements stated in the following sections are for the University of Colorado programs; other schools may have slightly different requirements. Students are advised to check the bulletins of all schools to which they may apply, as requirements continually change. Students should consult Letters, Arts and Sciences academic advisers for additional information. Admission to a professional program normally requires evidence of academic achievement and letters of recommendation documenting both academic and nonacademic qualifications. Each of the professional programs has many more applicants than it can accommodate, so no student should count on acceptance. Students are strongly urged to select undergraduate courses that provide the opportunity to apply to a number of different professional programs, as well as provide alternatives outside the health science fields.

Students should choose appropriate chemistry courses because courses are available at several levels of complexity. A student enrolling in courses suggested for premedical or predental students maintains the option of applying to any of the health fields; a student enrolling in less complex courses limits available options. Several preprofessional programs are based on the assumption that the student will be enrolled in Letters, Arts and Sciences for only two or three years. However, it is suggested that students assume they will graduate from the College of Letters, Arts and Sciences and select courses and a college major that provide the potential for graduation.

Because of the complexities involved in planning, the student is urged to consult the preprofessional adviser early in his or her college career. Professor Pigage is the faculty adviser for premedical, preveterinary, predental, premedical technology, and prepharmacy programs and other allied health programs.

Predental Hygiene

In conjunction with the School of Dentistry, a baccalaureate degree program in dental hygiene is available at the University of Colorado. This is a "2+2"program with two years at Colorado Springs and two years at Denver. The dental hygienist must satisfactorily complete a college program and

pass the state board examination. After being licensed by the state in which he or she wishes to practice, the dental hygienist has many opportunities for employment in private dental offices, state and city health agencies, federal government agencies, public and private schools, boards of education, industrial dental clinics and hospitals, and in schools of dental hygiene as directors and teachers. Minimum requirements for admission to the University of Colorado program are completion of 60 semester hours including:

General Biology (BIOL 110/111 and 115/116) 8

General Chemistry (CHEM 103 and 106) 10

English Composition (ENGL 131 and 141) 6

Psychology (PSY 100) 4

Public Speaking (COMM 210) 3

Sociology (SOC 111) 4

Human Anatomy and Physiology (BIOL 201) 4

Information and application materials are available from: School of Dentistry, University of Colorado, 4200 E. Ninth Avenue, Denver, CO 80262.

Predentistry

Students planning to seek admission to the School of Dentistry should meet periodically during their undergraduate years with the faculty predental adviser concerning their curriculum. The majority of students accepted to the University of Colorado School of Dentistry have completed at least four years of undergraduate work and have received an undergraduate degree. Students must complete the Dental Admissions Test before entering Dental school. The basic requirement for admission is completion of 90 semester hours (with at least 30 hours upper division) including:

General Biology (BIOL 110/111 and 115/116) 8

General Chemistry (CHEM 103 and 106) 10

Organic Chemistry (CHEM 331/333 and 332/334) 10

Physics (PES 101/115 and 102/215). 10

English Literature or Humanities 6

English Composition (ENGL 131) 3

Other electives

Because schools of dentistry vary in admission requirements, students are urged to check the bulletins of other dental schools where they might apply to determine specific requirements.

Since most predental students will graduate before entering dental school, it will be necessary to complete an academic major and other College of Letters, Arts and Sciences degree requirements.

Information and application materials are available from: School of Dentistry, University of Colorado, 4200 E. Ninth Avenue, Denver, CO 80262.

Premedicine

Students planning to seek admission to medical school should consult the academic advisers of the College of Letters, Arts and Sciences. They are also urged to meet periodically during their undergraduate years with a faculty adviser to discuss their premedical curriculum. Because schools of medicine vary in admission requirements, students are urged to check the bulletins of medical schools where they might apply to determine specific requirements.

The University of Colorado School of Medicine is a multifacility aggregate with all modern resources for the assessment and comprehensive health care of individuals of all ages. The curriculum is under constant study and has recently been extensively revised to meet the changing needs in medical education. The MCAT and a baccalaureate degree or at least 120 semester hours of college credit with a major leading to a degree are required. The MCAT must be taken before the November 1 application deadline. The following courses are required:

General Biology (BIOL 110/111 and 115/116) 8

General Chemistry (CHEM 103 and 106) 10

Organic Chemistry (CHEM 331/333 and 332/334) 10

Physics (PES 101/115 and 102/215). 10

Mathematics (Minimum requirement of algebra and trigonometry, MATH 135 and 136 recommended 6-8

English Literature. 6

English Composition (ENGL 131) 3

Although many medical schools, including that of the University of Colorado, do not specifically require all of the above courses, the student who completes them successfully will have a substantial advantage in attempting to gain medical school admission. Students who deviate from the above program should do so only after consultation with a faculty adviser.

Information and application materials are available from: School of Medicine, University of Colorado Health Sciences Center, 4200 E. Ninth Avenue, Denver, CO 80262.

Prephysical Therapy

Physical therapy is a health profession whose practitioners are involved in the treatment of abnormalities of the muscular, skeletal and nervous systems. Persons who are disabled as a result of pain, disease, injury or developmental delay are evaluated by a physical therapist who then plans and administers an appropriate therapeutic program. Rehabilitation of individuals with cardiac or pulmonary disease also involves physical therapy in the recovery process.

The physical therapy program at the University of Colorado is an entry-level Master of Science curriculum. A Bachelor's degree (B.S. or B.A.) in a field other than physical therapy must be completed prior to matriculation into the professional program. The distribution of credits for admission and minimum credits are as follows:

General Biology (BIOL 110/111 and 115/116) 8

Anatomy and Physiology (BIOL 201 and 202) 8

General Chemistry (CHEM 103 and 106) 10

Physics (PES 101/115 and 102/215). 10

Developmental Psychology (PSY 362) 3

Abnormal Psychology (PSY 328) 3

English Composition (ENGL 131) 3

Kinesiology (BIOL 455) 3

Exercise Physiology (BIOL 330). 3

Statistics (PSY 210 or other statistics) 3

A minimum cumulative grade point average of 3.0 (4.0 scale) is required for application. The pass/fail option and grades below C will not be accepted in required courses. A minimum combined score of 1500 on the verbal, quantitative and analytical portions of the G.R.E. is required. The GRE Written Assessment test is also required. Proficient computer skills will be required as well as 45 hours of Field Experience. All science courses listed as prerequisites can be no older than seven years at the time of matriculation.

Application materials are available after October 1 each year and must be returned by January 2 each year. Application materials may be obtained by writing or calling: Physical Therapy Program, University of Colorado School of Medicine, 4200 E. Ninth Avenue,

Box C-244, Denver, CO 80262, (303) 372-9144.

Prepharmacy

Students are referred to the School of Pharmacy, University of Colorado Health Sciences Center for information concerning admissions policies and details of the curriculum leading to the Doctor of Pharmacy degree.

Students accepted into the School of Pharmacy must have completed 60 semester hours of undergraduate work, including the following:

General Chemistry (CHEM 103/106) 10
Organic Chemistry (CHEM 331/332) 10
General Biology (BIOL 110/111, 112, and 115/116) 8
Microbiology (BIOL 203) 4
Calculus (MATH 135) 4
English Composition (ENGL 131 and 141) 6
Speech & Thought Curriculum (COMM 210) 3
Electives 10
Human Anatomy & Physiology (BIOL 201) 4
Physics (PES 101/115) 5
Social Science Elective 3
Economics (ECON 101) 3

The Doctor of Pharmacy is a "2+4" program with four years of professional pharmacy course work completed once admitted to the School of Pharmacy. All math and science prerequisite courses can be no older than seven years at the time of application.

Ph.D. programs in Pharmaceutical Sciences are also available at the University of Colorado. Information and application materials for all pharmacy programs are available from: the School of Pharmacy, University of Colorado Health Sciences Center, Box C238, 4200 E. Ninth Ave., Denver, CO 80262.

Preveterinary Medicine

A preprofessional veterinary medicine curriculum prepares students to apply to a professional veterinary medicine program. In Colorado, a program is available at Colorado State University in Fort Collins. Students interested in this area should consult the bulletins of the schools they may apply to for specific requirements. In general, at least 68 semester credits must be completed before admission to a veterinary program, including:

General Biology (BIOL 110/111 and 115/116) 8
Genetics (BIOL 383) 3
General Chemistry (CHEM 103 and 106) 10
Organic Chemistry (CHEM 331/333 and 332/334) 10
Biochemistry (BIOL/CHEM 481) 3
Physics (PES 101/115. 5
Statistics (PSY 210 or MATH 310) 3-4
English Composition (ENGL 131) 3
Social Science and Humanities 12

Additional courses which are highly recommended include microbiology, cell biology, developmental biology, computer science and nutrition. Since most preveterinary medicine students will graduate before entering veterinary school, it will be necessary to complete an academic major and other College of Letters, Arts and Sciences degree requirements.

Child Health Associate Program

Physician Assistant Program

Educational programs for these careers are also available at the University of Colorado. Minimum requirements for applying to the programs are completion of a Bachelor's degree of at least 120 semester hours. A GRE General Exam and a GRE Writing Assessment no older than 5 years at time of application must also be submitted. Additionally, the upper division science prerequisites and the statistics class must be no older than 5 years at the time of the application deadline.

General Biology (BIOL 110/111 and 115/116) 8
General Chemistry (CHEM 103 and 106) 10
Genetics (BIOL 383) 3
Upper division science (Anatomy, Physiology, or Biochemistry) . . 6
Statistics (PSY 210, MATH 310, or QM 201) 4
Psychology 6
Humanities 12

Information on these programs may be obtained from: the School of Medicine, University of Colorado Health Sciences Center, 4200 E. Ninth Avenue, Denver, CO 80262.

Other Prehealth Professional Programs

A number of other professions exist for which preparatory coursework may be completed in this College. Students interested in such programs should see Professor Pigage for advising.

Other professional programs

Prejournalism

Students are referred to the School of Journalism section of the University of Colorado at Boulder Bulletin for detailed information concerning requirements for the Bachelor of Science degree in journalism.

Students normally transfer to the School of Journalism at the end of the sophomore year. Application for intra-university transfer must be filed not later than 90 days prior to the term for which the student wishes to register, or 60 days prior to preregistration if the student participates in early registration. A cumulative grade point average of at least 2.25 in prior work at the University of Colorado is required before the student will be considered for admission to the School of Journalism.

Candidates for Bachelor of Science degrees in journalism are expected to fulfill all general requirements of the College of Arts and Sciences at Boulder. Students should note that these requirements differ in several ways from those of the College of Letters, Arts and Sciences which are listed in this Bulletin. Satisfactory completion of these requirements will normally occupy most of the first two years. However, two required journalism courses are designed as lower-division courses and should be taken in the sophomore year prior to transfer to the School of Journalism:

JOUR 100 Contemporary Mass Media. . . . 3
JOUR 290 Writing for the Media 3

Prelaw

Students are referred to the School of Law section of the University of Colorado at Boulder Bulletin for details of the curriculum leading to the professional degree, Juris Doctor (J.D.).

The School of Law of the University of Colorado, Boulder, requires a bachelor's degree for admission but does not stipulate courses that shall constitute a prelaw curriculum. Normally, all degree programs in the College of Letters, Arts and Sciences in Colorado Springs will enable a student to meet the School of Law admission criteria, with the possible exception of a few specialized performance programs such as those involving concentration in music, studio fine arts, or physical education.

The Law School Admission Test is required of all applicants and should be taken as early as possible during the senior year.

Students are urged to consult the Admissions Office of the School of Law, Room 141, Fleming Law Building (Boulder). Professor Robert S. Lorch, Department of Political Science, is the CU-Colorado Springs prelaw adviser.

Teacher Education

Students are referred to the College of Education sections of this Bulletin for detailed information concerning teacher education programs at elementary and secondary levels.

Students may obtain through the College of Education a teaching certificate in elementary education or in secondary education in the areas of English, foreign language (Spanish), mathematics, science, or social studies. However, they must first complete all requirements for an academic major in the College of Letters, Arts and Sciences.

Students who plan on applying to the TEP should seek early advising in both Letters, Arts and Sciences and the College of Education in order to complete all requirements in a timely fashion.

Master of Basic Science Degree Program

Director: Larkin; Advisers: Professors Burke, Camley, Gruntfest, Larkin, Malone, Schinazi, Schoffstall, Soifer, and Tierson.

This program is the only graduate-level program in the natural and physical sciences that can be taken totally at CU-Colorado Springs. The breadth of the program allows students to emphasize their principal discipline of interest and also to take several courses in a related department. There is no list of courses in the degree program. Instead, each student designs his or her own program in consultation with a departmental adviser.

The Master of Basic Science Program is a cross-disciplinary program leading to the Master of Basic Science. It provides an opportunity for present and prospective science and mathematics professionals and others to extend and/or broaden their training in the natural and physical sciences and mathematics at advanced undergraduate and graduate levels. These professionals include teachers, industrial scientists, engineers, business persons, and others. Wide latitude is possible in the details of a degree plan so that each student may follow a course of study most pertinent to his or her interests and career goals. Each degree plan must be approved by the M.B.S. Director and the student's adviser.

All courses credited toward the degree after admission must be taken at the University of Colorado, on the Colorado Springs, Denver, or Boulder campuses, over a maximum of five years or six successive summers.

Requirements for Admission

1. General regulations for admission to the Graduate School apply.

2. A student must present at least 40 semester hours in the natural sciences and mathematics, preferably including one year of calculus. (Several departments accept other mathematics courses in lieu of calculus.) Students may be admitted to the program with a deficiency in mathematics but must remedy the deficiency within two years after admission with a grade of C or better.

3. Students having an undergraduate grade point average below 2.75 must take the G.R.E. prior to consideration for admission.

How to Apply

Write to Graduate School, Master of Basic Science Program, CU-Colorado Springs, P.O. Box 7150, Colorado Springs, CO 80933-7150. All forms, transcripts, and supporting documents are processed at the campus. Student advising is available through the Program Director or faculty advisers listed above.

Requirements for Master of Basic Science Degree

1. General regulations of the Graduate School governing the award of the master's degree apply except as modified below.

2. Thirty semester hours of science and/or mathematics courses numbered 300 and above are required. If a thesis is written, the student will take 24 semester hours of coursework and six semester hours of thesis credit. These are to be selected from two or more departments. Upper-division courses may be taken from non-Graduate School faculty members by permission. Fifteen or more hours in science/math must be from courses numbered 500 and above. Courses may be selected only from the following departments: Anthropology (selected courses), Biology, Chemistry, Geography and Environmental Studies (selected courses), Geology, Mathematics, and Physics. Requirements for the different options are detailed below.

3. Either a thesis (thesis option) or a paper (non-thesis option) is required. Completion of a paper describing a research project or other specialized study on a topic is to be approved by the Director and the student's adviser. Approval of the topic is given on the basis of a written explanation or précis submitted during the second or third semester after admission. The final paper must be approved by the student's committee and is in lieu of the comprehensive examination. Thesis option students write a thesis on their research rather than a paper. Students defend their thesis before a thesis defense committee. Publication of thesis results is encouraged.

4. Minimum grade point average: Courses at the 300 and 400 levels will be accepted toward the degree only with grades of A or B; 500 and 600 level courses will be accepted toward the degree with grades of A, B, or C. Students must have a B average in all courses taken subsequent to admission to the program, including courses not actually required for the degree.

Program Options

Mathematics Option

Students must (1) develop a reasonable degree of competence in the fields of analysis and algebra and (2) demonstrate a depth to their mathematical education. Towards that end, the requirements for the Mathematics Option in the Masters of Basic Science Program are:

1. Students must complete a minimum of 15 semester hours of upper division and graduate courses offered by the Mathematics Department.

2. Of these 15 hours, 12 semester hours must be at the 400-level or higher, including at least 3 semester hours at the 500-level. (For example, students could take 1 300-level course, 3 400-level courses and 1 500-level course.)

3. Students must demonstrate the successful completion (with a grade of B or better) of the following courses.

a. Algebra. MATH 414 Introduction to Modern Algebra (or its equivalent)

b. Analysis. MATH 431 Introduction to Modern Analysis (or its equivalent)

c. A year-long sequence of mathematics courses, sharing a common mathematical topic, to provide depth within the student's mathematical education. The common topic of the sequence may be one of algebra, analysis, probability and statistics, or mathematical applications. The courses of this sequence must be 400 level or higher. For example, MATH 414 and MATH 513 constitute an acceptable sequence in algebra. The details of this requirement are to be specified in the student's program plan that is to be approved by a member of the Department of Mathematics.

The student opting for the Mathematics Option must arrange for a faculty advisor during the first or second semester after admission. The student, together with the advisor, will construct a course plan and will decide on the details for the paper or thesis option. To formally arrange for the advisor, the student should contact the Chair of the Graduate Committee of the Mathematics Department.

Science Option

The Science Option emphasizes the following natural science departments: Biology, Chemistry, Geography and Environmental Studies, Anthropology, and Physics. Two-semester sequence courses (which are offered in some of the natural science departments) are encouraged where appropriate. The student's courses in his or her department of emphasis are supplemented with several courses from a second department. The secondary department may be any of the following: Biology, Chemistry, Geology, Geography and Environmental Studies, Mathematics, Anthropology, and Physics.

The complete Science Option Program includes 30 semester hours of coursework, of which 15 or more hours must be at the graduate level (500 level or above). Thesis research is not counted toward this 15-hour requirement. The 30 hours may also include three semester hours of upper-division courses or seminars in secondary school teaching, history of science, or philosophy of science.

Science Teaching Option

This option requires 36 semester hours of study. The same rules are followed as for the science option except that 24 hours of science/math and 12 hours of education courses are required.

For the 12 hours of required education courses, students should consult their advisers to choose courses suitable for their programs.

Students may select a thesis or non-thesis option.

Exercise Science Option

Work in the Exercise Science Option may be done in cooperation with the Olympic Training Center.

All courses taken for the option must be in biology, chemistry, and/or engineering. A research thesis is required. Admission to this program requires an undergraduate grade point average of 3.0 or better and a combined G.R.E. score of 1560 or better.

All other exercise science requirements are the same as for the science option.

Geography and Environmental Studies

The Department of Geography and Environmental Studies (GES) has a stand-alone option in the M.B.S. program. For applications and initial advising contact the M.B.S. director. See the description of the M.B.S. degree program in the previous section for general questions. Entry into the GES option requires a 3.00 G.P.A. in undergraduate work or higher; 40 hours of science, mathematics, or computer science; and requires the G.R.E. exam. Students may substitute a college level statistics course and a computer science course in lieu of the general calculus entrance requirements. Once accepted into the GES Option, each student will take GEOG 501 Seminar: Geographic Research in their first fall semester. Graduation requirements are the same as for the other M.B.S. options a thesis plus 24 credit hours or 30 credit hours and a research paper.

College of Nursing

College of Nursing and Health Sciences
Beth-El Graduate School of Nursing

Carole Schoffstall, Dean

Eagle Rock at Four Diamonds Annex
Telephone: (719) 262-4422
Fax: (719) 262-4416

Beth-El School of Nursing was established in 1904 by an agency of the Methodist Church. The school was purchased by the City of Colorado Springs in 1943. In 1983 the school sought regional accreditation from NCA to acquire college status. Beth-El operated as a city school/college until 1997. On July 1st, 1997, Beth-El merged with the University of Colorado at Colorado Springs. The College moved to the CU-Colorado Springs campus in December of 1997.

Mission

Beth-El College of Nursing and Health Sciences prepares graduates for service and leadership roles in health care. The college addresses the nursing and allied health science educational needs of the city of Colorado Springs and Southern Colorado by offering undergraduate and graduate degrees as well as certificate, and life-long learning programs. The multidisciplinary approach to academic and clinical excellence fosters a community of scholarship and caring that extends beyond the walls of the college influencing the present and future direction of health care. The college facilitates collaboration for the promotion of a healthy community.

Program Accreditations

Colorado State Board of Nursing

National League for Nursing

Commission on Accreditation of Educational Programs for the EMS Professions

State of Colorado Department of Health Paramedic Training Center

Memberships

Colorado Association of Colleges of Nursing

Colorado Council of Nurse Educators

American Association of Colleges of Nursing

Sigma Theta Tau (Xi Phi Chapter)

National League for Nursing

National Association of Emergency Health Educators

Colorado Council of Emergency Health Programs

Clinical Learning Experiences

The College utilizes diverse clinical facilities to provide learning opportunities for students in Colorado Springs, Pueblo, Denver and throughout the country. Memorial Hospital, Penrose/St. Francis Health Services, Evans Army Hospital, Cedar Springs Behavioral Health Systems Inc., Colorado Mental Health Institute at Pueblo, Parkview Hospital and St. Mary Corwin Hospital in Pueblo are major hospitals which provide clinical learning environments for students. A wide variety of community and other health agencies are also utilized for clinical experiences.

Faculty

Professor: Carole Schoffstall; Associate Professors: Mary Hagedorn, Barbara Joyce-Nagata, Kathy LaSala, Jenenne Nelson, Cindy Roach; Assistant Professors: Lynne Bryant, Jewell Chambers, Lea Gaydos, Jennifer Hensley, Beverly Priefer; Senior Clinical Instructors: Marcia London, Hope Mena; Clinical Instructors: Ellen Biebesheimer, Scott Bourn, Tricia Lind, Virginia Lynch, Trellis Moore, Kit Pedersen, Linda Pfeffer-Klea.

Programs of Study

Bachelor of Science in Nursing

The graduate is prepared to practice professional nursing while providing care for individuals, families, groups and communities. Students who are not RNs will choose the traditional curriculum plan. Students with bachelor or associate degrees in fields other than nursing will also choose this plan but will have advanced placement due to completion of some (or all) of the general education requirements.

Admission Requirements for Bachelor of Science in Nursing Program

High school requirements:

Prerequisite Course Work (grades 9 thru 12)

English . . . . . .4 years
Mathematics . . . . . .3 years
Chemistry . . . . . .1 year
Non-lab Science . . . . . .1 year
Biological Science . . . . . .1 year
Social Sciences . . . . . .2 years
Foreign Language . . . . . .2 years

High School courses with less than a grade of "C" may result in a recommendation to take remedial college work in that area.

The following high school courses are recommended:

Psychology . . . . . .2 terms
Physics . . . . . .2 terms
Typing . . . . . .1 term
Speech . . . . . .1 term

Other requirements:

- Rank in the upper 40% of high school graduating class
- G.P.A. of 2.8 or higher.
- A composite score of 23 on the ACT. The Scholastic Aptitude Test (SAT) accepted in lieu of the ACT test scores with a combined score of 1100 or higher

Students who have a previous conviction for a felony as well as some misdemeanors may not be eligible to be placed in clinical assignments and may not be allowed to sit for the State Board of Nursing exam (NCLEX), even if they complete a degree in nursing. Contact the Colorado State Board of Nursing for additional information prior to application to Beth-El College of Nursing and Health Sciences.

Transfer Students

Students who have attended a collegiate institution may apply as transfer students. Transfer students must be in good standing and eligible to return to all institutions previously attended and have a cumulative G.P.A. of 2.8 on all work attempted.

Curriculum Plan for Traditional Baccalaureate Nursing Students

First Year/Level I

ANTH 104 Cultural Anthropology 3
BIOL 201 Anatomy and Physiology 4

BIOL 202 Anatomy & Physiology 4
CHEM 101 Chemistry 4
CHEM 102 Chemistry 4
ENGL 131 English Composition 3
ENGL 141 English Composition 3
HSCI 207 Nutrition 3
NURS 123 Theoretical Foundations of Practice 3
General Education Elective 3
34 credits

Second Year/Level II

BIOL 203 Microbiology 4
HSCI 101 Pharm Math . . . . (16 clock hours)
HSCI 205 Pharmacology 3
HSCI 206 Statistics 3
NURS 208 Health Promotion 3
NURS 210 Basic Health Assessment 3
NURS 220 Fundamentals of Nursing 6
PSY 100 General Psychology. 3/4
PSY 362 Developmental Psych 3
SOC 111 Intro to Sociology. 3/4
31 credits

Third Year/Level III

HSCI 301 Pathophysiology 3
NURS 310 Mental Health Nursing 6
NURS 320 Nursing Care of Adults I 5
NURS 321 Nursing Care of Adults II 5
NURS 401 Nursing Research 3
NURS 420 Nsg Care of the Childbearing Family 6
Nursing/Health Science Elective 3
Humanities 3
34 credits

Fourth Year/Level IV

NURS 410 Nursing Care of Children 6
NURS 429 Advanced Nursing. 5
NURS 430 Leadership and Management . . 3
NURS 440 Community Health Nursing . . . 6
NURS 449 Nursing Capstone 3
General Education Elective 3
Humanities. 3
29 credits

Total Program Credits: 128

Computer Competency Requirements

Students are expected to have basic computer skills upon entering Beth-El. If not, students can take an introduction to computers course for 3 credit hours.

Bachelor of Science — Nursing for Registered Nurses

Multiple entry levels facilitate the educational upward mobility of RNs and LPNs. All students seeking advanced standing will be required to meet the same prerequisites and terminal objectives of the college as traditional students. Advanced placement credit may be obtained by transfer credit, or credit by examination. Those seeking advanced placement in the baccalaureate program must meet the following requirements:

- Clinical practice experiences of at least 1,000 hours within the past three years or completion of an approved R.N. refresher course.
- Advanced placement students must have an active unrestricted R.N. or LPN license in Colorado. Request information related to the "Colorado Articulation" to answer additional questions for registered nurses seeking advanced placement.

Curriculum Plan for Advanced Placement in R.N. to B.S.N.

General Education

ANTH 104 Cultural Anthropology 3
BIOL 201 Anatomy and Physiology 4
BIOL 202 Anatomy & Physiology. 4
BIOL 203 Microbiology 4
*BIOL 205 Nutrition for Health Science . . 3
CHEM 101 Chemistry 4
*CHEM 102 Chemistry. 4
ENGL 131 English Composition 3
ENGL 141 English Composition 3
PSY 100 General Psychology. 3
PSY 210 Statistics 3
PSY 362 Developmental Psych. 3
SOC 111 Intro to Sociology 3
Humanities Elective (2). 6
General Education Elective (2) 6
56 credits

Nursing/Health Science Required Courses

HSCI 301 Pathophysiology. 3
NURS 304 Patterns of Knowing (R.N.) 3
NURS 305 Health Assessment (R.N.) 3
NURS 401 Nursing Research 3
NURS 425 Professional Nursing Practice (R.N.) 4
NURS 435 Nursing Management (R.N.) . . . 4
NURS 445 Community Health (R.N.). 6
Nursing/Health Science Elective. 6
32 credits

Colorado Articulation:
Nursing credits granted through articulation for RNs . . . . . 41 credits

Total Program Credits: 129

**Transfer courses with integrated content other options available.*

B.S.N. Program Requirements

Clinical Requirements for Student in the B.S.N. Program

Nursing students are to keep a personal file of the following information. It will be reviewed by clinical faculty prior to any clinical courses.

- Colorado Nursing License (for R.N. to B.S.N. students)
- CPR card
- Date and result of PPD test or last chest x-ray report if unable to take PPD
- Date and result of Rubella Titer or evidence of MMR boosters (2) if born after 1957
- Dates of Heptavax series
- Verification of Medical Insurance

If eligible, the student will receive notification of eligibility for admission. Admission eligibility to the University of Colorado does not constitute a guarantee of enrollment in any specific nursing or health science program.

B.S.N. State Board Passing Rates

B.S.N. graduates of the program are eligible to apply to the Colorado State Board of Nursing to take the R.N. licensure examination.

State Board of Nursing passing rates for those taking the licensing exam (NCLEX) for the first time are one of the highest in the state of Colorado for B.S.N. Nursing programs.

Bachelor of Science in Health Care Services

The Bachelor of Science in Health Care Services prepares the graduate for professional practice in health related settings. The program includes a foundation in general education as well as a broad understanding of health care delivery systems.

It is possible to choose options within the program to develop advanced specialization in a specific or chosen discipline such as emergency health (paramedic), forensics, sports health, wellness promotion and health care management or a self defined option. An upper division completion option is available in radiation technology and paramedicine for students with associate degrees in these areas.

Admission requirements

■ Rank in the upper 40% of high school graduating class

■ G.P.A. of 2.5 or higher.

■ A composite score of 23 on the ACT. The Scholastic Aptitude Test (SAT) accepted in lieu of the ACT test scores.

Students in this program can complete a minor in business or public administration with additional course work.

Emergency Health Services

General Education Course Requirements

ENGL 131 & 141
English Composition I & II. 6
PSY 100 General Psychology 3-4
Humanities Electives (2) 6
SOC 111 Introduction to Sociology 3-4
PSY 210, HSCI 206, MATH 281
or SOC 317 3
Electives 6-9
(Must take HSCI 100 and HSCI 105 if not a certified EMT-B)
Credits 30

Health Science Prerequisites

Cultural/Psychology/Sociology Elect (2). . . 6
MATH 104 College Algebra or higher math 3
BIO 201 & 202 Anatomy and Physiology . 8
Science Electives 4
CHEM 101 and 102 8
Credits 29

Health Science Core Requirements

HSCI 200 Professional Practice Foundations3
HSCI 245 Health Care Environments 3
HSCI 248 Computer Applica Hlth Care . . . 3
HSCI 301 Pathophysiology. 3
HSCI 345 Trends and Issues 3
HSCI 401 Health Science Research 3
HSCI 436 Health Systems Management. . . 3
HSCI 450 Legal/Ethical Issues 3
Credits 24

Option Requirements

Paramedic Certificate Granted upon Successful Completion; CPR, Immunizations and Hsci 100 and 105/ or EMT-B certification are prerequisites for upper level courses listed below.

HSI 205 Pharmacology. 3
HSCI 210 Patient Assessment 3
HSCI 302 Introduction to Emerg Med Svcs 3
HSCI 311 Fundamental Emergency Skills . 3
HSCI 312 Cardiac Emergency Skills 3
HSCI 313 Pulmonary and Neuro Disorders 3
HSCI 410 Advanced Emergency Skills. . . . 4
HSCI 412 Medical Emergencies 3
HSCI 413 Trauma Management 3
HSCI 416 Community and Home Care . . . 3
HSCI 417 Paramedic Practicum I 3
HSCI 418 Paramedic Practicum II 3
Credits 37

Total Credits *120*

Forensic Health Sciences

General Education Course Requirements

ENGL 131 & 141
English Composition I & II. 6
PSY 100 General Psychology 3-4
Humanities Electives (2) 6
SOC 111 Intro to Sociology 3-4
PSY 210, HSCI 206, MATH 28,
or SOC 317 3-4
Electives 6-9
Credits 30

Health Science Prerequisites

Cultural/Psychology/Sociology Elective . . . 6
MATH 104 College Algebra or Higher Math 3
BIOL 201 & 202 Anatomy and Physiology 8
CHEM 101 & 102 8
Credits 33

Health Science Course Requirements

HSCI 200
Professional Practice Foundations 3
HSCI 450 Legal/Ethical Issues 3
HSCI 401 Health Science Research 3
HSCI 245 Health Care Environments 3
HSCI 210 Health Assessment. 3
HSCI 301 Pathophysiology. 3
HSCI 436 Health Systems Management . . . 3
HSCI 248 Computer Applications
in Health Care 3
HS 345 Trends and Issues
in Health Care 3
Credits 27

Option Requirements

HSCI 430 Sexual Assault 3
HSCI 431 Introduction to Forensics 3
HSCI 432
Investigation of Injury and Death. 3
HSCI 433
Criminalistic and Forensic Science 3
HSCI 434
Pyschosocial Aspects of Forensics 3
HSCI 429
Legal Aspects: Civil and Criminal 3
HSCI 437 Violence and
Human Rights Issues 3
HSCI 438 Substance Abuse 3
HSCI 439 Forensic Photography 3
HSCI 440 Forensic Practicum 4
HSCI 441
Forensic Chemistry and Toxicology 4
HSCI Health Science Elective 3
Credits 38

Total Credits *120*

Health Care Management Option

General Education Course Requirements

ENGL 131 & 141
English Composition I & II. 6
PSY 100 General Psychology 3-4
Humanities Electives (2) 6
SOC 111 Intro to Sociology 3-4
PSY 210, HSCI 206, MATH 281,
SOC 317 or QM 201 3-4
Electives 6-9
Credits 30

Health Science Prerequisites

Cultural/Psychology/Sociology Elective . . . 6
MATH 104
College Algebra or Higher Math 3
Science Electives 12
BIO 201 & 202 Anatomy and Physiology. . 8
Credits 29

Health Science Course Requirements

HSCI 200
Professional Practice Foundations 3
HSCI 450 Legal/Ethical Issues 3
HSCI 401 Health Science Research 3
HSCI 245 Health Care Environments 3
HSCI 301 Pathophysiology. . . . . .

Or

HSCI 459
Concepts of Health and Disease. 3
HSCI 436 Health Systems Management . . 3
HSCI 248
Computer Applications in Health Care . . . 3
HSCI 345
Trends and Issues in Health Care 3
Credits 24

Option Requirements

ACCT 201 Accounting 3
MKT 300 Marketing 3
PHR 438
Personnel Human Resources Mgmt 3
FIN 305 Finance 3
MKT 440
Service Management and Marketing 3
B. AD 470
Emerging Bus & Entrepreneurship 3
HSCI 472
Health Care Budget and Finance 3
HSCI 473
Community Network Development 3
HSCI 479 Synthesis Seminar 3
HSCI 477 Management Practicum 4
Business Elective 3
Health Science Elective 3
Credits 37

Total Credits *120*

(To receive a minor in Business, students could add Math 111 or 112 (or replace Math 104 if adequately prepared), and one more Business Course.)

Radiation Technology Option

General Education Course Requirements

ENGL 131 & 141 English Composition I & II 6

PSY 100 General Psychology 3-4

Humanities Electives (2 courses) 6

SOC 111 Introduction to Sociology 3-4

PSY 210, HSCI 206, MATH 281 or SOC 317 3

Electives 6-9

Credits 30

Health Science Prerequisites

Cultural/Psychology/ Sociology Electives (2) 6

MATH 104 College Algebra or higher math 3

BIO 201 & 202 Anatomy and Physiology 8

Science Electives 4

CHEM 101 and 102 8

Credits 29

Health Science Core Requirements

HSCI 200 Professional Practice Foundations 3

HSCI 245 Health Care Environments 3

HSCI 248 Computer Appli Health Care . . . 3

HSCI 301 Pathophysiology 3

HSCI 345 Trends and Issues 3

HSCI 401 Health Science Research 3

HSCI 436 Health Systems Management . . 3

HSCI 450 Legal/Ethical Issues 3

Credits 4

Option Requirements

Articulation Credit for Associate Degree or Radiology Tech. Certification

Accredited Radiology Technology Program

Upper Level Division Course completion

Credits 37

Total Credits *120*

Sports Health and Wellness Option

General Education Course Requirements

ENGL 131 & 141 English Composition I & II 6

PSY 100 General Psychology 3-4

Humanities Electives (2) 6

SOC 111 Intro to Sociology 3-4

PSY 210, HSCI 206, MATH 281 or SOC 317 3-4

Electives 6-9

Credits 30

Health Science Prerequisites

Cultural/Psychology/Sociology Elective 6

MATH 104 College Algebra or Higher Math 3

BIO 110 Biology 4

PES 101 Physics for Life Sciences 4

BIO 201 & 202 Anatomy and Physiology . 8

CHEM 101 4

Credits 29

Health Science Course Requirements

HSCI 200 Professional Practice Foundations 3

HSCI 450 Legal/Ethical Issues 3

HSCI 401 Health Science Research 3

HSCI 245 Health Care Environments 3

HSCI 301 Pathophysiology 3

HSCI 436 Health Systems Management . . 3

HSCI 248 Computer Applications in Health Care . . . 3

HSCI 345 Trends and Issues in Health Care 3

Credits 24

Option Requirement

HSCI 100 Emergency Medical Technician - Basic *or*

HSCI Elective (if already a certified EMT-B) 3

BIO 205 Nutrition 3

HSCI 210 Patient Assessment 3

HSCI 459 Concepts of Health and Disease 3

HSCI 460 Fitness and Wellness Concepts . 3

HSCI 461 Sports Injury and Prevention . . 3

HSCI 462 Internship in Sports Health . . . 4

PSY 348 or SOC 330 Sports Psychology . . 3

BIO 330 Exercise Physiology 3

BIO 455 Biomechanics/Kinesiology 3

BIO 479 Basic Lab Mech Sports Physiology 3

HSCI Elective 3

Credits 37

Total Credits *120*

(Undergraduate minor options in Sports Health & Wellness, Forensic Health Science and Health Care Management.)

Master of Science in Nursing

The graduate nursing program at Beth-El builds upon and expands the knowledge, values, and skills of the baccalaureate prepared nurse. Beth-El College of Nursing and Health Sciences offers a program of advanced study leading to a Master of Science degree. In addition to courses which prepare for expanded clinical roles,the student gains experience with research, health care policy, nursing theory, clinical problem solving/critical thinking and creativity. Students choose a clinical specialty of nurse practitioner or clinical nurse specialist. Additional credit hours are required if students choose a dual clinical role. Students choose a major in adult, neonatal, family, forensic, holistic, community health, gerontological nursing or choose a self defined major. A nonclinical major in nursing administration is also available. A post certificate masters option is available in noenatal, women's and adult health. Students may also complete a minor in business or public administration through collaboration with the respective colleges or schools. Post masters certificates are available in selected specialities.

Admission Requirements

■ Completion of an accredited baccalaureate degree in nursing.

■ Prerequisite undergraduate courses include: Introduction to Statistics, Nursing Research & Health Assessment

■ Vitae documenting work experience (Adult 1 yr.; Family 2 yr.; Neonatal 2 yr. in level III nursery)

■ Current unrestricted Colorado Registered Nurse license or temporary Colorado license

■ Passing score on the Test of English as a Foreign Language (TOEFL) if your native language is not English.

■ Computer technology skills required.

■ Submission of videotape: Satisfactory demonstration of health assessment skills following guidelines for a head to toe adult health assessment

NNP Applicant: satisfactory completion of pre-entrance exam.

If a student does not meet eligibility requirements for admission, petitioning of the Graduate Committee for provisional status is possible.

Guaranteed Admission is available to those undergraduate baccalaureate nursing students from Beth-El who maintain a 3.0 G.P.A. (nursing and cumulative) and are recommended for admission by the Department of Undergraduate Nursing. Specific admission requirements are waived and students remain eligible for guaranteed admission for one year after completion of B.S.N.

Transfer Students

A transfer student is a student who is seeking the M.S.N. degree, has attended another institution and meets all M.S.N. admission requirements. Articulation course work may be required of a transfer student. The student must petition the Graduate Department for acceptance of transfer credits.

M.S.N. Programs

The Master of Science in Nursing at Beth-El College of Nursing and Health Sciences has three distinct bodies of knowledge; graduate core, advanced practice core and specialty courses related to the selected clinical specialty.

M.S.N. Curriculum

Core Course Requirements (Required of all M.S.N. Students)

NURS 610 Philosophy and Theory of Nursing Practice 3
NURS 611 Advanced Nursing Practice and Health Care Policy 3
NURS 612 Research and Data Management 4
NURS 614 Dynamics of Holistic Practice . 2
NURS 702 Clinical Research Application plus Elective 3
or NURS 700 Thesis 5
Credits 17

Advanced Practice Nursing Core

*(Required of all M.S.N. Students - *courses and hours are dependent on degree specialty)*

*NURS 628 Clinical Pharmacotherapeutics 3-4
*NURS 673 Advanced Health Assessment 3-4
*NURS 674 Pathophysiology 3-4
Credits 10-12

Nurse Practitioner Option Specialty Courses

Adult Nurse Practitioner

NURS 678 Primary Care I 3
NURS 679 Primary Care II 3
NURS 784 Practicum 6
Credits 39

Adult/Geriatric Nurse Practitioner

NURS 622 Collaborative Health Care Management w/Elderly 3
NURS 623 Physiological Problems of Aging 3
NURS 678 Primary Care I 3
NURS 679 Primary Care II 3
NURS 784 Practicum 6
Credits 45

Family Nurse Practitioner

NURS 627 Family Theory and Intervention 3
NURS 662 Family I 4
NURS 664 Family II 4
NURS 667 Family III 3
NURS 777 Role Synthesis 2
NURS 789 Practicum 9
Credits 53

Neonatal Nurse Practitioner

NURS 627 Family Theory and Intervention 3
NURS 653 Clinical Management 4
NURS 780 Practicum I 5
NURS 781 Practicum II 5
Credits 45

Articulation for Nurse Practitioners

Articulation for Nurse Practitioners returning to school for the M.S.N. degree. Individuals seeking this option should contact the college for information regarding admission, portfolio requirements and curriculum.

Clinical Nurse Specialist Option
Self Defined Clinical Nurse Specialist

NURS 615 CNS Seminar 3
Nursing Specialty Course work 9
NURS 782 CNS Practicum 5
Credits 44-46

Forensic Clinical Nurse Specialist

NURS 615 CNS Seminar 3
NURS 627 Family Theory 3
NURS 631 Intro to Forensics 3
NURS 632 Injury and Death. 3
NURS 630 Sexual Assault or NURS 633 Crinimalistics 3
NURS 634 Psychosocial 3
NURS 782 CNS Practicum 5
Credits 51

Neonatal Clinical Nurse Specialist

NURS 615 CNS Seminar 3
NURS 627 Family theory 3
NURS 653 Clinical Management 4
NURS 782 CNS Practicum 5
Credits 41

Holistic Clinical Specialist

NURS 615 CNS Seminar 3
NURS 642 Dynamics 3
NURS 645 Art of Holistic 3
NURS 647 Praxis: Imagination or NURS 648 Human Energy 3
NURS 649 World Views 3
NURS 782 (CNS) Practicum. 5
Credits 47

Community Clinical Specialist

NURS 615 CNS Seminar 3
NURS 627 Family Theory 3
NURS 663 Community & Rural 2
NURS 629 Resource Management 3
NURS 666 Promoting Health 3
NURS 782 CNS Practicum 4
NURS 783 Community Assessment Practicum 1
Credits 47

Courses related to the selected clinical specialty provide the student the opportunity to use empirical, ethical, esthetic, personal, and socio-political knowledge in the clinical setting specific to the students chosen advanced practice role.

Nursing Administration Option

Designated to prepare qualified individuals seeking management careers in hospitals, health maintenance organizations, long-term care facilities, health departments and other health care organizations. Option done in collaboration with the College of Business. Curriculum includes graduate nursing core courses (17 credits) plus 27 credits in specialty administration courses.

NURS 629 Resource Management: Budget and Finance 3
NURS 624 Managed Care Environments . . 3
NURS 655 Health Care Ethics and Law . . 3
NURS 704 Health Care Administration . . . 3
BAD 680 New Venture Management 3
NURS 790 Administrative Internship 3
NURS 791 Administrative Practicum 3
Electives 6
Credits 44

Post Certificate MSN Option

Students with a certificate in neonatal, women's health, adult or geriatric nursing:

Certificate program materials are evaluated for transfer credit. Masters core courses and advanced practice courses are required. Specialty courses needed will be determined individually after transcript evaluation. Interviews may be required.

On-line Option

Core courses in the graduate program are offered on-line. For further information contact Department Chair (719) 262-4430.

RN to MSN Option

Designation for individuals with an associate degree in nursing and a bachelors degree in a non-nursing discipline. Students apply for admission to graduate nursing program (see graduate nursing admission requirement). Student must meet all MSN admission requirements except graduation from NLN accredited BSN program. Students will be admitted provisionally to the graduate program until completion of 18 credits of undergraduate pre-requisite course work (with a grade of B or better).

PSY 210 Statistics 3
NURS 301 Pathophysiology 3
NURS 305 Health Assessment 3
NURS 445 Community Health Nursing . . . 6
NURS 401 Nursing Research 3

Course requirement for Prescriptive Authority

Specific courses may differ for the selected specialty but must include Advanced Pathophysiology, Advanced Assessment, and Clinical Pharmacotherapeutics.

Program Minor

A minor can be received by taking nine to twelve hours in one of the following specialty focuses: Community Health (12), Forensics (9), Gerontology (9), Holistic Health Nursing (9), Business (12) or Public Administration (9). A minor can be self-defined if the selected focus meets identified program criteria.

M.S.N. Program Advising

Graduate students are responsible for meeting with the Chair of the Graduate Nursing Department to develop a degree plan. Students are assigned an advisor while completing academic requirements of the program. Students meet with their advisors twice a year in October and April. Advisors facilitate development and enhancement of program outcomes in a required student portfolio. Advising is mandatory and failure to participate may result in a recommendation to postpone progression toward degree completion.

New student orientation is provided each semester. Graduate students should obtain a copy of the Graduate Nursing Department Student Handbook and familiarize themselves to policies and procedures of the Department to facilitate success toward completion of the advanced degree. Students will receive a Schedule of Deadlines for Masters Degree Candidates.

Degree Requirements

- Completion of a minimum of 39-53 credits at the graduate level.
- A grade of "B" in all required nursing courses.
- Final comprehensive examination or thesis.
- Students are admitted to candidacy following successful completion of the professional portfolio and comprehensive examination or thesis defense.
- Completion of degree requirements within five years.

Certificate Programs

Beth-El College of Nursing and Health Sciences offers two levels of certificate programs:

Undergraduate Certificate

Graduate Certificate

Certificate programs can be taken through regular university enrollment or through the Beth-El division of expanded study.

Program Options

Forensics studies (graduate, undergraduate or expanded studies)

Gerontological Nursing (graduate, undergraduate or expanded studies)

Holistic nursing (undergraduate, graduate or expanded studies)

Neonatal nursing (graduate or expanded studies)

Emergency Medical Technician - Paramedic (undergraduate or expanded studies)

Post-Master's Degree Certificates in Nursing

Students with master's degrees in nursing may apply for these certificate programs: adult, neonatal, holistic and adult/gerontology. If the student's initial master's degree did not require a course in advanced pathophysiology the student is required to take Advanced Pathophysiology. Please request information from the college.

Application Procedures contact:

Undergraduate and Certificate Programs: University of Colorado at Colorado Springs 1420 Austin Bluffs Parkway, PO Box 7150 Colorado Springs, CO 80933-7150

Telephone: (719) 262-3000 or 1-800-990-UCCS

E-mail: Admissions & Records: ADMREC@MAIL.UCCS.EDU

on the WEB: http://www.uccs.edu

Graduate Program: Department of Graduate Nursing 262-4424

Extended Studies: Telephone 262-4486

Academic Policies See website: http://web.uccs.edu/bethelstudenthandbook

Course Descriptions

College of Business

Accounting

ACCT 201-3. Introduction to Financial Accounting.
Focuses on the selection and preparation of basic financial information for the principal financial statements of the business enterprise, with emphasis on asset and liability valuation problems and the determination of net income. Includes use of spreadsheets. Prer., I S 100 and Sophomore standing.

ACCT 202-3. Introduction to Managerial Accounting.
Preparation of the statement of cash flows, basic financial statement analysis, the analysis of product, service and period costs, and the role of accounting in the planning and control of business enterprises. Emphasis on management decision-making uses of accounting information. Includes the use of spreadsheets. Prer., I S 100 and ACCT 201.

ACCT 301-3. Intermediate Accounting I.
A comprehensive analysis of the practice of financial accounting and reporting by public corporations to investors, creditors and other users. Includes analysis of standards setting, accounting theory and generally accepted accounting principles. Emphasis is on the purpose of financial statements with a focus on income determination and asset valuation. Includes the use of spreadsheets. Prer., Junior standing, I S 100 and ACCT 202 or ACCT 550 or ACCT 600.

ACCT 302-3. Intermediate Accounting II.
A continuation of ACCT 301 with focus on liabilities, equity, and special areas, including cash flow statements, leases, pensions, income taxes, earnings per share and changing prices. Includes the use of spreadsheets. Prer., ACCT 301.

ACCT 311-3. Cost Accounting.
Cost analysis for purposes of control and decision-making. Analysis of cost behavior, role of accounting in planning and control, and managerial uses of cost accounting data. Includes use of spreadsheets. Topics of current interest will be discussed, including activity-based costing. Includes the use of spreadsheets. Prer., Junior Standing, ACCT 202 or ACCT 550 or ACCT 600.

ACCT 401-3. Advanced Financial Accounting.
Advanced financial accounting provides an in-depth analysis into the theory and practices of accounting for business combinations, consolidated financial statements, international operations and partnerships. Prer., ACCT 301 and ACCT 302.

ACCT 402-3. Financial Accounting Theory.
In-depth analysis of contemporary accounting issues and problems, the development of accounting thought and principles, and critical review of generally accepted accounting principles. Prer., ACCT 301. May be taken concurrently with ACCT 302.

ACCT 411-3. Managerial Accounting Issues.
Critical analysis of advanced topics in managerial accounting. Uses cases and readings from the current managerial accounting literature to focus on issues of concern to managers. Prer., ACCT 311.

ACCT 421-3. Individual Income Tax.
Analysis of basic concepts of federal income taxes such as income, exclusions, deductions, passive losses, and property transactions. Concepts will be applied to actual situations by the use of a computer-generated tax return package. Focus is on individual considerations and planning. Prer., ACCT 201, ACCT 202, or ACCT 550 or ACCT 600 and ECON 102.

ACCT 422-3. Corporate and Partnership Taxation.
Primary emphasis is on C and S corporations and partnerships. Basic analysis of planning and compliance of most forms of corporate and partnership organization, operations, mergers and dissolution. Business planning and international taxation are also considered. Prer., ACCT 421.

ACCT 431-3. Introduction to Accounting Systems.
An introduction to the elements in an accounting information system, one of an organization's central information systems. Explores the newest technology and the accountant's/financial analyst's role in designing systems. Includes "hands-on" projects designed to expose the student to various software tools commonly used by accountants and financial analysts. Students will also complete several projects on a leading accounting software package. Prer., I S 100, FIN 305, ACCT 201 and ACCT 202, or ACCT 550 or ACCT 600.

ACCT 441-3. Fund Accounting for Government and Nonprofit Organizations.
To provide an introduction to accounting practices in governmental and nonprofit organizations. Fund accounting and budgetary control techniques will be covered in detail. Emphasis will be placed on management uses of this information. Necessary for CPA exam preparation. Prer., ACCT 201, ACCT 202, or ACCT 550 or ACCT 600.

ACCT 451-3. Accounting Ethics and Institutions.
An in-depth study of the technical and behavioral ethical standards existing for professional accountants in all fields, and of the political and regulatory institutions that affect the practice of professional accounting including the SEC, IRS, FASB, AICPA and state authorities. Prepares students for dealing successfully with ethical issues throughout their careers Prer., Nine semester hours upper division accounting.

ACCT 461-3. Auditing.
A study of generally accepted auditing standards, ethical responsibilities and legal liabilities of the independent auditor and auditing techniques used by the independent public accountant. Prer., ACCT 301. May be taken concurrently with ACCT 302.

ACCT 495-1 to 3. Topics in Accounting.
Experimental course in accounting.

ACCT 496-1 to 3. Internship in Accounting.
Undergraduate accounting internship for business students. Prer., Junior/senior business students only.

ACCT 600-3. Contemporary Issues in Accounting.
Focuses on the use of accounting information for executive decision making. Accounting information can provide managers with critical data about their organizations and those of customers and competitors. Will enable executives to manage better using accounting reports as effectively as possible.

ACCT 601-3. Seminar: Financial Accounting Theory.
A concentrated analysis and evaluation of alternative conceptual systems for reporting about and by public corporations in financial statements. Involves considering the economic and political history of currently acceptable and unacceptable theories and practices for financial accounting in general and for specific topics. Prer., ACCT 301 and ACCT 302 or equivalent.

ACCT 611-3. Seminar: Managerial Accounting Issues.
An in-depth exploration of the broad professional field of managerial accounting, especially as related to organizational decision making, planning and control. Development and current problems of the managerial accounting function are analyzed. Prer., ACCT 311 or equivalent.

ACCT 621-3. Seminar: Advanced Topics in Income Taxation.
Prepares the student to develop supporting documentation for tax planning and compliance. Research using tax statutes, regulations, rulings, and court cases related to advanced income tax issues is emphasized. Prer., ACCT 600.

ACCT 639-3. Contemporary Issues in Accounting.
Focuses on the use of accounting information for executive decision making. Accounting information can provide managers with critical data about their organizations and those of customers and competitors. Will enable executives to manage better using accounting reports as effectively as possible. Distance MBA course. Tuition schedule differs from on-campus courses.

ACCT 661-3. Seminar: Issues in Auditing.
Development of auditing as a profession including the evolution of auditing standards and audit reports. Current issues relating to ethical and legal responsibilities of the auditor are explored. Historical and contemporary literature in the field is reviewed. Prer., ACCT 600 or equivalent; ACCT 461 desirable.

ACCT 695-1 to 3. Topics in Accounting — Graduate.
Experimental course in accounting offered at the graduate level for the purpose of presenting new subject matter. Open only to MBA degree students.

ACCT 940-1 to 3. Independent Study in Accounting — Undergraduate.
With the consent of the instructor who directs the study and the dean.

ACCT 950-1 to 3. Independent Study in Accounting — Graduate.
With the consent of the instructor who directs the study and the dean.

Business Communication

BCOM 550-3. Professional Business Communication.
Purpose is to enhance oral and written communication skills. A combination of lectures and experiential learning techniques will be used to teach students how to develop effective reports and presentations for business audiences. Emphasis will be placed on the elements which form the basis for successful communication including analyzing situations, organizing and focusing thoughts, using proper transition, and constructing appropriate handouts and visual aids. Issues such as style, grammar, and punctuation rules will be reviewed as needed.

BCOM 559-3. Professional Business Communication.
Practical and theoretical components of effective professional business communication. Provides foundational skills in effective oral and written business communication, including development of business proposals and presentations. Further strategic communication in interpersonal and group and team contexts is investigated through case analysis with special emphasis on the importance of communication in understanding organizational culture, leadership, diversity, emerging organizational technologies, and business ethics. Tuition schedule differs from on-campus courses.

Business Law

BLAW 200-3. Business Law.
The legal significance of business transactions as they are part of the decision making process in business. Coverage of text and statues includes law and its enforcement and integration of the Uniform Commercial Code with the law of contracts, bailments, warehousemen and carriers, documents of title, sales of goods, and commercial paper. Prer., Sophomore standing.

Business Administration

BUAD 100-3. Introduction to Business.
Nature of business enterprise; role of business in our society; problems confronting business management. Career opportunities in business. Business students are advised to take this course during their freshman year. It fits into the program at a business elective. Open only to freshmen and sophomores.

BUAD 209-3. Macroeconomics for Managers.
Development of economic skills and knowledge of the modern capitalist economic system. Emphasis on tools of economic analysis, the functioning of the macroeconomy, the growing influence of the international sector on the macroeconomy, and the role of technology in forming a “new” economy. Students will learn to analyze simple market events, understand and interpret key macroeconomic variables, analyze the effect of both domestic and international eventson the domestic economy, understand the government’s and the Fed’s role in the economy, and understand how technological change may be driving the formation of a “new” economy. Distance MBA course. Tuition schedule differs from on-campus courses.

BUAD 295-1 to 3. Topics in Business.
Experimental courses offered irregularly at the Sophomore level for the purpose of presenting new subject matter in a particular business field. Course prerequisites will vary depending upon topics covered. Prer., Sophomore standing.

BUAD 301-1. Career Strengths: Assessment and Development.
Gives students an in-depth understanding of their interests, skills, and values and how these match to particular jobs and professions. Through research and analysis the students will gain a clear, detailed picture of what they want to do and what they have to offer an employer. Pass/fail only. Prer., Junior standing.

BUAD 302-1. Career Skills: Resume Writing and Interviewing.
Instructs and gives students hands-on experience on how to: (a) write cover letters and resumes, (b) practice effective interviewing techniques, and (c) develop effective job hunting skills. Pass/fail only. Prer., Junior standing.

BUAD 303-1. Career Success: Image and Impact.
Helps students converse, interact, and dress in a professional manner for job interviews, telephone calls, written correspondence, and professional work settings. Course will cover working in a diverse, cross-cultural environment, making effective first impressions, and appropriately communicating in a variety of speaking and writing situations. Pass/fail only. Prer., Junior standing.

BUAD 390-3. Improving Personal and Team Creativity.
Covers the concepts and theories of creativity but devotes most of the course time to specific, proven approaches to unlock and surface the student's innate creativity. Examples of creative approaches in business and industry are illustrated. Both individual and group creativity techniques are reviewed and practiced, with emphasis on how to form a creative work team. Prer., Junior standing.

BUAD 410-3. Business and Its Environment.
An examination of interrelationships between business, society and government. Topics include the balance between business and government, perspectives on the socioeconomic political system, government regulation of business current public policy issues, social responsibilities and ethics. Prer., Business seniors only.

BUAD 450-3. Cases and Concepts in Business Policy.
Takes a general manager's perspective on the administration of the corporation. Topics include the role and responsibility of general management, analysis of threats and opportunities in the competitive environment, strategies for building and sustaining competitive advantage, strategy implementation and management, and strategic management in the international environment. Topics covered through comprehensive case analysis. Prer., QUAN 201, MKTG 300, OPMG 300, FNCE 305, and ORMG 330. Business seniors only.

BUAD 460-3. International Business.
An introduction to international business. Examines economic, political and cultural systems and provides a broad overview of how these effect business management. Addresses managerial issues related to all the functional areas of business. Provides an overview of major aspects of planning, organizing and controlling international business ventures. Prer., All 300 level core courses. Junior/senior standing only.

BUAD 461-3. Regional Business Environment Europe.
A series of international business seminars conducted abroad by management personnel of European companies. Insight is provided into the cultural, social, and political environments of each country visited. This is an intensive international business and travel experience. Prer., Instructor approval.

BUAD 470-3. Emerging Businesses and Entrepreneurship.
How to plan, organize and operate a new independent business. Case studies of local small businesses. Prer., Senior standing.

BUAD 495-1 to 3. Topics in Business — Undergraduate.
Experimental courses offered irregularly at the undergraduate level for the purpose of presenting new subject matter in a particular business field. Second semester junior or senior standing required. Course prerequisites will vary depending upon topics covered.

BUAD 496-1 to 3. Internship — Undergraduate.
Undergraduate internship for business students. Prer., Junior/senior business students only.

BUAD 550-3. Fundamentals of Economics.
Provides basic understanding of microeconomic and macroeconomic theory essential for graduate study in business.

BUAD 556-3. Business, Government, and Society.
The interdependence of business with societal, governmental, and economic environments. Explores the role and balance of responsibilities between business and government, nature of the free market system, current public policy issues, and external trends affecting business. Prer., BUAD 550.

BUAD 569-3. Business, Government, and Society.
This course examines the interdependence of business with societal, governmental, and economic environments. The role and balance of responsibilities between business and government, the nature of the free market system, current public policy issues, and external trends affecting business are explored. Distance MBA course. Tuition schedule differs from on-campus courses. Prer., Macroeconomics.

BUAD619-3. Service Management.
Effective service management requires a multi-disciplinary approach involving marketing, management, human resource managment, and information and production/operations management. Provides a foundation in these areas as they pertain to service management. Content for each area will include a conceptual overview of its importance to service quality, specific tools representative of the area, and exercises to demonstrate practical application. The focus is on the integrative requirements of service quality. Distance MBA course. Tuition schedule differs from on-campus courses.

BUAD 629-3. Strategic Management.
Taking a global perspective, this course focuses on the role of the general manager in articulating a vision for the business, assessing threats and opportunities in a competitive environment, formulating a strategy for achieving competitive advantage and designing an organizational architecture for effectively implementing the strategy. Utilizes a combination of lectures, group discussions, and case analysis to raise and examine the key issues. Recommended

for the final semester in the program. Distance MBA course. Tuition schedule differs from on-campus courses. Prer., All preparatory courses or their equivalents and all MBA core courses.

BUAD 650-3. Strategic Management.
Taking a global perspective, this course focuses on the role of the general manager in articulating a vision for the business, assessing threats and opportunities in the competitive environment, formulating a strategy for achieving competitive advantage, and designing an organizational architecture for effectively implementing the strategy. Utilizes a combination of lectures, group discussions, and case analysis to raise and examine the key issues. Open only to MBA degree students. Prer., All foundation courses or their equivalents and all MBA core courses. Recommended for final semester in the program.

BUAD 661-3. Managing Technology for Strategic Advantage.
This course provides managers with the knowledge necessary to adopt technology to advance an organization's goals. The course is divided into three segments: (1) an overview of existing technologies and the value each offers to an organization, (2) valuing technology and developing technology-based strategy, and (3) developing a business model to implement a technology-based strategy. The progression is from the general to the specific and from principles to applications.

BUAD 669-3. Managing Technology for Strategic Advantage.
Provides managers with the knowledge necessary to adopt technology to advance an organization's goals. The course is divided into three segments: (1) an overview of existing technologies and the value each offers to an organization, (2) valuing technology and developing technology-based strategy, and (3) developing a business model to implement a technology-based strategy. The progression is from the general to the specific and from principles to applications. Distance MBA course. Open only to MBA degree students.

BUAD 670-3. World Class Service Management.
Effective service management requires a multi-disciplinary approach involving marketing, management, human resource management, and information and production/operations management. Provides a foundation in these areas as they pertain to service management. Content for each area will include a conceptual overview of its importance to service quality, specific tools representative of the area, and exercises to demonstrate practical application. The focus is on the integrative requirements of service quality. Open only to MBA degree students.

BUAD 680-3. New Venture Management.
Identifies unique features of new ventures (including start-up companies or internal ventures of established firms), high uncertainty, a newly formed management team, and a shortage of resources. Covers business plan development, recruiting the start-up team, legal and financial issues, start-up operations, managing growth, forming alliances, and exit strategies. Students, working in teams, will develop a business plan for a new venture. Open only to MBA degree students.

BUAD 690-3. Managing in Global Markets.
Designed to prepare students to anticipate global forces that impact present management. Briefly reviews the economic, the social-cultural, and the political/legal context of global management. Also reviews various concepts related to the internationalization process of the firm and frameworks related to global strategy.

BUAD 691-3. Regional Business Environment Europe.
A series of international business seminars conducted abroad by management personnel of European companies. Insight is provided into the cultural, social, and political environments of each country visited. This is an intensive international business and travel experience. Prer., Instructor approval.

BUAD 695-1 to 3. Topics in Business — Graduate.
Experimental course offered at the graduate level for the purpose of presenting new subject matter in a particular business field. Open only to MBA degree students. Prer., MBA degree students only.

BUAD 696-1 to 3. Internship — Graduate.
Graduate internship in business. Open only to MBA degree students. Prer., Determined by instructor.

BUAD 699-3. Regional Business Environment Europe.
Short study abroad. A series of international business seminars conducted abroad by management personnel of European companies. Insight is provided into the cultural, social, and political environments of each country visited. This is an intensive international business and travel experience. Distance MBA course. Tuition schedule differs from on-campus course. Prer., Instructor approval.

BUAD 940-1 to 4. Independent Study in Business Administration — Undergraduate.
Independent study at the undergraduate level with the prior consent of the instructor under whose direction the study is undertaken and the dean.

BUAD 950-1 to 3. Independent Study in Business Administration — Graduate.
Independent study at the graduate level with prior consent of the instructor under whose direction the study is undertaken and the dean. Prer., Consent of instructor and dean.

FINANCE

FNCE 305-3. Basic Finance.
An introduction to the financial management of the firm and the function of finance. Topics include the study of money and capital markets; time value of money; techniques of financial analysis, planning and control; capital budgeting techniques and analysis; management of short and long-term sources of financing; management of working capital; and capital structure theory. Emphasis is placed on the interpretation, analysis and use of accounting measures in making financial decisions. Prer., ECON 101, ECON 102, ACCT 201, and QUAN 201. Junior standing.

FNCE 330-3. Investments and Personal Finance.
The study of the basic problems concerning development and implementation of a personal investment program. Includes analysis of investment risk and return, alternative types of investments,

obtaining and interpreting investment information, and designing and executing an investment program. No credit given toward degree for finance majors. Students may not receive credit for both FNCE 330 and FNCE 420. Prer., Junior standing.

FNCE 340-3. Risk and Insurance Principles.
Risk management is an important element of individual and corporate financial plans. Probability, theory of the firm under uncertainty, insurance carriers and contracts, underwriting, and regulation are covered. Types of insurance including life, health, homeowners, auto, other property liability, and individual employee benefits are discussed. Prer., Junior standing.

FNCE 400-3. Advanced Corporate Finance.
The comprehensive study of how corporations make investment decisions, raise capital to finance their investments, and manage their financial affairs to create shareholder value. Topics covered include capital budgeting and the cost of capital, dividend policy, capital structure and financial distress. Emphasis on developing analytical tools and problem solving. Prer., FNCE 305 and working knowledge of Excel. Second semester junior or senior standing.

FNCE 410-3. Cases and Concepts in Finance.
The development of analytical and decision-making skills of students in relation to problems that confront financial managers. Areas include planning, control and financing of both current operations and longer term capital commitments, management of income, evaluation of income-producing property, and expansion and contraction. Case method of instruction. Prer., FNCE 400. Second semester junior or senior standing.

FNCE 420-3. Investment and Portfolio Management.
The study of the investments industry and instruments. Topics include the investment setting, portfolio theory, risk and return, and valuation of common and preferred stocks, bonds, options and futures. The course discusses investment problems and policies and and the methodology for implementing them. Students may not receive credit for both FNCE 330 and FNCE 420. Prer., FNCE 400. Second semester junior or senior standing.

FNCE 430-3. Bank Management.
An examination of the particular problems of managing a financial intermediary. The analytical tools for addressing the issues of regulatory requirements, the acquisition and management of funds, loan policies and precedures, capital adequacy, liquidity and solvency are developed. Prer., FNCE 305 and working knowledge of Excel. Second semester junior or senior standing.

FNCE 440-3. International Financial Management.
Examines the opportunities and risks of firms doing business in a global economy. International capital movements, balance of payment problems, foreign and international institutions, foreign exchange markets, and global investment and financing strategies are explored. Prer., FNCE 305. Second semester junior or senior standing.

FNCE 450-3. Money and Banking.
The study of the interaction between financial markets and the Federal Reserve system. The course emphasizes how the Federal Reserve Bank conducts monetary policy to promote a stable banking system and strong economic growth while minimizing inflation and unemployment. Topics covered include interest rates, inflation and the money supply and the effect of these variables on the business style. Prer., FNCE 305. Second semester junior or senior standing.

FNCE 470-3. Financial Information Systems.
An introduction to the elements in an accounting information system, one of an organization's central information systems. Explores the newest technology and the accountant's/financial analyst's role in designing systems. Includes "hands-on" projects designed to expose the student to various software tools commonly used by accountants and financial analysts. Students will also complete several projects on a leading accounting software package. Prer., INFS 100, FNCE 305, ACCT 201, ACCT 202 or ACCT 600. Second semester junior or senior standing. Meets with ACCT 431.

FNCE 480-3. Professional Financial Planning.
Concepts and practical implementation of professional financial planning. Focus is on essentials of budgeting and saving, the management of risk, tax planning, and retirement and estate planning. Emphasis is placed on integrating these elements into a comprehensive personal financial plan. Prer., FNCE 305. Second semester junior or senior standing.

FNCE 600-3. Corporate Financial Management.
Concerned with the optional allocation of a company's financial resources and a working knowledge of financial terminology and concepts. Capital market history, time value of money, valuation of securities, risk and return, capital budgeting principles and techniques, financial statement analysis, financial planning, raising capital, and cost of capital. Emphasizes techniques necessary to create and maximize the value of the firm. Open only to MBA degree students. Prer., ACCT 600, BUAD 550 and QUAN 550.

FNCE 610-3. Problems and Policies in Financial Management.
Application of financial analysis to new product evaluation, project finance, working capital management, new issues of debt and equity, acquisitions and divestitures, and financial distress/ turnarounds. Open only to MBA degree students. Prer., FNCE 600.

FNCE 620-3. Investment Management and Analysis.
The theory of investment management and security values is presented. Topics include portfolio management; the analysis of investment risks and constraints on investment policies and objectives; the analysis and use of investment information; the development and application of the tools for determinining value; the analysis of common stock, bonds, options and futures. Open only to MBA degree students. Prer., FNCE 600.

FNCE 629-3. Investment Management and Analysis.
The theory of investment management and security values is presented. Topics include portfolio management; the analysis of investment risks and objectives; the analysis and use of investment information; the development and application of the tools for determining value; and analysis of common stock, bonds, options, and futures. Distance MBA course. Tuition schedule differs from on-campus courses. Prer., FNCE 639.

FNCE 639-3. Financial Management Strategy.
Financial management is concerned with the optimal allocation of a company's financial resources. The objective of this course is to provide the student with a working knowledge of financial terminology and concepts. We do this by investigating the major areas of finance and the role of finance in mangement of the firm. We will concentrate on topics such as capital market history, time value of money, valuation of securities, risk and return, capital budgeting principles and techniques, financial statement analysis, financial planning, raising capital, and cost of capital. Emphasizes techniques necessary to create and maximize the value of the firm. Statistics is a prerequisite for this course. Distance MBA course. Tuition schedule differs from on-campus courses. Prer., ACCT 639 and BUAD 209.

FNCE 640-3. International Financial Management.
Uses the fundamental tools of financial analysis to assess the risks and opportunities for firms operating in an increasingly global economy. Special emphasis will be placed on the opportunities that arise from both market imperfections and the increasing integration of financial markets worldwide. Focuses on the international financial environment, the measurement and management of foreign exchange rate risk, and global funding and investment opportunities using both quantitative and qualitative decision tools to exploit opportunities and control risk. Open only to MBA degree students. Prer., FNCE 600.

FNCE 649-3. International Financial Management.
Uses the fundamental tools of financial analysis to assess the risks and opportunities for firms operating in an increasingly global economy. Special emphasis will be placed on the opportunities that arise from both market imperfections and the increasing integration of financial markets worldwide. Focuses on the international financial environment, the measurement and management of foreign exchange rate risk, and global funding and investment opportunities using both quantitative and qualitative decision tools to exploit opportunities and control risk. Distance MBA course. Tuition schedule differs from on-campus courses. Prer., FNCE 639.

FNCE 650-3. Managerial Economics and the Business Cycle.
Study of forces affecting the US and global business cycle. Interpretation of business cycle indicators and their implications for financial planning and decision-making. Topics include interest rates and inflation, the conduct of monetary policy, aggregate supply and demand, and employment levels. Presents concepts, tools, and methods of economic analysis relevant to decision-making within the firm. Open only to MBA degree students. Prer., FNCE 600.

FNCE 660-3. Financial Engineering and Corporate Risk Management.
Examines "derivative" securities such as options, futures, swaps as instruments for controlling fluctuations in interest rates, exchange rates, and business conditions. Develops common methods for valuing derivative securities and applies these methods to representative cases. Open only to MBA degree students. Prer., FNCE 600.

FNCE 695-1 to 3. Topics in Finance — Graduate.
Experimental course in finance offered at the graduate level for the purpose of presenting new subject matter. Open only to MBA degree students.

FNCE 940-1 to 3. Independent Study in Finance — Undergraduate.
Independent study in finance at the undergraduate level given with the consent of the instructor who directs the study and the dean. Prer., Junior/senior standing only and consent of instructor and dean.

FNCE 950-1 to 3. Independent Study in Finance — Graduate.
Independent study in Finance at the graduate level given with the consent of the instructor who directs the study and the dean.

Human Resource Management

HRMG 434-3. Collective Bargaining and Labor Relations.
Examines in detail the dynamic relationships between labor unions and employers. Topics include the history of labor relations, labor laws, labor union structures, organizing campaigns, negotiation, contract administration, arbitration, and international labor relations. Legal and ethical practices are emphasized. Prer., ORMG 330 or equivalent recommended.

HRMG 438-3. Human Resources — Management, Staffing and Development.
Presents an overview of the entire Human Resource (HR) function. Topics include recruiting, staffing, human resource planning, employee separation and retention, training and development, career planning, and human resource information systems (HRIS). Prer., ORMG 330 recommended. Junior standing.

HRMG 439-3. Legal, Social, and Union Issues in Human Resources Management.
Covers the myraid of legal, social, and union issues facing Human Resources (HR) and other managers today. Major emphasis is placed on equal employment opportunity, affirmative action, safety and health, and collective bargaining and labor relations areas such as labor laws, organizing campaigns, negotiation, contract administration, and arbitration. Other topics may include sexual harassment, drug testing programs, employing the disabled, employee privacy rights, and wrongful termination. Prer., ORMG 330 or equivalent recommended.

HRMG 441-3. Motivating, Rewarding, and Appraising Employees.
Examines practices by which organizations and employees can maximize the mutual benefits that accrue to each other. Emphasis is placed on developing and applying skills in compensation and benefits. Other topics include developing effective performance management systems, strategic human resource management (HRM), and international HRM. PRER., ORMG 330 recommended or equivalent.

HRMG 485-3. Directed Research Projects in Human Resources and Management.
A comprehensive human resources or management reserach, analysis, and planning project. Students work with a local business under the supervision of the course instructor to perform a literature review, conduct analysis, present information, and put together a comprehensive project on some aspect of personnel or management. Prer., ORMG 330 and ORMG 335 recommended.

HRMG 619-3. Human Resources Management.
This course probes the underlying values and techniques associated with employee recruitment, selection, motivation, training, affirmative action, compensation, benefits, performance appraisal, and related topics. Distance MBA course. Tuition schedule differs from on-campus courses.

Information Systems

INFS 100-3. Information Technology and Business Problem Solving.
Intro to information technologies and business information processing. Students will learn about careers in the rapidly expanding high-tech arena and how they can use information systems skills to help companies be more efficient. The course will enhance the students' personal knowledge of computers.

INFS 230-3. Business Programming I.
Provides comprehensive understanding of beginning structured programming. The emphasis is on structured programming methodology, procedural abstraction, and top-down design. Introduces file input/output and simple data structures. Proficiency developed as student designs, codes, compiles, and debugs programs. Prer., INFS 100.

INFS 240-3. Business Programming II.
Business program design and development from the perspective of visual programming technologies. Emphasis on performance characteristics and interface design considerations. Prer., INFS 230.

INFS 251-3. Managing Network Interconnections.
This is a lab-based course dedicated to working with networking devices. The principles and practice of configuring local and wide area networks are covered with a focus on business practices, software and hardware technologies, and internetworking standards. Prer., INFS 230. Sophomore standing.

INFS 295-1 to 3. Topics in Information Systems.
Experimental course offered for the purpose of presenting new subject matter in information systems. Course prerequisites will vary depending on topics covered.

INFS 330-3. Systems Analysis and Design.
Provides an introduction to modern systems analysis and design, the procedures for conducting systems analysis and design, and the use of Computer Aided Software Engineering (CASE) tools. Students will be exposed to both structured and object oriented methodologies of analysis, design, and deployment. Prer., INFS 230.

INFS 340-3. Database Concepts and Application.
Students are introduced to the fundamental concepts of database including high level entity-relationship and object modeling, design, and coding via a Structured Query Language. This class involves heavy computer tools use and is regularly scheduled in a computer lab. Prer., INFS 330.

INFS 370-3. Computer Networks and Telecommunications.
Introduces students to the hardware, topology, and terminology aspects of computer networks and telecommunications. Students differentiate between the different networks, learn how they work, and learn business applications for networks. Includes the basics of data transmission and LAN protocols. Prer., INFS 330.

INFS 380-3. Web Development.
Topics include using HTML, creating web pages, creating applets with JAVA, server development, server applications, and the web server/database interface. No credit for Information Systems majors. Prer., Junior/senior standing.

INFS 401-3. Applied Electronic Commerce.
Business-to-business and business-to-consumer electronic commerce will be introduced in an applied manner. Students will be immersed in the development and deployment of electronic commerce solutions via projects and tutorial sessions in the computer lab. Prer., INFS 100 and senior standing.

INFS 440-3. Emerging Technologies.
Each year, many new technologies enter the development arena, bringing new advantages and new risks, new benefits and new challenges. Looks at the most recent developments and provides an overview of their place in the industry. Topics will be explored along with a discussion of its uses and misuses. Will focus on helping participants gain an insight into these technologies and understand their place in organizational settings. Prer., INFS 340.

INFS 450-3. Information Systems Project Management.
A capstone project course for IS majors. A realistic application will be completed using IS technology and concepts. Critical to success will be the creation of an application environment and incorporation of management issues, especially project management. Prer., INFS 240 and INFS 340.

INFS 485-3. Directed Research Project.
Different phases of research investigating key issues in information systems. Students conduct a variety of analyses using spss-pc and work on real research projects. Focus on descriptive statistics, frequencies, crosstabs and measures of association, correlation analysis, regression analysis, and X-Y plotting. Knowledge of statistical methods and interest in information systems required. Prer., INFS 100 and QUAN 201. Junior/Senior standing.

INFS 619-3. Information Systems.
Introductory course. Students will learn what information systems are, how they work, and what purposes they serve. Students will also learn about data and information, and different methodologies for decision making and how much value information has. This course touches on such topics as telecommunications, databases and artificial intelligence. Also covered will be the integration of information within the organzation, decision support models, and what is required to manage information systems. Distance MBA course. Tuition schedule differs from on-campus courses.

INFS 620-3. Information Systems.
Introductory course. Students will learn what information systems are, how they work, and what purposes they serve. Students will also learn about data and information, and different methodologies for decision making and how much value information has. This course touches on such topics as telecommunications, databases and artificial intelligence. Also covered will be the

integration of information within the organzation, decision support models, and what is required to manage information systems.

INFS 630-3. Principles of Programming.
Provides comprehensive understanding of structured and object-oriented programming. The emphasis on structured programming includes methodology, procedural abstraction, and top-down design. The primary concepts of objects, inheritance, polymorphism, and data hiding are stressed as valuable components of object-oriented programming. Introduces file input/output and simple data structures. Visual techniques for design are included. Proficiency in programming developed as stduents designs, codes, compiles, and debugs programs. Prer., INFS 620 or INFS 619.

INFS 640-3. Development of Information Systems.
Planning, analysis, design, and construction phases of the development lifecycle. Information engineering methodology and integrated computer-assisted software engineering (I-CASE) tools to build information systems. A variety of techniques are used to build the enterprise model, entity model, decomposition diagrams, association matrices, data flow diagrams, stucture charts, action diagrams, and reengineering business processes. Prer., INFS 620.

INFS 650-3. E-commerce Practice.
Focus on the breadth of aspects making e-commerce the driving force of business initiatives. Technology infrastructure issues are examined in detail with an added look at the traditional infrastructure required to be a player in the expanding e-marketplace. Prer., INFS 620.

INFS 659-3. E-commerce Practice.
Focus on the breadth of aspects making e-commerce the driving force of business initiatives. Technology infrastructure issues are examined in detail with an added look at the traditional infrastructure required to be a player in the expanding e-marketplace. Distance MBA course. Tuition schedule differs from on-campus courses. Prer., INFS 619.

INFS 660-3. Database Principles.
Design, management, and implementation of data-oriented systems on all organizational levels including individual, departmental, corporate, distributed and international. Theories of data modeling and operational implementation of those models. Topics include systems and database planning, entity-relationships and object oriented data modeling, data normalization, data administration, SQL and other database languages, client-server processing, and distributed databases. Prer., INFS 620.

INFS 661-3. Data Warehouse Implementation and Applications.
An examination of the business case for data warehouse. Alternative designs for data warehouses are critically examined including architectures of distribution, data models and data marts. Policies for the protection and utilization of the data are discussed. Current systems to use the data warehouse in decision settings are explored, including data mining and OLAPs. Prer., INFS 660 or instructor permission.

INFS 670-3. Systems Development Project.
Students will work through a real-world industry information systems project to build development and research skills. Explores business problems, identifies areas where information technology can have an impact, implements re-engineering techniques, assesses and uses key project tools, and develops systems for those areas. Students will be exposed to the different phases of research investigating key issues in information systems. Prer., INFS 640.

INFS 671-3. Enterprise Systems.
Systems that integrate the multiple functional areas of an organization are examined in depth. The emphasis is on the reduction and replacement of complex legacy systems to improve data quality and build competitive advantage. Comparisons are made of enterprise systems and models of complete systems are developed to foster creative development of future integrative information systems. Prer., INFS 640 or instructor permission.

INFS 673-3. IT Portfolio Management.
The focus is on making investment decisions about the organizational technology infrastructure in order to create value. Detailed components of an information technology infrastructure are examined in light of contribution to the enterprise. Perspectives of investment include identification of risk and value while the balance of components includes hardware, software, services and personnel. Prer., INFS 620 or instructor permission.

INFS 681-3. Telecommunicaitons and Networking Principles.
Telecommunications technologies, hardware and software, architectures, topologies, protocols, and standards. Telecommunication devices, media systems, network hardware and software; network configuration; network applications; coding of data; cost-benefit analysis; distributed versus centralized systems; performance analysis; privacy, security, reliability, installation of networks, monitoring and management of telecommunication. Prer., INFS 620.

INFS 683-3. Building Virtual Organizations.
Using computer and communications technology to achieve a physically unbounded enterprise. The technology structures required to achieve anywhere, anytime operations are fully explored as are current business practices, social barriers, and legal issues associated with implementing global practices. Prer., INFS 681 or instructor permission.

INFS 690-3. Special Topics in Information Technology.
For IS majors and for persons who want to manage IT activities within a functional area, such as marketing or finance. Topics include the changing nature of information technology, managing information, strategic value of information systems, business process redesign, ensuring effective interaction of IS and client organizations, information technology planning, managing systems development and computer operations, managing end-user computing, decision support, group support and executive information systems, project management, recruitment, selection, placement, motivation, and performance evaluation, and the expanding universe of computing. Prer., INFS 620.

INFS 940-1 to 3. Independent Study in Information Systems — Undergraduate.
Independent study in Information Systems at the undergraduate level given with the consent of the instructor who directs the study and the dean. Prer., Junior/senior standing only and consent of instructor and dean.

INFS 950-1 to 3. Independent Study in Information Systems — Graduate.
Independent study in Information Systems at the graduate level given with the consent of the instructor who directs the study and the dean.

International Business

INTB 619-3. Managing in Global Markets.
Designed to prepare students to anticipate global forces that impact present management. Briefly reviews the economic, the social-cultural, and the political/ legal context of global management. Also reviews various concepts related to the internationalization process of the firm and frameworks related to global strategy. Distance MBA course. Tutition schedule differs from on-campus program.

INTB 660-3. Contemporary Topics in International Business.
This seminar examines major contemporary issues in international business. It takes a global view and particularly assesses key US, European, and Asian events and processes in a managerial context. Prer., Completion of all MBA foundation courses.

INTB 670-3. International Field Project.
May be an independent student research project, an international internship, or an international field study. Offered on an ad hoc basis and occasionally with a specific focus. Students must get instructor's approval prior to registration. Prer., B AD 690 or instructor permission.

INTB 950-1 to 3. Independent Study in International Business.
With the consent of the instructor who directs the study and the dean.

Leadership and Human Resource Management

LHRM 600-3. Leading and Managing in Changing Times.
This course is designed to help students succeed personally and professionally in a rapidly changing, global world. The course begins with a focus on our changing environment and the need for personal and organizational excellence. The remainder of the course focuses on developing leadership and management skills and apply them with an understanding of individual, group, and organizational behavior. Students will also lead and manage change. The course concludes with a discussion of one or more contemporary organizational issues. Open only to MBA degree students.

LHRM 610-3. Development of Groups and Organizations.
An introductory study of the dynamics involved in managing and facilitating change in groups and organizations by application of behavioral science knowledge. Emphasis is placed on both cognitive and experiential learning.

LHRM 619-3. Leading and Managing in Changing Times.
This course is designed to help students succeed personally and professionally in a rapidly changing, global world. The course begins with a focus on our changing environment and the need for personal and organizational excellence. The remainder of the course focuses on developing leadership and management skills and applying them with an understanding of individual, group, and organizational behavior. Students will also learn how to develop high performance teams and to lead and manage change. The course concludes with a discussion of one or more contemporary organizational issues. Distance MBA course. Open only to MBA degree students.

LHRM 620-3. Managing Organization Development and Change.
Addresses how to manage organization development and change, which will be one of the most critical skills managers and human resource professionals will need to master in an age of dynamic change. Provides sound theory and practical training in how to develop high performance individuals, teams, and organizations, and how to manage the change process. Prer., B AD 640.

LHRM 629-3. Managing Organizational Change.
This course provides students with an understanding of how they can serve as proactive participants in the many organizational changes occurring today and can develop a feel for what works and what does not. Difficulties, obstacles, and resistance will be addressed and, while there are no pat answers, the more successful paths for bringing about change in complex organizations will be explored. Distance MBA course. Tuition schedule differs from on-campus courses.

LHRM 630-3. Contemporary Human Resource Management.
Presents an overview of contemporary personnel/human resource management. Topics include job analysis, staffing, performance appraisal and development, training, compensation, career planning, equal employment opportunity and affirmative action, and ethics. Application of personnel/human resource management principles is emphasized through discussion and in-class cases and exercises.

LHRM 640-3. Legal and Social Issues in Human Resource Management.
Examines the profusion of legal, social, and ethical issues confronting human resource managers, though the course is appropriate for all majors. Emphasis is on equal employment opportunity, affirmative action, safety and health. Other topics include sexual harassment, drug testing programs, employing the disabled, employee privacy rights, wrongful termination, and honesty testing. Application of principles are emphasized with in-class cases and exercises. The overall objective for the course is to explain how organizations can manage employees legally and ethically, while still maintaining a productive work force.

LHRM 950-1 to 3. Independent Study in Leadership and Human Resource.
Management-Graduate. With the consent of both the instructor who directs the study and the dean.

Marketing

MKTG 300-3. Principles of Marketing.
Analytical survey of issues involved with the development and exchange of goods and services. Takes a marketing management approach in attacking problems related to product planning, channels of distribution, pricing and promotion. Emphasizes the role of marketing in responding to changing environmental conditions. Prer., Junior standing.

MKTG 330-3. Marketing Research.
Course emphasizes marketing research as a decision-making tool with special attention to creativity and innovation. Practical experience in evaluating and using the following research methodolo-

gy: planning an investigation, questionnaire design, sampling, experimentation, interpretation of results, and report preparation. Prer., INFS 100, QUAN 201, and MKTG 300. Junior standing.

MKTG 431-3. Introduction to Marketing Information Systems.
This applied course reviews the principles of gathering and organizing information about customers. Gives students a survey of design of marketing information systems. Proven practical ways to introduce successful marketing information systems into for-profit and not-for-profit organizations. Prer., MKTG 330. Junior standing.

MKTG 440-3. Service Management and Marketing.
The service component of business requires a distinctive approach to marketing strategy both in development and execution. In addition, quality service cannot be delivered without understanding and developing the organizational and human resources of the firm. The course builds and expands on the introductory marketing course by showing adaptations and applications of marketing ideas to the service setting. Designed for those students who are interested in working in either traditional service industries or in the service areas of manufacturing industries. Prer., MKTG 300. Junior standing.

MKTG 455-3. Contemporary Issues in Marketing.
Course provides a comprehensive review of important marketing issues. The topics vary between semesters. Course uses a seminar format allowing in-depth discussion and exploration of topics. Prer., MKTG 300. Junior standing.

MKTG 460-3. Business Marketing Management.
A detailed description of commercial, institutional and governmental markets with emphasis on analyzing and understanding organizational buyer behavior. Major differences between business-to-business marketing and consumer marketing are examined and implications to marketing management of these differences are discussed. Prer., MKTG 300. Junior standing.

MKTG 465-3. Promotion Management and Strategy.
Emphasis on the management and integration of the promotion mix (advertising, personal selling, sales promotion and publicity). The impact of buyer behavior variables on promotional strategy is examined and several communication models are described. The relationship between the organization's marketing communications program and its marketing strategy is also explored. Prer., MKTG 300. Junior standing.

MKTG 470-3. E-Commerce.
The focus of this class is on the expanding role of e-commerce (electronic commerce) and direct marketing in contemporary business settings. Both consumer oriented and business-to-business aspects of e-commerce will be explored. Prer., MK 300.

MKTG 480-3. Marketing Policies and Strategies.
Detailed consideration of the process of formulating and implementing marketing policies. Major emphasis on market analysis, product/brand management, promotion, distribution and pricing. Case analyses used to develop analytical abilities and to integrate all major areas of marketing. It is recommended that students take two required marketing courses in addition to MK 300 before enrolling in this course. Prer., MKTG 300. Junior standing.

MKTG 485-3. Marketing Analysis and Planning Project.
A comprehensive marketing research and planning project. Students work with a local business, under the supervision of the course instructor, to analyze a marketing opportunity and to develop a comprehensive plan to exploit that opportunity. Prer., Nine hours marketing or instructor's permission. Junior standing.

MKTG 490-3. International Marketing.
Provides an overview of marketing issues related to international markets. Major topics covered are description of major world markets, market analysis including cultural and political assessment, target market selection, market entry modes, marketing strategy, program management and implementation issues. Prer., MKTG 300. Junior standing.

MKTG 610-3. MBA Seminar in Contemporary Topics in Marketing.
An in-depth examination of selected topics in marketing. Course topics are chosen based on their current importance to the theory and practice of marketing. This study of advanced marketing material is accomplished through various activities including presentation, discussion groups, and experiential learning activities.

MKTG 620-3. Marketing Strategy.
A concentrated examination of fundamental principles of marketing including product and service development, positioning, distribution, promotion, and pricing.

MKTG 629-3. Marketing Management.
A concentrated examination of fundamental principals of marketing including product and service development, positioning, distribution, promotion, and pricing. Distance MBA course. Tuition schedule differs from on-campus program.

MKTG 630-3. Marketing Research and Decision Making.
The acquisition, organization, and dissemination of information for the purposes of making better decisions. Alternative approaches for accomplishing these tasks will be evaluated with special emphasis being placed on emerging information systems. Gives students the knowledge and tools to conduct business research and to use that information in developing marketing plans and assist in making other critical marketing decisions. Open only to MBA degree students. Prer., MKTG 620.

MKTG 640-3. Service Marketing.
Focuses on customer needs, expectations, and decision processes as they relate to the purchase and evaluation of services. Topics include service quality, assessment of customer satisfaction, marketing planning for services, internal marketing, and customer evaluation of services. Open only to MBA degree students. Prer., MKTG 620.

MKTG 650-3. Marketing Communications.
Theories of communication and buyer behavior are applied to the process of communicating with critical constituencies. The emphasis is on the practical aspects of creating and managing effective marketing communication programs with special attention being placed on business-to-business environments. Open only to MBA degree students. Prer., MKTG 620.

MKTG 660-3. Marketing Field Project.
A comprehensive field project. Students will work with local businesses on a project emphasizing development and implementation of a marketing program. Open only to MBA degree students. Prer., MKTG 620.

MKTG 670-3. E-Commerce.
The focus is on advanced topics in e-commerce (electronic commerce) and direct marketing including the integration of internet and traditional promotions, service quality, and pricing strategies. This class will examine these issues within both consumer and business-to-business environments.

MKTG 690-3. International Marketing and Export Management.
Provides an overview of international marketing issues. It provides detailed analysis of international market entry modes and strategy. Modes such as exporting, licensing, franchising, management contracts, alliances and partnerships, joint ventures, and the establishment and management of foreign sales subsidiaries are discussed. A major portion of the course is concerned with managing the export function. Open only to MBA degree students. Prer., MKTG 620.

MKTG 940-1 to 3. Independent Study in Marketing — Undergraduate.
With the consent of the instructor who directs the study and the dean. Prer., Junior standing.

MKTG 950-1 to 3. Independent Study in Marketing-Graduate.
Independent study in Marketing at the graduate level given with the consent of the instructor who directs the study and the dean. Prer., Consent of instructor and dean.

Operations and Technology Management

OPTM 300-3. Fundamentals of Operations Management.
Intro to the design and analysis of production systems in manufacturing, service and public organizations. Topics include facility location and layout, job design and work standards, production and inventory planning and control, quality control, forecasting, simulation, waiting line analysis, linear programming, and productivity and competitiveness. Prer., ACCT 201, ACCT 202, and QUAN 201.

OPTM 600-3. Operations: Competing Through Capabilities.
Operations management focuses on the strategies and processes involved in providing goods and services to customers. This course wll provide students with the ability to evaluate key factors in the design of an effective operations system and to align an operations system with an organization's business strategy. The course provides the tools to effectively design, analyze, and manage operations systems in manufacturing, service, and public entities. Prer., ACCT 600 and QUAN 550.

OPTM 609-3. Operations: Competing Through Capabilities.
Operations management focuses on the strategies and processes involved in providing goods and services to customers. This course will provide students with thee ability to evaluate key factors in the design of an effective operations system and to align an operations system with an organization's business strategy. The course provides the tools to effectively design, analyze, and manage operations systems in manufacturing, service, and public entities. Distancee MBA course. Tuition schedule differs from on-campus program. Prer., ACCT 639 and statistics.

OPTM 644-3. Customer Focused Processes: Quality Management and Metrics.
Customer satisfaction provides the critical link of operations to the marketplace. This course examines service and manufacturing processes and their impact on quality. Students are provided with tools to document processes, diagnose problems, develop innovative process improvement solutions and design metrics for process analysis. Through strategic quality management programs and techniques, students will develop an understanding of the critical link between productive systems and success in the market-place. Prer., OPTM 600.

OPTM 646-3. Managing Supply Chains.
As companies seek to provide their products and services to customers, faster, cheaper, and better than the competition, the need for cooperation between suppliers, manufacturers, and markets becomes increasingly important. Addresses the strategic implications of an integrated supply chain and the management of functional activities required to make a supply chain successful. Develops the integration of functional activities within the company and between supply chain partners with the help of textbooks, cases, and selected readings. Prer., OPTM 600.

OPTM 664-3. Managing Projects for Competitive Advantage.
Companies are adopting a project structure to manage the increasingly complex, cross functional tasks present in today's business climate. This course will provide an in-depth analysis of the techniques available to select, define, plan, schedule, control and learn from projects. Broadening the traditional project management structure, this course explores the strategic implications of project management through learning, knowledge management, and maturity models. This course will highlight the impact of technology changes and new product development on traditional project management techniques. Prer., ACCT 600 and QUAN 550 or consent of instructor.

OPTM 950-1 to 3. Independent Study in Operations and Technology Management.
With the consent of both the instructor who directs the study and the dean. Prer., Instructor consent.

Organizational Management

ORMG 330-3. Introduction to Management and Organization.
An introductory study of management fundamentals and organizational behavior. How individuals adapt to organizations; how managers motivate and lead in work situations; how organizations are designed and managed. Students are urged to complete PSY 100 and SOC 111 before taking this course. Prer., Junior standing.

ORMG 335-3. Groups and Teams in Organizations.
Contemporary theories, concepts, applications. Examines what happens within and between groups, "teamwork," why teams are used, self-management processes, managing diversity in teams. Inter-personal skill development to become a productive team member and effective team leader. Prer., Junior standing, ORMG 330 recommended.

ORMG 411-3. Experiences in Leadership.
Through lectures, videos, exercises, case studies and a major project, students learn the needed skills to become effective leaders. Topics covered include building relationships, dealing with conflict, planning, change, teams and the major leadership theories that have been developed. Prer., ORMG 330 and 335 or COMM 111 and LEAD 411. Junior standing.

ORMG 436-3. Organization Processes and Design.
How organizations are structured and designed. The organization's environment, technology, size and age, and goals and strategies. Includes decision-making in organizations, innovation and change, organizational culture, power and politics, and organizational learning and renewal. Prer., ORMG 330 is recommended.

ORMG 437-3. Organization Development and Change.
Introduction to the field of organization development. Provides practical skills for managers and human resource professionals in understanding, developing and changing individuals, teams and whole organizations. Students will also learn how to manage organization changes and increase the probability of successful change. Prer., ORMG 330 or equivalent.

ORMG 940-1 to 3. Independent Study in Organizational Management.
With the consent of the instructor who directs the study and the dean.

Quantitative Methods

QUAN 201-3. Business Statistics.
Statistical applications in business. Includes descriptive statistics, probability distributions, sampling theory, statistical inference and quality control, simple and multiple regression, and decision theory. Prer., MATH 111 and MATH 112, INFS 100. Sophomore standing.

QUAN 550-3. Fundamentals of Business Statistics.
MBA preparatory course. Provides basic understanding of business statistics essential for graduate study in business.

QUAN 619-3. Research Tools for Managers.
Business statistics with an empahsis on techniques for data analysis and inference in management. Students are assumed to be familiar with basic descriptive statistics, probablility theory, and probability distributions from the prerequisite statistics course. Presentation of technical material is combined with hands-on analysis of data to aid managerial decision making. Course objectives are to develop a conceptual understanding of statistics and the role of data analysis in management, and to master the mechanics of applied statistics using Microsoft Excel. Distance MBA course. Tuition schedule differs from on-campus program. Admitted MBA students only. Prer., Statistics.

College of Education

Counseling

COUN 483-1 to 3. Workshop in Professional Counseling.
Explores selected topics in-depth in professional counseling including conflict resolution, human resource development, child abuse or topics in counseling research. Counts toward masters degree with advisor approval only. Prer., upper division standing.

COUN 500-3. Introduction to Counseling and Human Services.
Provides an overview of the field of counseling and human services. Students will learn about career opportunities in this field and the roles and functions of professional counselors in various settings. The history of the field and future trends will be presented.

COUN 501-3. Theories and Techniques of Individual Counseling.
Major theories of individual counseling and their philosophic bases will be studied in this course. Techniques used in the application of theory to practice in counseling and consultation will be presented. Basic and advanced counseling skills will be introduced in this course and practiced in COUN 502, taken concurrently. Prer., Admitted to counseling program.

COUN 502-3. Laboratory in Individual Counseling Skill Development.
Provide basic interviewing, assessment and counseling skills and characteristics of counselors and counselees that impact the counseling and consulting process. Students engage in self-examination of characteristics that may affect them as professional counselors. Core counseling/consultation skills are practiced and refined. Prer., Admission to CHS program. Coreq., COUN 501.

COUN 504-3. Human Growth and Development.
Provides a broad understanding of life span theories of human development; understanding of the nature and needs of individuals at all developmental levels; normal and abnormal human behavior indicators; personality theory and development; and learning theory with cultural contexts. Meets with EPSY 510.

COUN 505-3. Introduction to Play Therapy.
Provides a developmental and systems approach to play therapy with content areas including history, theory, techniques, methods applications to special settings or populations. Also included is sandplay therapy which is based on the work of Jung.

COUN 506-3. Issues and Trends in College Student Development.
Examines theories of college student development to include: intellectual, moral, ethical, ego, psychosocial, and systems and career development. Contemporary issues and trends in providing services to traditional and non-traditional students will be presented.

COUN 508-3. Counseling and Student Affairs in Higher Education.
Studies the philosophy and history of counseling and student services in higher education. Examines models for designing, managing, and evaluating student affairs programs, including use of information technology. Explores current trends, issues, and challenges in service delivery.

COUN 510-3. Theories and Techniques of Group Counseling.
Includes studies that provide a broad understanding of group development, group dynamics, group leadership styles and group counseling theories. Core group counseling skills and techniques will be studied in this course and practiced in COUN 511, a small group

laboratory experience taken concurrently. Prer., COUN 501 and COUN 502.

COUN 511-3. Laboratory in Group Counseling Skills Development.
Taken in conjunction with COUN 510, this course provides the student with experiences as both a group member and leader. Students will apply group counseling skills and techniques and evaluate the effectiveness of several group counseling strategies. Prer., COUN 501 and COUN 502; must be admitted to CHS program.

COUN 512-3. Practicum in Professional Counseling.
Provides students with experience in counseling and consultation. Introduces the counselor and client characteristic that may affect the counseling process. Students complete 100 clock hours of supervised field experience of which 40 hours must be in direct service to clients. Prer., COUN 501, COUN 502 and admission to CHS program.

COUN 513-3. Introduction to Marriage and Family Counseling.
Introduction to marriage and family therapy with a focus on the transition from individual and group theories to systems theories. Students will learn to think in systems terms and gain an appreciation for the multiple levels of systemic functioning. A treatment of the nuclear family and alternate family forms will be included in this course. Prer., COUN 501 and 510 or consent of instructor.

COUN 514-3. Advanced Theories and Techniques of Family Counseling.
Examines the following theories of family counseling: strategic, structural, experiential, object relations, communication and behavioral. Students will become familiar with the differences and similarities of these theories as well as consider the techniques for change associated with each. Prer., COUN 513 or consent of instructor.

COUN 515-3. Conflict Resolution Training.
This workshop course presents a win-win approach to conflict resolution that can be utilized with individuals, families, groups and organizations. Participants will be asked to examine their personal conflict resolution strategies and change any win-lose strategies into win-win strategies. Prer., Open only to students enrolled in Counseling and Human Services program.

COUN 530-3. Laboratory in Marriage and Family Counseling.
Provides students with skills in rapport building; information gathering and giving; structuring the session; reflecting and summarizing content and feeling; self disclosure; confrontation; and session closure for use in family counseling sessions. Prer., COUN 501 and COUN 511.

COUN 533-3. Issues, Ethics and Trends in Professional Counseling.
A comprehensive study of professional roles and functions, professional goals and objectives, professional organizations and associations, professional history and trends, professional preparation standards and professional credentialing.

COUN 540-3. Research in Counseling and Human Services.
A comprehensive study of types of research, basic statistics, research project development, program evaluation, needs assessment, and ethical and legal considerations. A thorough review of the recent research literature in the student's area of emphasis is required for this course. Prer., COUN 501 and COUN 502 or instructor consent.

COUN 541-3. Measurement and Appraisal.
A comprehensive study of group and individual educational and psychometric theories and approaches to appraisal, data and information-gathering methods, validity and reliability, psychometric statistics, factors influencing appraisals, and use of appraisal results in helping processes. Prer., COUN 513 and COUN 540 or instructor consent.

COUN 543-3. Career Development.
A comprehensive study of career development theories, occupational and educational information sources and systems, career and leisure counseling, guidance and education, lifestyle and career decision-making, career development program planning and resources, and effectiveness evaluations.

COUN 544-3. Advanced Psychopathology and Diagnosis.
An intensive survey of the major theories, research findings and behavioral characteristics associated with mental illness and behavior disorders. Requires thorough working knowledge of the DSM IV and related diagnostic tools. Prer., COUN 513 or instructor consent.

COUN 550-3. Advanced Play Therapy.
Builds on the basic concepts presented in Intro to Play Therapy and includes using play to help children and families communicate through symbols, metaphors and stories. Puppet play, the hero/heroine's journey, family art and games are highlighted. Prer., COUN 505 or consent of instructor.

COUN 570-3. Internship in School Counseling.
To complete the school counselor program the student must complete a 600 clock hour internship in an appropriate school setting under the supervision of a licensed school counselor. The intern will perform a variety of activities that a regularly employed school counselor would be expected to perform. The intern must complete 240 hours of direct service as part of the 600 clock hour internship. Direct service may include but is not limited to individual counseling, group work, developmental classroom guidance and consultation with faculty, staff and parents. May be repeated for credit three times. A minimum of two semesters of internship is required for graduation from the CHS program. Prer., Instructor consent.

COUN 572-6 to 12. Internship in Community Counseling.
Graduation from the counseling and human services program requires students to complete an appropriate supervised internship of six hundred (600) clock hours. The internship must include a minimum of two hundred forty (240) hours of direct service work with clientele appropriate to the program emphasis area. Students must be enrolled in the internship while working toward completion of this requirement. Direct service may include but is not limited to individual counseling, group work, developmental classroom guidance and consultation with faculty, staff and parents. May be repeated for credit three times. A minimum of two semesters of internship is required for graduation from the CHS program. Prer., Instructor consent.

COUN 574-3. Internship in Student Affairs.
To complete the student affairs in higher education program, students must complete a 600 hour internship; 40% in direct service, 60% indirect. May be repeated three times. Prer., Completion of core courses.

COUN 580-3. Roles and Functions of the School Counselor.
An overview of developmental guidance and counseling programs, kindergarten through twelfth grade, that are preventive and proactive in orientation. Participants examine services to children, parents, and school staff to maximize each student's personal-social, educational and career development potential.

COUN 581-3. Organization/ Administration of the School Counseling Program.
Strategies for implementing comprehensive developmental guidance and counseling programs, kindergarten through twelfth grade, with goals, curricula and accountability. The school counselor as the team leader in counseling, coordination, and consulting.

COUN 582-3. Role and Functions of Community Counselor.
Broad examination of the context of the mental health movement with focus on the role and functions of the community counselor. Students will engage in studies that examine the clinical, administrative and specialized skills that community counselors must develop to serve as effective members of the health care team. Prer., COUN 513 or instructor consent.

COUN 583-1 to 4. Topics in Counseling.
Explores selected topics in professional counseling in depth including conflict resolution, human resource development, or advanced topics in counseling research. Prer., Consent of instructor.

COUN 584-3. Advanced Workshop in Counseling.
In-depth study of selected counseling topics based on directed readings. For example, examination of original writings of major counseling theorists.

COUN 585-3. Advanced Theories and Techniques of Marriage Counseling.
Presents marriage counseling from perspectives of psychodynamic, behavioral and systems theories. Introduces mate-selection, pre-marital counseling, marriage enrichment, sex therapy, counseling blended families and divorce mediation. Prer., COUN 513.

COUN 586-3. Social and Cultural Foundation of Professional Counseling.
Examines socioeconomic trends in society including sources of conflict and methods of conflict resolution, trends and changes in human roles, multicultural and pluralistic trends including characteristics and concerns of subgroups, and major societal concerns including discrimination on the basis of human characteristics such as age, race, religious preference, physical condition, sexual preference, ethnicity or gender, and methods for alleviating these concerns.

COUN 950-1 to 3. Independent Study in Counseling.
Independent investigation of topics of specific interest to the student and completed under the direction of a faculty member. The specifics of the investigation and the topic are a joint decision by the student and faculty member. Meeting times, expectations and evaluation are arranged with the faculty member. Students must have written consent of instructor to participate. Students using the independent study for degree purposes should also have written consent of their advisor. Prer., Consent of instructor.

COUN 999-0. Candidate for Degree.
To be used only by those students who will not be registered for coursework or independent study during the semester in which the student will take comprehensive examinations for the master's degree. Registration as candidate for degree will fulfill the requirement for registration during the semester in which comprehensives are taken. No credit will be earned and the fee is that of a one-semester credit hour course. Prer., Consent of advisor is required.

CURRICULUM

CURR 3199-1 to 3. Educational Technology Laboratory.
A series of self-paced modules including operating systems, word processing, graphics, gradebooks, presentation programs, e-mail, multimedia, and the internet available for both MAC and PC. Number of credits to be arranged with instructor. Prer., This course is open only to those admitted to and participating in TEP.

CURR 4100-2. Introduction to Technology in Education.
Covers the fundamental concepts of computer uses in education. The course is designed for practicing or prospective educators who wish to explore computer uses in the classroom. Demonstrations of classroom activities, modern applications, and electronic mail will be conducted. Coreq., CURR 4101.

CURR 4101-1 to 4. Introduction to Technology in Education Laboratory.
Accompanies CURR 4100. Participants will individually use microcomputers to experience methods and outcomes of hands-on activities. Coreq., CURR 4100. $20 lab fee required.

CURR 4102-1 to 4. Selected Topics in Education Technology.
Offered by guest lecturers to the university or by regular faculty where special topics or special needs arise. Examples of appropriate topics include the study of hypermedia, desktop publishing in educational settings, the application of microcomputers to a field or suject area, or the study of advanced technologies such as a videodisk integration. Topics and prerequisites to be announced.

CURR 4103-3. Technology for the Learner with Special Needs.
Participants will review and synthesize literature on a broad variety of technological solutions that meet the needs of special learners (with different school-based disabilities). Students will also conduct investigations into the use of adaptive devises and assistive technologies, demonstrate their use, and design learning environments to support the learner's needs for education in the least restrictive environment. Meets with CURR 5122.

CURR 4130-1 to 3. Multimedia Development.
This series of six half-credit modules addresses a range of topics relating to multimedia development. The topic mix for the modules evolves as the technolo-

gy evolves. Students must take modules in multiples of two. Prer., CURR 4140. Meets with CURR 5130.

CURR 4131-1 to 3. Web-Based Delivery of Training.
This series of six half-credit modules addresses a range of topics relating to web-based delivery of training. The topic mix for the modules evolves as the technology evolves. Students must take modules in multiples of two. Meets with CURR 5131.

CURR 4140-1 TO 3. Graphics Design.
This series of six half-credit modules addresses a range of topics relating to graphic design. The topic mix includes graphic design, desktop publishing, and a variety of graphics applications. Students must take modules in multiples of two. Meets with CURR 5140.

CURR 4440-1 to 6. Selected Topics in Reading Education.
Selected topics and issues in reading education will be explored in depth. Examples of special topics include: Introduction to Whole Language; Whole Language and Phonics Instruction; Reading; Writing and Spelling Connections; and others as issues arise. Prer., Bachelor's degree in Education or related field.

CURR 4504-1 to 4. Topics in Teaching Science.
Explores selected topics in science teaching. Topics will vary each time course is offered. Meets with CURR 5504.

CURR 5001-3. Introduction to Research and Statistics.
Introduces measures of central tendency, variability, percentiles, standard scores, and correlation. Basic concepts in statistical inference are covered. Evaluating and using research. Design and analysis of educational research. Critical evaluation of published research and completion of research project. Meets with SPED 529.

CURR 5002-3. Issues, Strategies and Models in Curriculum Design.
Designed to prepare students to write challenging, differentiated, and effective curricula for a variety of learners. A variety of curriculum models and strategies will be explored.

CURR 5010-3. Secondary Methods.
This methods course in the various disciplines gives an overview of instructional theory, methods, and materials in English, foreign language, social studies, science, or math and helps students develop teaching strategies in their context area. Prer., Accepted and participating students in ALP/TEP.

CURR 5011-3. Education Profession: Its Bases and Contexts.
Philosophical and historical bases of current educational issues, the role of education in a democratic society, reciprocal rights and responsibilities in teaching, the ethics of teacher decision-making, fostering effective home-school and community-school relationships. Prer., Acceptance into SOE Alternative Licensure Program.

CURR 5012-3. Understanding Learners and Learning.
Understanding human developmental processes and variations; understanding how factors in the home, school, and the community may affect learners; understanding diverse student populations; understanding learning processes and strategies that foster student learning. Prer., Acceptance into SOE Alternative Licensure Program.

CURR 5013-6. Instructional/ Classroom Management Strategies I — Elementary.
Instructional methods, standards-based curriculum, materials, classroom management and discipline, reading and writing literacy teaching and learning, assessment, and integrating curriculum across content and with technology. Prer., Acceptance into SOE Alternative Licensure Program.

CURR 5014-6. Instructional/ Classroom Management Strategies I — Secondary.
General teaching strategies designed to promote learning and the use of literacy in secondary content areas. Specific strategies for developing standards-based curriculum and methods in particular subject areas. Technological supports; developing assessment and evaluation strategies, classroom management strategies. Prer., Acceptance into SOE Alternative Licensure Program.

CURR 5015-2 to 4. Instructional/ Classroom Management Strategies II — Elementary.
Continuation of CURR 5013 with emphasis on math and reading methods, analyzing results, and reflecting on the teaching process. Prer., Acceptance into SOE Alternative Licensure Program.

CURR 5016-2 to 4. Instructional/ Classroom Management Strategies II - Secondary.
Continuation of CURR 5014 with emphasis on applying strategies, analyzing results, and reflecting on the teaching process. Prer., Acceptance into the SOE Alternative Licensure Program.

CURR 5017-3 to 6. School Residency and Teaching Seminar — Elementary.
Full-time service in a school as a resident teacher planning, delivering, and evaluating instruction, managing the classroom environment and student behavior, developing collaborative relationships with parents and colleagues. Prer., Acceptance into SOE Alternative Licensure Program.

CURR 5018-3 to 6. School Residency and Teaching Seminar — Secondary.
Full-time service in a school as a resident teacher planning, delivering, and evaluating instruction, managing the classroom environment and student behavior, developing collaborative relationships with parents and colleagues. Prer., Acceptance into SOE Alternative Licensure Program.

CURR 5019-3. Teaching Seminar in Elementary Education.
Exploration of learning from theory and practice; developing and presenting a teaching portfolio; developing a problem-based approach to teaching; self-analysis and reflection on teaching. Prer., Acceptance into the SOE Alternative Licensure Program.

CURR 5020-3. Teaching Seminar in Secondary Education.
Exploration of learning from theory and practice; developing and presenting a teaching portfolio; developing a problem-based approach to teaching; self-analysis and reflection on teaching. Prer., Acceptance into SOE Alternative Licensure Program.

CURR 5050-1 to 4. Workshop in Curriculum.
Contemporary national, state, and local issues in education. An overview of current issues and trends in elementary and secondary education is developed for reference, discussion, and debate.

CURR 5090-1. Research Project.
During this course the student will complete a research paper/project which investigates a topic of specific interest to the student under the guidance of the faculty member. This project serves as the comprehensive exam for the C & I masters. Prer., Acceptance in Curriculum and Instruction Masters Degree and CURR 5001.

CURR 5100-2. Introduction to Technology in Education.
Introduction to the fundamentals of microcomputer use in the classroom. The course covers a variety of educational applications including information processing, teacher utilities, problem solving in various programming environments, selection of software and management of hardware, and other relevant topics. Coreq., CURR 5101.

CURR 5101-1. Introduction to Technology in Education Laboratory.
Accompanies CURR 5100. Participants will individually use microcomputers to experience the methods and outcomes of hands-on activities. Coreq., CURR 5100. $20 lab fee required.

CURR 5110-3. Evaluation of Computer-Based Training and Education Programs.
Instructional designers are responsible for validating the effectiveness of their training or educational programs. This course covers the design of a program evaluation, design and application of measures and instruments, presentation of formative and summative evaluation reports, and the evaluation of cost effectiveness. Prer., CURR 5001.

CURR 5120-3. Project.
Students will be required to design and implement a project involving the practical application of the principles and techniques addressed by the degree program. Details will be arranged through the student's advisor. Projects based on activities in the field are encouraged. Prer., CURR 5212 and CURR 5213.

CURR 5121-1. Selected Topics in Education Technology.
Graduate level courses to be offered by guest lecturers to the university or by regular faculty where special topics or special needs arise. Examples of appropriate topics include the study of hypermedia, desktop publishing in educational fields or settings, the application of microcomputers to a field or subject area, or the study of advanced technologies such as videodisk integration. Topics and prerequisites to be announced.

CURR 5122-3. Technology for the Learner with Special Needs.
Students will synthesize literature on a variety of technological solutions that meet the needs of special learners, conduct investigations into the use of adaptive devices and assitive technologies, demonstrate their use, and design learning environments that support the learner in the least restrictive environment. Meets with CURR 4103.

CURR 5123-1 to 4. Field-based Practicum in Educational Computing and Technology.
Students will develop and complete under the direction of a faculty member an in-depth field experience involving educational technology in an educational setting. The specifics of the investigation and the topic are a joint decision by the student and the faculty member. The meeting times, expections, and evaluation are arranged with the faculty member. Students must have written consent of the instructor. Students using field experience for degree purposes should have the written consent of their advisor. Students are expected to submit a written proposal of their work to the instructor involved. Suggested examples of field experiences are as follows: (1) Work with students in lab situations to acquire computer skills, (2) develop, design, and evaluate curricular programs for implementation of computer skills at the district, school, or classroom level, (3) develop, design, and field test educational computer software in an educational setting.

CURR 5130-1 to 3. Multimedia Development.
This series of six half-credit modules addresses a range of topics relating to multimedia development. The topic mix for the modules evolves as the technology evolves. Students must take modules in multiples of two. Graduate credit will involve a review of research literature on multimedia use in training. Prer., CURR 5131. Meets with CURR 4130.

CURR 5131-1 to 3. Web-Based Delivery of Training.
This series of six half-credit modules addresses a range of topics relating to web-based delivery of training. The topic mix for the modules evolves as the technology evolves. Students must take modules in multiples of two. A review of the literature on web applications of media analysis will be required for graduate credit. Meets with CURR 4131.

CURR 5140-1 to 3. Graphics Design.
This series of six half-credit modules addresses a range of topics relating to graphics design. The topic mix includes graphics design, desktop publishing, and a variety of graphics applications. Students must take modules in multiples of two. An instruction design/visual literacy submission will be required for graduate credit. Meets with CURR 4140.

CURR 5150-3. Instructional Message Design.
Design of instructional environments that support effective learning. Environments may include computer-based instruction, web designs and computer- augmented classrooms.

CURR 5151-3. Instructional Design I.
Provides an introduction to the major theories and principles of systematic instructional design and evaluation. Students will be required to create, field test, and evaluate their own instructional designs. Prer., CURR 5150.

CURR 5152-3. Instructional Design II.
Building upon the theories and principles of instructional design introduced in CURR 5151, this course will explore the application of ID in a broad spectrum of environments. Field work may be required. Prer., CURR 5151.

CURR 5153-3. Authoring.
Students will learn to use software tools for media integration and the development of Computer Based Training. Topics include navigation design coding, CMI, and Cross platform integration. The primary application used is AUTHORWARE. Prer., CURR 5130 or instructor's permission.

CURR 5154-3. Technologies for Computer-Based Training and Assisted Instruction.
Hardware and software technologies that support computer-based training and computer-assisted instruction. Students will be required to present their findings in class.

CURR 5162-6. Practicum Instructional Technology.
Students will meet with course instructor to design a CBT project (corporate) or classroom interventions for both students and teachers (educator). Prer., CURR 5152.

CURR 5201-3. Seminar: Current Research Issues in Gifted Education.
Students enrolled in this seminar explore contemporary research related to the identification of gifted students, programs for the gifted, affective needs of gifted students, and other related educational issues. Meets with SPED 590.

CURR 5202-3. Methods and Materials for Teaching Multiple Intelligence.
Focuses upon the examination of giftedness through the lens of Howard Gardner's theory of multiple intelligences. Participants will examine educational research and practice relative to multiple intelligence theory. Methods for infusing multiple intelligence teaching strategies into the curriculum will be studied. Meets with SPED 533.

CURR 5210-3. Arts for the Gifted.
Explores a variety of arts activities for the elementary and middle grades. There will be a focus on a multi-faceted approach to teaching arts within creative, stimulating environments where the gifted student can evolve and thrive. Creativity, hemisphericity, problem solving, and practical applications of visual arts, music, dance, drama, and creative writing are addressed. Meets with SPED 559.

CURR 5211-3. Curriculum Strategies for the Gifted and Talented.
Prepares participants to write challenging, effective, and differentiated curricula for gifted learners. A variety of curriculum models and strategies will be explored. Participants will create curriculum units for gifted students in content areas of their choice. Meets with SPED 561.

CURR 5212-3. Reading and Language Arts for the Gifted.
Explores a wide variety of reading and writing activities for gifted learners. Children's and adolescent literature, biography, independent study, creative dynamics and expository and creative writing are among the many topic areas addressed. Meets with SPED 562.

CURR 5213-3. Social Studies and Humanities for the Gifted.
Addresses the teaching of social studies and the humanities to gifted and talented students, grades K-12. An integrated, holistic approach to social studies is emphasized. Meets with SPED 563.

CURR 5220-3. Creative Problem Solving and Future Problem Solving for Gifted Learners.
Covers four areas: creativity, problem solving, future studies, and future problem solving. Course content will focus on both the theoretical frameworks underlying each topic as well as concomitant teaching strategies. Meets with SPED 564.

CURR 5230-1 to 3. Supervised Practicum — Gifted/ Talented Education.
Practicum credit may be obtained through selected, supervised field placements in teaching of supervisory roles in gifted education.

CURR 5301-3. Mathematical Connections and Concepts.
Exploration of current mathematics curriculum topics in ways which will allow students to develop deeper conceptual knowledge and a better understanding of the connections between various mathematical topics. Applications of mathematics to other disciplines. Historical background of secondary curriculum.

CURR 5400-3. Teaching Reading and Writing in Content Areas.
Format variations from content area to content area, materials, equipment, readability of content materials, vocabulary, variations in comprehensions, and variations in study procedures.

CURR 5401-3. Teaching Reading in the Elementary School.
Comparative analysis of predominant current philosophies/methodologies of reading instruction, current organizational procedures, skill development, and comprehension activities in the elementary school.

CURR 5402-3. Teaching the Basal.
Application of current instructional techniques in reading to basal readers in use. Focus on the instruction of average to below average readers.

CURR 5403-3. Introduction to Clinical Experiences.
Introduction to diagnostic, evaluative, prescriptive and remedial principles. Tutorial approach.

CURR 5404-2 to 3. Facilitating Reading in the Preschool and Kindergarten Classroom.
Historical background of reading readiness and strategies for advancing literacy in the preschool and kindergarten classroom. Workshop approach.

CURR 5410-3. Informal Diagnostic and Remedial Techniques of Reading.
Causes of low reading ability and techniques employed in teaching the poor reader, diagnosis, motivation, and skills.

CURR 5411-3. Psycholinguistics and Reading.
An analysis of the reading process from a psycholinguistic orientation. Emphasis on research studies and selected readings dealing with linguistic development and appropriate implications for reading acquisition. Prer., CURR 5401 or CURR 5410.

CURR 5412-3. The Reading-Writing Connection.
Explores the relationships that exist between reading (decoding) and writing (encoding). Both reading and writing are viewed as inseparable parts of the complete language arts complex. Reading to write and writing to read are both important focus areas of this course.

CURR 5413-3. Organization and Administration of Reading Programs.
Procedures involving organization of programs which include selection of staff, materials, scheduling, budgeting, and evaluation. Prer., 6 hours of instruction in reading or consent of instructor.

CURR 5420-3. Children's Literature.
Reading and evaluation of books for children, information about children's books, children's interests in reading, important authors and illustrators, and problems in the guidance of reading.

CURR 5421-3. Literature for Adolescents.
Reading and evaluation of literature for adolescents. Emphasis on modern literature as well as literature by female and minority group authors. Meets with SPED 545.

CURR 5430-4. Reading Clinical Procedures I (Elementary).
Supervised diagnosis of reading problems; evaluation instruments; pertinent research; case study approach. Prer., CURR 5410 or consent of instructor. Meets with CURR 5431.

CURR 5431-4. Reading Clinic Procedures II (Secondary).
Supervised remediation of reading problems; methods and teaching materials; use of readability measures. Prer., CURR 5410 or consent of instructor. Meets with CURR 5430.

CURR 5432-3. Supervised Practicum in Reading: Elementary.
For advanced students working toward reading certification at the elementary level. Supervised field placements focusing on the application of program planning components. Prer., CURR 5410, CURR 5430, CURR 5431, and consent of instructor.

CURR 5433-3. Supervised Practicum in Reading: Secondary.
For advanced students working toward reading certification at the secondary level. Supervised field placements focusing on the application of program components. Prer., CURR 5410, CURR 5430, CURR 5431, and consent of instructor.

CURR 5440-1 to 6. Selected Topics in Reading Education.
Selected topics and issues in reading education will be explored in depth. Examples of special topics include: Introduction to Whole Language; Whole Language and Phonics Instruction; Reading, Writing, and Spelling Connections; and others as issues arise. Prer., Bachelor's degree in Education or related field.

CURR 5501-3. Exploring the Science Curriculum.
Explores the curriculum, instructional strategies, and foundations for teaching science K-12. The course presents a variety of strategies for creating and implementing science curriculum. Participants will acquire knowledge and skills necessary to implement a holistic approach to science teaching that considers knowledge, process skills, scientific attitudes, and mandated standards.

CURR 5502-3. Developing Manipulative Materials for Science Teaching.
Designed to enable teachers at all levels to develop manipulative science materials from easily available resources. Participants will develop and demonstrate materials for teaching science in a contemporary fashion on a limited budget.

CURR 5503-3. Integrating Reading and Science.
Familiarizes teachers with contemporary practices in science and reading education. Particular emphasis is placed on integrating "learning-cycle" procedures from science education with "marginal gloss" and other "whole language" techniques from reading education. Many activities with direct application to classroom practice will be presented.

CURR 5504-1 to 4. Topics in Teaching Science.
Explores selected topics in science teaching. Topics will vary each time course is offered. Prer., Bachelor's degree in Education or related field. Meets with CURR 4504.

CURR 5510-3. Science and Environmental Education for Gifted Students.
Designed for K-12 educators interested in developing their ability to work with gifted and talented students in science education and environmental education. The course emphasizes using and developing science resources for gifted and talented students. It also explores contemporary methodology for teaching science to gifted and talented students. Prer., Teaching experience.

CURR 5511-3. Teaching Energy and Environment.
Focuses on contemporary energy and environmental topics and issues. It is designed for elementary through secondary teachers. Emphasis is placed on clarifying environmental issues; showing relationships between energy, environment, and society.

CURR 5512-3. Energy and Environmental Activities.
Focuses on developing and utilizing activities, games, and role playing simulations in the area of energy, environment and conservation. This course is designed to enable classroom teachers at all levels to present and clarify various related concepts.

CURR 5513-2. Activities for Teaching Earth Science.
Focuses on using and developing classroom activities for anyone teaching earth science topics. Most activities presented are adaptable from preschool through high school. The course will cover five main topics including: space, land, water, air, and the earth's past.

CURR 5514-3. Activities for Teaching Weather.
Provides many classroom activities demonstrating various aspects of weather and weather prediction. Topics include aspects of weather ranging from local up-slope caused by an "Albuquerque Low" to global warming. Activities presented will be applicable for elementary through high school grades.

CURR 5520-3. Activities for Teaching Physical Science.
Designed for teachers at all levels and includes a wide variety of activities for teaching physical science concepts. Contemporary science teaching methods will be modeled to develop physical science concepts through manipulative and inquiry experiences.

CURR 5521-2. Activities for Teaching Electricity and Magnetism.
Provides classroom activities involving electricity and magnetism for teachers. Activities are designed for use with materials easily available from local sources. The course covers a wide variety of activities ranging from simple interactions of magnets to generation of electricity.

CURR 5522-1. Teaching Cosmology — Explaining the Universe.
Utilizes the PBS series "Stephen Hawking's Universe" as a basis for presenting an overview of the universe from its theoretical origins to its ultimate

demise. The course will focus on understanding the broad principles and incorporating cosmology into classroom instruction.

CURR 5530-3. Cutting-Edge Science for Cutting-Edge Teachers.
Focuses on the readings from contemporary journals, magazines, databases, etc. It will bring participants up-to-date with recent developments in science and technology. It allows teachers to explore current scientific information along with strategies for including new information in their science teaching from K-12.

CURR 7000-1 to 6. Master's Thesis.

CURR 9500-1 to 5. Independent Study in Reading.
Independent investigation of topics of specific interest to the individual student and completed under the direction of a faculty member. The specifics of the investigation and the topic are a joint decision by the student and faculty member. The meeting times,, expectations, and evaluation are arranged with the faculty member. Students must have written consent off the instructor. Students using independent study for degree purposes should have the written consent of their advisors.

CURR 9600-1 to 3. Independent Study in Curriculum.
Independent investigation of topics of specific interest to the individual student and completed under the direction of a faculty member. The specifics of the investigation and the topic are a joint decision between the student and faculty member. The meeting times, expectations, and evaluation are arranged with the faculty member. Students must have written consent of the instructor.

CURR 9601-1 to 3. Independent Study in Junior High/ Middle School.
Independent investigation of topics of specific interest to the individual student and completed under the direction of a faculty member. The specifics of the investigation and the topics are a joint decision between the student and the faculty member. The meeting times, expectations, and evaluation are arranged with the faculty member. Students must have written consent of the instructor.

CURR 9602-1 to 3. Independent Study in Gifted/ Talented.
Independent investigation of topics of specific interest to the individual student and completed under the direction of a faculty member. The specifics of the investigation and the topic are a joint decision between the student and faculty member. The meeting times, expectations, and evaluation are to be arranged with the faculty member. Students must have written consent of the instructor.

CURR 9603-1 to 3. Independent Study in Educational Computing and Technology.
Designed to accomodate students who wish to pursue the study of a special topic of interest. Approval must be sought from the instructor prior to registration. A proposal outlining the planned study, including readings and written reports to be submitted, should be filed during the first week of the semester. Sample topics for study: computers and the handicapped; research on computing in education; emerging technologies; artificial intelligence; hypermedia; desktop publishing; advanced graphics; and telecommunications in education.

CURR 9604-1 to 3. Independent Study in Reading.
Independent investigation of topics of specific interest to the individual student and completed under the direction of a faculty member. The specifics of the investigation and the topic are a joint decision by the student and faculty member. The meeting times, expectations and evaluation are arranged with the faculty member. Students must have written consent of the instructor. Students using independent study for degree purposes should have the written consent of their advisors.

CURR 9999-0. Candidate for Degree.

Educational Psychology

EPSY 507-3. Educational Applications of Learning Theory.
A seminar designed to introduce a spectrum of current theories of learning including elements of cognitive psychology, social learning theory and behaviorism. Students will be expected to read extensively and lead discussion of their areas of investigation.

EPSY 510-3. Human Growth and Development.
Provides a broad understanding of life span theories of human development; understanding the nature and needs of individuals at all developmental levels; normal and abnormal human behavior indicators; personality theory and development; and learning theory within cultural contexts. Meets with COUN 504.

EPSY 525-3. Teaching the Gifted and Creative Student.
This introductory course explores the nature and nurture of gifted children and adolescents. Characteristics, identification, program alternatives, and teaching strategies are addressed as is the gifted child movement. Meets with SPED 560.

Leadership

LEAD 211-3. Profiles of Leadership.
Creates insight relative to the breadth and depth of leadership potential within a multicultural society. Students are challenged to develop personal profiles of leadership based upon multiple factors including leadership theory and non-traditional forms of leadership. Prer., COMM 111 or equivalent.

LEAD 400-3. Principles of Student Leadership.
Designed as a participatory class with a focus on leadership theories, styles of leadership, and strategies for successful student leadership. Topics included are conflict management, strategic planning, goal setting, leading leaders, leadership ethics and other related topics. Meets with LEAD 500.

LEAD 411-3. Experiences in Leadership.
Leadership in the context of organizational management, the political arena, and social causes. Students organize expert discussion panels. Special issues include women and minorities in leadership. Students research and prepare their own leadership development programs with emphasis on application and skill development. Prer., COMM 111 and LEAD 211 or equivalent.

LEAD 450-1 to 3. Student Leadership Seminar.
Offers opportunities for undergraduate students to discuss problems of practice in leadership, plan and implement service projects and coordinate student leadership development activities.

LEAD 500-3. Introduction to Leadership Studies.
Meets with LEAD 400.

LEAD 502-2. Vision, Values and Leadership in a Democratic Society.
Students explore leadership theory, values, and assumptions inherent in public education within a democratic society, and personal beliefs relative to education and democracy. Personal educational philosophy and strategies facilitating vision, community, and common purpose are developed. Field work required.

LEAD 516-2. Curriculum Leadership in a Multicultural Society.
Study of the nature of curriculum, the historical evolution of curriculum, conflicting philosophical perspectives on curriculum, and current issues and trends affecting curriculum implementation and change. Emphasis placed upon creating congruent curriculum amidst competing forces. Field work required.

LEAD 522-2. Program Evaluation and Curriculum Assessment.
Designed to be taken with LEAD 523. Offers students an opportunity to explore various methods of evaluating school programs and assessing the effectiveness of curriculum. Field work is included in the requirements for this course. Prer., LEAD 516 or equivalent.

LEAD 523-1. Action Research Laboratory.
Designed to be taken concurrently with LEAD 522. Offers students an opportunity to apply methods in program evaluation and curriculum assessment to actual school problems. Students apply methods completing a schoolbased action research project.

LEAD 524-1. Leadership and Management of Programs for Special Populations.
Students explore challenges and needs placing students at risk of school failure. Emphasis placed on the legal and educational requirements of special programs including Title I, Special Education, Gifted and Talented, ESL, Section 504, ADA, and IDEA. Field work required.

LEAD 525-2. Creative Communication for School Leaders.
Strategies for effective communication and its role in group process, organizational effectiveness, persuasion, and conflict including criteria for effectiveness in communication are examined. Emphasis placed upon the role of technology and creativity in communication for leaders. Field work required.

LEAD 545-3. The Principalship.
Examination of the principalship at elementary, middle, and high school levels based upon research and recommended practices. Analysis of instructional, organizational, political, and leadership challenges. Assessment of policies and principles guiding coordination of the instructional program. Field work required.

LEAD 553-1 to 4. Workshop in Leadership.
Contemporary national, state, and local issues in education from the perspective of the education leader. An overview of current issues and trends in elementary and secondary education will be developed for reference, discussions, debates, and policy purposes.

LEAD 554-1 to 4. Advanced Topics in Leadership.
In-depth analysis and application of leadership principles related to contemporary school issues.

LEAD 604-2. Developing Collaborative School Communities.
Leadership principles, change process research, and organizational theory applied to school research, and administration. Strategies for facilitating collaborative decision making and change processes, building community, and including and motivating diverse population of stakeholders in program planning and evaluation. Field work required.

LEAD 605-3. Financing Schools and Programs.
Funding sources for public schools, procedures in financial planning, budgeting implications, and the relationship between costs and effectiveness explored including resource procurement, control of funds, accounting requirements, and payment procedures. Emphasis on management of building level budgets. Field work required.

LEAD 612-3. Educational Politics in a Democratic Society.
A study of models, concepts, and processes regarding the organization of the American public school system at the federal, state, intermediate, and local school district levels including the values, resources, and power structures of the local community. Field work required.

LEAD 614-3. Supervision and Evaluation of Instruction.
The role of instructional leader facilitating instructional effectiveness toward student success. Evaluation and supervision strategies included are: data collection, data analysis, legal aspects, evaluation report writing, conferencing, goal setting, motivation, and focusing on student outcomes. Field work required.

LEAD 640-3. Legal Issues for School Leaders.
Federal and state laws from statutes, key court decisions, and recent legal developments are studied. Governance challenges of American education with emphasis on the legal duties, rights, and restraints of principals and administrators are explored. Field work required.

LEAD 670-3. Methods of Qualitative Inquiry.
Prepares students to conduct field research employing qualitative methods and perspectives. Students analyze qualitative studies from various fields of study. A field research project is required. Prer., Introductory course in research.

LEAD 671-3. Applications of Qualitative Inquiry.
Builds upon the basic foundations of qualitative inquiry and is designed to assist doctoral level students in designing and implementing research studies and analyzing data. Prer., LEAD 670 or equivalent.

LEAD 675-3. Intermediate Statistics.
Advanced methods of analyzing data with an empahsis on the use and interpretation of descriptive and inferential techniques. Topics covered include one-way and two-way ANOVA, power, multiple correlation and regression, ANCOVA, and selected packaged statistical programs. Prer., Introduction to Statistics or equivalent.

LEAD 682-3. Practicum in School Leadership: The Principalship.
A minimum of 300 clock hours of administration activities at the elementary, middle, and high school levels supervised by site mentors in varied settings with educationally, culturally, and socioeconomically diverse populations. Professional portfolio documents competencies required for program completion.

LEAD 686-3. Superintendent as Transformational Leader.
Exploration of leadership challenges of the superintendency and central office administrators. Content is based upon Colorado licensure standards, NCATE curriculum standards, and AASA professional standards for the superintendency. Field work is required. Prer., Completion of Approved Principal Licensure Program.

LEAD 687-3. The Superintendent as Manager of Quality Systems.
Exploration of management challenges of the superintendency and central office administrators. Content is based upon Colorado licensure standards, NCATE curriculum standards, and AASA professional standards for the superintendency. Field work is required. Prer., Completion of approved Principal Licensure Program or consent of instructor.

LEAD 688-3. Practicum in Central Office Leadership and the Superintendency.
A minimum of 300 clock hours of central office administration activities supervised by site mentors in varied settings with educationally, culturally, and socioeconomically diverse populations. Professional portfolio documents required competencies. Prer., LEAD 686 and 687.

LEAD 700-1 to 6. Master's Research Laboratory in Leadership.
Laboratories organized by professors to engage students in on-going research projects. Students extend and apply knowledge and skills developed in coursework. Student complete portfolio requirements and/or work on thesis. Prer., Admission to Master's Program or consent of instructor.

LEAD 750-1 to 6. Doctoral Research Laboratory in Leadership.
Laboratories are organized by professors to engage students in on-going research programs. They provide opportunities for students to extend and apply knowledge and skills developed in coursework. The laboratories enable students to complete portfolio requirements and work on doctoral dissertations. Prer., Only students enrolled in the UCD/ UCCS PhD program may enroll.

LEAD 755-1 to 3. Readings in Leadership.
Selected readings for advanced study in a specific area of Educational Leadership or Leadership Studies. Prer., Admission to Master's or Ph.D. program or consent of instructor.

LEAD 950-1 to 6. Independent Research in Educational Leadership.
Independent investigation of topics of specific interest completed under guidance of a faculty member. Specifics of the investigation are a joint decision requiring a written research proposal. Used for degree purposes only upon written consent of an advisor. Prer., Consent of instructor.

LEAD 999-0. Candidate for Degree.
Used only by students not registered for course work or independent research during the semester in which the student takes the comprehensive examination. Fulfills requirement for registration during the semester in which comprehensive is taken. No credit is earned.

Social Foundations

SFND 500-3. Social Foundations of Education Trends.
Addresses the relationship of schooling to society by focusing on the question of whether the schools can significantly reduce the environmentally related inequalities in achievement which exist in America and zeroing in on relationships between the federal government and education. Various speakers will present and discuss these and other issues.

Special Education

SPED 300-3. Introduction to Special Education.
An overview of the physical, cognitive, and affective characteristics and development of exceptional individuals in relation to normal development is presented. The course examines why students succeed or fail, the teaching-learning process, individualized instruction, service delivery, ethics, and how general educators, special educators, and parents work together to maximize student development in the least restrictive environment. Participants are introduced to the historical, legal, and financial aspects of special education. Understanding and appreciating multicultural influences on educational practices are also discussed. Variable credit is only available for students in TEP. Meets with SPED 500.

SPED 372-2. Practicum I.
Provides participants with an introductory experience teaching students with disabilities. The focus of the course is on learning and applying basic instructional and management techniques. In addition, students will learn how to collect student performance data and make appropriate instructional decisions. Prer. or Coreq., SPED 300.

SPED 401-3. Special Education Policies and Procedures.
Examines current special education law and procedures, financial structures, and delivery systems. Additionally, students discuss educational problems and discuss potential solutions. Students are introduced to current research and foundational concepts that are studied in depth in future coursework. These include examining multicultural influences on educational practice, framing special education services in a problem solving model, and constructing a unified system for delivering educational services to all students. Prer., SPED 300 and SPED 405. Meets with SPED 502.

SPED 405-3. Applied Behavior Analysis.
Examines applied behavior analysis principles and techniques, including observational analysis, databased instruction, and social validity. These concepts are emphasized as means to increase or decrease target behavior, and to facilitate behavior maintenance and generalization. Additionally, students are exposed to current research findings related to applied behavior analysis. APA writing style, ethics, legal issues, and materials are also covered. Prer., SPED 300. Meets with SPED 505.

SPED 406-2. Mathematics Instruction.
Students will learn specific procedures for designing mathematics lessons for

students with mild and moderate disabilities. Students will learn procedures for evaluating, selecting, and modifying mathematics curricula to meet the needs of students in diverse instructional environments. Current research findings and instructional delivery systems such as cooperative learning and precision teaching will also be discussed. Meets with SPED 506.

SPED 407-3. Language Arts Instruction.
Introduction to the design of curriculum and the use of effective instructional practices for students with mild and moderate disabilities. Students will learn specific procedures for designing reading and written language lessons, practice applying teacher presentation techniques to improve student achievement outcomes. The Colorado Language Arts Standards will also be discussed. Prer. or coreq., SPED 405. Meets with SPED 507.

SPED 410-3. Assessment and Instructional Monitoring.
Provide the skills necessary to plan and conduct systematic assessments of students who are at risk for academic failure in educational environments. Class lectures, activities, and assignments will focus on how to select assessment procedures for: a) planning prereferral interventions, b) determining eligibility for special education services, c) planning efficient instructional programs, and d) monitoring student progress. The linkage of assessment data to intervention planning and effective instructional practices will be emphasized throughout the course. Additionally, current research findings and contemporary issues in educational assessment will be addressed. Prer., SPED 405 and 407. Meets with SPED 510.

SPED 414-3. Self-Determination and Transition II.
Elementary and secondary career education and transition concepts including history, legal issues, IEP transition planning, assessment, labor laws, and community-based instructions are presented. Coordination of post-school services is discussed in relation to supported and competitive employment and community agencies. Prer., SPED 300/SPED 500. Meets with SPED 514.

SPED 416-3. Significant Support Needs.
Focus on the development, implementation, and evaluation of instructional programs for students with severe cognitive and physical needs in elementary and secondary settings. Prer., SPED 300 and SPED 405. Meets with SPED 516.

SPED 420-3. Behavioral and Social Skills I.
Focus on the development, implementation, and evaluation of instructional programs for students with challenging behaviors. Course content focuses on defining characteristics of children and youth with emotional and behavioral disorders across educational settings. Prer., SPED 405/505. Meets with SPED 519.

SPED 421-3. Behavioral and Social Skills II.
Focus on the development, implementation, and evaluation of instructional programs for students with challenging behaviors. Course content includes behavioral assessment, social skills instruction, and techniques for managing aggressive behavior. Prer., SPED 300, SPED 405 and SPED 420. Meets with SPED 539.

SPED 428-3. Self-Determination and Transition I.
Presents self-determination instructional methodology including assessment and instructional programs. Focus is upon teaching students how to choose goals, express goals through learning to actively participate in the IEP meeting, and taking action on achieving their own goals. Prer., SPED 300/SPED 500. Meets with SPED 528.

SPED 429-3. Consultation and Collaboration.
Emphasizes data-based consultation models and collaborative problem solving techniques that are effective across learning environments. Meets with SPED 530.

SPED 431-2. Consultation and Collaboration II.
Emphasizes data-based consultation and the design, implementation, monitoring, and evaluation of interventions to improve students' opportunities to benefit from their learning and social environments. Strategies for coordinating and managing educational staff and programs in a variety of environments will also be presented. Prer., SPED 430; Coreq., SPED 476 or 477.

SPED 432-3. Mathematics Instruction.
Students will learn procedures for evaluating, selecting, modifying, and teaching mathematics curricula to meet the learning needs of students with mild and moderate disabilities. Prer., SPED 300 and SPED 405. Meets with SPED 532.

SPED 436-6. Elementary Student Teaching: Moderate, Affective, Cognitive Needs.
This supervised student teaching experience provides students with the opportunity to apply and integrate principles and techniques learned in previous course in elementary school settings. Student teaching application due dates: Fall (October 15) and Spring (March 15). Prer., SPED 300/SPED 500 through SPED 550. Meets with SPED 536.

SPED 437-6. Secondary Student Teaching: Moderate, Affective, Cognitive Needs.
This supervised student teaching experience provides students with the opportunity to apply and integrate principles and techniques learned in previous course in secondary school settings. Student teaching application due dates: Fall (October 15) and Spring (March 15). Prer., SPED 300/SPED 500 through SPED 550. Meets with SPED 537.

SPED 450-3. Teaching Secondary Students in Content Classes.
Provides participants with procedures and techniques teachers may use to increase student achievement in content area courses. Participants will learn effective strategies for planning, implementing, and evaluating complex content area instruction. A variety of ways to deliver instruction including cooperative learning, peer tutoring, and coteaching will also be addressed. Meets with SPED 540.

SPED 455-3. Language Arts II.
Provides participants with procedures and techniques to increase student achievement in content area courses. Participants will learn effective strategies for planning, implementing, and evaluating complex content. A variety of ways to deliver instruction will also be addressed. Prer., SPED 300, SPED 405 and SPED 407. Meets with SPED 555.

SPED 471-3. Practicum II.
Participants will develop skills to implement an effective, research-based language arts reading program for low achieving students and students with disabilities in a variety of educational settings. Meets with SPED 585.

SPED 474-3. Practicum III.
Participants will work with a team of general and special educators in an elementary or secondary setting. Participants will plan and implement effective mathematics instruction for low achieving students and students with disabilities. Participants will also plan and deliver instruction to students with affective needs in a variety of instructional settings. Prer., SPED 473.

SPED 476-7. Elementary Student Teaching: Moderate, Affective, Cognitive Needs.
Provides students the opportunity to apply and integrate the principles and techniques learned in previous courses in an elementary setting. Students will work with children with moderate, affective, and cognitive disabilities under the supervision of a cooperating teacher. Competency assignments and current issues are discussed during student teaching seminars. Coreq., SPED 430 or 431 and permission of instructor.

SPED 477-7. Secondary Student Teaching: Moderate, Affective Cognitive Needs.
Provides students the opportunity to apply and integrate the principles and techniques learned in previous courses in a secondary setting. Students will work with adolescents with moderate, affective, and cognitive disabilities under the supervision of a cooperating teacher or district supervisor. Competency assignments and current issues are discussed during student teaching seminars. Coreq., SPED 430 or 431 and permission of instructor.

SPED 491-1 to 4. Workshop.
Designed to allow specific topics and issues to be explored in-depth. Prer., Permission of instructor.

SPED 500-3. Introduction to Special Education.
An overview of the physical, cognitive and affective characteristics and development of exceptional individuals in relation to normal development is presented. The course examines why students succeed or fail, the teaching-learning process, individualized instruction, service delivery, ethics, and how general educators, special educators and parents can work together to maximize student development in the least restrictive environment. Students are introduced to the historical, legal, and financial aspects of special education. Understanding and appreciating multicultural influences on educational practices are discussed also. Meets with SPED 300.

SPED 501-1. Trends and Legal Issues.
Examines current special education trends and special education law, procedures, financial structures, and delivery systems. Additionally, students discuss educational problems and discuss potential solutions. Students are introduced to current research and foundational concepts that are studies in depth in future and foundational concepts that are studied in depth in future courses. These include examining multicultural influences on educational practice, framing special education services in a problem-solving model, and constructing a unified system for delivering educational services to all children. Meets with SPED 401.

SPED 502-3. Special Education Policies and Procedures.
Examines current special education laws, including IDEA, Section 504, and ADA. In addition, students learn how to develop legally correct and educationally useful Individualized Education Programs. Prer., SPED 500 and SPED 505. Meets with SPED 401

SPED 505-3. Applied Behavior Analysis.
Examines applied behavior analysis principles and techniques including observational analysis, databased instruction, and social validity. These concepts are emphasized as means to increase or decrease target behavior, and to facilitate behavior maintenance and generalization. Additionally, students are exposed to current research findings related to applied behavior analysis. APA writing style, ethics, legal issues and materials are also covered. Prer., SPED 500. Meets with SPED 405.

SPED 506-2. Mathematics Instruction.
Specific procedures for designing mathematics lessons for students with mild and moderate disabilities. Students will learn procedures for evaluating, selecting, and modifying mathematics curricula to meet the needs of students in diverse instructional environments. Prer., SPED 505. Meets with SPED 406.

SPED 507-3. Language Arts Instruction.
Design of curriculum and the use of effective instructional practices for students with mild and moderate disabilities. Students will learn specific procedures for designing reading and written language lessons, and practice applying teacher presentation techniques to improve student achievement outcomes. Prer., SPED 505. Meets with SPED 407.

SPED 510-3. Academic Assessment and Instruction.
Provides the skills necessary to plan and conduct systematic assessments of students who are at risk for academic failure in educational environments. Class lectures, activities, and assignments will focus on how to select assessment procedures for: a) planning prereferral interventions, b) determining eligibility for special education services, c) planning efficient instructional programs, and d) monitoring student progress. The linkage of assessment data to intervention planning and effective instructional practices will be emphasized throughout the course. Additionally, current research findings and contemporary issues in education will be addressed. Prer., SPED 506, 507, and REM 501. Meets with SPED 410.

SPED 514-3. Self-Determination and Transition II.
Elementary and secondary career education and transition concepts including history, legal issues, IEP transition planning, assessment, labor laws, and community-based instructions are presented. Coordination of post-school services is discussed in relation to supported and competitive employment and community agencies. Prer., SPED 300/SPED 500. Meets with SPED 414.

SPED 516-3. Significant Support Needs.
Focus on the development, implementation, and evaluation of instructional programs for students with severe cognitive and physical needs in elementary and secondary settings. Prer., SPED 500 and SPED 505. Meets with SPED 416.

SPED 519-3. Behavioral and Social Skills I.
Focus on the development, implementation, and evaluation of instructional programs for students with challenging behaviors. Course content focuses on defining characteristics of children and youth with emotional and behavioral disorders across educational settings. Prer., SPED 405/505. Meets with SPED 420.

SPED 528-3. Self-Determination and Transition I.
Self-determination instructional methodology including assessment and instructional programs. Focus is upon teaching students how to choose goals, express goals through learning to actively participate in the IEP meeting, and taking action on achieving their own goals. Prer., SPED 300/SPED 500. Meets with SPED 428.

SPED 530-3. Consultation.
Focus on collaborative consultation services as framed in an ecological, problem-solving model for delivering educational services to students. Consultation models, theory and techniques will include group process and teamwork, collaborative problem solving, ongoing monitoring of the effectiveness of interventions, and conflict resolution. The course will emphasize databased consultation and the use of learning strategies with other educators across environments. The student's regular curriculum and social environment is the focal point for intervention. Prer., SPED 510, 512, 513 and 516.

SPED 532-3. Mathematics Instruction.
Procedures for evaluating, selecting, modifying, and teaching mathematics curricula to meet the learning needs of students with mild and moderate disabilities. Prer., SPED 500 and SPED 505. Meets with SPED 432.

SPED 533-3. Multiple Intelligence and Gifted Students.
Focus upon the creation and development of teaching materials to assist school personnel charged with meeting the instructional needs of gifted, creative, and talented students in both regular and special education classrooms, Grades K-12. Participants will examine existing educational research to determine the most effective ways and means of instructing gifted students. They will study and evaluate existing methods and materials designed for the target population, and they will design new materials to utilize in the teaching of gifted students. Meets with CURR 5202.

SPED 536-6. Elementary Student Teaching: Moderate, Affective, Cognitive Needs.
Supervised student teaching that provides the opportunity to apply and integrate principles and techniques learned in previous course in elementary school settings. Student teaching application due dates: Fall (October 15) and Spring (March 15). Prer., SPED 300/SPED 500 through SPED 550. Meets with SPED 436.

SPED 537-6. Secondary Student Teaching: Moderate, Affective, Cognitive Needs.
Supervised student teaching that provides the opportunity to apply and integrate principles and techniques learned in previous courses in secondary school settings. Student teaching application due dates: Fall (October 15) and Spring (March 15). Prer., SPED 300/SPED 500 through SPED 550. Meets with SPED 437.

SPED 539-3. Behavioral and Social Skills II.
Focus on the development, implementation, and evaluation of instructional programs for students with challenging behaviors. Course content includes behavioral assessment, social skills instruction, and techniques for managing aggressive behavior. Prer., SPED 300/500, SPED 405/505, and SPED 420/519. Meets with SPED 421.

SPED 540-3. Teaching Secondary Students in Content Area.
Participants will learn effective strategies for planning, implementing, and evaluating complex content area instruction. A variety of ways to deliver instruction including cooperative learning, peer tutoring, and co-teaching will also be addressed. Prer., SPED 405/505. Meets with SPED 450.

SPED 545-3. Literature for gifted adolescents.
Reading and evaluation of literature for gifted and talented adolescents. Emphasis is on contemporary literature, especially literature by and about female, minority and gifted and talented persons. Meets with CURR 5421.

SPED 550-3. Applied Research Project.
The basic premise of this seminar is that applied behavior analysis and the teacher as a researcher- scientist are integral components of an effective educational setting. Based on individual interests, students will design a research project for the purpose of evaluation interventions in their own setting. Students will (a) develop a research proposal in APA format, (b) conduct the research, and (c) submit a final research paper to the special education faculty. All papers will be evaluated by the research review committee consisting of three university faculty members. This course is required to fulfill the MA comprehensive exam requirement. Prer., Enrolled in SPED 530.

SPED 555-3. Language Arts II.
Procedures and techniques to increase student achievement in content area courses. Participants will learn effective strategies for planning, implementing, and evaluating complex content. A variety of ways to deliver instruction will also be addressed. Prer., SPED 500, SPED 505 and SPED 507. Meets with SPED 455.

SPED 559-3. Arts for the Gifted.
Explores a variety of arts activities for the elementary and middle grades. There will be a focus on a multifaceted approach to teaching arts within creative, stimulating environments where the gifted student can evolve and thrive. Creativity, hemisphericity, problem solving, and practical applications of visual arts, music, dance, drama, and creative writing are addressed. Meets with CURR 5210.

SPED 560-2 to 3. Teaching the Gifted and Creative Student.
This introductory course explores the nature and nurture of gifted children and adolescents. Characteristics, identification, program alternatives and teaching strategies are addressed as is the history of the gifted child movement. Meets with EPSY 525.

SPED 561-3. Curriculum Strategies for Gifted and Talented.
Prepares participants to write challenging, effective and differential curricula for gifted learners. A variety of curriculum models and strategies will be explored. Participants will create curriculum units for gifted students in

content areas of their choice. Meets with CURR 5211.

SPED 562-3. Reading and Language Arts for the Gifted.
Explores a wide variety of reading and writing activities for gifted learners. Children's and adolescent literature, biography, independent study, creative dramatics and expository and creative writing are among the many topic areas addressed. Meets with CURR 5212.

SPED 563-3. Social Studies and Humanities for the Gifted.
Addresses the teaching of social studies and the humanities to gifted and talented students, grades K-12. An integrated, holistic approach to social studies is emphasized. Meets with CURR 5213.

SPED 564-3. Creative Problem Solving and Future Problem Solving for Gifted Learners.
Covers four areas: creativity, problem solving, future studies, and future problem solving. The course content will focus on both the theoretical frameworks underlying each topic, as well as concomitant teaching strategies. Meets with CURR 5220.

SPED 569-3. Supervised Practicum — Gifted/Talented Education.
Practicum credit may be obtained through selected, supervised field placements in teaching or supervisory roles in gifted education.

SPED 576-3. Elementary Student Teaching: Moderate, Affective, Cognitive Needs.
Supervised student teaching or on-the-job teaching experience provides the opportunity to apply and integrate principles and techniques learned in previous courses in an elementary setting. Applications are due March 15 for Fall semester and October 15 for Spring semester. Prer., SPED 500-550.

SPED 577-3. Secondary Student Teaching: Moderate, Affective, Cognitive Needs.
Supervised student teaching or on-the-job teaching experience provides the opportunity to apply and integrate principles and techniques learned in previous courses in a secondary setting. Applications are due March 15 for Fall semester and October 15 for Spring semester. Prer., SPED 500-550.

SPED 585-3. Practicum II.
Participants will develop skills to implement an effective, research-based language arts reading program for low achieving students and students with disabilities in a variety of educational settings. Meets with SPED 471.

SPED 590-3. Seminar: Current Research Issues in Gifted Education.
Students explore contemporary research related to the identification of gifted student, programs and other related educational issues. Meets with CURR 5201.

SPED 591-1 to 4. Workshop.
Designed to allow specific topics and issues to be explored in-depth.

SPED 593-2. Step Up to Writing: Basic, Practical and Helpful Writing Instruction.
Participants will receive training using the Step Up to Writing curriculum published by Sopris West. This program provides training in how to organize ideas and information, write topic sentences and thesis statements, connect main ideas, write conclusions, think creatively, and other components of effective writing.

SPED 594-3. Language! Professional Development Course for Reading Educators.
Uses Language! curriculum published by Sopris West. A comprehensive intervention curriculum for students who lack age or grade level mastery in reading, writing and spelling. Participants will be trained using integrated strands that include decoding, spelling, comprehension, grammar, vocabulary, mechanics, usage, figurative language, expository and narrative writing, and literature.

SPED 595-2. Reaching the Tough to Teach Institute.
This institute provides participants with a variety of training opportunities that specifically relate to programs, policies, and procedures for working with at-risk students. Participants will have multiple opportunities to reflect on knowledge learned and develop practical application plans.

SPED 945-1 to 4. Independent Study.
Independent investigation of topics of specific interest to the student and completed under the direction of a faculty member. The specifics of the investigation are a joint decision by the student and faculty member. The meeting times, expectations, and evaluation are arranged. Courses leading to licensure are seldom completed through an independent study. Prer., Permission of instructor.

SPED 950-1 to 4. Independent Study in Special Education.
Independent investigation of topics of specific interest to the student and completed under the direction of a faculty member. The specifics of the investigation are a joint decision by the student and faculty member. The meeting times, expectations and evaluation are arranged. Certification and/or endorsement courses are seldom completed through an independent study.

SPED 955-1 to 4. Independent Study in Gifted and Talented Education.
Independent research, study and planning in gifted education may be completed under the direction of a faculty member. The specifics of the investigation and the topic are a joint decision by the student and faculty member. The meeting times, expectations and evaluation are arranged with the faculty member. Students must have written consent of the instructor.

SPED 999-0. Candidate for Degree.
To be used only by those students who will not be registered for course work during the semester in which the comprehensive examination for the master's degree is taken. Consent of advisor is required.

Teacher Education

T ED 300-3. Contemporary American Education.
Provides an introduction to contemporary American education for anyone interested in today's schools as well as for potential teachers.

T ED 301-1 to 3. Early School Experience.
Provides early school experience for potential teachers in public school classrooms. This experience focuses on the roles, responsibilities and qualities of the professional teacher through practical experience. Prer., T ED 300, prior or concurrent.

T ED 441-1. Children's Literature Methods.
Surveys historical and contemporary literature for children to promote literacy growth. Author studies, technology connections in children's literature, and genre such as picture books, biography, nonfiction, and mystery and adventure are among the critical topics covered, as well as the Colorado content standards for reading and writing.

T ED 444-3. Mathematical Connections and Concepts.
Exploration of current mathematics curriculum topics in ways which will allow students to develop deeper conceptual knowledge and a better understanding of the connections between various mathematical topics. Applications of mathematics to other disciplines. Historical background of secondary curriculum. Meets with CURR 524.

T ED 450-1. The Professional Educator.
Provides student teachers in the final semester of teacher training with the skills and strategies to successfully enter the teaching profession including portfolio development, interviewing, philosophies, and application processes.

T ED 452-2. Educational Psychology.
Designed to provide teachers with knowledge of those parts of psychology most relevant to the profession of teaching. In particular, the focus will be on the areas of child development and learning theories. The student will become familiar with the major theories of cognitive, social, and moral development and learning (behavioral and cognitive) and the application of these theories for classroom behavior and learning. Meets with T ED 552.

T ED 453-1. Social Foundations of Educational Issues.
Addresses the relationship of schooling to society by focusing whether the schools can significantly reduce the environmentally related inequalities in achievement which exist in America on relationships between the state and federal government and education. Includes an overview of multicultural education and an outline of recent legislative changes enacted at the state and federal level.

T ED 454-2. Education of Exceptional Children.
Includes an overview of the major current issues in special education as well as a description of the most commonly encountered handicapping conditions. Students gain an understanding of different learning styles and adapting instruction to meet individual needs. Information regarding the general legal requirements for handicapped students and due process is also provided. Requires volunteer work with special populations.

T ED 459-1. Elementary Physical and Wellness Education Methods.
Examines the contribution physical and wellness education makes to the curriculum. The components of the curriculum will be explained and students will have direct experience with most activities. Emphasis will be on low-organized games, rhythm, perpetual motor activities, conflict resolution, class management, and the importance of individual skill development. Prer., Accepted TEP students only.

T ED 460-1 to 4. School Experience — Elementary.
Pre-student teaching field experience. Summer involves participating in organizing, planning, conducting and evaluating a reading clinic experience in a public school. Fall involves observing a variety of schools and classrooms and serving as a teaching associate at assigned Professional Development School.

T ED 462-3. Elementary Reading Methods.
An introduction to reading literacy instructional practices. Includes a critical overview of current approaches, methods and materials, supported by a basic understanding about the reading and literacy learning process.

T ED 463-8 to 14. Student Teaching — Elementary.
Elementary education students, in consultation with members of the school of education faculty, will be assigned to an elementary professional development school for full-day teaching for a period of sixteen weeks. During this time students will demonstrate, through direct site development experience, competency and understanding of teaching-learning process. Prer., TEP students only.

T ED 464-3. Elementary Mathematics Methods.
Provides teachers with a laboratory approach for teaching mathematics and acquaints them with a variety of materials and methods. Emphasis is on fostering skills in problem-solving; creative/critical thinking; and inductive/deductive processes and addressing the Colorado content standards for math.

T ED 465-2. Elementary Science Methods.
Designed to acquaint teachers with materials and methods for teaching science to elementary school children. Consideration will be given to various programs and textbook series as well as the Colorado content standards in science. Teachers will complete a number of laboratory activities.

T ED 466-1. Elementary Social Studies Methods.
Elementary social studies disciplines of history, civics, economics, and geography, writing standards- based instructional units, and characteristics of high quality social studies programs and instruction.

T ED 467-1. Elementary Language Arts Methods.
Acquaints students with language arts strategies at the elementary school level. Provides them with knowledge and skills to successfully implement reading, writing, and dramatic activities for children and to recognize literature for children of exceptional quality.

T ED 468-1. Expressive Arts Methods.
Introduces prospective teachers to methods for teaching the expressive arts within the regular classroom. Students will learn how to meaningfully integrate the expressive arts into all subject areas. Visual arts, music drama, puppetry, dance, expressive literature, creative story telling and writing will all be explored. Prer., Accept TEP students only.

T ED 469-1. Elementary Curriculum Instruction and Evaluation.
Acquaints students with general principles of curriculum design, as well as specific instructional practices relative to the implementation of standard-based curriculum and assessment.

T ED 470-1 to 5.School Experience-Secondary.
Pre-student teaching field experience. Summer: Teaching in a summer program for area secondary school students. Fall: 1) Observing schools and teachers; 2) Teacher associate for three five-week periods with secondary teachers at a professional development site. Prer., Participation in TEP.

T ED 471-1 to 3. Methods for Secondary Education.
Introduces the fundamentals of teaching methods. Focus is on the decision-making model of teaching including planning, implementing, assessment, and modifying teaching. Skill in developing instructional objectives and planning and presenting lessons are emphasized.

T ED 472-3. Teaching Reading and Writing in the Content Area.
Designed to help secondary teachers become aware of the reading and writing process and how they apply to subject matter material. A framework for functionally teaching reading and writing within a particular content area is developed and strategies for increasing student independence with print are emphasized.

T ED 473-8 to 14. Student Teaching — Secondary.
Secondary education students, in consultation with members of the school of education faculty, will be assigned to a secondary professional development school for full-day teaching for a period of sixteen weeks. During this time students will demonstrate, through direct experience, competency and understanding of the teaching-learning process.

T ED 474-3 to 4. Secondary Methods.
This methods course in the various disciplines gives an overview of instructional theory, methods, and materials in English, foreign language, social studies, science, or math and helps students develop teaching strategies in their content areas as well as address the Colorado model content standards.

T ED 479-3 to 4. Secondary Curriculum, Instruction and Evaluation.
Students develop an understanding of the context in which instruction takes place in today's middle and high schools, as well as principles of curriculum design, including standards-based lesson and unit planning. Methods of assessment, interpretation of results, and diagnostic teaching will be addressed.

T ED 482-1 to 4. Workshop in Educational Development.
Current trends and issues in education. In-depth study of selected topics. Advanced-level work but counts toward a graduate degree only as a minor.

T ED 483-1 to 4. Instructional Workshop.
Current instructional approaches are considered. Focus is upon classroom applications with in-depth study of selected topics.

T ED 552-2. Educational Psychology.
Provides teachers with the knowledge of psychology most relevant to teaching. The focus is on areas of child development and major learning theories and their application in the classroom. Meets with T ED 452.

T ED 940-1 to 6. Independent Study.
Independent investigation of topics of specific interest to the individual student and completed under the direction of a faculty member. The specifics of the investigation and the topic are a joint decision by the student and faculty member. The meeting times, expectations, and evaluation are arranged with the faculty member. Students must have written consent of the instructor.

College of Engineering and Applied Science

Computer Science

C S 100-3. Computer Literacy.
The role of computers in society with an introduction to programming in basic. The student is introduced to the concepts and operations of a microcomputer including several typical software environments such as word processing, spread sheet accounting, and database systems. The history and impact of computing in society is covered. This is the most elementary course offered by the computer science department. This course is not for CS or engineering majors. Prer., High School algebra.

C S 103-1. Introduction to Microsoft Word.
Introduction to word processing and the specifics of using the Microsoft Word for Windows system. Students will learn to create, format, and edit documents using Word.

C S 104-1. Introduction to Microsoft Excel.
Introduction to spreadsheets and the specifics of using the Microsoft Excel for Windows system. Students will learn to create, edit, and print spreadsheets using Excel.

C S 105-3. Introduction to Programming with FORTRAN for Non-majors.
An introductory course in FORTRAN programming. Topics include top-down analysis of problems, structured programming, data storage, control statements, loops and subprograms. Programming assignments are oriented more toward scientific applications. This course is not for computer science majors. Prer., High School algebra.

C S 106-3. Introduction to Programming with C for Non-majors.
An introductory course in C programming. Topics include top-down analysis of problems, structured programming, data storage, control statements, loops and subprograms. This course is not for computer science majors. Prer., High School algebra.

C S 107-3. Introduction to Programming in Visual BASIC for Non-Majors.
Introduction to using visual basic to design and implement programs that interface with their users through Microsoft Windows. Prer., High School algebra.

C S 115-3. Principles of Computer Science.
Introduction to programming with emphasis on computer science concepts. Develops methods for computer problem solving. Develops proficiency for programming in a modern programming language, and introduces the concepts of abstraction in problem solving. Includes basic concepts of computer systems and environments including debuggers, editors, and file systems. Prer., High school algebra and familiarity with computer concepts including file operations and text editing.

C S 145-3. Data Structures and Algorithms.
Concepts of data type, data abstraction, and data structure. Internal representations of fundamental data types. Linear data structures: stack, queue. Linked data structures and dynamic data types. Search table data abstraction, linear search in arrays and lists, binary search in arrays and trees. Binary trees, non-binary trees, binary search trees. Prer., C S 115 or equivalent.

C S 201-1 to 3. Topics in Computer Science.
Content will vary to reflect the areas of current interest in computer science. As the courses continually change, students may take the course several times for elective credit. Prer., Consent of instructor.

C S 202-1 to 3. Topics in Computer Science.
Content will vary to reflect the areas of current interest in computer science. As the courses continually change, students may take the course several times for elective credit. Prer., C S 145 and ECE 1011.

C S 203-1 to 3. Topics in Computer Science.
Content will vary to reflect the areas of current interest in computer science. As the courses continually change, students may take the course several times for elective credit. Prer., Consent of instructor.

C S 205-1 to 3. Topics in Computer Science.
Content will vary to reflect the areas of current interest in computer science. As the courses continually change, students may take the course several times for elective credit. Prer., Consent of instructor.

C S 206-1 to 3. Topics in Computer Science.
Content will vary to reflect the areas of current interest in computer science. As the courses continually change, students may take the course several times for elective credit. Prer., Consent of instructor.

C S 201-1 to 3. Topics in Computer Science.
Content will vary to reflect the areas of current interest in computer science. As the courses continually change, students may take the course several times for elective credit. Prer., Consent of instructor

C S 201-1 to 3. Topics in Computer Science.
Content will vary to reflect the areas of current interest in computer science. As the courses continually change, students may take the course several times for elective credit. Prer., Consent of instructor

C S 216-3. Computer Organization and Assembly Language Programming.
Provides an introduction to the concepts of computer architecture, functional logic, design and computer arithmetic. It presents material on the mechanics of information transfer and control within a computer system. Also included are symbolic programming techniques, implementing high level control structures, addressing modes and their relation to arrays, subprograms, parameters, linkage to high level languages and the assembly process. Prer., C S 145.

C S 301-1 to 3. Selected Topics in Computer Science.
The content of these courses will vary from time to time and reflect the areas of current interest in Computer Science. As the courses continually change, students may take the course several times for technical elective credit. Prer., Instructor consent.

C S 302-1 to 3. Selected Topics in Computer Science.
The content of these courses will vary from time to time and reflect the areas of current interest in Computer Science. As the courses continually change, students may take the course several times for technical elective credit. Prer., Instructor consent.

C S 303-1 to 3. Selected Topics in Computer Science.
The content of these courses will vary from time to time and reflect the areas of current interest in Computer Science. As the courses continually change, students may take the course several times for technical elective credit. Prer., Instructor consent.

C S 304-1 to 3. Selected Topics in Computer Science.
The content of these courses will vary from time to time and reflect the areas of current interest in Computer Science. As the courses continually change, students may take the course several times for technical elective credit. Prer., Instructor consent.

C S 305-1. Social and Ethical Implications of Computing.
This class will discuss selected topics in ethical, social, political, legal and economic aspects of the application of computers. Each student is expected to research one or more topics, actively participate in discussions, and give a presentation. Written papers may be required. Prer., C S 202 or instructor consent.

C S 306-3. Object-Oriented Programming Using C++.
The principal goals of this course are: 1) to learn the fundamentals of object-oriented programming, 2) to gain skill and proficiency in using the C++ programming language, 3) to exercise the C++ language in implementing a moderate sized software system designed with objects. Prer., C S 202 and ECE 1011 or instructor consent.

C S 316-3. Concepts of Programming Languages.
Evolution of the central concepts of programming languages, describing syntax and semantics, data types, abstract data types, control structures, subprograms, concurrency and exception handling. Prer., C S 145.

C S 330-3. Software Engineering.
Software engineering methodologies. The software lifecycle. Emphasis on the design, development and implementation of a software system. A course project provides the student teams practical application of the software engineering techniques. Prer., C S 145 and C S 202.

C S 401-1 to 3. Selected Topics in Computer Science.
The content of these courses will vary from time to time and reflect the areas of current interest in Computer Science. As the courses continually change, students may take the course several times for elective credit. Prer., Instructors consent.

C S 402-1 to 3. Selected Topics in Computer Science.
The content of these courses will vary from time to time and reflect the areas of current interest in Computer Science.

As the courses continually change, students may take the course several times for elective credit. Preq., Instructor consent.

C S 403-1 to 3. Selected Topics in Computer Science.
The content of these courses will vary from time to time and reflect the areas of current interest in Computer Science. As the courses continually change, students may take the course several times for elec- tive credit. Preq., Instructor consent.

C S 405-1 to 3. Selected Topics in Computer Science.
The content of these courses will vary from time to time and reflect the areas of current interest in Computer Science. As the courses continually change, students may take the course several times for elec- tive credit. Preq., Instructor consent.

C S 406-1 to 3. Selected Topics in Computer Science.
The content of these courses will vary from time to time and reflect the areas of current interest in Computer Science. As the courses continually change, students may take the course several times for elec- tive credit. Preq., Instructor consent.

C S 407-1 to 3. Selected Topics in Computer Science.
The content of these courses will vary from time to time and reflect the areas of current interest in Computer Science. As the courses continually change, students may take the course several times for elec- tive credit. Preq., Instructor consent.

C S 408-1 to 3. Selected Topics in Computer Science.
The content of these courses will vary from time to time and reflect the areas of current interest in Computer Science. As the courses continually change, students may take the course several times for elec- tive credit. Preq., Instructor consent.

C S 409-1 to 3. Selected Topics in Computer Science.
The content of these courses will vary from time to time and reflect the areas of current interest in Computer Science. As the courses continually change, students may take the course several times for elective credit. Preq., Instructor consent.

C S 410-3. Compiler Design I.
Underlying theory and design techniques for compilers. Lexical analysis, top-down and bottom-up parsing algorithms, run-time storage management, syntax directed translation schemes, intermediate code generation. Prer., C S 216, C S 316 and C S 470/570. Meets with C S 510.

C S 420-3. Computer Architecture I.
Logical design of digital computer systems. Examines the functional basis of various computer structures including control systems, memory devices, work structure and addressing, arithmetic and logic units, and input/output devices. Recent advances in computer architecture. Research project and presentation on advanced topics required of graduate students. Prer., C S 216. Meets with C S 520.

C S 438-3. Object-Oriented Software Construction: Foundations of OOP.
The basic principles and subtleties of object-oriented programming are presented. The notation used to support the principles will be Eiffel. Prer., C S 316.

C S 442-3. Data Base Systems I.
Course includes a study of general database concepts as well as an examination of data management system implementation approaches for data organization, maintenance and retrieval. Particular emphasis will be made on the relational approach including data normalization, relational algebra and relational calculus. Prer., C S 145 and C S 202 or equivalent background. Meets with C S 542.

C S 450-2. Operating Systems I.
Introduces concepts, terminology, and algorithms of operating systems. Describes semaphores, processes, virtual mappings, interrupts, resource allocation and management, protection, synchronization, scheduling, queueing and communication as applied to operating system design and implementation. Prer., C S 145, C S 202, C S 216, C S 420/520. Meets with C S 550.

C S 460-3. Numerical Computing.
Algorithms for the solution of nonlinear equations, interpolation and approximation, differentiation, integration, systems of linear equations, ordinary differential equations and least squares. Prer., C S 145, MATH 235 and MATH 313. Meets with C S 560.

C S 470-3. Computability, Automata and Formal Languages.
Finite automata and regular expressions, context-free grammars, context-free languages, and pushdown automata, Turning machines, undecidability, the Chomsky hierarchy of formal languages, computational complexity and intractable problems. Prer., C S 145, C S 202, MATH 215, & MATH 313. Meets with C S 570.

C S 472-3. Design and Analysis of Algorithms.
Design methodologies; divide-and-conquer, exhaustive search, dynamic programming. Time and space complexity measures, analysis of algorithms. Survey of important algorithms for searching, sorting, graph manipulation. Tractability: class P and NP, NP complete problems. Prer., C S 145, C S 202 and MATH 215. Meets with C S 572.

C S 480-3. Computer Graphics.
Fundamental areas of modern raster computer graphics: hardware, software, data structures, mathematical modeling, user interface and manipulation of graphical objects. A subset of the two dimensional GKS is examined and implemented with emphasis placed upon segmented display files and instance modeling. Basic to all graphic programs written are the ergonomic requirements of the user. Required programs are in the areas of animation, paint systems, polygon filling and clipping, and curve generation. Prer., C S 145, C S 202, and MATH 313. Meets with C S 580

C S 482-3. Functional and Logical Programming for Artificial Intelligence.
Course focuses on functional programming using LISP and logical programming using Prolog. Programming projects are geared towards various aspects of artificial intelligence. Prer., C S 316 or consent of instructor.

C S 501-3. Intensive Computer Science for Graduate Students.
Intended for prospective graduate students with extensive programming experience. Covers concepts in C S 115 and C S 145. Can substitute for these courses in satisfying entrance requirements for M.S. in Computer Science. Does not count towards M.S. or B.S. degrees. Not open to undergraduate. Prer., Knowledge of high-level programming language.

C S 502-1 to 3. Selected Topics in Computer Science.
Topics vary.

C S 503-1 to 3. Selected Topics in Computer Science.
Topics vary.

C S 505-1 to 3. Selected Topics in Computer Science.
Topics vary.

C S 506-1 to 3. Selected Topics in Computer Science.
Topics vary.

C S 507-1 to 3. Selected Topics in Computer Science.
Topics vary.

C S 508-1 to 3. Selected Topics in Computer Science.
Topics vary.

C S 509-1 to 3. Selected Topics in Computer Science.
Topics vary.

C S 510-3. Compiler Design.
Underlying theory and design techniques for compilers. Lexical analysis, top-down and bottom-up parsing algorithms, run-time storage management, syntax directed translation schemes, and intermediate code generation. Prer., C S 216, C S 316 and C S 470/570. Meets with C S 410.

C S 520-3. Computer Architecture I.
Logical design of digital computer systems. Examines the functional basis of various computer structures including control systems, memory devices, work structure and addressing, arithmetic and logic units and input/output devices. Recent advances in computer architecture. Research project and presentation on advanced topics required of graduate students. PRER., C S 216. Meets with C S 420.

C S 522-3. Computer Communication.
The subject of transmitting information between processors is described in detail. The student is expected to have maturity with hardware and/or realtime concepts. Communication systems, from simple to asynchronous point-to-point links, to those based on complex network architectures will be studied. Material will be oriented toward the computer scientist as a user, designer and evaluator of such systems. Terminology and concepts will be emphasized rather than detailed electronic or physical theory. Prer., C S 420/520, C S 450/550.

C S 525-3. Multimedia Computing and Communications.
Design principles of multimedia authoring and communication systems. It covers the interface and characteristics of voice and video processing equipment, multimedia document architectures, media encoding/compression schemes, real-time scheduling of time critical multimedia documents, multimedia editors, multimedia communication standards and communication software. Prer., Graduate standing or instructor permission.

C S 531-3. Software Requirements Analysis and Specification.
Techniques and tools for requirements analysis and requirements specification. Requirements languages and notations. Specification completeness and consistency. Team project in the analysis and specification of a major software system. Prer., C S 145 or equivalent, knowledge of a modern programming language and discrete structures. Meets with S E 531.

C S 532-3. Software Design.
Covers a variety of methodologies and tools for design of sequential, parallel and distributed software systems. Design language; graphical design representations. Data abstraction, data dictionaries. Data flow design and diagrams. Object-oriented design. Documentation. Team project in the design of a major software system. Prer., S E 531/C S 531 or I S 665. Meets with S E 532.

C S 533-3. Formal Methods of Software Systems Engineering.
Elements of discrete mathematics. Formal mechanisms for specifying and verifying the correctness, reliability, and efficiency of software systems. State transition, regular expression, context free, and applicative models. Assertions, hoare axioms, and weakest preconditions. State machine, algebraic, and operational specification techniques. Prer., C S 145 or equivalent, knowledge of a modern programming language, and discrete structures. Meets with S E 533.

C S 534-3. Software Maintenance.
Discussion and application of corrective, adaptive, perfective and preventive software maintenance techniques and tools. Related topics such as software systems analysis, reverse-engineering, re-engineering, regression testing and configuration management are examined. As a project, student teams maintain an existing software system. Prer., Knowledge of modern programming language, discrete structures, C S 145 or equivalent. Meets with S E 534.

C S 535-3. Software Project Management.
Planning, scheduling, costing of projects. Measuring progress, predicting success, controlling failure. Management tools and their use. Effectiveness and efficiency of software engineering environments. Distributed software development. Quality control standards and practices. Prer., Knowledge of modern programming, NG language, data structures and algorithms, and discrete structures. Meets with S E 535.

C S 536-3. Software Product Assurance.
Principles, techniques and tools for producing quality software systems. The first half of this course focuses on software product assurance processes. The second half covers a variety of software testing techniques. Prer., C S 531. Meets with S E 536.

C S 537-3. Human-Computer Interfaces.
Techniques and tools for the analysis, design, implementation and testing of human-computer interfaces. Special topics such as human factors, rapid prototyping and usability testing will be studied. Term project. Prer., C S 330, C S 531. Meets with S E 537.

C S 538-3. Object-Oriented Software Development.
Principles of object-oriented problem-solving, object- oriented analysis and object-oriented design. Development of class hierarchies, use of polymorphism and inheritance, criteria for good design, semester project. Prer., C S 330 or consent of instructor. Meets with S E 538.

C S 539-3. Software Systems Engineering Project Laboratory.
Students participate in a project involving the development or maintenance of a software system intended for external distribution and use. Duties include requirements analysis, specification,

design, implementation, testing, quality assurance, configuration management and documentation. Projects come from the university and from outside sources. Students are evaluated based on their project work and an oral presentation describing their work and critiquing their results. Prer., CS 531, CS 532, CS 534, CS 535, and CS 536. Meets with S E 539.

C S 542-3. Database Systems I.
Course includes a study of general database concepts as well as an examination of data management system implementation approaches for data organization, maintenance and retrieval. Particular emphasis will be made on the relational approach including data normalization, relational algebra and relational calculus. Prer., C S 145 and C S 202 or equivalent. Meets with C S 442.

C S 543-3. Database Systems II.
Examines methods for concurrency, multiple copies of data, data distribution, and recovery for distributed database systems. Prer., C S 442/542.

C S 550-3. Operating Systems I.
Introduces concepts, terminology, and algorithms of operating systems. Describes semaphores, processes, virtual mappings, interrupts, resource allocation and management, protection, synchronization, scheduling, queueing and communication as applied to operating system design and implementation. Prer., C S 145, C S 202, C S 216, C S 420/520. Meets with C S 450.

C S 551-3. Operating Systems II.
Examines and compares algorithms for deadlock, mutual exclusion, synchronization, maximal parallelism, paging, queueing, buffer allocation, interprocess communication, and scheduling as they relate to operating systems performance. Examines mechanisms and primitives for both loosely and tightly coupled networks of systems. Considers system reliability. Prer., C S 450/550.

C S 555-3. Computer Systems Performance Evaluation.
Perspectives of performance evaluation, measurement techniques; hardware, software, and firmware tools, simulation techniques, analytical techniques; workload characterization, system selection; system tuning; performance tracking, performance prediction in the design phase and cost-benefit analysis. Prer., C S 450/550.

C S 560-3. Numerical Computing.
Algorithms for the solution of nonlinear equations, interpolation and approximation, differentiation, integration, systems of linear equations, ordinary differential equations and least squares. Prer., C S 145 MATH 235 and MATH 313. Meets with C S 460.

C S 567-3. Discrete Simulation I.
Examines concepts and methods of discrete event simulation. Compares major modeling methods. Discusses statistical issues including random number generation, arrival processes, analysis of simulation output, verification and validation of models and simulation programs. Describes in detail the use of a major discrete event simulation language. Discusses simulation level of detail and simplifying assumptions. Prer., C S 202 and MATH 381.

C S 570-3. Computability, Automata, and Formal Languages.
Finite automata and regular expressions; context-free grammars, context-free languages, and pushdown automata; Turing machines; undecidability; the Chomsky Hierarchy of Formal Languages; computational complexity, and intractable problems. Prer., C S 145, C S 202, MATH 215 & MATH 313. Meets with C S 470.

C S 571-3. Evolutionary Computation.
Introduction to evolutionary computation with emphasis on genetic algorithms. Includes evolution strategies, evolutionary programming, schemata fitness functions and classifiers, current research topics, messy algorithms, adaptive landscapes. Prer., C S 202 and MATH 381. .

C S 572-3. Design and Analysis of Algorithms.
Design methodologies: divide-and-conquer, exhaustive search, dynamic programming. Time and space complexity measures, analysis of algorithms. Survey of important algorithms for searching, sorting, graph manipulation. Tractability: class P and NP, NP-complete problems. Prer., C S 145, C S 202 and MATH 215. Meets with C S 472.

C S 575-3. Computational Geometry.
Computational complexity of geometric problems within the framework of analysis of algorithms. Stress on geometric searching, intersection problems, particularly of rectangles, and fundamental algorithms. Practical applications of concepts developed can be found in computer graphics, analysis of algorithms, spatial data structures and VLSI system design. Prer., C S 472/572, C S 480/580 or instructor's consent.

C S 577-3. Computer Graphics Animation & Scientific Visualization Techniques.
Animation: basic principle, physically based modeling, algorithms for animation, constraint optimization, use of dynamics in animation, teleological modeling. Scientific visualization: overview, foundation and techniques, applications. Prer., C S 480/580.

C S 580-3. Computer Graphics.
Fundamental areas of modern raster computer graphics; hardware, software, data structures, mathematical modeling, user interface and manipulation of graphical objects. A subset of the two dimensional GKS is examined and implemented with emphasis placed upon segmented display files and instance modeling. Basic to all graphic programs written are the ergonomic requirements of the user. Required programs are in the areas of animation, paint systems, polygon filling and clipping, and curve generation. Prer., C S 145, C S 202 and MATH 313. Meets with C S 480.

C S 581-3. Topics in Computer Graphics.
Examines the mathematical and physical models used to produce realistic three dimensional images. Topics include perspective viewing, hidden surface removal, shading, fractals, and rag tracing. Prer., C S 480/580.

C S 582-3. Artificial Intelligence.
Course covers the foundation of artificial intelligence: search techniques, first-order predicate calculus and knowledge representation. Also covers advanced topics such as speech and natural language processing and learning. Prer., C S 316, C S 482, or instructor consent for graduate students.

C S 583-3. Artificial Intelligence II.
Covers in detail a selection of AI topics: planning, natural language processing, computer vision, robotics, expert systems, and learning. Current research

topics may be covered. Students may use a programming language of their choice. Prer., C S 482/582 or instructor's consent.

C S 584-3. Computer Vision.
Representation and manipulation of digital images, Fourier analysis of images, enhancement techniques in spatial and frequency domain, segmentation procedures, digital geometry, region and boundary representation, texture processing, pattern recognition and application to robotics. Prer., MATH 235 or consent of instructor. Meets with MATH 584.

C S 587-3. Introduction to Artificial Neural Networks.
The course will cover basic neural network architecture and learning algorithms. Practical applications will be surveyed. Students will learn to implement their own simulator and implement various architectures. Prer., MATH 235.

C S 589-3. Computational Linguistics.
Approaches to syntactic processing of natural language: issues in semantic interpretation, pragmatics or the impact of context and world knowledge of natural language understanding and generation of natural language responses. Prer., C S 582 or consent of instructor.

C S 622-3. Distributed Networks.
Deals with complex communications systems in depth. Packet switching networks, local area networks, satellite systems, the open systems interconnect (OSI) reference model, and the development of communications software. Prer., C S 522.

C S 630-3. Topics in Software Systems Engineering.
Advanced topics and current research issues in software engineering. Possible topics include software engineering environments, requirements, design, testing, software metrics, configuration management, maintenance, software cost analysis, and distributed software. Prer., C S 531 or C S 535. Meets with S E 630.

C S 638-3. The Design and Modeling of Class Interfaces and Contracts.
Past and present work related to specifying the semantics of a class using assertions are examined. The BON method is presented. Prer., C S 538.

C S 677-3. Virtual Reality and Computer-Human Interaction.
The course will focus on the so-called ultimate form of interaction between human and machine, creating virtual or artificial world. The basic idea and various input devices will be discussed. Several advanced papers in this area will be covered. Some of these ideas will be implemented through a term project. Prer., C S 580 or C S 577 or consent of instructor.

C S 687-3. Advanced Studies in Artificial Neural Networks.
A research seminar treating contemporary results in the theory and applications of artificial neural networks. Prer., C S 587.

C S 700-1 to 6. Masters Thesis.

C S 701-3. Masters Project.

C S 800-1 to 10. PhD Dissertation.
Prer., Acceptance into program.

C S 920-1 to 3. Independent Study in Computer Science Undergraduate.

C S 999-0. Candidate for Degree.

Electrical and Computer Engineering

ECE 1010-2. Problem Solving in Engineering.
An introductory course which combines elementary applied mathematics, basic numerical methods, computer programming, and problem solving methodology to introduce the student to tools and techniques which will be useful throughout his/her engineering career. Grand challenges of engineering are used to motivate several applied problem solving experiences that the student will do and submit throughout the semester. The computer programming tool Matlab will be used as a problem solving language. Coreq., MATH 135.

ECE 1011-2. Computer-Based Modeling and Methods of Engineering.
Methodology for solving engineering problems is introduced. Fundamental features of the C programming language are presented and integrated with a variety of engineering examples and applications. Prer., MATH 135 and ECE 1010.

ECE 2210-3. Circuit Analysis I.
Modeling and analysis of electrical devices and circuits, including operational amplifiers. Transient and steady state response using classical differential equation methods. Impulse and step responses. Prer., MATH 136, ECE 1010, and ECE 1011. Coreq., MATH 235 and PES 112.

ECE 2220-3. Circuit Analysis II.
Continuation of ECE 2210, with frequency response, filter design, Fourier series, Fourier transforms and Laplace transforms. Prer., ECE 2210, PES 112, and MATH 235. Coreq., MATH 340.

ECE 2230-1. Circuits Laboratory.
Experimental work dealing with fundamental electrical circuits and measurement techniques. An introduction to computer-aided design (CAD). Prer., ECE 2210. Coreq., ECE 2220.

ECE 2410-3. Logic Circuits.
Design of digital systems with emphasis on synchronous state machines. The algorithmic state machine (ASM) method is used. Other topics include combinatorial logic design, asynchronous design, timing, signal propagation and noise. Prer., ECE 1011.

ECE 2420-1. Logic Circuits Laboratory.
Design, construction, and testing of digital circuits emphasizing synchronous-state machines. Memory-based circuits are stressed. Logic probes, state analyzers, and PROM programmers are used. Prer., ECE 2410.

ECE 3050-3. Introduction to Physical Electronics.
An introduction to semiconductor devices used in modern microelectronic technologies. The course objective is to provide an understanding of the fundamental physical principles and concepts underlying the operation and use of the most important semiconductor devices. Prer., ECE 2210, 3110 and PES 213.

ECE 3110-3. Electromagnetic Fields I.
Static electric and magnetic field analysis, Poisson's and Laplace's equations, steady electric current, fields of steady electric currents, ferromagnetic materials, boundary-value problems for static

fields, time-varying electric and magnetic fields, and Maxwell's equations and wave equations. Relationship between field and circuit theory. Prer., ECE 2220, MATH 235 and PES 213.

ECE 3120-3. Electromagnetic Fields II.
Electromagnetic wave propagation in dielectric and conducting media: solutions to the wave equations, transmission lines, waveguides and resonators, antennas and radiation, uniform and non-uniform plane waves. Design involving considerations of electromagnetic fields. Prer., ECE 3110 and MATH 340.

ECE 3210-3. Electronics I.
The application of semiconductor devices to the design of electronic circuits. Topics include diode circuits and applications, low frequency transistor amplifier design and switching theory. Prer., ECE 2210. Coreq., ECE 3230.

ECE 3220-3. Electronics II.
Transistor models used in circuit design at high frequencies: multistage amplifiers design, frequency response of amplifiers, feedback, operational amplifiers and distortion. Prer., ECE 2220 and ECE 3210. Coreq., ECE 3240.

ECE 3230-1. Electronics Laboratory I.
Design and implementation of power supplies, amplifiers with bipolar junction transistors, junction field effect transistors and MOSFETS. In addition, basic circuit design with operational amplifiers will also be performed. Prer., ECE 3220. Coreq., ECE 3210.

ECE 3240-1. Electronics Laboratory II.
Continuation of ECE 3230. Design of differential amplifier with discrete components, analysis of frequency response, frequency compensation techniques, feedback amplifier design, power amplifiers, oscillator and simple subsystem design. Prer., ECE 3230. Coreq., ECE 3220.

ECE 3420-1. Microprocessor Systems Laboratory.
Introduction to the microprocessor development system. Foundations of system design using the Motorola MC68000 microprocessor. Assembly language will be used in the development. Use of the high-level languages will also be discussed. Prer., ECE 1011.

ECE 3430-3. Introduction to Microcomputer Systems.
Design of microcomputer systems including assembly language programming and interfacing techniques. Emphasis is on the practical application of microcomputers as solutions to engineering problems. Prer., ECE 2410. Coreq., ECE 3420.

ECE 3440-1. Microcomputer Systems Laboratory.
Experiments are performed to program and interface microcomputer systems to design and implement microcomputer-based systems. Emphasis is on the application of the microcomputer as a tool to solve control and data acquisition problems. Prer., ECE 2420 and ECE 3430.

ECE 3510-3. Linear System Theory.
Characterization of linear systems by impulse response, convolution, transfer function. Linear differential equations and linear difference equations as models. Applications to circuits, electromechanical systems, etc. Transform methods include: Fourier series, Fourier transforms, and Laplace transforms. Introduction to state variables, and the state transition matrix. Use of a variety of models in design. Prer., ECE 2220 and MATH 340.

ECE 3610-3. Engineering Probability & Statistics.
An introduction to probability and statistics with application to solving engineering problems. Includes the axioms of probability, random variables, density functions, distributions functions, expectations. Gaussian random variables, bivariate random variables, sums of independent random variables. Estimation of sample mean and variance. Monte Carlo simulation, binomial, hypergeometric, Poisson counting processes, Erlang model and applications to telephone calls, etc., introduction to queues, confidence intervals, reliability, failure rates, the Weibull model, the log-normal model, estimation using regression. Introduction to random processes. Involves a project making use of simulation of random variables on a computer. Prer., MATH 235.

ECE 4020-3. Principles of Semiconductor Devices.
Detailed analysis of transport properties as they apply to device characteristics including switching, transit time, and bulk-effect devices. Prer., ECE 3050 and ECE 3110. Meets with ECE 5020.

ECE 4040-1. Introductory VLSI Fabrication Laboratory.
Various types of VLSI fabrication processes such as thermal oxidation, rapid thermal annealing, diffusion, physical vapor deposition, ion implantation, photolithography and etching. In addition, students will use a variety of device characterization techniques available in the laboratory. Prer., ECE 3050, ECE 4020, and ECE 4080 or consent of instructor.

ECE 4050-3. Microelectronics IC Fabrication Laboratory.
Independent experimental project in which students are expected to acquire the theoretical understanding of modern IC fabrication process, perform the IC processing and supporting measurements, and write detailed laboratory reports. Students should take ECE 4050 before ECE 4896. Prer., ECE 4080, and ECE 4020 or consent of instructor. Meets with ECE 5050.

ECE 4070-3. Electronic Properties of Materials.
Principles and applications of the electrical, optical, magnetic, and thermal properties of engineering electronic materials. The treatment is designed for students specializing in the areas of microelectronics, solid state and electromagnetics. Prer., ECE 3050. Meets with ECE 5070.

ECE 4080-3. VLSI Processing.
Introductory study of the various processes such as oxidation, diffusion, epitaxy, ion-implantation, photolithography, CVD, plasma processing, etc., used in contemporary fabrication of modern microelectronic technologies; use and understanding of process modeling programs used in design, fabrication and simulation of MOSFET and bipolar microelectronics technologies. Prer., ECE 3050 or consent of instructor. Meets with ECE 5080.

ECE 4110-3. Electromagnetic Theory and Applications.
An intermediate level fields course beginning with the classical development of Maxwell's equations and the Wave equation. Included are electrostatics, the

steady magnetic field, plane-wave propagation, Poynting's vector, guided waves, transmission lines, wave guides, the interaction of fields and matter, and concluding with an introduction to the subject of radiation. Dirac-delta and Dyadic Green's function method of problem solution are treated. Prer., ECE 3120 or equivalent. Meets with ECE 5110.

ECE 4150-1. Microwave Measurements Laboratory.
Experiments with transmission lines and waveguide systems. Infrared imaging of electromagnetic fields. Measurement of antenna fields. Exposure to equipment and techniques used in microwave measurements. Design of microwave circuits. Prer., ECE 3120 or equivalent. Meets with ECE 5150.

ECE 4200-1. Advanced Digital Design Laboratory.
A design laboratory focusing on the design of digital systems, using modern programmable devices (PLDs and FPGAs). Contemporary design tools and hardware description languages (e.g., Verilog) will be used. Prer., ECE 2420.

ECE 4211-3. Rapid Prototyping with FGPAs.
Field programmable gate arrays (FPGAs) are becoming an important part of the overall design flow for application specific integrated circuits (ASICs) because they offer the potential of allowing cheap hardware prototypes to be built to meet a narrow window of opportunity. They also offer novel, programmable architectures. This course will focus on the combined use of FPGAs and modern synthesis tools to develop rapid prototypes of ASICs. Architectural and performance tradeoffs and characteristics of both commercial anti-fuse and dynamically programmable FPGAs will be considered. Includes a team project. Prer., ECE 4242. Meets with ECE 5211.

ECE 4220-3. Analog IC Design.
A fundamental analog circuit design course that establishes relationships between semiconductor device theory, semiconductor processing technologies and the electrical and functional performance requirements of modern analog integrated circuits. Includes design project. Prer., ECE 3050, ECE 3220 and ECE 3240. Meets with ECE 5220.

ECE 4230-3. Analog Filter Design.
theory, specification, design and simulation of active and passive analog filters based on modern integrated circuit technology and VLSI Design I design philosophy. Prer., ECE 3220. Meets with ECE 5230.

ECE 4242-3. Advanced Digital Design Methodology.
This course focuses on modern digital design practice using computer-based design tools and then considers key steps in a modern design flow, with particular attention to the use of behavioral models in hardware description languages as a stepping-stone to combinational and sequential logic synthesis. The Verilog language will be presented, along ancillary topics of functional verification, testbench generation, timing analysis, fault simulation and design for testability. Design examples will include microcontrollers, RISC-CPUs, pipelined processors, digital filters, finite state machines for datapath control, UARTs, and typical architectures of synchronous computational units. Prer., ECE 3210. Meets with ECE 5242.

ECE 4250-3. Microwave Circuit Design.
An introduction to the design and analysis of microwave circuits both passive and active. Topics include microwave circuit analysis, measurement methods, transmission line structures, material properties, lumped elements, discontinuities, terminations, attenuators, directional couplers, hybrids, power dividers, impedance transformers, filters, mixers, switches, phase shifters and amplifiers. Prer., ECE 3120 or equivalent. Meets with ECE 5250.

ECE 4260-3. Mixed Signal IC Design.
Design of data converters, switch capacitor filters, high performance opamps, phase locked loops, oscillators. Prer., ECE 4220/5220 or consent of instructor. Meets with ECE 5260.

ECE 4270-3. CMOS Radio Frequency Integrated Circuit Design.
CMOS based high Frequency amplifier design, s-parameters, voltage references, noise, low noise amplifier (LNA), mixers, RF power amplifiers, phase locked loops, Oscillators and Synthesizers, Transmitter and Receiver architectures and RFID systems. Prer., ECE 3110, ECE 3210, ECE 3220. Meets with ECE 5270.

ECE 4320-3. Fault Detection & Design for Testability.
Stuck-at fault modeling. Test generation for combinational circuits-Boolean difference, D algorithm, PODEM, FAN, critical path. Fault dominance and equivalence. Test generation for synchronous sequential circuits. Cost functions used in test generation. Fault simulation. Basics of design for testability. Prer., ECE 3430 or equivalent. Meets with ECE 5320.

ECE 4330-3. Embedded Systems Design.
Introduction to embedded system including real time fault-tolerant significance. Study the hardware and software techniques to designing embedded system, including study of various embedded operating systems, embedded controllers and digital signal processing hardware. Study existing embedded systems. Prer., ECE 3430, C S 145, or consent of instructor.

ECE 4340-3. VLSI Circuit Design I.
Design considerations for MOS integrated circuits with an emphasis on CMOS technology and the relationships between semiconductor device theory, semiconductor processing technologies and the electrical and functional performance requirements of modern digital IC circuits. Physical behavior of CMOS transistors and integrated circuits, CMOS processing technology, CMOS circuit and logic design, design rules and structured design methodology. Prer., ECE 3050 and ECE 3210. Meets with ECE 5340.

ECE 4362-3. Synthesis with Verilog HDL.
Use of the Verilog hardware description language in the synthesis of digital systems. Topics include Verilog semantics, syntax, event-driven simulation, examples, and a brief comparison of Verilog and VHDL. Logic synthesis with Verilog using commercial tools for cell-based and FPGA technologies. Design project required. Prer., ECE 3430. Meets with ECE 5362.

ECE 4480-3. Computer Architecture and Design.
The design of large digital systems with emphasis on the computer. Architectural alternatives, instruction set design, implementations including micropro-

gramming, and actual examples are discussed. Performance tradeoffs. Prer., ECE 3430. Meets with ECE 5480.

ECE 4510-3. Feedback Control Systems.
Linear analysis and analog simulation of electrical, chemical, hydraulic and mechanical systems using block diagrams and signal flow graphs. Comparison of open and closed loop configurations. Feedback control system design using Nyquist, Bode, and root locus methods. Effects of simple networks on system response. Introduction of state variable techniques and digital computer solutions. Prer., ECE 3510 and either MAE 2102 or PES 321.

ECE 4520-3. Multivariable Control Systems I.
Fundamental aspects of modern control theory are covered, including solutions to systems modeled in state variable format, controllability, observability, pole placement, and linear transformation. Computerbased tools for control system design are used. Prer., ECE 4510 and MATH 313, or equivalent. Meets with ECE 5520.

ECE 4530-3. Control Systems Laboratory.
Introductory experiments on response of control system components. Open-loop and closed-loop (feedback) response of servo systems. Simulation of systems on analog computer. Design of compensator systems. Coreq., ECE 4510.

ECE 4540-3. Digital Control Systems.
Theory and application of classical and modern discrete-time control systems. Analysis and design of discrete-time and hybrid control using Z-transforms, root locus, frequency domain and state variable compensation techniques. On-line implementation by digital computers will be studied. Prer., ECE 4510.

ECE 4550-3. Computer Control System Theory & Design.
Control theory relevant to analysis and design of computer controlled systems. Topics covered include concepts of sampled data systems, methods of design for control system with digital controllers including redesign of analog controllers. Pole placement algorithms and state estimators for discrete systems are covered. Prer., ECE 4540 or equivalent. Meets with ECE 5550.

ECE 4560-1. Digital Control Laboratory.
Discrete-time control systems will be designed and tested using microcomputers, compensators, A/D and D/A converter analog computers. Experiments in the control of discrete and analog systems will be performed. Coreq., ECE 4540.

ECE 4610-3. Analysis of Random Signals.
Practical aspects and methods for analyzing and interpreting random signals. Statistical and parametric descriptions, estimators and errors for measurement data from such fields and meteorology, oceanography, seismology, remote sensing, communications, nuclear processes, biomedicine, aerospace applications and any field which must develop concise interpretations based on complex measurement data. Prer., ECE 3510 and ECE 3610 or equivalent. Meets with ECE 5610.

ECE 4625-3. Communication Systems I.
Introduction to principles of modern communication theory and signal processing: AM, FM, PAM, PCM, and Delta modulation. Noise analysis, filtering, threshold effects, phase-locked loops, and digital modulation. Prer., ECE 3510 and 3610. Meets with ECE 5625.

ECE 4630-3. Communications Systems II.
Continuation of ECE 4625. Digital modulation and demodulation; equalization and diversity; error correcting code performance in noise; introduction to spread spectrum and space communications; simulation of communication systems. Prer., ECE 3610 & ECE 4625/5625 or equivalent. Meets with ECE 5630.

ECE 4640-3. Introduction to Digital Signal Processing.
An introductory treatment of design and application of signal-processing techniques. Includes design of digital filters by both classical frequency response and impulse response specification, discussions of FIR/IIR/lattice structures and properties, implementation and hardware considerations. Study of spectrum analysis by fast Fourier transform (FFT). Discussion of applications in communication, speech analysis and synthesis, image processing, radar/sonar, seismography, digital control, etc. Prer., ECE 3510.

ECE 4650-3. Modern Digital Signal Processing.
Study of linear discrete-time systems, linear difference equations, Z-transforms, discrete Fourier transform, fast Fourier transform, sensitivity, discrete random processes, quantization effects, and design-related concepts. Prer., ECE 3510 and ECE 3610 or equivalent. Meets with ECE 5650.

ECE 4655-3. Real-Time Digital Signal Processing.
An introduction into the design, development, and implementation of signal processing algorithms on real-time hardware targets. The emphasis will be on high-level language, but assembly language will also be discussed. Prer., ECE 4650/5650 or ECE 4640. Meets with ECE 5655.

ECE 4660-3. Introduction to Digital Image Processing.
Methods for coding, storing and processing images by digital computers. Image models, sampling theorem, Fourier representation. Methods for image enhancement, restoration, registration and image understanding. Introduction to pattern recognition, computer vision and robotics with industrial applications. Prer., ECE 3510 and ECE 3610. Meets with ECE 5660.

ECE 4670-1. Communications Laboratory.
Laboratory experiments demonstrating material taught in ECE 4625/5625. Use is made of Spectrum analysis to study baseband signals and signal processors. Topics include noise, AM, FM, PM, sampling, TDM, digital modulation, errors, equalizers and complete communication systems. Prer., ECE 3230. Coreq., ECE 4625/5625.

ECE 4680-1. Signal Processing Laboratory.
Analog filter design, design and simulation of digital processors including filters and FFT algorithms. Prer., ECE 3230. Coreq., ECE 4640.

ECE 4890-1. Senior Seminar.
Design principles and a variety of realistic constraints such as economic factors, safety, reliability, aesthetics, ethics, and social impact; design project organization and design goals; techniques for making oral presentations and organizing written reports; interviewing and resume writing skills along with the art

of making a favorable first impression. Prer., This course must be taken the semester before C S 409, ECE 4892, or ECE 4899.

ECE 4892-3. Computer Engineering Design Projects.
A project lab taken during the last semester of the senior year for the design of computer engineering components and systems. Students will identify, select, and complete a design project. Design specification, analysis, design, simulation and/or construction of a successful project is required for completion of the course. Prer., ECE 4890 and last semester of degree program.

ECE 4899-3. Electrical Engineering Design Project.
A project lab taken during the last semester of the senior year for the design of system components and systems in the areas of communications, computer engineering, controls, digital signal processing, electromagnetics, microelectronic fabrication processes, or CMOS integrated circuits. Students will identify, select, and complete a design project. Design specification, analysis, design, simulation and/or construction of a successful project is required for completion of the course. Prer., ECE 4890 and last semester of degree.

ECE 4910-3. Selected Topics.
Credit and subject matter to be arranged. Consult current course schedule of classes for offering of topics. Prer., Senior standing. Meets with ECE 5910.

ECE 4990-1 to 3. Selected Topics.
Credit and subject matter to be arranged. Consult current course schedule of classes for offering of topics. Prer., Consent of instructor.

ECE 5010-3. Electronic Ceramics.
Course covers physical theory of each type of electronic ceramic used in applications such as insulators, resistors, capacitors, fast ion conductors, magnetic ceramic, optical and electro-optical materials, waveguides, lasers, high Tc ceramic superconductors, high dielectric constant materials and sensors. Course is biased toward thin-films in integrated circuit applications. However, many examples in the current literature of basic materials synthesis techniques, deposition processes and properties will also be an integral part of the course. Prer., ECE 4070/5070.

ECE 5020-3. Principles of Semiconductor Devices.
Detailed analysis of transport properties as they apply to device characteristics including switching, transit time and bulk-effect devices. Prer., ECE 3050 and ECE 3110. Meets with ECE 4020.

ECE 5030-3. Advanced Semiconductor Device Modeling.
Introduce to advanced students and graduate engineers the methodology of numerical device modeling. The course is designed to take the student from the classical analytical models to finite difference and finite element schemes common in existing device modeling programs. Technologically worthy models (as opposed to simple phenomenological models) have a high degree of sensitivity to the fabrication technology and regions of operating voltages, currents and frequencies. This course sets the foundations for state-of-the-art modeling analysis and simulation employed by most semiconductor companies. Prer., ECE 4020/5020.

ECE 5050-3. Microelectronics IC Fabrication Laboratory.
independent experimental project in which students are expected to acquire the theoretical understanding of modern IC fabrication process, perform the IC processing and supporting measurements, and write detailed laboratory reports. Students should take ECE 4050/5050 before ECE 4896. Prer., ECE 4080/5080 and ECE 4020/5020 or consent of instructor. Meets with ECE 4050.

ECE 5060-3. Processing and Device Physics of Advanced MOSFET Microelectronic Structures.
Development of basic and up-to-date understanding of the fabrication, processing and device physics of advanced MOSFET structures used in contemporary microelectronic circuits. Topics covered include MOS theory and characterization, MOSFET process/ device physics, advanced MOSFET process/device topics, review and study of current literature. Prer., ECE 4020/5020 or consent of instructor.

ECE 5070-3. Electronic Property of Materials.
Principles and applications of the electrical, optical, magnetic, and thermal properties of engineering electronic materials. The treatment is designed for students specializing in the areas of microelectronics, solid state and electromagnetics. Prer., ECE 3050. Meets with ECE 4070.

ECE 5080-3. VLSI Processing.
Introductory study of the various processes such as oxidation, diffusion, epitaxy, ion-implantation, photolithography, CVD, plasma processing, etc., used in contemporary fabrication of modern microelectronic technologies; use and understanding of process modeling programs used in fabrication simulation of MOFSET and bipolar microelectronics technologies. Prer., ECE 3050 or consent of instructor. Meets with ECE 4080.

ECE 5090-3. Semiconductor Device Characterization.
Characterization of semiconductor devices for application in signal amplification. Topics include models for integrated-circuit active devices, bipolar and MOS integrated-circuit technology, single-transistor and two-transistor amplifiers, transistor current sources and active loads, output stages, operational amplifiers, and frequency response and integrated circuits. Prer., ECE 4020/5020 or equivalent.

ECE 5100-3. Technology of Gallium Arsenide Devices.
Topics pertinent to GaAs processing technology and devices. Topics include materials characterizations, GaAs physics MOCVD, MOSFETS and HEMTS, digital GaAs circuits and analog applications. Prer., ECE 4020/5020.

ECE 5110-3. Electromagnetic Theory and Applications.
An intermediate-level fields course beginning with the classical development of Maxwell's Equations and the Wave equation. Included are electrostatics, the steady magnetic field, plane-wave propagation, Poynting's vector, guided waves, transmission lines, wave guides, the interaction of fields and matter, and concluding with an introduction to the subject of radiation. Dirac-delta and Dyadic Green's-function methods of problem solution are treated. Prer., ECE 3120 or equivalent. Meets with ECE 4110.

ECE 5150-1. Microwave Measurements Laboratory.
Experiments with transmission lines and waveguide systems. Infrared imaging of electromagnetic fields. Measurement of antenna fields. Exposure to equipment

and techniques used in microwave measurements. Design of microwave circuits. Prer., ECE 3120 or equivalent. Meets with ECE 4150.

ECE 5160-3. Electromagnetic Effects in IC Design.
System electromagnetic considerations in IC systems design. Includes RF component behavior, EM material properties, impedance and resonance, transmission lines, differential circuits, ground bounce, crosstalk radiated emissions, and EM measurements. Prer., ECE 3110 and ECE 3210.

ECE 5190-3. Remote Sensing.
Covers fundamental technology for various remote sensing techniques. These techniques cover optical, infrared, microwave and nuclear sensors and imaging systems as appropriate. Background effects and effects of propagation through the atmosphere are included as well as tradeoffs of systems and platform capabilities. Prer., ECE 3120 and PES 213 or equivalent. Meets with MAE 5092.

ECE 5211-3. Rapid Prototyping with FPGAs.
Field programmable gate arrays (FPGAs) are becoming an important part of the overall design flow for application specific integrated circuits (ASICS) because they offer the potential of allowing cheap hardware prototypes to be built to meet a narrow window of opportunity. They also offer novel, programmable architectures. This course will focus on the combined use of FPGAs and modern synthesis tools to develop rapid prototypes of ASICs. Architectural and performance tradeoffs and characteristics of both commercial anti-fuse and dynamically programmable FPGAs will be considered. Includes a team project. Prer., ECE 4242/5242. Meets with ECE 4211.

ECE 5220-3. Analog IC Design.
A fundamental analog circuit design course that establishes relationships between semiconductor device theory, semiconductor processing technologies, and the electrical and functional performance requirements of modern analog integrated circuits. Includes design project. Prer., ECE 3050, ECE 3220 and ECE 3240. Meets with ECE 4220.

ECE 5230-3. Analog Filter Design.
Theory, specification, design and simulation of active and passive analog filters based on modern integrated circuit technology and VLSI Design I design philosophy. Prer., ECE 3220. Meets with ECE 4230.

ECE 5242-3. Advanced Digital Design Methodology.
Modern digital design with computer-based design tools: Verilog behavioral models, combinational and sequential logic synthesis. Functional verification, testbench generation, timing analysis, fault simulation and design for testability. Microcontrollers, signal processors, state machines, and datapath control. Prer., ECE 3210. Meets with ECE 4242.

ECE 5250-3. Microwave Circuit Design.
An introduction to the design and analysis of microwave circuits both passive and active. Topics include microwave circuit analysis, measurement methods, transmission line structures, material properties, lumped elements, discontinuities, terminations, attenuators, directional couplers, hybrids, power dividers, impedance transformers, filters, mixers, switches, phase shifters and amplifiers. Prer., ECE 3120 or equivalent. Meets with ECE 4250.

ECE 5260-3. Mixed Signal IC Design.
Design of data converters, switch capacitor filters, high performance opamps, phase locked loops, oscillators. Prer., ECE 4220/5220 or consent of instructor. Meets with ECE 4260.

ECE 5270-3. CMOS Radio Frequency Integrated Circuit Design.
CMOS based high Frequency amplifier design, s-parameters, voltage references, noise, low noise amplifier (LNA), mixers, RF power amplifiers, phase locked loops, Oscillators and Synthesizers, Transmitter and Receiver architectures and RFID systems. Prer., ECE 3110, ECE 3210, ECE 3220. Meets with ECE 4270.

ECE 5320-3. Fault Detection & Design for Testability.
Stuck-at fault modeling. Test generation for combinational circuits-Boolean difference, D-algorithm, PODEM, FAN, critical path. Fault dominance and equivalence. Test generation for synchronous sequential circuits. Cost functions used in test generation. Fault simulation. Basics for design for testability. Prer., ECE 3430 or equivalent. Meets with ECE 4320.

ECE 5340-3. VLSI Circuit Design I.
Design considerations for MOS integrated circuits with an emphasis on CMOS technology and the relationships between semiconductor device theory, semiconductor processing technologies and the electrical and functional performance requirements of modern digital IC circuits. Physical behavior of CMOS transistors and integrated circuits, CMOS processing technology, CMOS circuit and logic design, design rules and structured design methodology. Prer., ECE 3050 and ECE 3210. Meets with ECE 4340.

ECE 5362-3. Synthesis with Verilog HDL.
Use of the Verilog hardware description language in the synthesis of digital systems. Topics include Verilog semantics, syntax, event-driven simulation, examples, and a brief comparison of Verilog and VHDL. Logic synthesis with Verilog using commercial tools for cell-based and FPGA technologies. Design project required. Prer., ECE 3430. Meets with ECE 4362.

ECE 5370-3. Artificial Neural Networks.
A research seminar treating fundamental models and contemporary results in the theory, implementation and application of artificial neural networks. Prer., Graduate standing. Meets with ECE 6370.

ECE 5410-3. Advanced Topics in Testing.
Bridging faults and quiescent-current testing. BIST PLAs, RAMs, ROMs. Delay-faults and gate-delay/ path-delay models. Logic-level and system-level fault diagnosis. Prer., ECE 4320/5320. Meets with ECE 6410.

ECE 5450-3. Advanced Computer Architecture.
This is a second course in computer architecture. Topics covered will include proposed novel architectures, arithmetic system design, multi-processor and multicomputer interconnection schemes and their performance evaluation, and application-directed architecture. Prer., ECE 4210/5210 and ECE 4480/5480.

ECE 5480-3. Computer Architecture and Design.
The design of large digital systems with emphasis on the computer. Architectural alternatives, instruction set design, implementations including microprogramming, and actual examples are discussed. Performance tradeoffs. Prer., ECE 3430. Meets with ECE 4480.

ECE 5520-3. Multivariable Control Systems I.
Fundamental aspects of modern control theory are covered, including solutions to systems modeled in state variable format, controllability, observability, pole placement, and linear transformations. Computer-based tools for control system design are used. Prer., ECE 4510, and MATH 313, or equivalent. Meets with ECE 4520.

ECE 5530-3. Multivariable Control Systems II.
Design of systems in state variable format are covered including linear quadratic regulators, state estimators, model reference compensators, and H infinity control. Computer tools are used. Prer., ECE 4520/5520.

ECE 5550-3. Computer Control System Theory & Design.
Control theory relevant to analysis and design of computer controlled systems. Topics covered include concepts of sampled data systems, methods of design for control system with digital controllers including redesign of analog controllers. Pole placement algorithms and state estimators for discrete systems are covered. Prer., ECE 4540 or equivalent. Meets with ECE 4550.

ECE 5570-3. Optimal Control Theory.
Formulation of optimal control problems, performance index, the variational approach to optimal control problems, Pontryagin's maximum principle, the principle of optimality, the Hamilton-Jacobi equation, computational methods, the steepest descent method, variation of extremals, quasilinearization, gradient projection. Prer., ECE 4520/5520 or equivalent.

ECE 5610-3. Analysis of Random Signals.
Practical aspects and methods for analyzing and interpreting random signals. Statistical and parametric descriptions, estimator and errors for measurement data from such fields as meteorology, oceanography, seismology, remote sensing, communications, nuclear processes, biomedicine, aerospace applications and any field which must develop concise interpretations based on complex measurement data. Prer., ECE 3510 and ECE 3610 or equivalent. Meets with ECE 4610.

ECE 5620-3. Detection and Extraction of Signals from Noise.
Detection and extraction methods used in signal processing and includes such subjects as decision theory, detection of known random signals, optimum receiver design and evaluation, estimation theory, estimation of parameters, Wiener filtering, Kalman-Bucy filtering, applications to problems in communication theory. Prer., ECE 4625/5625 and ECE 4610/5610 or equivalent. Meets with ECE 6620.

ECE 5625-3. Communication Systems I.
Introduction to principles of modern communication theory and signal processing: AM, FM, PAM, PCM, and Delta modulation. Noise analysis, filtering, threshold effects, phase-locked loops, and digital modulation. Prer., ECE 3510 and ECE 3610. Meets with ECE 4625.

ECE 5630-3. Communication Systems II.
Continuation of ECE 4625/5625. Digital modulation and demodulation; equalization and diversity; error correcting code performance in noise; introduction to spread spectrum and space communications; simulation of communication systems. Prer., ECE 3610 and ECE 4625/5625 or equivalent. Meets with ECE 4630.

ECE 5635-3. Wireless Communication Systems.
Types of wireless communication systems; channel models; cellular characteristics; handoff; modulation techniques; first, second, and third generation systems; wireless networks. Prer., ECE 4625/5625.

ECE 5640-3. Spread Spectrum Communications Systems.
An in-depth study of spread spectrum systems including implementation and performance. This will include effects of hostile interference on spread spectrum system performance, acquisition and tracking of the spread spectrum signal and an introduction to coding techniques used to mitigate the effect of jamming. Prospective students should have previous course background in signal analysis, probability and digital communications. Prer., ECE 4630/5630 or equivalent. Meets with ECE 6640.

ECE 5650-3. Modern Digital Signal Processing.
Study of linear discrete-time systems, linear difference equations, Z-transforms, discrete Fourier transform, fast Fourier transform, sensitivity, discrete random processes, quantization effects, and design-related concepts. Prer., ECE 3510 and ECE 3610 or equivalent. Meets with ECE 4650.

ECE 5655-3. Real-Time Digital Signal Processing.
An introduction into the design, development, and implementation of signal processing algorithms on real-time hardware targets. The emphasis will be on high-level language, but assembly language will also be discussed. Prer., ECE 4650/5650 or ECE 4640. Meets with ECE 4655.

ECE 5660-3. Introduction to Digital Image Processing.
Methods for coding, storing and processing images by digital computers, image models, sampling theorem, Fourier representation, methods for image enhancement, restoration, registration and image understanding. Introduction to pattern recognition, computer vision and robotics with industrial applications. Prer., ECE 3510 and ECE 3610. Meets with ECE 4660.

ECE 5670-3. Phase-Locked Loops and Frequency Synthesis.
A study of phase-locked loops and frequency synthesizers. Both analysis and design aspects are addressed. Linear and nonlinear models are considered. Prer., ECE 3610 and ECE 4625/5625.

ECE 5680-3. Computer Communications Networks.
Modern communications networks provide a means for messages and data to be exchanged between high speed digital computers. Central to this technology are many design problems dealing with network layout, capacity assignment, user delay, routing, cost and queue management. This course will address the problems in the context of different con

temporary communications network designs. Prer., ECE 3610 or equivalent.

ECE 5900-3. Graduate Seminar.
Meetings of faculty, students and guests from industry to participate in discussions of recent advances in research or other topics of interest. Seminar schedule will be announced at the beginning of the Fall and Spring semesters. Topics will be presented by faculty, graduate students and invited lecturers from other universities, government agencies and industry. Prer., Consent of instructor.

ECE 5910-3. Selected Topics.
Current topics in ECE. See current course bulletin for detailed description. Prer., Graduate standing. Meets with ECE 4910.

ECE 5990-3. Microelectronics Advanced Topics Seminar.
Current topics in microelectronics, materials, devices, and processes. Prer., Consent of instructor. Meets with ECE 6990.

ECE 6020-3. Solid State Electronics II.
This course is designed for advanced students looking for a formal treatment of solid state phenomena with special emphasis on semiconductors. Topics include energy band theory, impurities and imperfections in semiconductors, carrier concentration in thermal equilibrium, Boltzmann's transport equation, thermal effects in semiconductors, diffusion of electrons and holes, scattering of electrons and holes, recombination phenomena, strong field effects, high frequency and amorphous semiconductors. Prer., ECE 4020/5020, ECE 4070/5070 and PES 690 or equivalent.

ECE 6040-3. Quantum Electronics.
Introduction to the theory of lasers, optical resonators and nonlinear optics, with the emphasis on applications to devices. Prer., ECE 3120 and PES 313 or equivalent.

ECE 6111-3. Math Methods for EM Field Theory: Part I.
Develop a mathematical model of EM fields, based on Maxwell's Equations. Derive the Helmoltz (Wave) Equations for the auxiliary potentials and the fields. Develop the integral equation solutions for radiation and scattering based on Green's Functions. Applications include electric and magnetic properties of materials, wave propagation and polarization, reflection and transmission. Prer., ECE 4110/5110.

ECE 6112-3. Math Methods for EM Field Theory: Part II.
Apply the mathematical methods developed in ECE 6111 to advanced EM problems. Applications include wave propagation and scattering, waveguides, cavities and resonators, striplines and microstrip lines, fiber optics, introductory numerical techniques (Moment Methods & GTD), and Green's Functions. Prer., ECE 6111.

ECE 6120-3. Numerical Methods of Field Theory.
Continuation of ECE 6112. Prer., ECE 5110 or equivalent.

ECE 6370-3. Artificial Neural Networks.
A research seminar treating fundamental models and contemporary results in the theory, implementation and application of artificial neural networks. Prer., Graduate status. Meets with ECE 5370.

ECE 6410-3. Advanced Topics in Testing.
Bridging faults and quiescent-current testing. BIST PLAs, RAMs, ROMs. Delay-faults including gate-delay/ path-delay models. Logic level and system-level fault diagnosis. Prer., ECE 4320/5320. Meets with ECE 5410.

ECE 6550-3. Nonlinear and Adaptive Systems.
Analyses of nonlinear control systems including phase plane, singular points, describing functions, and stability via Lyapunov are covered. System identification and design of adaptive systems are included. Prer., ECE 4520/5520.

ECE 6620-3. Detection and Extraction of Signals from Noise.
Detection and extraction methods used in signal processing and includes such subjects as decision theory, detection of known random signals, optimum receiver design and evaluation, estimation theory, estimation of parameters, Wiener filtering, Kalman-Bucy filtering, applications to problems in communication theory. Prer., ECE 4625/5625 and ECE 4610/5610 or equivalent. Meets with ECE 5620.

ECE 6630-3. Information Theory and Coding.
Information and entropy, Markov chains, combined systems, continuous systems, coding theory, channel capacity, modulation and applications to communications engineering. Prer., ECE 4610/5610 or equivalent.

ECE 6640-3. Spread Spectrum Communications Systems.
An in-depth study of spread spectrum systems including implementation and performance. This will include effects of hostile interference on spread spectrum system performance, acquisition and tracking of the spread spectrum signal and an introduction to coding techniques used to mitigate the effect of jamming. Prospective students should have previous course background in signal analysis, probability and communications. Prer., ECE 4630/5630 or equivalent. Meets with ECE 5640.

ECE 6650-3. Estimation Theory and Adaptive Filtering.
Presents the application of digital filtering theory to problems in communications and signal processing. Topics include discrete spectral analysis of random signals, discrete time signal detection, estimation and filtering algorithms including the Kalman filter and effects of discrete noise sources in digital signal processing. Prer., ECE 4610/5610 and ECE 4650/5650 or equivalent.

ECE 6980-3. Ferroelectric Materials and Applications.
Phenomenon of ferroelectricity in bulk and thin-film materials with emphasis on applications to integrated circuit devices. Devonshire's treatment and its variation to include surface phenomena are studied in some detail. Switching analysis and device modeling are discussed with emphasis to memory applications. Prer., ECE 6020.

ECE 6990-3. Microelectronics Advanced Topics Seminar.
Current topics in microelectronics, materials, devices, and processes. Prer., Consent of instructor. Meets with ECE 5990.

ECE 7000-1 to 6. Masters Thesis.

ECE 8000-1 to 10. Ph D Dissertation.

ECE 9200-1 to 3. Independent Study in ECE - Undergraduate.
An opportunity for sophomore students to do independent, creative work in elec-

trical and computer engineering, possibly including industrial co-op (see co-op policy for details). Prer., Prior agreement on study program with faculty advisor.

ECE 9300-1 to 3. Independent Study in ECE - Undergraduate.
An opportunity for juniors to do independent, creative work in electrical and computer engineering, possibly including industrial co-op (see co-op policy for details). Prer., Prior agreement on study program with faculty advisor.

ECE 9400-1 to 3. Independent Study in ECE - Undergraduate.
An opportunity for seniors to do independent, creative work in electrical and computer engineering, possibly including co-op (see co-op policy for details). Prer., Prior agreement on study program with faculty advisor.

ECE 9500-1 to 3. Independent Study in ECE - Graduate.
An opportunity for graduate students to do independent, creative work in electrical and computer engineering. Prer., Prior agreement on study program with faculty advisor.

ECE 9990-0. Candidate for Degree.
For students who have completed all course work and thesis hours, but have yet to defend thesis.

Engineering

ENGR 3001-3. Technology and Change.
Geared toward non-technical majors -- removes mystery from technology. Students increase understanding of technology's impact on society, familiarization with today's systems (e.g., space, cellular phones, internet, etc.), and appreciation of the acceleration of change and possible alternative futures. National technology leaders will share experiences and perspectives. Prer., Should have at least sophomore status.

ENGR 342-3. Engineering Economy.
Economic decision-making, professional ethics, business records, net worth and profit and loss calculation, engineering law and contract agreements. Prer., Junior standing or instructor consent.

Mechanical and Aerospace Engineering

MAE 1003-3. Fundamentals of Flight.
Introduction to the engineering science of flight, its history, and fundamental engineering concepts. Basic understanding of aerodynamic lift and drag, equations static force and moment equilibrium spacecraft orbital equations aircraft performance, stability, and control. Introduction to the development of aircraft/ spacecraft design requirements based on mission objectives. Prer., Admission to the College of Engineering and Applied Science.

MAE 2101-3. Statics.
Force vectors, moments of force, equilibrium of a particle and rigid bodies, structural analysis and trusses, internal forces and shear, friction, center of gravity and mass, moments of inertia, and virtual work. Prer., MATH 135 and PES 111.

MAE 2102-3. Dynamics.
Dynamics of a particle. Kinetics of a system of particles. Kinematics of rigid bodies in two and three dimensions. Free and forced vibrations with and without viscous damping. Prer., MAE 2101 and MATH 340 co-req.

MAE 2301-3. Thermodynamics.
First and second laws of thermodynamics. Properties, states, thermodynamic functions, entropy, and probability. Prer., MATH 135 and PES 111.

MAE 2501-3. Computer-Aided Drafting (CAD).
Fundamentals of mechanical drawing. Manual drafting techniques and the use of CAD software to create 2D and 3D drawings on a computer. 2D orthographic projections and 3D isometric views, pictorial drawings, technical sketching, dimensioning, sectioning, working drawings, wireframe, and solid modeling. Production of castings, weldments, machined parts, and assemblies will be covered.

MAE 3005-3. Engineering Measurement Laboratory.
Fundamental technical measurement techniques, measurement processes, analog and digital measurements, system response, sensors, signal conditioning, readout data processing. Measurement standards and treatment of uncertainties. Applied mechanical measurements: counters, displacement, stress and strain, force and torque, temperature, and pressure. Prer., MATH 340 and ECE 3210.

MAE 3130-3. Fluid Mechanics.
An introduction to fluid mechanics. Continuums, velocity and stress fields. Viscous and inviscid flows, laminar and turbulent flows, compressible and incompressible flows, internal and external flows. Hydraulic systems, buoyancy and stability. Stream functions, Navier-Stokes Equations. Prer., MAE 2301.

MAE 3135-3. Aerodynamics.
Airfoil and wing aerodynamics, thin airfoils, finite-span wings, compressible and incompressible flow, nozzle theory. Intro to numerical methods in aerodynamics. Prer., MAE 3130.

MAE 3201-3. Strength of Materials.
The theory and application of the fundamental principles of mechanics of materials, including stress, strain, mechanical properties of materials, axial load, torsion, bending, transverse shear, combined loadings, stress transformation, strain transformation, design of beams and shafts, deflections of beams and shafts, buckling of columns, and energy methods. Prer., MATH 340.

MAE 3310-3. Heat and Mass Transfer.
The principles of heat transfer: conduction, convection, and radiation. Steady-state and transient conduction, thermal contact resistance, insulation, heat capacity. Forced and natural convection, velocity and thermal boundary layers, fluid flow. Radiation from blackbodies, surfaces and the sun. Prer., MATH 313, MATH 340 and MAE 2301.

MAE 3401-3. Modeling and Simulation of Dynamic Systems.
Course presents basic concepts of dynamic behavior, and the analytic and computational techniques for predicting and assessing dynamic behavior. Modeling a basic system, compound system, dynamic stability and natural behavior and response to continuing and abrupt inputs are presented. Prer., MATH 340, MAE 2102 and (MATH 381 or ECE 3610), knowledge of MATLAB.

MAE 3420-3. Automatic Control of Aerospace and Mechanical Systems.
Introduction to the automatic control of aerospace and mechanical systems. Aero/Mech systems modeling, aircraft/spacecraft; computational analysis via MATLAB; frequency-domain

techniques for analysis and synthesis; root-locus, bode, nyquist. Time-and- frequency-domain relationships. Mech/Aero System simulation. Prer., MAE 3401, MATH 313 and MATH 340.

MAE 3560-3. Design for Manufacture.
Theories and practice for achieving manufacturable designs. Topics include: introduction to manufacturing processes, creativity and design, DFM concepts, design philosophy, company DFM programs, group technology, cost and value analysis, life-cycle engineering, assembly strategies, and human factors. Prer., ENGR 342 and MAE 2501. Meets with MAE 5570.

MAE 4001-1 to 3. Engineering Analysis.
Purpose of this course is to assist a student who is deficient in a prerequisite or who is looking for a refresher course in engineering analysis prior to entering the Master of Engineering program. Each module is 1 hour credit. Module I: Differential Equations and Series. Module II: Linear Systems. Module III: Probability and Applications. Prer., Senior or graduate standing.

MAE 4150-3. Vibrations.
Free and forced single-degree of freedom systems. Damping: Rayleigh, Coulomb, hysteretic, and viscous. Harmonic motion, frequency-domain representation, harmonic forcing. General forcing, convolution, and response spectra. Computational techniques for solving simple vibration problems. Prer., MATH 340, MAE 2102, C S 115 or equivalent. Meets with MAE 5190.

MAE 4155-3. Introduction to Composite Materials.
Polymer, metal and ceramic matrix composites. Anisotropic and orthotropic elasticity, rotation and layering of laminas, properties of laminate structures. Failure theories: Tsai-Hill and Tsai-Wu. Hygrothermal and piezoelectric strains/stresses in composites. Computation of composite behavior. Prer., MAE 2102, MAE 3201 and MATH 340.

MAE 4210-3. Fracture Mechanics.
Fundamental concepts of structure failure. Stress intensity, energy criterion, cracking, and damage tolerance. Linear Elastic Fracture Mechanics: stress concentrations, Griffith energy, energy release rates, K/G and J-integrals, crack trip plasticity. Plane stress/strain, and mixed-mode failure. Prer., MATH 313, MATH 340 and MAE 2102. Meets with MAE 5205.

MAE 4316-3. Rocket Propulsion.
Basic theory of rocket propulsion, nozzle performance, propellant characteristics. Primary emphasis on the engine system design process, based on mission requirements. Chemical, as well as nuclear, electric, and advanced propulsion concepts are treated. Prer., MATH 340 and MAE 2301. Meets with MAE 5391.

MAE 4318-3. Air-Breathing Propulsion.
Thermodynamics applied to quasi-one-dimensional fluid flows. Ideal cycle analysis of turbojets, turbofans with separate and mixed exhaust streams, and turboprops, with a study of propulsive efficiency. Inlet, compressor, burner, turbine, and nozzle performance. Non-ideal and off-design performance analysis. Elementary blade aerodynamics with throughflow and cascade flow theory. Prer., MATH 340 and MAE 2301.

MAE 4402-3. System Dynamics.
Kinematics, relative motion, and rotation of particles and rigid bodies, including inertia tensors, Euler's angles and equations. Variational principles, work, energy expressions, and Lagrange's equations. Electrical circuits and electromechanical systems. Prer., MAE 2102 or equivalent, MATH 340 and MATH 313. Meets with MAE 5402.

MAE 4410-3. Fundamentals of Astrodynamics.
Development and application of the fundamental principles of astrodynamics to satellite motion. Study of coordinate systems, time keeping, computation of orbits, and introduction to perturbation theory. Prer., MAE 2102, MATH 313, MATH 340, C S 206, or equivalents. Meets with MAE 5410.

MAE 4415-3. Flight Dynamics.
Advanced treatment of the flight dynamics of atmospheric flight vehicles and spacecraft. Rigorous development of non-linear equations of motion, including environmental and propulsive forces. Linearization via small-perturbation methods - limitations. Transient response, stability, natural modes. Intro to simulation techniques. Prer., MAE 3401, MAE 4402 recommended by the instructor. Meets with MAE 5415.

MAE 4420-3. Space Communications.
Fundamentals of digital data transmissions; noise characterizations and calculations; communications link calculations; error probabilities for basic digital modulation schemes - BPSK, QPSK, OQPSK, MSK, serial MSK; system degradations, carrier and clock recovery; multiple access techniques - FDMA, TDMA, CDMA; packet satellite networks; orbital parameters; comparison of satellite comm systems with fiber optic links. Prer., ECE 3510 or MAE 3401, MAE 4410, and ECE 3610 or MATH 381. Meets with MAE 5594.

MAE 4425-3. Space Environment.
Introduction to properties and effects of the environment in which spacecraft and astronauts must operate. Intensive coverage given to earth-sun-lunar system. Topics include earth's environment, ionosphere, atmosphere chemistry, radiation belts, magnetosphere, aurora, geomagnetic storms, celestial background, and recent bioastronautic effects. Prer., PES 112 or equivalent and MATH 340. Meets with MAE 5091.

MAE 4450-3. Robotics.
Dynamics, kinematics, and automatic control of robotic devices. Force and position control, path planning. Prer., MATH 313, MATH 340, MAE 3401, and MAE 3420. Meets with MAE 5450.

MAE 4455-3. Flight Mechanics.
A fundamental study of the trajectory dynamics of aerospace vehicles operating in the atmosphere (aircraft and missiles). Rigid-body equations of motion; vehicle-carried coordinate systems; aerodynamic and propulsive forces; maneuvering flight; introduction to trajectory simulation. Prer., MAE 4402/MAE 5493, MATH 313 and MATH 340. Meets with MAE 5455.

MAE 4456-3. Launch, On-Orbit, and Entry Dynamics.
This course details the application of orbital dynamics to orbital flight, ascent flight, and atmospheric entry. The course covers trajectory specific factors that must be considered for a complete mission plan, such as time and lighting constraints, placement requirements, coverage requirements. Prer., MAE 4410. Meets with MAE 5495.

MAE 4506-3. Engineering Simulation.
Introduction to the essential elements of stochastic simulation including discrete, continuous and hybrid simulations models. A practical hands-on course illustrating concepts and principles through use of a flexible, advanced, higher-order simulation software package (SLAM II). Illustrates cost-saving techniques resulting from simulation studies of manufacturing systems. Prer., MATH 313 and MATH 340. Senior or graduate standing. Meets with MAE 5596.

MAE 4510-1. Engineering Design I.
Design principles with the realistic constraints of economy, safety, reliability, aesthetics, ethics and social impact. Project and team organization to meet design goals. Professional oral and written communication of the design through presentations, memos, reports, and e-mail. Prer., Senior standing. Meets with MAE 5510.

MAE 4511-3. Engineering Device Design II.
Project laboratory for the senior or graduate student for the design of a mechanical or electromechanical component, with emphasis on the identification, selection, design, and simulation or fabrication of the component. A successful project is required for completion of the course. Prer., MAE 4510 and instructor's consent. Meets with MAE 5511.

MAE 4512-2. Engineering System Design II.
A senior or graduate-level design course on a complex system. Examples of potential projects include spacecraft, high-altitude balloon payloads, aircraft, automobiles, trains, and bicycles. A feasible design that considers the economy, safety, reliability, aesthetics, and social impact of the system is the central goal of this course and is a requirement for its completion. Prer., MAE 4510. Meets with MAE 5512.

MAE 4540-3. Methods of Operations Research.
Apply the principles of operations research to decision-making with multiple criteria and objectives; develop mathematical and computer models for decision- making - linear, integer, and nonlinear programming. Apply principles to hands-on examples. Prer., Senior standing. Meets with MAE 5573.

MAE 4541-3. Cellular Manufacturing.
Cellular manufacturing has become an essential part of most world-class strategies. Investigation of analysis design and implementation of high-performance manufacturing cells. Topics include: key cell design issues, simulation in cell design, techniques for economic evaluation, group technology, just-in-time strategies, and team building in cellular manufacturing. Prer., MAE 3560, MAE 4561, and MAE 4506. Meets with MAE 5574.

MAE 4542-3. Contemporary Issues in Manufacturing.
Introduction to world class manufacturing including interaction with customers and suppliers, integrated and concurrent manufacturing, and just-in-time production meeting customer requirements, using case analysis, field study, and experiential learning. Prer., MAE 3560, MAE 4561, and MAE 4506. Meets with MAE 5575.

MAE 4550-3. Space Mission Analysis.
Survey of various spacecraft bus systems, and tradeoffs needed to satisfy the space-mission requirements. Spacecraft subsystems considered include communications, data handling, power, thermal, structures, sensors, and mechanisms. Prer., MAE 4410 or ASE 510, MAE 4425 or ASE 560. Meets with MAE 5595.

MAE 4561-3. Analysis and Design of Experiments.
Statistical methods to design experiments for the design of effective manufacturing systems. Balanced treatment of traditional and modern techniques in experiment design, with emphasis on real-world applications. Processes of planning, collecting data, and analyzing the data are covered. Prer., Senior or graduate standing and either ECE 3610 or MATH 381. Meets with MAE 5571.

MAE 5090-3. Space Mission Operations.
This course describes the relationship between the operations concept and the other elements of a space mission and covers the various functions associated with a space mission. These functions include mission planning, trajectory analysis, navigation, payload operations, spacecraft operations, data processing, communications, training, and management. Students learn how to translate mission objectives and requirements into a viable operations concept. The course covers key cost, technical, and schedule drivers and develops methods for determining key space mission operations design parameters (data flow diagrams, orbit maneuvers, communication links, and spacecraft and payload commanding). Prer., MAE 4410/5410.

MAE 5091-3. Space Environment.
Introduction to properties and effects of the environment in which spacecraft and astronauts must operate. Intensive coverage given to earth-sun-lunar system. Topics include earth's environment, ionosphere, atmospheric chemistry, radiation belts, magnetosphere, aurora, geomagnetic storms, celestial background and recent bioastronautic effects. Prer., PES 112 or equivalent and MATH 340. Meets with MAE 4425.

MAE 5092-3. Remote Sensing in Space.
Covers fundamental technology for various remote sensing techniques. These techniques cover optical, infrared, microwave and nuclear sensors and imaging systems as appropriate. Background effects and effects of propagation through the atmosphere are included as well as trade-offs of systems and platform capabilities. Prer., ECE 3120 and PES 213 or consent of instructor. Meets with ECE 5190.

MAE 5093-3. Systems Engineering.
Focus on the Systems Engineering lifecycle process and the derivation of engineering/technical requirements from customer/operational requirements. Analytical tools which support fielding of effective systems consistent with developed requirements will be covered. Major emphasis will be placed on systems reliability and life-cycle costing. Prer., MATH 381 and MATH 313 or equivalent.

MAE 5095-3. Engineering Simulation.
Course will introduce the cost saving technique of simulation. The statistical tools needed to model and simulate events and equipment will be presented. A major course project simulating either a space, information or manufacturing system will cover the last quarter of the course and replace the final.

MAE 5110-3. Solid Mechanics.
Fundamental applied elasticity. Theory of stress and strain and stress-strain-temperature relationships. Inelastic materials. Energy methods: stationary PE, Castigliano's theorem. Classical problems in elasticity. Flat plates, stress concentrations, fracture, contact mechanics, and creep. Prer., MATH 447 and MAE 4402/MAE 5493.

MAE 5115-3. Plates and Shells.
Static and dynamic analysis of beams, arches, rings, plates, and shell structures. Development of coordinates, strain, stress-strain relationships, forces and moments, boundary conditions, and equations of motion using Hamilton's theorem. Solutions by exact and computational techniques. Prer., MATH 447, MAE 4150/MAE 5190 and MAE 4402/MAE 5493.

MAE 5125-3. Advanced Dynamics.
Analytical dynamics: Lagrange's equations, Hamilton's principle and variational calculus, Routh's method, Hamilton's equations. Applications in rigid bodies and continuous, nonautonomous, and nonlinear systems. Stability of nonlinear systems with Liapunov's direct method. Prer., MATH 447 and MAE 4402/MAE 5493.

MAE 5130-3. Advanced Fluid Dynamics.
Mechanics of fluids. Governing equations: conversation laws, flow kinematics, and basic theorems. Ideal fluid flow: 2D and 3D potential flows and surface waves. Viscous flows of incompressible fluids: exact solutions, low-Reynolds number approximations, and boundary layer theory. Compressible flow of inviscid fluids: shock waves, 1-D and multi-dimensional flows. Prer., MATH 447 and MAE 3130.

MAE 5150-3. Advanced Vibrations.
A second course in vibrations covering the following topics: multiple-degree of freedom systems, undamped and damped, harmonic and forced, numerical solutions, continuous systems, and the finite-element method. Prer., MATH 313 and MATH 340; MAE 4150/5190 or ASE 553.

MAE 5155-3. Mechanics of Composite Materials.
Polymer, metal, and ceramic matrix composites. Anisotropic and orthotropic elasticity, rotation and layering of laminas, properties of laminate structures. Failure theories: Tsai-Hill and Tsai-Wu. Hygrothermal and piezoelectric strains/stresses in composites. Computation of composite behavior. Prer., MAE 4150 or MAE 5190 and MATH 447.

MAE 5160-3. Finite Element Analysis for Mechanics.
An introduction to finite element analysis (FEA) procedures in mechanics, beginning with vectors, matrices and tensors, and continuing with formulation and calculation of FEA for solid mechanics, static and dynamic structural mechanics, heat transfer, electric fields, and incompressible fluid flow analysis. Students will do a significant amount of programming in the language of their choice. Prer., MATH 447, MAE 4150/MAE 5190, and programming competency.

MAE 5165-3. MicroElectroMechanical Systems (MEMS).
Integration of electrical and mechanical processes to design micromachines. Properties of materials. Structural design: fundamental mechanics, systems, and vibrations. Transducer and actuator principles. Sensor design integration and applications. Prer., MATH 313, MATH 340, MAE 4402 or MAE 5493, ECE 2220 or equivalent.

MAE 5167-3. MEMS Design and Fabrication Laboratory.
Integration of electrical and mechanical design processes to build micro machines. Process design: wet chemical etching, wafer bonding, RIE and CMP. Surface micro machining. Sensor design integration and application. Prer., MAE 5165.

MAE 5190-3. Vibrations.
Free and forced single-degree of freedom systems. Damping: Rayleigh, Coulomb, hysteretic, and viscous. Harmonic motion, frequency-domain representation, harmonic forcing. General forcing, convolution, and response spectra. Computational techniques for solving simple vibration problems. Prer., MATH 340, MAE 2102, C S 115 or equivalent. Meets with MAE 4150.

MAE 5205-3. Fracture Mechanics.
Fundamental concepts of structural failure. Stress intensity, energy criterion, cracking, and damage tolerance. Linear Elastic Fracture Mechanics: stress concentrations, Griffith energy, energy release rates, K/G and J-integrals, crack tip plasticity. Plane stress/strain, and mixed-mode failure. Graduate credit requires the solution and presentation of a class project. Prer., MATH 313, MATH 340 and MAE 2102. Meets with MAE 4210.

MAE 5210-3. Advanced Fracture Mechanics.
Review of linear elastic fracture mechanics. Dynamic fracture mechanics: arrest and branching, energy release rates, contour integrals, and examples. Elastic-plastic fracture mechanics, including Dugdale's model, J-integrals, CTOD, and mixed-mode failure. Introduction to computational technique. Prer., MAE 4210 and MATH 447.

MAE 5391-3. Rocket Propulsion.
Basic theory of rocket propulsion, nozzle performance, propellant characteristics. Primary emphasis on the engine system design process, based on mission requirements. Chemical, as well as nuclear, electric, and advanced propulsion concepts are treated. Prer., MATH 340 and MAE 2301. Meets with MAE 4316.

MAE 5402-3. System Dynamics.
Kinematics, relative motion, and rotation of particles and rigid bodies, including inertia tensors, Euler's angles and equations. Variational principles, work, energy expressions, and Lagrange's equations. Electrical circuits and electromechanical systems. Prer., MAE 2102 or equivalent, MATH 340 and MATH 313. Meets with MAE 4402.

MAE 5410-3. Fundamentals of Astrodynamics.
Development and application of the fundamental principles of astrodynamics to satellite motion. Study of coordinate systems, time keeping, computation of orbits, and introduction to perturbation theory. Prer., MAE 2102, MATH 313, MATH 340, C S 206, or equivalents. Meets with MAE 4410.

MAE 5411-3. Space Operations Analysis.

An advanced class in astrodynamics and space mission operations. The primary goal is to present numerical methods useful in evaluating spacecraft trajecto-

ries. This will include methods of orbit determination, numerical vehicle targeting, and statistical estimation theory. Prer., MAE 4410/5410.

MAE 5412-3. Atmospheric Flight Control.
Feedback control of aerospace vehicles operating in the atmosphere (aircraft and missiles). Aircraft and missile stability augmentation and autopilots. Frequency-domain analysis and synthesis, Bode/Nyquist, loop shaping. Prer., MAE 3420 and MAE 4415/MAE 5415.

MAE 5415-3. Flight Dynamics.
Advanced treatment of the flight dynamics of atmospheric flight vehicles and spacecraft. Rigorous development of non-linear equations of motion, including environmental and propulsive forces. Linearization via small-perturbation methods - limitations. Transient response, stability, natural modes. Intro to simulation techniques. Prer., MAE 3401, MAE 4402 recommended by the instructor. Meets with MAE 4415.

MAE 5417-3. Analysis of Mechanical and Aerospace Dynamic Systems.
Unified approach to dynamic systems analysis; method for development of lumped-parameter analytical models for mechanical and electromechanical systems, vehicles, robots, power systems; energy-based state-space formulations; simulation of linear and non-linear systems; perturbation techniques and neighboring trajectories; controllability concepts; modal analysis. Prer., MAE 3401, MAE 3420, MATH 413/MATH 513.

MAE 5419-3. Trajectory Optimization.
Optimization of the non-linear dynamics governing trajectories of aerospace vehicles or robots. Calculus of variations and numerical algorithms. Optimal orbit transfer, launch, re-entry, and interplanetary trajectories; robot path planning. Treatment of equality and inequality constraints (e.g., heating, loads). Projects in numerical optimization. Prer., MATH 313, MATH 340, MAE 2102, and Graduate level linear algebra and astrodynamics recommended.

MAE 5421-3. Digital Flight Control.
A laboratory-based course addressing the feedback control of aerospace vehicles, with special focus on the fact that the control systems will be implemented digitally. Z-domain systems analysis, discrete loop- shaping synthesis techniques; sample-rate selection; quantization effects. Real-time code generation and implementation. Hardware-in-the-loop testing and validation. Aircraft and missile stability augmentation and autopilots, spacecraft attitude control, and control of flexible systems. Prer., MAE 3420 or ECE 4510.

MAE 5425-3. Spacecraft Attitude Determination and Control.
Graduate-level treatment of attitude-determination algorithms for spacecraft, using on-board sensors; attitude feedback-control techniques. Review of attitude dynamics and conventional control analysis and synthesis methods. Loop-shaping design techniques; control-system requirements. Safe-hold algorithms, tracking, regulation control and maneuvering. Prer., MAE 3420, MAE 4414/MAE 5415 recommended.

MAE 5430-3. Orbit Perturbation Theory.
Perturbation Methods including Lagrange and Hamiltonian mechanics, and the generalized method of averaging. Gravitational and atmospheric modeling. Prer., MAE 4410 or MAE 5410 or ASE 510. Meets with ASE 511 and MATH 552.

MAE 5440-3. Attitude Control of Aerospace Vehicles.
Introduction to attitude-determination algorithms for spacecraft. Attitude feedback-control analysis and synthesis techniques for spacecraft, missiles, and aircraft. Review of attitude dynamics and conventional control analysis and synthesis methods. Loop shaping design techniques; control-system requirements. Prer., MAE 3420 and MAE 4415/MAE 5415. Meets with ASE 570.

MAE 5450-3. Robotics.
Dynamics, kinematics, and automatic control of robotic devices. Force and position control, path planning. Prer., MATH 313, MATH 340, MAE 3401, and MAE 3420. Meets with MAE 4450.

MAE 5455-3. Flight Mechanics.
A fundamental study of the trajectory dynamics of aerospace vehicles operating in the atmosphere (aircraft and missiles). Rigid-body equations of motion; vehicle-carried coordinate systems; aerodynamic and propulsive forces; maneuvering flight; introduction to trajectory simulation. Prer., MAE 4402/MAE 5493, MATH 313 and MATH 340. Meets with MAE 4455.

MAE 5456-3. Spacecraft Actuators and Sensors.
Modeling of spacecraft actuators, including momentum wheels, reaction wheels, gas jets, and magnetic torque bars. Modeling of spacecraft sensors, including sun sensors, star sensors, earth sensors, magnetometers, gyros, and GPS. Prer., MAE 5402 and MATH 340. Meets with ASE 572.

MAE 5460-3. GPS Principles and Applications.
Course will focus primarily on GPS (Global Positioning Satellite) navigation system and its limits and applications in navigation on earth and near-space. Effects of atmospheric propagation will be included. Surveys of usage for such navigational systems to the military and civilian sectors will be given. Prer., MAE 4410/5410 and MATH 381 or ECE 3610.

MAE 5495-3. Launch, On-Orbit, and Entry Dynamics.
Application of orbital dynamics to orbital flight, ascent flight, and atmospheric entry. The course covers trajectory specific factors that must be considered for a complete mission plan, such as time and lighting constraints, placement requirements, coverage requirements, ground tracks, uplink/downlink considerations, etc. Prer., ASE 510 or equivalent. Meets with MAE 4456.

MAE 5510-1. Engineering Design I.
Design principles with the realistic constraints of economy, safety, reliability, aesthetics, ethics and social impact. Project and team organization to meet design goals. Professional oral and written communication of the design through presentations, memos, reports, and e-mail. Prer., Senior/Graduate standing. Meets with MAE 4510.

MAE 5511-3. Engineering Device Design II.
Project laboratory for the senior or graduate student for the design of a mechanical or electromechanical component, with emphasis on the identification, selection, design, and simulation or fabrication of the component. A successful project is required for completion of the course. Prer., MAE 4510/MAE 5510. Meets with MAE 4511.

MAE 5512-2. Engineering System Design II.
A senior or graduate-level design course on a complex system. Examples of potential projects include spacecraft, high-altitude balloon payloads, aircraft, automobiles, trains, and bicycles. A feasible design that considers the economy, safety, reliability, aesthetics, and social impact of the system is the central goal of this course and is a requirement for its completion. Prer., MAE 4510/MAE 5510. Meets with MAE 4512.

MAE 5559-3. Manufacturing Technology and the Factory of the Future.
Engineering and technology issues are integrated with management methods and international interaction to examine future developments in manufacturing. Topics include: computer-integrated manufacturing, robotics, flexible automation, expert systems, integration of design and production through databases and telecommunications, the human-machine interface, and manufacturing management information systems. Prer., MAE 4541/MAE 5574 and MAE 4542/ MAE 5575.

MAE 5560-3. Engineering Project Management.
Capstone course involving all components of the manufacturing systems engineering curriculum. Focus on mathematical programming, networks, dynamic programming and tools such as PERT/CPM to model projects, systems and timelines. A major portion of the course is a hands-on project. Written and oral reports are required that meet publication standards for completeness, clarity and technical integrity. Prer., Instructor's discretion.

MAE 5570-3. Design for Manufacture.
Theories and practice for achieving manufacturable designs. Topics include: introduction to manufacturing processes, creativity and design, DFM concepts, design philosophy, company DFM programs, group technology, cost and value analysis, life-cycle engineering, assembly strategies, and human factors. Prer., ENGR 342 and MAE 2501. Meets with MAE 3560.

MAE 5571-3. Analysis and Design of Experiments.
Statistical methods to design experiments for the design of effective manufacturing systems. Balanced treatment of traditional and modern techniques in experiment design, with emphasis on real-world applications. Processes of planning, collecting data, and analyzing the data are covered. Prer., Senior/Graduate standing and either ECE 3610 or MATH 381. Meets with MAE 4561.

MAE 5573-3. Methods of Operations Research.
Apply the principles of operations research to decision-making with multiple criteria and objectives; develop mathematical and computer models for decision- making - linear, integer, and nonlinear programming. Apply principles to hands-on examples. Prer., Senior/Graduate standing. Meets with MAE 4540.

MAE 5574-3. Cellular Manufacturing.
Cellular manufacturing has become an essential part of most world-class strategies. Investigation of analysis design and implementation of high-performance manufacturing cells. Topics include: key cell design issues, simulation in cell design, techniques for economic evaluation, group technology, just-in-time strategies, and team building in cellular manufacturing. Prer., MAE 3560/MAE 5570, MAE 4561/MAE 5571 and MAE 4506/MAE 5596. Meets with MAE 4541.

MAE 5575-3. Contemporary Issues in Manufacturing.
Introduction to world class manufacturing including interaction with customers and suppliers, integrated and concurrent manufacturing, and just-in-time production meeting customer requirements, using case analysis, field study, and experiential learning. Prer., MAE 3560/MAE 5570, MAE 3561/MAE 5571 and MAE 4506/MAE 5596. Meets with MAE 4542.

MAE 5590-3. Space Systems Design and Integration.
Student will design a simple spacecraft payload based upon mission requirements. Basic sequence will be followed through design, review, manufacturing, test, and integration. The payload will then be flown and evaluated in a follow-on course. Prer., Graduate standing.

MAE 5591-3. Space Systems Operation and Evaluation.

The spacecraft payload designed in MAE 5590 will be flown/operated. Vehicle telemetry and payload data will be analyzed, and a report of the results will be prepared. Prer., MAE 5590.

MAE 5593-3. Space Sensor Systems.
Introduction to airborne and space based sensor systems and data fusion techniques. The sensor design and performance characteristics of microwave and millimeter wave radar systems, infrared (IR) thermal imagers, and electro-optical (EO) devices will be covered. Additionally, multiple sensor systems, data fusion, and tracking will be discussed. Prer., MATH 340, PES 112 and ASE 569.

MAE 5594-3. Space Communications System Design.
Fundamentals of digital data transmission; noise characterizations and calculations; communications link calculations; error probabilities for basic digital modulation schemes - BPSK, QPSK, OQPSK, MSK, serial MSK; system degradations, carrier and clock recovery; multiple access techniques - FDMA, TDMA, CDMA; packet satellite networks; "orbital" parameters; comparison of satellite communication systems with fiber optic links. Prer., ECE 3510, 3610, and MAE 4410/5410 or equivalent. Meets with MAE 4420.

MAE 5595-3. Space Mission Analysis.
A survey of the various spacecraft bus subsystem systems and tradeoffs needed to satisfy the space mission requirements. Spacecraft subsystems considered include communications, data handling, control, power, thermal, stuctures, sensors and mechanisms. Prer., MAE 4410/5410 and MAE 4425/5091. Meets with MAE 4550.

MAE 5596-3. Space Mission Design.
A capstone course which includes some review of engineering subsystem technology. Students will be asked to configure and design a spacecraft bus to fulfill missions specified. Prer., MAE 5090, MAE 5594 and MAE 5595.

MAE 6415-3. Robust Multivariable Control.
Theory and application for multivariable feedback control systems, limitations of achievable performance and stability robustness in the face of uncertainty in the dynamics of the controlled system. Characterization of uncertainty, and

robustness analysis. Multivariable synthesis techniques, applications to control of electromechanical systems and spacecraft. Prer., ECE 5520.

MAE 6430-3. Optimal Estimation Theory.
Theory of optimal estimation, with applications to aerospace navigation. Kalman filtering, and complementary filters, continuous and discrete formulations. Observability issues, sensor selection, numerical methods. Prer., ECE 4610 or ECE 5610.

MAE 6432-3. Space Navigation and Guidance.
Further development of astrodynamic theory, and extension to interplanetary orbit analysis. Non-Keplerian motion, Three-body problems; patched conics, Lagrange's and Gauss' Equations. Interplanetary orbit transfer, introduction to trajectory optimization. Prer., MAE 4410 and ASE 510.

MAE 7000-1 to 12. Master's Thesis.
For master's thesis in mechanical and aerospace engineering. Prer., Prior agreement with faculty advisor.

MAE 7500-1 to 12. Master's Research.
Research credit for master's program in mechanical and aerospace engineering. Prer., Prior agreement with faculty advisor.

MAE 9110-1 to 3. Special Topics: Undergraduate.
An opportunity for students to study special subjects in mechanical and aerospace engineering, undergraduate level. Prer., Prior agreement with faculty advisor.

MAE 9400-1 to 3. Independent Study: Undergraduate.
Provides opportunity for independent study in mechanical and aerospace engineering by one or more students on topics determined by a faculty member. Prer., Prior agreement with faculty advisor.

MAE 9500-1 to 6. Independent Study: Graduate.
Provides opportunity for independent study in mechanical and aerospace engineering by one or more graduate students on topics determined by a faculty member. Prer., Prior agreement with faculty advisor.

MAE 9510-1 to 3. Special Topics: Graduate.
An opportunity for students to study special subjects in mechanical and aerospace engineering, graduate level. Prer., Prior agreement with faculty advisor.

MAE 9520-1 to 3. Graduate Seminar.
Allows graduate students credit for attending department seminars and workshops. Prer., Prior agreement with faculty advisor.

MAE 9999-0. Candidate for Degree: MAE.
Candidate for degree. Prer., Prior agreement with faculty advisor.

MATHEMATICS

MATH 090-1. Fundamentals of Algebra.
A review of basic algebra and arithmetic, including algebra of polynomials, factorization of simple polynomials, arithmetic operations on fractions and rational expressions, laws of exponents, linear equations and inequalities in one variable, quadratic equations using factoring. Administered through Department of Mathematics. Pass/fail grading only. Does not count toward BA or BS degree.

MATH 104-3. College Algebra.
An in-depth study of algebraic equations and inequalities. Comprehension of the underlying algebraic structure will be stressed as well as appropriate algebraic skills. The study will include polynomials, rational, exponential, and logarithmic equations as well as systems of equations/inequalities. Prer., Score 9 or more on algebra diagnostic exam. *** See Mathematics Department prerequisite policy. ***

MATH 105-4. Elementary Functions of Calculus.
An intensive study of the elementary functions required for calculus. These functions will include polynomial, rational, exponential, logarithmic, and trigonometric functions. Emphasis is on their algebraic structure and graphs. Analysis of conic sections and analytic geometry will be included. Prer., MATH 104 or score 17 or more on algebra diagnostic exam. **See Mathematics Department prerequisite policy. ***

MATH 111-3. Topics in Linear Algebra.
Systems of linear equations, matrix algebra, linear programming, probability, and statistics. Prer., MATH 104 or score 17 or more on algebra diagnostic exam. **See Mathematics Department prerequisite policy**

MATH 112-3. Calculus for Business and Economics.
Calculus for the business and economics student. Prer., MATH 104 or score 17 or more on algebra diagnostic exam. **See Mathematics Department prerequisite policy**

MATH 135-4. Calculus I.
Selected topics in analytical geometry and calculus. Rates of change of functions, limits, derivatives of algebraic and transcendental functions, applications of derivatives, and integration. Prer., MATH 105 or score 10 or more on the Calculus Readiness Exam. *** See Mathematics Department prerequisite policy. ***

MATH 136-4. Calculus II.
Continuation of MATH 135. Transcendental functions, techniques and applications of integration, Taylor's theorem, improper integrals, infinite series, analytic geometry, polar coordinates. Prer., MATH 135.

MATH 215-3. Discrete Math.
Introduction to most of the important topics of discrete mathematics, including set theory, logic, number theory, recursion, combinatorics, and graph theory. Much emphasis will be focused on the ideas and methods of mathematical proofs, including induction and contradiction. Prer., MATH 135.

MATH 235-4. Calculus III.
Continuation of MATH 136. Parametric curves, vector functions, partial differentiation, multiple integrals, Green's Theorem and Stoke's Theorem. Prer., MATH 136.

MATH 301-3. Mathematics for Elementary Teachers I.
This is primarily a mathematics course which covers the number systems of whole numbers, integers, and rational numbers that are of prime importance to the elementary teacher. For students planning on elementary teacher certification.

MATH 302-3. Mathematics for Elementary Teachers II.
Intuitive and logical development of the

fundamental ideas of geometry such as parallelism, congruence, and measurement. Includes study of plane analytical geometry. For students planning on elementary teacher certification.

MATH 310-3. Statistics for the Sciences.
Descriptive probability, hypothesis testing, nonparametric methods. Discrete and continuous random variables, mean and variance, confidence limits, correlation and regression. Prer., MATH 135.

MATH 311-3. Theory of Numbers.
A careful study, with emphasis on proofs, of the following topics associated with the set of integers: divisibility, congruences, arithmetic functions, sums of squares, quadratic residues and reciprocity, and elementary results on distributions of primes. Prer., MATH 136 and MATH 215.

MATH 313-3. Introduction to Linear Algebra.
Systems of linear equations, matrices, vector spaces, linear independence, basis, dimension, determinants, linear transformations and matrices, eigenvalues and eigenvectors. Prer., MATH 135.

MATH 340-3. Introduction to Differential Equations.
First order differential equations, linear differential equations, the Laplace transform method, power series solutions, numerical solutions, linear systems. Prer., MATH 235.

MATH 341-3. Estimation, Convergence and Approximation.
Sequences, numerical series and power series. Improper integrals and the analysis of functions defined by integrals. Applications of these ideas to topics such as Fourier and Laplace transforms, infinite products, the Gamma function and Bessel functions, orthogonal functions. This course provides a thorough introduction to proofs in analysis, and is strongly recommended for students planning to take MATH 431. Prer., MATH 235.

MATH 350-3. Graph Theory.
Standard material on the theory of both directed and undirected graphs, including the concepts of isomorphism, connectivity, trees, traversability, planar graphs, coloring problems, relations and matrices. Prer., MATH 215.

MATH 351-3. Topics in Combinatorial Analysis.
A survey of important areas of combinatorics. Topics may include enumeration techniques, recurrence relations, combinatorial designs, graph theory, machining and optimization. Prer., MATH 215.

MATH 381-3. Introduction to Probability and Statistics.
The axioms of probability and conditional probability will be studied as well as the development, applications and simulation of discrete and continuous probability distributions. Also, expectation, variance, correlation, sum and joint distributions of random variables will be studied. The Law of Large Numbers and the Central Limit Theorem will be developed. Applications to statistics will include regression, confidence intervals, and hypothesis testing. Prer., MATH 235.

MATH 405-1 to 3. Topics in Mathematics Secondary Classroom.
The topics covered will vary from one offering to the next. Topics will be chosen to meet the needs of secondary mathematics teachers for additional training to teach to the Colorado Model Content Standards. Prer., One semester of calculus, or instructor approval. Meets with MATH 505.

MATH 410-3. Technology in Mathematics Teaching and Curriculum.
Methodology for using technology as a teaching/ learning tool for high school and college math courses. Use of graphing calculators, computer algebra systems, computer geometry systems and the internet will be emphasized. Students are required to develop and present a portfolio of in-depth projects. Prer., MATH 136. Meets with MATH 510.

MATH 413-3. Linear Algebra I.
Vector spaces, linear transformations and matrices, determinants, eigenvalues, similarity transformations, orthogonal and unitary transformations, normal matrices and quadratic forms. Prer., MATH 313. Meets with MATH 513.

MATH 414-3. Modern Algebra I.

A careful study of the elementary theory of groups, rings, and fields. Mappings such as homomorphisms and isomorphisms are considered. The student will be expected to prove theorems. Prer., MATH 215 and MATH 313. One of MATH 311, MATH 350, or MATH 351 (preferably MATH 311) is strongly recommended.

MATH 415-3. Modern Algebra II.
Continuation of MATH 414 through Galois theory. Prer., MATH 414. Meets with MATH 515.

MATH 421-3. Higher Geometry.
Axiomatic systems. The foundations of Euclidean and Lobachevskian geometries. Prer., MATH 311 or 313. Meets with MATH 521.

MATH 423-3. Fractal Geometry.
Introduction to iterated function systems and mathematical aspects of fractal sets. Includes metric spaces and the space fractals live in, transformations, contraction mapping and Collage Theorem, chaotic dynamics, shadowing theorem, fractal dimension, fractal interpolation, and measures on fractals. Prer., MATH 235 and MATH 313. Meets with MATH 523.

MATH 425-3. Introduction to Chaotic Dynamical Systems.
Introduction to dynamical systems or processes in motion, that are defined in discrete time by iteration of simple functions, or in continuous time by differential equations. Emphasis on understanding chaotic behavior that occurs when a simple non-linear function is iterated. Topics include orbits, graphical analysis, fixed and periodic points, bifurcations, symbolic dynamics, chaos, fractals, and Julia sets. Prer., MATH 235. Meets with MATH 525.

MATH 431-3. Modern Analysis I.
Calculus of one variable, the real number system, continuity, differentiation, integration. Prer., MATH 235 and MATH 215, MATH 341 is strongly recommended.

MATH 432-3. Modern Analysis II.
Sequence and series, convergence, uniform convergence; Taylor's theorem; calculus of several variables including continuity, differentiation, and integration. Prer., MATH 431. Meets with MATH 532.

MATH 442-3. Optimization.
Linear and nonlinear programming, the simplex algorithm and other approaches to linear optimization, minimax theorems, convex functions, introduction to calculus of variations. Prer., MATH 313 and 340. Meets with MATH 542.

MATH 443-3. Ordinary Differential Equations.
Linear systems of differential equations, existence and uniqueness theorems, stability, periodic solutions, eigenvalue problems, and analysis of equations important for applications. Prer., MATH 313 and MATH 340. Meets with MATH 543.

MATH 445-3. Complex Variables.
Theory of functions of one complex variable including integrals, power series, residues, conformal mapping and special functions. Prer., MATH 235. Meets with MATH 545.

MATH 447-3. Methods of Applied Mathematics.
Boundary value problems for the wave, heat, and Laplace equations, separation of variables methods, eigenvalue problems, Fourier series, orthogonal systems. Prer., MATH 235, MATH 313 and MATH 340. Meets with MATH 547.

MATH 448-3. Mathematical Modeling.
The use of diverse mathematical techniques to analyze and solve problems from science and engineering, particular problems likely to arise in nonacademic settings such as industry or government. Converting a problem to a mathematical model. Commonly encountered classes of mathematical models, including optimization problems, dynamical systems, probability models and computer simulations. Communication of results of mathematical analysis. Prer., MATH 313, 340, and 310 or 381 or ECE 3610. Meets with MATH 548.

MATH 465-3. Numerical Analysis.
Error analysis, root finding, numerical integration and differentiation, numerical methods for ordinary differential equations, numerical linear algebra and eigenvalue problems. Prer., C S 115, MATH 313, and MATH 340. Meets with MATH 565.

MATH 482-3. Introduction to Mathematical Statistics.
Point and confidence interval estimation, principles of maximum likelihood, sufficiency and completeness; tests of simple and composite hypotheses. Linear models and multiple regression analysis. Other topics will be included. Prer., MATH 381 or 310. Meets with MATH 582.

MATH 483-3. Linear Statistical Models.
Methods and results of linear algebra are developed to formulate and study a fundamental and widely applied area of statistics. Topics include generalized inverses, multivariate normal distribution and the general linear model. Applications focus on model building, design models and computing methods. The "Statistical Analysis System" (software) is introduced as a tool for doing computation. Prer., MATH 381 or ECE 3610, or MATH 310 and MATH 313. Meets with MATH 583.

MATH 485-3. Stochastic Modeling.
Mathematical development of continuous and discrete time Markov chains, queuing theory, reliability theory, and Brownian motion with applications to engineering and computer science. Prer., MATH 381 or ECE 3610. Meets with MATH 585.

MATH 495-1. Senior Seminar.
This is the capstone course for the students in the mathematics program (with MATH 448, Mathematical Modelling). Students will give oral and written presentations on mathematical topics. Prer., MATH 448 or concurrent enrollment.

MATH 505-3. Topics in Mathematics for the Secondary Classroom.
The topics covered will vary from one offering to the next. Topics will be chosen to meet the needs of secondary mathematics teachers for additional training to teach to the Colorado Model Content Standards. Prer., One semester of calculus, or instructor approval. Meets with MATH 405.

MATH 510-3. Technology in Mathematics Teaching and Curriculum.
Methodology for using technology as a teaching/ learning tool for high school and college math courses. Use of graphing calculators, computer algebra systems, computer geometry systems and the internet will be emphasized. Students are required to develop and present a portfolio of in-depth projects. Prer., MATH 136. Meets with MATH 410.

MATH 511-1 to 3. Technology in Math Education Seminar.
A follow-up to MATH 410/510. Students will present demonstrations, projects and/or laboratories they have developed for use in their math courses. Extended in-depth coverage of computer algebra or geometry systems and/or graphing calculators and internet. Basic familiarity with computer algebra or geometry systems and/or graphing calculators is required. Prer., MATH 510 or consent of instructor.

MATH 513-3. Linear Algebra I.
Vector spaces, linear transformation and matrices, determinants, eigenvalues, similarity transformations, orthogonal and unitary transformations, normal matrices and quadratic forms. Prer., MATH 313. Meets with MATH 413.

MATH 515-3. Modern Algebra II.
Continuation of MATH 414 through Galois theory. Prer., MATH 414. Meets with MATH 415.

MATH 517-3. Graduate Modern Algebra I.
Groups, rings, modules, fields, algebraic systems and Galois theory. Prer., MATH 414.

MATH 521-3. Higher Geometry.
Axiomatic systems. The foundations of Euclidean and Lobachevskian geometries. Prer., MATH 311 or MATH 313. Meets with MATH 421.

MATH 523-3. Fractal Geometry.
Introduction to iterated function systems and mathematical aspects of fractal sets. Includes metric spaces and the space fractals live in, transformations, contraction mapping and collage theorem, chaotic dynamics, shadowing theorem, fractal dimension, fractal interpolation, and measures on fractals. Prer., MATH 235 and MATH 313. Meets with MATH 423.

MATH 525-3. Introduction to Chaotic Dynamical Systems.
Introduction to dynamical systems or processes in motion, defined in discrete time by iteration of simple functions, or in continuous time by differential equations. Emphasis on chaotic behavior of an iterated simple nonlinear function. Orbits, graphical analysis, fixed and periodic points, bifurcations, symbolic dynamics, chaos, fractals, and Julia sets. Prer., MATH 235. Meets with MATH 425.

MATH 527-3. Algebraic Coding Theory.
The basic ideas of the theory of error-correcting codes are presented. We will

study some important examples and give applications. These codes are important for the digital transmission of data. Prer., MATH 414.

MATH 532-3. Modern Analysis II.
Sequence and series, convergence, uniform convergence; Taylor's theorem; calculus of several variables including continuity, differentiation, and integration. Prer., MATH 431. Meets with MATH 432.

MATH 533-3. Real Analysis I.
Zorn's dilemma, metric and normed linear spaces, completions, continuous functions. Reimann Stieltjes and Lebesque integration, measure theory. Prer., MATH 432/532.

MATH 535-3. Applied Functional Analysis.
An introduction to the basic concepts, methods and applications of functional analysis. Topics covered will include metric spaces, normed spaces, Hilbert spaces, linear operators, spectral theory, fixed point theorems and approximation theorems. Prer., MATH 431.

MATH 542-3. Optimization.
Linear and nonlinear programming, the simplex algorithm and other approaches to linear optimization, minimax theorems, convex functions, introduction to calculus of variations. Meets with MATH 442.

MATH 543-3. Ordinary Differential Equations.
Linear systems of differential equations, existence and uniqueness theorems, stability, Lyapunov functions, periodic solutions, applications. Prer., MATH 313 and MATH 340. Meets with MATH 443.

MATH 545-3. Complex Variables.
Theory of functions of one complex variable, including integrals, powering series, residues, conformal mapping and special functions. Meets with MATH 445.

MATH 547-3. Methods of Applied Mathematics.
Boundary value problems for the wave, heat, and Laplace equations, separation of variables methods, eigenvalue problems, Fourier series, orthogonal systems. Prer., MATH 235, MATH 313 and MATH 340. Meets with MATH 447.

MATH 548-3. Mathematical Modeling.
The use of diverse mathematical techniques to analyze and solve problems from science and engineering, particularly problems likely to arise in a nonacademic setting such as industry or government. Converting a problem to a mathematical model. Commonly encountered classes of mathematical models, including optimization problems, dynamical systems, probability models, and computer simulations. Communication of results of mathematical analysis. Prer., MATH 313, 340, and 310 or 381. Meets with MATH 448.

MATH 552-3. Perturbation Theory in Astrodynamics.
Perturbation methods including Lagrange and Hamiltonian mechanics and the generalized method of averaging. Gravitational and atmosphere modeling. Prer., ASE 510 or PHYS 551. Meets with ASE 511.

MATH 562-3. Complex Variables II.
Homotopy, Global Cauchy Theorem, Residue Theory, conformal mapping, infinite products, analytic continuation, special functions, selected topics. Prer., MATH 445/545 and MATH 431.

MATH 565-3. Numerical Analysis.
Error analysis, root finding, numerical integration and differentiation, numerical methods for ordinary differential equations, numerical linear algebra and eigenvalue problems. Meets with MATH 465.

MATH 582-3. Introduction to Mathematical Statistics.
Point and confidence interval estimation, principles of maximum likelihood, sufficiency and completeness; tests of simple and composite hypotheses. Linear models, and multiple regression analysis. Other topics will be included. Prer., MATH 310 or MATH 381. Meets with MATH 482.

MATH 583-3. Linear Statistical Models.
Methods and results of linear algebra are developed to formulate and study a fundamental and widely applied area of statistics. Topics include generalized inverses, multivariate normal distribution and the general linear model. Applications focus on model building, design models and computing methods. The "Statistical Analysis System" (software) is introduced as a tool for doing computations. Prer., MATH 381 or ECE 3610, or MATH 310 and MATH 313. Meets with MATH 483.

MATH 584-3. Computer Vision.
Representation and manipulation of digital images; Fourier analysis of images; enhancement techniques in spatial and frequency domain; segmentation procedures; digital geometry, region and boundary representation; texture processing; pattern recognition and application to robotics. Prer., Graduate standing in mathematics, engineering or computer science. Meets with C S 584.

MATH 585-3. Stochastic Modeling.
Mathematical development of continuous and discrete time Markov chains, queuing theory, reliability theory and Brownian motion with applications to engineering and computer science. Prer., MATH 381 OR ECE 3610. Meets with MATH 485.

MATH 590-1 to 3. Graduate Seminar.
Various topics in mathematics at the graduate level. Prer., Consent of instructor.

MATH 591-3. Theory of Probability.
Theoretical approach to probability. Measure theory is given form within a large body of probabilistic examples, ideas and applications. Weak and strong laws of large numbers, central limit theory, recurrence, Martingales. Prer., MATH 431.

MATH 700-1 to 6. Masters Thesis.

MATH 800-1 to 10. PhD Dissertation.
Enrollment is limited to those students who are in the PhD program in Engineering, and have primary thesis advisor in the Department of Mathematics. Prer., Consent of instructor.

MATH 920-1 to 4. Independent Study Math Undergraduate.

MATH 940-1 to 3. Independent Study Math Undergraduate.
MATH 950-1 to 3. Independent Study Math, Graduate.

MATH 999-0. Candidate for Degree.

SOFTWARE ENGINEERING

S E 531-3. Software Requirements Analysis and Specification.
Techniques and tools for requirements analysis and requirements specification. Requirements language and notations. Specification completeness and consistency. Team project in the analysis and specification of a major software system.

Prer., Knowledge of modern programming language, data structures and algorithms, discrete structures. Meets with C S 531.

S E 532-3. Software Design.
Covers a variety of methodologies and tools for design of sequential, parallel and distributed software systems. Design language; graphical design representation. Data abstractions, data dictionaries. Data flow design and diagrams. Object-oriented design. Documentation. Team project in the design of a major software system. Prer., S E 531/C S 531 or I S 665. Meets with C S 532.

S E 533-3. Formal Methods of Software Systems Engineering.
Elements of discrete mathematics. Formal mechanisms for specifying and verifying the correctness, reliability, and efficiency of software systems. State transition, regular expression, context free, and applicative models. Assertions, hoare axioms, and weakest preconditions. State machine, algebraic, and operational specification techniques. Prer., Knowledge of modern programming language data structures and algorithms, discrete structures. Meets with C S 533.

S E 534-3. Software Maintenance.
Discussion and application of corrective, adaptive, perfective and preventive software maintenance techniques and tools. Related topics such as software systems analysis, ware reverse-engineering, re-engineering, regression testing and configuration management are examined. As project, student teams maintain an existing software system. Prer., Knowledge of modern programming language data structures, and algorithms, discrete structures. Meets with CS 534.

S E 535-3. Software Project Management.
Planning, scheduling, costing of projects. Measuring progress, predicting success, controlling failure. Management tools and their use. Effectiveness and efficiency of software engineering environments. Distributed software development. Quality control standards and practices. Prer., Knowledge of modern programming language data structures and algorithms, discrete structures. Meets with C S 535.

SSE 536-3. Software Product Assurance.
Principles, techniques and tools for producing quality software systems. Student teams plan and carry out software quality assurance, verification and validation, testing, and configuration management functions. Students participate in various kinds of software of reviews and audits and apply different methods of unit integration and system testing to an existing software system. Students also examine new software development methods that seek to improve the quality of software products. Prer., SSE 531/C S 531 or I S 665. Meets with C S 536.

S E 537-3. Human-Computer Interfaces.
Techniques and tools for the analysis, design, implementation and testing of human-computer interfaces. Special topics such as human factors, rapid prototyping and usability testing will be studied. Term project. Meets with C S 537.

SSE 538-3. Object-Oriented Software Development.
Principles of object-oriented problem-solving, object-oriented analysis and object-oriented design. Development of class hierarchies, use of polymorphism and inheritance, criteria for good design, semester project. Prer., C S 330 or consent of instructor. Meets with C S 538.

S E 539-3. Software Systems Engineering Project Laboratory.
Students participate in a project involving the development or maintenance of a software system intended for external distribution and use. Duties include requirements analysis, specification, design, implementation, testing, quality assurance, configuration management and documentation. Projects come from the university and from outside sources. Students are evaluated based on their project work and an oral presentation describing their work and critiquing their results. Prer., S E 531, 532, 534, 535, 536. or C S 531, 532, 534, 535, 536. Meets with C S 539.

S E 700-1 to 6. Masters Thesis - Software Engineering.
Masters thesis work as determined in consultation with the major advisor.

S E 701-3. Masters Project - Software Engineering.
Masters project work as determined in consultation with the major advisor.

SSE 630-3. Topics in Software Systems Engineering.
Advanced topics and current research issues in software engineering. Possible topics include software engineering environments, requirements, design, testing, software metrics, configuration management, maintenance, software cost, analysis, and distributed software. Prer., SSE 531/C S 531 or SSE 535/C S 535. Meets with C S 630

Graduate School of Public Affairs

Criminal Justice

C J 5000-3. Law and Social Control.
A general introduction to the nature of law, legal institutions, and legal processes as one among multiple systems of social control; consideration of various theories of interpretation, application, and enforcement of law; the structure and function of legal institutions. Meets with SOC 594.

C J 5100-3. Administration of Criminal Justice.
Analysis of the policies and practices of agencies involved in the criminal justice process from detection of crime and arrest of suspects through prosecution, adjudication, sentencing, and imprisonment to release. The patterns of decision and practices are reviewed in the context of the entire criminal justice system.

C J 5110-3. Criminal Justice Planning and Evaluation.
Techniques for assessing the probability and desirability of future possible states of society, and particularly of social control systems, will be considered in relation to the goals of the criminal justice system.

C J 5120-3. Nature and Causes of Crime.
Survey of theories of crime causation ranging through biological, psychological, sociological, cultural, and political theories. Close attention to the problems inherent in approaching the study of crime from a cause of crime perspective. Meets with SOC 595.

C J 5320-3. Police Administration.
The role of the police in a rapidly changing society, relationship between police services, the courts, and correctional administration.

C J 5321-3. Research Methods in Criminal Justice.
Provides an assessment of research strategies in criminal justice through an examination of applied research designs and analytical models. The logic and rationale of these various strategies are contrasted, and their relative merits are critiqued. Selected research problems in the criminal justice system are utilized to illustrate the application and interpretation of alternative strategies.

C J 5361-3. Advanced Seminar in Criminal Justice.
Designed to assist students in synthesizing what they have learned in the program, applying their knowledge and skills to a particular problem of interest. Students conduct an independent project, enabling them to explore an issue in depth. This course is taken in the final semester of the student's program. Meets with P AD 5361.

C J 5510-3. Contemporary Law Enforcement.
Strategies for implementing new programs directed at social control and crime prevention. Experiences in programmatic innovations and revolutionary interventions in law enforcement administration; case histories of past efforts at radical change and experimentation, emphasis on implementation strategy and consequences of innovation.

C J 5520-3. Corrections.
Contemporary correctional practice and its evolution, development of correctional programs; alternatives to incarceration, probation, jails, prisons, and parole. Meets with SOC 599 and SOC 442.

C J 5530-3. Administration of Community-Based Corrections.
Theory and practice of probation and parole; examination of efforts to create mixtures of institutional settings and normal community life.

C J 5540-3. Juvenile Justice Administration.
Covers the policies and practices of agencies in processing young persons through the juvenile court system; trends in juvenile justice; examination of disposition of cases by probation, foster home placement, training schools, and transfer to adult correction programs.

C J 5550-3. Criminal Justice Policy Analysis.
Deals with crime as a national political issue and examines how conflicting political philosophies influence criminal justice policy. Case studies will be made of significant criminal justice policy changes in both the federal and state levels.

C J 5551-3. Judicial Administration.
An analysis of judicial organization, court administration, and criminal court judges as participants in the operation of the criminal justice process; attention to the prosecutor and public defender systems.

C J 5552-3. Criminal Justice Ethics.
This seminar offers a normative framework within which to explore ways to increase sensitivity to the demands of ethical behavior among criminal justice personnel. The application of a normative perspective enhances the possibility that moral problems will be better understood, more carefully analyzed and rendered more tractable. Applied ethics forces a reflection not just on ethics, but also on the nature and operation of the criminal justice system itself.

C J 5553-3. Women and Criminal Justice.
This seminar explores issues surrounding women as offenders, victims, and criminal justice professionals. Investigates explanations for the involvement of women in illegal activities. Analyzes the plight of battered women, rape victims and other female victims. Examines the participation of women in law enforcement, judicial processes, corrections and lawmaking.

C J 5554-3. Criminal Justice Reform.
This seminar provides an overview of reform efforts in the criminal justice system. Selected theoretical approaches and policies are examined and assessed in light of their assumptions and programmatic applications. The rationales and processes underlying selected reform strategies are explored. The implications of the effects of reform in criminal justice policymaking and decision-making are analyzed.

C J 5571-3. Social Organization of Crime.
This seminar explores the relationship of neighborhood social disorganization to the dynamics of crime from a social ecology perspective. The course examines the underlying social causes of phenomena such as criminal victimization, violent and property crime, neighborhood fear, neighborhood deterioration, and recidivism. The course will examine both social, structural and ecological characteristics of neighborhoods and communities in affecting crime.

C J 5572-3. Race, Crime and Justice.
This seminar examines the role of race in criminal justice processing. The class examines the research findings, interpretations, issues and implications in assessing the impact of race in the administration of criminal justice. Explores the policy implications concerning the nature and extent of racial disparities in the criminal justice system and lays out a research agenda to more strategically address these issues within criminal justice policy making.

C J 5573-3. Organized Crime.
This seminar examines the issues involved in understanding those economic activities by which persons involved in "organized crime" make money. Major topics include: the structure of drug trafficking; the operations of illegal gambling activities; the culture and function of loansharking; the economics of labor racketeering; and the role of criminal groups in fencing stolen goods and providing other services to highjackers and burglars.

C J 5574-3. White Collar Crime.
This seminar employs both the social science and legal approaches to examine crime committed by corporations as well as by individuals in white collar occupations. The course covers how such crimes are socially defined, who commits them, who is victimized by them, which social contexts promote them, and how society and the criminal justice system respond to them.

C J 5575-3. The Mentally Disordered Offender.
This seminar examines the offender who may be mentally disordered. A survey is made of the various phases of the criminal justice system where psychiatrists are involved, e.g., diversion, fitness, insanity, and sentencing. Dangerous sex offender legislation, "not guilty by reason of insanity" and "guilty but mentally ill" statutes, and issues concerning confiden-

tiality, informed consent, and treatment are addressed.

C J 6600-3. Special Topics in Criminal Justice.
Analysis of specific topics relating to the criminal justice process.

C J 6910-3. Field Study in Criminal Justice.
For students who have not had practitioner experience, a full or part-time internship is required. Consent of the instructor. Prer., 12-15 hours of criminal justice coursework.

C J 9500-1 to 3. Independent Study in Criminal Justice.
Affords the student the opportunity to pursue creative activities under the individual supervision of a full-time faculty member. No more than six hours of credit for independent study may be applied toward the MCJ degree. Prer., twelve hours of criminal justice course work.

C J 9990-0. Candidate for Degree.

Public Administration

P AD 5001-3. Governance and Institutions.
It is a time of rapid change, resource limitations, and questioning of the roles of public service organizations and professionals in American society. In such a time, it is essential for practitioners and citizens to understand the history, nature, and scope of public service. This course explores the creation of American public and nonprofit institutions, the ways organizations are structured and managed, and the role of the public service practitioner in the challenging contemporary setting. Meets with P SC 432.

P AD 5002-3. Organizational Management and Change.
Under the pressures to increase productivity with ever diminishing resources and the constant watch of the public eye, public administrators face constant dilemmas over issues of leading and motivating subordinates, of making decisions in what are often highly political environments, of communicating effectively, and of managing the constant flow of change. This course examines these issues.

P AD 5003-3. Information and Analytic Methods.
Administrators in public, nonprofit, and criminal justice settings make use of research and data to make important decisions regarding the management of their organization. This course enables students to be informed consumers of that information and to initiate and take part in research projects in their organization as appropriate. The course covers the sequence of a research project: identification of questions/hypotheses, review of existing research, selection of designs and sampling strategies, and data collection. Data collection includes surveys, interviews, and existing data. Students are introduced to basic statistical methods, and user- friendly software is used to analyze data sets and answer questions of interest.

P AD 5004-3. Economics and Public Finance.
Uses economics to explore public and private sector roles, and the allocation of resources in the public sector.
Introduces the concepts of public goods, market failure, and externalities. The effects of taxation and subsidies on consumer and firm behavior are analyzed. Also covers cost benefit analysis and national, state, and local budgeting methods.

P AD 5005-3. The Policy Process and Democracy.
This course offers a theoretical approach to understanding the public policy process in the context of a democratic system. Presents theoretical models of the policy process, and issues in public affairs will be discussed.

P AD 5006-3. Ethics and Leadership.
Placed as they are in the public fishbowl and surrounded by a renewed interest in right and wrong, public administrators are constantly faced with ethical questions and dilemmas. This course looks both at age old ethical problems as well as issues facing administrators in the public setting today. It builds on the ethical framework of the founding fathers to consider issues relevant to the practice of public administration today.

P AD 5007-3. Qualitative Research Methods.
This seminar focuses on qualitative research methods that incorporate field work techniques such as observation, interviews and content analysis. The main objective is to discover practicalities and limitations of ethnographic methods with a comparative methodology perspective. Students are required to conduct a research project. Prer., P AD 5003.

P AD 5110-3. Seminar on Nonprofit Management.
Covers the principles and techniques of successful nonprofit management. Topics include such issues as board selection and governance, leadership, strategic planning, marketing and public relations, business management and fund accounting, the use of consultants, personnel policies, fund raising, and resource development.

P AD 5130-3. Building Public-Nonprofit Partnerships.
Introduces the student to basic comparisons, contrasts and conflicts of the local, state, and national levels of public and nonprofit governance. It features an analysis of the potential for partnering between the public and nonprofit sectors. The analysis examines particular variables in administration, and regulatory policies for each sector through an analysis of potential for partnering between these two sectors. Topics include procurement, contracting, and grants administration.

P AD 5140-3. Nonprofit Financial Management.
Nonprofit organizations depend on philanthropic, governmental, and fee-based funding. This course addresses the nature and the implications of these alternatives, as well as planning and budgeting for resource adequacy. The role of governmental regulation and funding for the nonprofit sector is a key focus. The course also covers the theory and practice of fund raising and development among nonprofit organizations.

P AD 5160-3. Nonprofit Board of Directors and Governance.
Roles, responsibilities, processes, and powers of voluntary boards of directors. Topics include leadership and management roles of board members and executive directors, board composition, board roles in fund raising, board liability, conduct of meetings, advisory boards and committees, and board development in grass roots organizations.

P AD 5220-3. Human Resources Management.
The technical knowledge and interpersonal skills involved in managing public and nonprofit sector personnel have become extremely complex and challenging. This course probes the underlying values and techniques associated with employee recruitment, selection, motivation, training, affirmative action, compensation, benefits, performance appraisal, and related topics.

P AD 5240-3. Administrative Law.
Examines the development of American administrative law and its relationship to regulations and legislative/administrative processes. Students study the nature of the legal process and its compatibility with the administrative process, as well as exposure to the regulatory process and its impact on the delivery of public programs. Meets with P SC 446.

P AD 5260-3. Managing in a Multicultural Society.
Using a systems approach, diversity within organizations is examined through the construction and review of theories in private, public and nonprofit organizations. Existing modes of managing diversity are examined and analyzed.

P AD 5262-3. Leadership Workshop.
This skill building workshop focuses on issues of effective leadership in the organizational setting and enables participants to examine their own leadership style(s) and how those styles influence others. Models of effective leadership are examined and applied to the specific work settings of those participating, with distinctions between leadership and management being developed.

P AD 5270-3. Management Development.
With a focus on the balance between one's personal and professional life, this course seeks to identify and apply principles out of which public managers can increase their effectiveness. Considering such issues as stress management, creative problem solving, time management, cooperative work strategies, effective listening, decision-making, and mechanisms for increasing power, this course has a strong focus on enabling students to personally apply the concepts considered.

P AD 5271-3. Managing Conflict and Change.
Explores the process of change in organizations, communities and society and the conflicts that arise within those organizations. Through the use of relevant case studies and role playing exercises, students are provided a practical framework for looking at change and managing conflict associated with change.

P AD 5320-3. Public Policy Analysis.
Provides training in the systematic analysis of policy and program initiatives. The course also covers benefit cost analysis, cost-effectiveness analysis and present values. Prer ECON 101 or P AD 5004. Meets with ECON 423.

P AD 5350-3. Program Evaluation.
Program evaluation is an important part of improving the performance of public and nonprofit organizations. This course introduces models and theories of program evaluation including decision-making models, utilization-focused evaluation, theory-based approaches, participatory and empowerment evaluation, and others. Students will also gain skills in program evaluation and will plan an evaluation for an organization or agency. Emphasis is placed on exercises and simulations to build skills for conducting evaluations.

P AD 5361-3. Advanced Seminar in Public Policy and Management.
Designed to assist students in synthesizing what they have learned in the program, applying their knowledge and skills to a particular problem of interest. Students conduct an independent project, enabling them to explore an issue in depth. This course is taken in the final semester of the student's program. Meets with C J 5361.

P AD 5370-3. Media and Public Policy.
Explores the conventions and practices of the print and electronic media in the United States. Students will better understand the place of the media in society, the way the media look at themselves, and how journalists confront conflicting values in the performance of their roles.

P AD 5380-3. Citizen Participation: Theory and Practice.
Tackles the issues of citizen participation and community involvement in theory and practice. Students will work in class on understanding the theoretical foundations that are relevent to citizen participation. Students will also engage in significant out-of-class projects to ground them in the practice of public involvement.

P AD 5440-3. Negotiation and Conflict Resolution.
Focuses on the concepts and skills necessary to negotiate policy and management decisions and manage internal conflicts. It is designed to help students understand the dynamics that affect negotiations and to apply the principles and strategies of negotiations in a variety of decision-making and dispute resolution contexts.

P AD 5502-3. Public Financial Management and Policy.
The use of financial resources is at the heart of governing; policy decisions are meaningful only when resources are provided to implement them. This course examines American public sector finance in relation to other nations; the national government and fiscal well-being; types of budgeting systems and their uses; creation of the national budget; structure of the local government budget; and selected topics such as debt and cash management, accounting for resource use, and forecasting financial condition.

P AD 5615-3. Health Policy.
Health is one of the more important policy issues facing America today. This course examines the nature of health policy and how it is impacted by politics, with a focus on the federal government's major programs for purchasing health care, Medicare and Medicaid, and their evolution over time. The course also reviews the impact of sociocultural context and federalism on program structure, the effects of managed care on the health care system and the state's role in providing health care. Attention is also given to health care issues in Colorado.

P AD 5625-3. Local Government Management.
Relates the systems, processes, and principles of public management to the local government environment. Public management concepts such as strategic planning, bureaucracy, formal and informal organizational structures, human resource planning, management control, systems theory, and administrative

behavior are explored within the context of local government.

P AD 5626-3. Local Government Politics and Policy.
The perspective of politics and public policy making is essential to understanding local governance. This course focuses on local government political structures, policy analysis and formulation, political forces in administrative decision making, and relationships between professional administrations and elected officials.

P AD 5710-3. Public Sector Technology.
Introduces participants to innovative and cutting- edge technology in the public sector. Emphasizes current information technology concepts, issues and practices, systems, self-service kiosks, groupware, simulations, imaging systems, data warehousing, and the Internet/World Wide Web.

P AD 6115-3. Grant Writing.
Designed to provide students with the knowledge and skills to perform one of the most critical functions for any public or nonprofit sector agency today: gaining funds through proposals. Students learn how to find a funding source among various public and private sources and how to plan and write a proposal.

P AD 6910-3. Field Study in Public Administration.
For students who have not had substantial professional experience in public or nonprofit organizations. Prer., Completion of the core courses and relevant electives.

P AD 9500-1 TO 3. Independent Study.
Independent study in Public Administration. Prer., Consent of Instructor.

College of Letters, Arts, and Sciences

Art History

A H 100-3. Languages of Art.
An introduction to the range of material culture, the human made environment, the representation and meaning in objects in a variety of times and cultures. The student will understand and communicate ideas about the visual arts.

A H 280-3. Survey: Ancient Art.
A survey of sculpture, painting, and architecture from the Paleolithic through the Roman periods. The Arts of Mesopotamia, of Egypt, Anatolia, Greece, and Rome will be given primary consideration.

A H 281-3. Survey: Medieval Art.
A survey of the arts of early Christian, Byzantine, early Medieval, Romanesque, and Gothic periods.

A H 282-3. Survey: Renaissance, Baroque, and Rococo Art.
A survey of the paintings, sculpture, and architecture of Proto-Renaissance Italy through the European Rococo periods, roughly 1300 through 1750.

A H 283-3. Survey: 19th and 20th Century Art.
The arts of the late 18th century in Europe to the present day in the United States.

A H 284-3. Survey: History of Architecture.
Addresses the space, function, form and environmental concerns of architecture in cultures throughout the world from caves to skyscrapers, tents to temples.

A H 285-3. Survey: American Art.
This course addresses the material culture of what now is the continental United States. Material culture in this context emphasizes painting, sculpture and architecture, but comprises as well the decorative arts.

A H 300-3. Topics in Art History.
Emphasizes study of a more specific area than that covered in regular art history course offerings. For further information see individual course listing for each semester.

A H 301-3. History of Photography.
The history of photography from its infancy to the present. The development of the photograph as art will be traced from the early 19th-century pioneers through the contemporary masters.

A H 324-3. The Art of Greece and Rome.
A consideration of the culture of ancient Greece and Rome as expressed by architecture, painting, and sculpture from around 800 B.C. to 400 A.D.

A H 327-3. Women in the Visual Arts.
A consideration of some recurrent images of women artists in relation to the male art of the same culture. The questions, "Why have there been no great women artists?" and "Is there such a thing as women's aesthetics?" will be examined in relation to the careers of the women artists selected. Meets with WMST 327.

A H 333-3. Film, Video and Narrative Representation.
Synchronic examination of the art of film and film as art in the context of the changing institutions of "fine art" in the Twentieth Century. The course will address the avant garde film and video of such artists as Duchamp, Warhol, and Nam June Paik.

A H 343-3. African-American Art.
Introduction to contemporary (1970-) African-American art forms with inclusion of traditional African art's influence on American Black culture.

A H 360-3. Modern Architecture.
The development in Europe and America which led to the present state of architecture and urbanism. Emphasis upon the designer's responses to totally new materials, technology, and environmental conditions.

A H 379-3. Romanesque and Gothic Art.
A consideration of Romanesque and Gothic culture as manifest in the sculpture, painting, and architecture of Europe from around 1030-1350.

A H 380-3. Sacred Spaces of the World.
An examination of the architecture and sites of the world's major religions with a focus on the relationships of the form of these sacred spaces to the history and philosophy of the religion. Meets with REST 380.

A H 384-3. Baroque Art.
The 17th century throughout Europe with primary attention to Caravaggio, Rubens, Bernini, Poussin, Velasquez, and Rembrandt.

A H 385-3. Topics in American Art.
Selected topics in the art of America from colonial times through the 20th century; folk and craft art; painting, sculpture, and architecture.

A H 400-3. Seminar: The Practice of Art History.
Seminar experience in art history methodology. Required of all graduating majors. Open to students with 15 hours of upper-division coursework in art history.

A H 434-3. Arts of Indigenous Cultures.
An in-depth investigation of the art forms and related social customs of cultures native to the Americas, Australia, and Africa.

A H 456-3. Perspectives on Art.
An examination of selected literature in art history, criticism, and aesthetics not usually covered in standard course offerings.

A H 481-3. Art of the Italian Renaissance I.
A study of major trends in the development of painting, sculpture, and architecture as they reflect the culture of Renaissance Italy from around 1300-1500. Prer., A H 282 or equivalent.

A H 482-3. Art of the Italian Renaissance II.
The late Renaissance and mannerism. The art of 16th- century Italy; special emphasis upon Michelangelo, Titian and Venice, both Florentine and Roman Mannerists, with some attention to Caravaggio. Prer., A H 282 or equivalent.

A H 483-3. Northern Renaissance Art.
History of painting in northern Europe from the late 14th through the 16th century with primary emphasis on the art of the low countries. Prer., A H 282 or equivalent.

A H 489-3. Nineteenth Century Art I.
History of the neoclassic and Romantic movements in European art with special reference to the Painting of David, Goya, Ingres, Gericault, and Delacroix, as well as consideration of architecture and sculpture from 1780 to 1850.

A H 490-3. Nineteenth Century Art II.
A study of the developments of Realism, Impressionism, Post-Impressionism, and Symbolism in France and England from 1850 to 1905.

A H 491-3. Modern Art: 1900-1945.
European and American art from around 1906 through World War II. The major movements of European art: Cubism, Fauvism, Dadaism, Surrealism will be considered, along with American art from around 1913-1945.

A H 492-3. Art Since 1945.
The history of American art and architecture from around 1945 to the present with some reference to developments in Europe during this period.

A H 940-1 to 4.
Independent Study in Art History.
Independent Study in Art History on the undergraduate level with any full-time professor by arrangement.

American Studies

AMST 599-3. Topics in American Studies.
Topics in American Studies will amplify student choices in academic departments and courses with a focus on the American experience at the graduate level. Prer., Enrollment in AMST Program.

AMST 700-1 to 6. Masters Thesis.
Thesis of original research on an appropriate topic approved by program director. Prer., Completion of 24 credit hours of course work.

Anthropology

ANTH 103-3. Introduction to Human Origins.
Evolution of humanity and its cultures from their beginnings through the early metal ages. Covers human evolution, race, prehistory, and the rise of early civilization.

ANTH 104-3. Introduction to Cultural Anthropology.
Introduction to the major aspects of culture, such as social organization, law, religion, and language. Juniors and seniors should begin their study of cultural anthropology with ANTH 240.

ANTH 204-3. Women in Cross-Cultural Perspective.
Provides a cross-cultural perspective on women primarily from an anthropological viewpoint. As a cross-listed course with WMST 204, we will build a framework for comparing women's experience cross-culturally. Meets with WMST 204.

ANTH 220-4. Survey of Prehistory.
The basic concepts and techniques of archaeology and a survey of the major developments in world prehistory.

ANTH 230-4. Survey of Biological Anthropology.
Basic concepts in the study of human evolution, human physical variation, and social behavior of nonhuman primates.

ANTH 240-3. Survey of Cultural Anthropology.
Basic concepts in the study of cultures. Prer., ANTH 104 or Sophomore status.

ANTH 241-3. Cultural Diversity in the United States.
Examines prejudice and discrimination in the United States from a variety of anthropological perspectives. It addresses such topics as racism, sexism, homophobia and religious intolerance.

ANTH 280-3. The Nature of Language.
Introduction to the anthropological study of language. Prer., ANTH 104 or Sophomore standing.

ANTH 300-3. Quantitative Methods in Anthropology.
A survey of quantitative methods emphasizing the nature of hypothesis testing. Attention is given to special problems of bioanthropological, archaeological, and ethnographic data. Prer., 9 Completed hours in anthropology or consent of instructor.

ANTH 307-3. Darwinism.
A critical examination of Charles Darwin's Origin of Species and The Descent of Man and their contemporary critics, considered in historical perspective.

ANTH 309-3. God, Darwin, and Morality.
Explores the moral implications of Darwin's Theory of Evolution by natural selection. Offered only through Extended Studies.

ANTH 320-5. Field Techniques in Archaeology.
While working on a local prehistoric site, students will learn basic archaeological field techniques such as stratigraphy, mapping, excavating, recording, and artifact storage. Students will play an active role in planning the field project and, if necessary, in adjusting techniques to the

problems presented by the site. Prer., ANTH 220.

ANTH 321-3. Lab Techniques in Archaeology.
Provides hands-on experience cataloging and analyzing materials from archaeological sites. Topics will include analysis, computer applications, materials conservation, and artifact illustration, and also the methodological decision-making that affects how we describe, analyze, and interpret data. Prer., ANTH 220 or consent of instructor.

ANTH 322-3. Prehistory of North America.
The prehistory of North America, emphasizing the peopling of the new world, earliest American cultures, and later regional developments. Prer., Either ANTH 103, ANTH 104, ANTH 220 or consent of instructor.

ANTH 323-3. High Civilizations of the Americas.
Prehistoric, protohistoric, and historic cultural analysis of the Aztecs, the Mayans, and the Incas. Includes discussion of their archaeological developments, cultural attainments, and influence on other peoples. Prer., ANTH 103 or consent of instructor.

ANTH 324-3. Paleolithic Archaeology.
The cultural evidence for human development from the earliest stone tool assemblages of the Plio- Pleistocene to the Mesolithic and Archaic cultures of the old and new worlds. Prer., ANTH 220 or consent of instructor.

ANTH 325-3. The Prehistory and History of Native American Cultures of the Southwest.
The prehistory and ethnography of the Indian cultures of the Southwest. Meets with A H 300 Sec 001.

ANTH 326-3. Agricultural Origins and the Emergence of Urban Society.
The evidence for the origins of agricultural economies and the emergence of complex social and political institutions in both the old and new worlds. Prer., ANTH 220 or 103 and consent of instructor.

ANTH 327-3. Historical Archaeology.
History and practice of the sub-discipline of historical archaeology. Covers archaeological method and theory, some of which is unique to this subfield. Students will explore diverse perspectives brought to historical archaeology by its practitioners, and critically examine individual case studies. Prer., ANTH 220 or consent of instructor.

ANTH 332-3. Primatology.
Behavior, ecology, and evolution of nonhuman primates. Emphasis on field studies, and on evolutionary explanations of social groups, mating systems, and behavior toward kin. Prer., ANTH 103 or ANTH 230 or consent of instructor.

ANTH 334-3. Human Evolution.
A detailed examination of the fossil evidence for human evolution, emphasizing functional analysis of human structure and the process of natural selection. Prer., ANTH 230 or 103 or consent of instructor.

ANTH 337-3. Human Biology and Ecology.
The study of variation and adaptations of human populations in an ecological framework. Includes interactions between cultural and biological factors in health and in reproduction, and anthropological aspects of demography. Prer., ANTH 103 or ANTH 230 or consent of instructor.

ANTH 341-3. Ecological Anthropology.
Examines the relationship between culture and the natural environment in varied settings around the world. It focuses on the role of cultural anthropology in averting ecological disasters and creating methods of sustainable natural resource management. Prer. ANTH 104 or ANTH 240.

ANTH 342-3. North American Indians.
A survey of the native cultures of America north of Mexico. Examines major institutions by culture area and type of social organization. Prer., ANTH 240 or 104 or consent of instructor.

ANTH 345-3. Social Organization.
Analysis of social organization among native peoples with an emphasis on kinship forms and functions. Prer., ANTH 104 or ANTH 240.

ANTH 346-3. Anthropological Theories of Religion.
Classic and recent anthropological theories of religion are evaluated in light of ethnographic data on shamanism, totemism, magic, witch-killing, divination, myths and ancestor worship. Prer., ANTH 104 or ANTH 240 or consent of instructor. Meets with REST 346.

ANTH 347-3. Human Sexuality in Cross-Cultural Perspective.
A variety of theoretical perspectives are applied to cross-cultural patterns of human sexual norms and behavior through the use of ethnographic examples. Prer: ANTH 104 or ANTH 240 or ANTH 337 or consent of instructor. Meets with WMST 347.

ANTH 348-3. Culture and Personality.
Surveys the field of psychological anthropology and examines cross-cultural studies of personality development, mental health issues, and forms of ethnotherapy or native healing methods. The course covers methods in the study of behavior and personality in a cross-cultural perspective. Prer., ANTH 104 or PSY 100 or instructor consent.

ANTH 349-3. Culture Theory.
Analysis of significant theories of culture. Prer., ANTH 104 or ANTH 240 or consent of instructor.

ANTH 351-3. The Ethnology of Death.
A cross-cultural consideration of a universal human experience. Prer., ANTH 104 or ANTH 240.

ANTH 381-3. Language, Culture, and Society: Introduction to Sociolinguistics.
An examination of the social and cultural functions of language, emphasizing the use of linguistic methods and theories in anthropology and sociology. Prer., Sophomore standing.

ANTH 397-3. History of Anthropology.
History of the growth of anthropology from the earliest times, various schools of thought, outstanding contributors and their work, to the mid-20th century. Prer., ANTH 240 or ANTH 104 or consent of instructor.

ANTH 409-3. Classics of Anthropological Literature.
Analysis of classical literature in the history of anthropology. Prer., ANTH. 240, 349, or 407 or consent of instructor.

ANTH 420-1 to 3. Advanced Topics in Archaeology.
Intensive study of selected topics in archaeology and prehistory. Prer., ANTH 320.

ANTH 430-3. Advanced Topics in Physical Anthropology.
Intensive study of selected issues in human evolution, human biology, and primate behavior and ecology. In different years deals with different topic areas. Prer., ANTH 104 or ANTH 240 or ANTH 280.

ANTH 440-3. Advanced Topics in Cultural Anthropology.
Intensive study of selected topics in cultural anthropology. In different years deals with different topic areas. Prer., Consent of instructor. Meets with EST 440.

ANTH 471-1 to 6. Internship in Anthropology.
A program of study and learning outside the classroom. Practical exposure to field of interest is intended to provide appropriate experience related to a student's career orientation. Students must have departmental permission. Anthropology majors only. Prerequisites vary depending on area of specialization.

ANTH 480-3. Advanced Topics in Anthropological Linguistics.
Intensive study of selected topics in anthropological linguistics. In different years deals with different topic areas. Prer., Consent of instructor.

ANTH 498-3. Senior Seminar in Anthropology.
A one semester special topics course designed to provide a synthesizing cap to the student's undergraduate program in anthropology. Topics vary by semester. Prer., Senior Status.

ANTH 499-3. Senior Thesis.
A one semester research project. The student will write a formal research paper drawing in primary sources and pertinent secondary material. The student will work under the direction of a full time member of the department and will have a second member as an additional reader.

ANTH 700-1 to 6. Masters Thesis.

ANTH 940-1 to 3. Independent Study in Anthropology.
Hours and credits to be arranged. Consent of instructor is required.

ANTH 950-1 to 4. Independent Study in Anthropology.
Prer., Consent of instructor.

American Sign Language

ASL 101-4. American Sign Language I.
Basics of American Sign Language with applied usage of signs and finger spelling. Introduction to oral methodology.

ASL 102-4. American Sign Language II.
American Sign Language with continued applied usage of finger spelling. Additional oral methodology. Prer., ASL 101 or equivalent.

ASL 211-3. American Sign Language Intermediate I.
American Sign Language at the intermediate level with additional study of the culture on the hearing impaired. Prer., ASL 102 or equivalent.

ASL 359-3. Deaf Culture.
Examines the culture of deaf people. The course will explore the customs, values, norms and heritage of the deaf community in America. Prer., ASL 101 and ASL 102. Meets with F CS 359.

Bibliography

BIBL 101-3. Introduction to Library Research.
Introduction to the use of library services and research materials. Emphasis on the individual research needs. Designed for the undergraduate student in any discipline.

Biology

BIOL 100-3. Biology in the Modern World.
Designed for the nonmajor. The introductory principles of biology stressing the relationships between man and the environment. Concepts include heredity, evolution, genetics, nutrition, physiology, and ecology. Satisfies the LAS natural science requirement. To be taken with 106-1 to satisfy the LAS laboratory requirement. May not count as credit for the major. Fall, Spring, Summer.

BIOL 105-3. Personal Nutrition.
Designed for the nonmajor. A course presenting basic information about factors influencing human nutritional requirements and food sources to meet them. Emphasis is on application of biological principles in the students' own diets and lives. The course will include how to evaluate one's own nutritional needs and the adequacy of personal diet. Satisfies the LAS natural science requirement. Spring.

BIOL 106-1. Introductory Biology Laboratory.
May be taken in conjunction with BIOL 100 to satisfy the LAS science requirement and lab requirement.

BIOL 110-3. General Biology I: Introduction to Cell Biology.
Designed to integrate the more important facts and principles throughout living systems from molecular to organismic levels of organization. Broad areas of coverage include molecular and cellular biology. Prer., High school chemistry or concurrent registration in CHEM 101 or 103. Fall.

BIOL 111-1. General Biology I Laboratory: Introduction to Cell Biology Laboratory.
To be taken in conjunction with BIOL 110. A series of experiments designed primarily to illustrate basic concepts of cellular biology and provide hands- on laboratory experience. Fall.

BIOL 113-4. Plant Biology.
Structural and functional characteristics of plants. Stresses adaptations that plants have made in transition from aquatic to terrestrial environments. Lab is integral part of course and allows students to examine these organisms and relationships. Prer., BIOL 110 and BIOL 111.

BIOL 114-3. Introduction to Health and Exercise Science.
Designed for the nonmajor. Introduction to energy systems in exercise, cardiorespiratory functions, nutrition, body composition, environmental considerations and training during exercise and work.

BIOL 115-3. General Biology II: Organismic Biology.
A continuation of BIOL 110 emphasizing diversity in living systems. The theme of structure and function is emphasized with consideration given to the principles of embryology, ecology, behavior, genetics and evolution. Also emphasizing the structure, function and diversity of the plant world, including cyanobacteria, fungi, and lower and higher plants. Spring. Prer. BIOL 110, BIOL 111 or equivalent.

BIOL 116-1. General Biology II Laboratory.
To be taken in conjunction with BIOL 115. Labs illustrate the basic concepts of plant and animal organisms. Spring.

BIOL 151-3. Environmental Science.
Introduction into atomic molecular structure and to biological structure and function. Environmental contaminants in air and their reactions, water quality and its analysis, wastewater treatment, the ecology of natural systems and genetic adaptation. The course deals with worldwide environmental issues in a scientific context. Counts towards fulfillment of the LAS natural science area requirement. Fall/Spring. Meets with CHEM 151.

BIOL 153-1. Environmental Science Laboratory.
With BIOL 151, satisfies the LAS science requirement and lab requirement. Fall, Spring. Meets with CHEM 153.

BIOL 201-4. Human Anatomy and Physiology.
Part 1. Lect. and lab. A comprehensive study of the structure and function of the human body. Covers basic anatomical terminology, cells, tissues, and the following systems: integumentary, skeletal, muscle, and nervous. Fall.

BIOL 202-4. Human Anatomy and Physiology.
Part 2. Lect. and lab. A comprehensive study of the sense organs, endocrine, cardiovascular, lymphatic, immune, respiratory, digestive, urinary and reproductive systems. Spring. Prer., BIOL 201.

BIOL 203-4. Microbiology.
Lect. and lab. Presentation of the basic aspects of microbiology within a broad biological perspective. Subject matter will include microbiological concepts and methodology; a survey of the distinguishing properties of microorganisms based on structural- functional relationships: introduction to growth, metabolism, genetics, and ecology. Fall. Prer., BIOL 110, BIOL 111, BIOL 115 and BIOL 116, or CHEM 103 and CHEM 106.

BIOL 204-3. Biomedical Aspects of Aging.
A comprehensive study of the normal and pathological aspects of the aging process in human beings. The course treats cellular through organ system function, examining causes and changes related to aging. Immunity, nutrition and biopsychological factors are studied. The course also examines the concept of wellness as it applies to aging. Meets with GRNT 204 and HSCI 280.

BIOL 205-3. Nutrition for Health Sciences.
An introductory level course for students preparing for health science careers. Emphasis will be on the variety of biological and environmental factors which influence nutritional needs and nutritional status. The role of nutrients in energy metabolism and physiology will also be covered. The course will also focus on the educational role of the health service provider. Each student will do a detailed analysis of his own diet. Fall. Prer., BIOL 110 and BIOL 111 or CHEM 101 and CHEM 102.

BIOL 300-3. Biometry.

BIOL 302-3. Cell Biology.
Life processes with emphasis on relationships of structure and function at organelle and molecular level. Physical and chemical properties of protoplasm, enzyme action; cellular respiration, cell growth, and division. Fall.

BIOL 310-3. Microbiology: Bacteriology/Mycology.
Bacteriology/Mycology is an upper division, advanced study of the metabolism, physiology, and genetics of bacteria, yeast and fungus. Prer., BIOL 110 and CHEM 103.

BIOL 311-1. Bacteriology/Mycology Lab.
Laboratory course to accompany BIOL 310. Prer., BIOL 310 concurrently or preceding.

BIOL 313-3. Plants of Colorado.
An introduction to the identification of plants and the study of vegetation of Colorado. Emphasis will be on the vascular flora. Lecture, lab and field trips.

BIOL 314-3. Microbiology: Virology.
Virology is an upper division course covering the topic of biology of viruses. Prer., BIOL 110 and CHEM 103.

BIOL 315-1. Virology Lab.
Research oriented - microbiology lab course. Prer., BIOL 310 and BIOL 314.

BIOL 321-3. Human Physiology.
This course focuses on the study of homeostatic control and how the nervous, endocrine, muscular, circulatory, respiratory, excretory, digestive and reproductive systems function in the human body. Prer., BIOL 110, 111, 115, 116. Spring.

BIOL 322-3. Animal Physiology.
An examination of how invertebrates and vertebrates have met the problems of survival through physiological adaptations. Fall.

BIOL 330-3. Exercise Physiology.
A comprehensive, introductory course describing the effect of exercise on normal, physiological function. The course will describe the long-term benefits of exercise training, training adaptations and control mechanisms for these adaptations. Fall.

BIOL 333-2. Alternative Therapies in Nutrition.
A review of the use and implications of alternative nutritional therapies. Provides a basis of understanding nutritional and herbal therapies. Winterim. Prer., BIOL 110 and BIOL 115.

BIOL 360-4. Histology. Lect. and Lab.
A comprehensive study of basic tissue type, stressing the structural and functional interrelations of these tissues within organs. Treatment of cellular ultrastructure and development as it relates to tissues. Emphasis on vertebrates, including human, beings. Spring. Prer., BIOL 110, BIOL 111, BIOL 115, BIOL 116 and BIOL 365 (or co-requisite). Open to junior, senior or graduate students.

BIOL 361-4. Vertebrate Embryology/Developmental Anatomy.
Lect. and lab. Embryonic development stressing vertebrate animals from fertilized egg through organ systems, with introduction to experimental analysis. Spring (even years).

BIOL 370-3. General Ecology.
A survey of environmental relationships of plants and animals. Topics include speciation, abiotic, and biotic limiting factors, population, community and ecosystem dynamics, and terrestrial and aquatic biomes. Spring.

BIOL 383-3. Genetics.
Classical and molecular genetic principles. Topics discussed include gene structure, function, and regulation; replication and recombination; DNA technology; and evolutionary and population genetics. Spring. Prer., BIOL 302.

BIOL 384-2. Genetics Laboratory.
Laboratory course designed to illustrate concepts of Genetics as described in lecture (BIOL383). Spring.

BIOL 391-3. Immunology.
A basic study of immunity which treats the biochemical, physiological, and genetic aspects of the immune response, particularly in humans. Fall.

BIOL 400-1 to 3. Current Topics in Biology.
Specialized topics and current issues are considered. Subject matter will change depending upon individual instructors. The topic in any given semester will be specified in the semester class schedule. May be repeated for credit more than one semester. Spring.

BIOL 401-1. Seminar in Biology.
Review and discussion of pertinent research subjects. Students will present seminars. Fall. Prer., Senior or graduate standing.

BIOL 403-3. Health and Fitness.
A review of exercise prescription and health evaluation techniques including a special section on nutrition. Prer., BIOL 201 and BIOL 202.

BIOL 423-3. Injury Prevention and Treatment.
A survey of typical sports-related injuries, their causes, treatment, rehabilitation and prevention. Prer., BIOL 201 and BIOL 202, or consent of instructor.

BIOL 425-3. Evolution.
A comprehensive analysis of the evolutionary history of microbes, plants, and animals including studying the driving forces in the development of molecular pathways, organismic morphology and function. Spring.

BIOL 426-4. Biogeography.
An analysis of plant and animal distributions on a world scale from ecological and historical perspectives. Human impact on vegetation and animals is emphasized. Prer., GES 100 or consent of instructor. Meets with GES 426 and GEOG 526.

BIOL 428-4. Mammalogy.
Lecture, lab, and field studies. Origin, evolution and adaptation, geographic distribution, ecology, and taxonomy of mammals; field and laboratory study of Colorado species.

BIOL 429-4. Plant Communities of Colorado.
An examination of plant assemblages in Colorado. Major plant communities will be examined in the context of environmental factors such as climate and landforms. Required field trip. Prer., GES 426 or consent of instructor. Meets with GES 429.

BIOL 430-3. Advanced Nutrition.
A comprehensive study of the energy providing nutrients and how they are metabolized within the human body. This course will provide students with a firm basis of the biochemistry of proteins, fats and carbohydrates. Fall. Prer., BIOL 302.

BIOL 431-3. Advanced Immunology.
An advanced course in Immunology to follow a junior-senior level introductory Immunology course. Prer., BIOL 391.

BIOL 440-4. Plant Physiology.
Lect. and lab. A comprehensive study of plant physiology, emphasizing molecular and cellular aspects of physiology. Laboratory topics will include photosynthesis, water relations, growth regulators, tissue culture and cell transformation. Fall.

BIOL 444-3. Winter Ecology.
An organismic/environmental course exploring the options available to organisms for surviving winter. Includes evolutionary, behavioral and physiological adaptations involved in migration, hibernation and overwintering in temperate environments. Lecture and field trips. Winterim.

BIOL 455-3. Biomechanics/ Kinesiology.
An introduction to the mechanics of human movement. Includes the application of kinematics, kinetics, hydrodynamics, kinesiology and analytical techniques to human movement. Periodic trips to the International Center for Aquatic Research for analytical methods. Spring. Prer., BIOL 201 and BIOL 202.

BIOL 471-1 to 12. Externship in Biology.
A program of study and learning outside the classroom. Practical exposure to field of interest is intended to provide appropriate experience to a student's career orientation. A variety of opportunities exists, and students may explore their own avenues as well. Some externships are in open competition. Students must have departmental permission and completed permission form to register. It is strongly suggested that students interested in this program plan their participation one semester before they plan to enroll. (Note: Externship is to be performed off campus at an institution performing biologically-oriented work, e.g., medical clinics and research laboratories.) Fall, Spring.

BIOL 472-1 to 12. Externship in Biology.
Exercise Science. Fall, Spring. Meets with BIOL 572.

BIOL 473-1 to 12. Externship in Biology.
Biochemistry. Fall, Spring.

BIOL 474-1 to 12.Externship in Biology.
Biotechnology. Fall, Spring.

BIOL 477-3. Human Metabolism.
An advanced course in exercise physiology/biochemistry. Topics will involve extensive review of the scientific literature. These topics involve a review of current trends in sport science and are designed to give the student a practical application and interpretation of the sports sciences. Spring. Prer., BIOL 330.

BIOL 478-2. DNA Technology for Teachers. Lect. and hands-on lab.
Introduction to elements of DNA technology and genetic engineering. Practical applications to biotechnology. Discussion of safety and ethical issues. Prer., 1 year chem., biol.

BIOL 479-3. Basic Laboratory Methods in Sports Physiology.
A course designed to teach students how to test and evaluate acute and chronic responses and adaptations to exercise. The course is intended to make students proficient in laboratory techniques for assessing human performance primarily from a metabolic standpoint. Fall. Prer., Consent of instructor.

BIOL 480-3. Analytical Methods in Sports Physiology.
A laboratory course designed to teach students techniques used in exercise biochemistry, exercise testing and evaluation of human performance. This course is an extension of Basic Laboratory Methods in Sports Physiology with emphasis in exercise biochemistry. Spring. Prer., Consent of instructor.

BIOL 481-3. General Biochemistry.
Topics include structure, conformation ande, structure and functions of properties of proteins; enzymes; mechanisms and kinetics; intermediary metabolism; carbohydrates, lipids; and amino acids; energetics and metabolic control; and photosynthesis. Fall. Prer., Organic Chemistry or consent of instructor. Meets with BIOL 581, CHEM 481, and CHEM 581.

BIOL 482-4. General Biochemistry.
Continuation of BIOL 481/581. Topics include control of metabolic flux through transcriptional and post transcriptional mechanisms, macromolecules; nucleic acids, metabolism of nitrogen-containing compounds; biosynthesis and function of macromolecules including DNA, RNA, and proteins; biochemistry of subcellular systems and special topics. Spring. Prer., Organic Chemistry.

BIOL 484-3. Molecular Biology.
Detailed examination of replication, recombination, transposition, and translation in prokaryotes and eukaryotes at the molecular level. Spring. Prer., BIOL 383.

BIOL 485-4. Molecular Biology Laboratory.
A laboratory course emphasizing techniques in Molecular Biology, including DNA cloning, and analysis of gene expression. Prer., BIOL 484/584.

BIOL 486-3. Biochemistry Laboratory.
Designed to provide laboratory skills and techniques. Experiments are selected to demonstrate principles and application of current techniques and the use of instrumentation. Spectrophotometry, enzymology, centrifugation and electrophoresis are stressed. Spring. Prer., One semester of biochemistry or cell biology and one semester of organic chemistry. Meets with BIOL 586, CHEM 486 and CHEM 586.

BIOL 488-2. Principles of Flow Cytometry.
A comprehensive introduction to the instrumentation, techniques and biological applications of flow cytometry, high speed single cell analysis, and cell sorting. Topics to be studied include light sources, fluidics, fluorescent dyes, data collection and analysis, and applications in biological research and clinical medicine. Prer., Upper division biology major.

BIOL 490-3. Pathobiology.
Designed primarily for the biology major and and pre-health profession students. The course will cover mechanisms of human disease from cellular through organ and systemic pathologies. Major and pertinent health problems will be discussed. Lab demonstrations are primarily from autopsy materials. Spring (odd years). Prer., BIOL 110, BIOL 111, BIOL 115 and BIOL 116. Open to junior, senior or graduate students. Meets with BIOL 590.

BIOL 491-4. Biotechnology I.
Lect. and lab. in Biotechnology; part I of a two semester sequence emphasizing practical techniques in several areas. Instrumentation principles, applied immunology, tissue culture, handling radioisotopes, recombinant DNA, cloning and characterization of genes. Special topics required for graduate credit. Fall. Prer., CHEM 331 and CHEM 332; BIOL 383 and BIOL 481; PES 101 and PES 102, and senior standing or consent of instructor.

BIOL 492-4. Biotechnology II.
Lect. and lab. Continuation of Biotechnology I. Recombinant DNA techniques, methods in microbial genetics. Engineering gene expression. Biomass conversion with engineered microbes. Computer applications, tumor growth modeling. Radioimmune assay of receptors in mammalian cells. Field trips to regional biotechnology companies. Spring. Prer., BIOL 491 or BIOL 591.

BIOL 493-3. Research Practicum in Genetics.
Laboratory course for advanced biology students and graduate students interested in molecular biology, microbial genetics, and biotechnology. Course includes experimental design, laboratory projects, and interpretation and presentation of data from individual projects. Prer., BIOL 484.

BIOL 494-3. Research Practicum in Biochemistry.
Laboratory course for advanced biology students and graduate students interested in biochemistry. Course includes experimental design, laboratory projects, and interpretation and presentation of data from individual projects. Meets 9 hours per week. Prer., BIOL 481, BIOL 482, BIOL 486, and consent of instructor.

BIOL 495-3. Research Practicum in Exercise Physiology.
Laboratory course for advanced biology students and graduate students interested in exercise physiology and nutrition. Course includes experimental design, laboratory projects, and interpretation and presentation of data from individual projects. Meets 9 hours per week. Prer., BIOL 330, BIOL 481, and consent of instructor.

BIOL 496-3. Tumor Biology.
A limited enrollment course that emphasizes the basic science of tumor growth and the clinical approach to cancer treatment. Fall, Spring. Prer., Senior or graduate status and consent of instructor.

BIOL 497-3. Research Practicum in Immunology.
Laboratory course for advanced biology students and graduate students interested in Immunology. Course includes experimental design, laboratory projects, and interpretation and presentation of data from individual projects. Meeting 9 hours per week. Consent of instructor required. Limited enrollment. Prer., BIOL 110, BIOL 111, BIOL 115 and BIOL 116.

BIOL 500-1 to 3. Current Topics in Biology.
Specialized topics of current issues are considered, thus subject matter will change depending upon individual instructors and time of offering. The topic in any given semester will be specified in the semester schedule. May be repeated for credit. Meets with BIOL 400.

BIOL 501-1. Seminar in Biology.
Review and discussion of pertinent research subjects. Students will present seminars. Fall. Prer., Senior or graduate standing.

BIOL 503-3. Health and Fitness.
A review of exercise prescription and health evaluation techniques including a special section on nutrition. Prer., BIOL 201 and BIOL 202.

BIOL 523-3. Injury Prevention and Treatment.
A survey of typical sports related injuries, their causes, treatment, rehabilitation and prevention. Prer: BIOL 201 and BIOL 202 or consent of instructor.

BIOL 530-3. Advanced Exercise Physiology.
Lect. Advanced treatment of physiological mechanisms underlying the body's responses to varying muscular and environmental stresses. Prer., BIOL 430 or consent of instructor.

BIOL 531-3. Advanced Immunology.
An advanced course in Immunology to follow a junior-senior level introductory Immunology course. Prer., BIOL 391.

BIOL 555-3. Biomechanics/ Kinesiology.
An introduction to the mechanics of human movement. Includes the application of kinematics, kinetics, hydrodynamics, kinesiology and analytical techniques to human movement. Periodic trips to the International Center for Aquatic Research for analytical methods. Spring. Prer., BIOL 201 and BIOL 202.

BIOL 571-1 to 12. Externship in Biology.
A program of study and learning outside the classroom. Practical exposure to field of interest is intended to provide appropriate experience to a student's career orientation. A variety of opportunities exists, and students may explore their own avenues as well. Some externships are in open competition. Students must have departmental permission and completed permission form to register. It is strongly suggested that students interested in this program plan their participation one semester before they plan to enroll. (Note: Externship is to be performed off campus at an institution performing biologically-oriented work, e.g., medical clinics and research laboratories.) Fall, Spring.

BIOL 572-1 to 12. Externship in Biology.
Exercise Science. Fall, Spring.

BIOL 573-1 to 12. Externship in Biology.
Biochemistry. Fall, Spring.

BIOL 574-1 to 12.Externship in Biology.
Biotechnology. Fall, Spring.

BIOL 577-3. Human Metabolism.
An advanced course in exercise physiology/biochemistry. Topics will involve extensive review of the scientific literature. These topics involve a review of current trends in sports science and are designed to give the student a practical application and interpretation of the sports sciences. Spring. Prer., BIOL 330.

BIOL 578-2. DNA Technology for Teachers. Lect. and hands-on lab.
Introduction to elements of DNA technology and genetic engineering. Practical applications to biotechnology. Discussion of safety and ethical issues. Prer., 1 year chem., biol.

BIOL 579-3. Basic Laboratory Methods in Sports Physiology.
A course designed to teach students how to test and evaluate acute and chronic responses and adaptations to exercise. The course is intended to make students proficient in laboratory techniques for assessing human performance primarily from a metabolic standpoint. Spring. Prer., Consent of instructor.

BIOL 580-3. Analytical Methods in Sports Physiology.
A laboratory course designed to teach students techniques used in exercise biochemistry, exercise testing and evaluation of human performance. This course is an extension of Basic Laboratory Methods in Sports Physiology with emphasis in exercise biochemistry. Spring. Prer., Consent of instructor.

BIOL 581-3. General Biochemistry.
Lect. Topics include structure, conformation, and structure and functions of properties of proteins; enzymes; mechanisms and kinetics; intermediary metabolism; carbohydrates, lipids; and amino acids; energetics and metabolic control; and photosynthesis. Fall. Prer., Organic Chemistry or consent of instructor. Meets with BIOL 481, CHEM 481 and CHEM 581.

BIOL 582-4. General Biochemistry.
Continuation of BIOL 481/581. Topics include control of metabolic flux through transcriptional and post transcriptional mechanisms, macromolecules; nucleic acids, metabolism of nitrogen-containing compounds; biosynthesis and function of macromolecules including DNA, RNA, and proteins; biochemistry of subcellular systems and special topics. Spring. Prer., Organic Chemistry.

BIOL 584-3. Molecular Biology.
Detailed examination of replication, recombination, transposition, transcription and translation in prokaryotes and eukaryotes at the molecular level. Spring. Prer., BIOL 383.

BIOL 585-4. Molecular Biology Laboratory.
A laboratory course emphasizing techniques in molecular biology, including DNA cloning, and analysis of gene expression. Prer., BIOL 484/584.

BIOL 586-3. Biochemistry Laboratory.
Designed to provide laboratory skills and techniques. Experiments are selected to demonstrate principles and application of current techniques and the use of instrumentation. Spectrophotometry, enzymology, centrifugation and electrophoresis are stressed. Spring. Prer., One semester of biochemistry or cell biology and one semester of organic chemistry. Meets with BIOL 486, CHEM 486, CHEM 586.

BIOL 587-3. Biochemistry and Molecular Biology of Lipids and Membranes.
An in-depth look at the structure and function of acyl and prenyl lipids (e.g. phospholipids and cholesterol) in biology. Focus on lipid synthesis and

metabolism and their roles in signal transduction and membrane physiology, emphasis on biomedical ramifications of triacylglycerol, cholesterol and prostaglandin homeostatsis in humans. Prer., BIOL 481/581 or BIOL 482/582.

BIOL 588-2. Principles of Flow Cytometry.
A comprehensive introduction to the instrumentation, techniques and biological applications of flow cytometry, high speed single cell analysis and cell sorting. Topics to be studied include light sources, fluidics, fluorescent dyes, data collection and analysis, and applications in biological research and clinical medicine. Summer. Prer., Consent of instructor.

BIOL 589-3. Advanced Flow Cytometry.
A seminar and laboratory course for in-depth study of flow cytometric techniques and applications. Topics to be studied include detection and quantitation in single cells of nucleic acids and other nuclear, cytoplasmic and cell surface macromolecules with emphasis on oncology and immunobiology. Fall, Spring. Prer., BIOL 488/588.

BIOL 590-3. Pathobiology.
Designed primarily for the biology major and and pre-health profession students. The course will cover mechanisms of human disease from cellular through organ and systemic pathologies. Major and pertinent health problems will be discussed. Lab materials are primarily from autopsy materials. Spring (odd years). Prer., BIOL 110, BIOL 111, BIOL 115 and BIOL 116. Open to junior, senior or graduate students. Meets with BIOL 490.

BIOL 591-4. Biotechnology I.
Lect. and lab. in Biotechnology; part I of a two semester sequence emphasizing practical techniques in several areas. Instrumentation principles, applied immunology, tissue culture, handling radioisotopes, recombinant DNA, cloning and characterization of genes. Special topics required for graduate credit. Fall. Prer., CHEM 331 and CHEM 332; BIOL 383 and BIOL 481; PES 101 and PES 102; senior standing or consent of instructor.

BIOL 592-4. Biotechnology II.
Lect. and lab. Continuation of Biotechnology I. Recombinant DNA techniques, methods in microbial genetics. Engineering gene expression. Biomass conversion with engineered microbes. Computer applications, tumor growth modeling. Radioimmune assay of receptors in mammalian cells. Field trips to regional biotechnology companies. Spring. Prer., BIOL 491 and BIOL 591.

BIOL 636-2. Advanced Biomechanics.
An advanced study of biomechanics. Includes methods of smoothing raw data, joint force and torque calculations, three-dimensional theory and kinematics and kinetics in three dimensions. Prer., Consent of instructor.

BIOL 693-3. Research Practicum in Genetics.
Laboratory course for advanced biology students and graduate students interested in molecular biology, microbial genetics, and biotechnology. Course includes experimental design, laboratory projects, and interpretation and presentation of data from individual projects. Prer., BIOL 484.

BIOL 694-3. Research Practicum in Biochemistry.
Laboratory course for advanced biology students and graduate students interested in biochemistry. Course includes experimental design, laboratory projects, and interpretation and presentation of data from individual projects. Meets 9 hours per week. Prer., BIOL 481, BIOL 482, BIOL 486, and consent of instructor.

BIOL 695-3. Research Practicum in Exercise Physiology.
Laboratory course for advanced biology students and graduate students interested in exercise physiology and nutrition. Course includes experimental design, laboratory projects, and interpretation and presentation of data from individual projects. Meets 9 hours per week. Prer., BIOL 330, BIOL 481 and consent of instructor.

BIOL 696-3. Tumor Biology.
A limited enrollment course that emphasizes the basic science of tumor growth and the clinical approach to cancer treatment. Fall, Spring. Prer., Senior or graduate status and consent of instructor.

BIOL 700-1 to 6. Masters Thesis.

BIOL 940 to 947-1 to 3. Independent Study in Biology.
Advanced students (usually seniors) are encouraged to pursue independent research in some specific area or problem where extensive reference to biological literature on that subject is available. Also encouraged is the design and execution of original research, either in the laboratory or field, that bears on the problem being considered. Prior to being admitted to this course, the student must submit an acceptable written proposal of the area or problem to be studied to the faculty member (selected by the student) who supervises the effort. Students must have consent of instructor and completed permission forms to register. Fall, Spring, Summer.

BIOL 941-1 to 3. Independent Study in Biochemistry.

BIOL 942-1 to 3. Independent Study in Micro Genetics.

BIOL 943-1 to 3. Independent Study Exercise Science.

BIOL 944-1 to 3. Independent Study in Plant Molecular Biology.
Meets with BIOL 954.

BIOL 945-1 to 6. Independent Study Biochem Genetics.

BIOL 946-1 to 3. Independent Study in Tumor Biology.

BIOL 947-1 to 3. Independent Study Organismic Biology.

BIOL 949-3. Senior Thesis.
For advanced students who wish to pursue independent research for honors standing in biology. Description follows that for Independent Study in Biology (BIOL 941 and 942). The course involves four phases: 1) A proposal must be submitted including a statement of the research goal, materials and methods, review of pertinent literature, and anticipated results. The proposal will be reviewed for acceptability; 2) Research must be carried out; 3) The thesis as a write-up of research should be in the form of a scholarly publication and will be reviewed for acceptability; 4) A seminar on the research must be presented to faculty and students in biology. It is strongly suggested that students initiate their work at the start of the last semester of their junior year. Fall, Spring.

BIOL 950 to 958-1 to 3. Independent Study in Biology.
Same as BIOL 940-947 and to be per-

formed at the graduate level. Fall, Spring, Summer.

BIOL 951-1 to 3. Independent Study in Biochemistry.

BIOL 952-1 to 3. Independent Study in Micro Genetics.

BIOL 953-1 to 3. Independent Study Exercise Science.
Advanced students are encouraged to pursue independent research in some specific area or problem where extensive reference to biological literature on that subject is available. Also encouraged is the design and execution of original research, either in the laboratory or field, that bears on the problem being considered. Prior to being admitted to this course the student must submit an acceptable written proposal of the area or problem to be studied to the faculty member who supervises the effort. Students must have consent of instructor and completed permission forms to register.

BIOL 954-1 to 3. Independent Study in Plant Molecular Biology.
Meets with BIOL 944.

BIOL 955-1 to 3. Independent Study Biochem Genetics.

BIOL 956-1 to 3. Independent Study in Tumor Biology.

BIOL 957-1 to 3. Independent Study in Exercise Physiology.

BIOL 958-1 to 3. Independent Study in Cell Physiology.

BIOL 959-1 to 3. Independent Study Senior Thesis.

BIOL 999-0. Candidate for Degree.

CHEMISTRY

CHEM 100-3. Chemistry in the Modern World.
Lecture. A brief introduction to chemical principles and study of their application to biochemical materials and processes, consumer chemistry, energy problems, air and water pollution and toxic chemicals. This course may be taken with or without the lab course CHEM 110. Counts towards fulfillment of the LAS natural science area requirement.

CHEM 101-4. Introduction to Chemistry.
Lecture and Recitation. This is a first-semester course in chemistry with an emphasis on principles and practical applications. The course is designed for two groups of individuals. Paramedical majors and nursing students comprise one of these groups. The second group will be made up of students who are required to take CHEM 103 but who have not had a high school chemistry course or who have inadequate backgrounds. Students who have not taken algebra in high school or college should take an algebra course before taking CHEM 101. The course covers measurements, matter, atoms, bonding, energy, phases of matter, acid-base and redox reactions, solutions, equilibria, electrolytes, inorganic and nuclear reactions. Counts towards fulfillment of the LAS natural science area requirement. Prer., One year of high school algebra.

CHEM 102-4. Introduction to Organic and Biochemistry.
Lecture, recitation, and lab. This is the second part of a one year course and should be taken after completion of CHEM 101. Students who are required to take CHEM 103-106 should not take both 101 and 102. The course includes a survey of organic functional group and organic and biomolecules. Prer., CHEM 101 with a grade of "C" or higher.

CHEM 103-5. General Chemistry I.
Lecture, recitation, and lab. A first college-level chemistry course for students with adequate high school chemistry. Emphasis on the structure and composition of matter: elements and compounds, atoms and molecules, and states of matter including solutions. Students having marginal mathematics backgrounds are advised to solidify their mathematics proficiencies before taking this course. To proceed to CHEM 106 a grade of C is necessary. Counts towards fulfillment of the LAS natural science area requirement. Prer., 1 Year high school chemistry and 2 years high school MATH.

CHEM 106-5. General Chemistry II.
Lecture, recitation, and lab. This is the second course of the general chemistry sequence. Emphasis iss on acid-base and solution chemistry, equilibria, kinetics, redox chemistry, transition metal chemistry, nuclear chemistry and organic chemistry. Counts towards fulfillment of the LAS natural science area requirement. Prer., CHEM 103 with a grade of C or higher.

CHEM 108-1. Introduction to Chemistry Lab Research.
Research methodology in chemistry is introduced by conducting an investigation involving the synthesis and determination of the physical and chemical properties of a series of metal coordination compounds of acetylacetone and its analogies. Concurrent enrollment in CHEM 106 required.

CHEM 110-1. Chemistry in Modern World Laboratory.
When taken along with CHEM 100, these courses count toward fulfillment of the LAS natural science requirement and lab requirement. Experiments have been chosen that illustrate the principles discussed in the lecture. Prer., Concurrent registration in CHEM 100 or prior completion of CHEM 100.

CHEM 115-3. Preparatory Chemistry.
Preparatory chemistry lecture for students who have not taken high school chemistry. Prepares students for general chemistry (CHEM 103-106). Credit is granted only if no other college chemistry credits have been earned. Does not count towards the LAS natural science area requirement. Prer., One year high school algebra or concurrent enrollment in MATH 104.

CHEM 121-3. Introduction to Physical Science.
An integrated presentation of the basic concepts of physics and chemistry for non-science majors. Topics include motion, heat, sound, light, atomic and molecular structure, chemical reactions, acids and bases, and radioactivity. Counts towards fulfillment of the LAS natural science area requirement. Prer., Two years of high school mathematics. Meets with PES 121.

CHEM 124-1. Physical Science Laboratory.
A laboratory to accompany CHEM/PES 121. Includes experiments on mechanics, heat, sound, light, electricity, chemical reactions, stoichiometry, acid-based chemistry, and reaction kinetics. Counts towards fulfillment of the LAS natural science area requirement. Meets with PES 124.

CHEM 151-3. Environmental Science.
Introduction to atomic molecular structure and to biological structure and

function. Environmental contaminants in air and their reactions, water quality and its analysis, wastewater treatment, the ecology of natural systems and genetic adaptation. Counts towards fulfillment of the LAS natural science area requirement. Meets with BIOL 151.

CHEM 153-1. Environmental Science Laboratory.
This lab is to designed to accompany BIOL 151 and CHEM 151. Counts towards fulfillment of the LAS natural science area requirement. Meets with BIOL 153.

CHEM 301-3. Materials Science.
Lecture. An introductory development of the physical and chemical properties of materials, including metals, alloys, ceramics, polymers, and composite materials. Intended for science and engineering students. Prer., Grades of "C" or higher in CHEM 106, PES 111 and MATH 135, or permission of the instructor.

CHEM 330-3. Organic Chemistry.
Lecture for biology majors and non-chemistry majors taking only one semester of organic chemistry. This is a survey of organic nomenclature, structure, preparations, and reactions. The course includes bio-organic topics, such as carbohydrates, peptides, and proteins, as well as a general introduction to important functional groups. Fall semester. Prer., CHEM 106 with a grade of C or higher.

CHEM 331-3. Organic Chemistry I.
For biochemistry option and non-chemistry majors. Topics include structure and reactions of alkanes, alkenes and alkyl halides. Organic nomenclature stereochemistry, reaction mechanisms and kinetics. Prer., Grade of C or higher in CHEM 106. Concurrent registration for CHEM 333 or CHEM 337 required.

CHEM 332-3. Organic Chemistry II.
For biochemistry option and non-chemistry majors. Topics include structure and reactions of alcohols, carboxylic acids, aldehydes, ketones, amines, aromatic compounds, heterocycles, sugars and amino acids. Emphasis is on organic synthesis and reaction mechanisms. Prer., CHEM 331 and either 333 or 337 with grades of C or higher. Coreq., CHEM 334 or CHEM 338.

CHEM 333-2. Organic Chemistry Laboratory I.
For biochemistry option and non-chemistry majors. Instruction of experimental techniques of modern organic chemistry including microscale techniques. Emphasis is also on reactions of alkenes, alkynes, alkyl halides and on stereochemical modeling. Prer., Grade of "C" or higher in CHEM 106.

CHEM 334-2. Organic Chemistry Laboratory II.
For biochemistry option and non-chemistry majors. Emphasis is on spectroscopic techniques and on syntheses of alcohols, aldehydes, ketones, carboxylic acids and their derivatives. Prer., CHEM 331 and 333 with grades of "C" or higher. Students must register for lecture and lab. Coreq., CHEM 332.

CHEM 337-2. Practical Organic Chemistry I.
An introduction to organic laboratory methods for chemistry majors. Prer., Grade of "C" or higher in CHEM 106. Coreq., CHEM 331.

CHEM 338-2. Practical Organic Chemistry II.
Laboratory. An introduction to organic, synthetic and spectroscopic methods for chemistry for chemistry majors. Prer., CHEM 331 and CHEM 337 with grades of "C" or higher. To be taken concurrently with CHEM 332.

CHEM 340-2. Organic Chemistry Laboratory.
Laboratory for biology majors and non-chemistry majors. Lab section to accompany CHEM 330. Instruction in experimental techniques, organic synthesis, analysis, and spectroscopy. Fall semester. Prer. or Coreq., CHEM 330.

CHEM 341-3. Environmental Chemistry.
An in-depth survey and discussion of problems of the environment from a chemical point of view. Air, water, land, pollution, and their effect on the ecology of living organisms. Prer., CHEM 106 with grade of "C" or higher.

CHEM 395-3. Cooperative Education in Chemistry.
Students arrange a program with appropriate faculty members through the auspices of local government or industrial facilities. The program will generally require independent laboratory and/or literature work, resulting in a report or series of reports.

CHEM 401-3. Modern Inorganic Chemistry.
An introduction to the physical inorganic concepts of modern inorganic chemistry. Topics include atomic structure and periodic properties, ionic and covalent bonding and a survey of inorganic main group reactions. Prer., One year of organic chemistry, CHEM 331-332, with grade of "C" or higher.

CHEM 402-4. Inorganic Chemistry Laboratory.
A detailed study of structure, characterization and synthesis of transition metal complexes. Laboratory demonstrates appropriate examples of synthesis and characterization techniques. Prer., CHEM 401 and CHEM 451 with grades of C or higher.

CHEM 405-1 to 4. Topics in Chemistry.
Examination of selected topics in chemistry in lecture, seminar and/or laboratory format. Topic will change according to the interest of the instructor and students. Students may repeat the course for credit when the topic changes. Consult the schedule of courses for topic.

CHEM 411-3. Nuclear Magnetic Resonance Spectroscopy.
Lecture and lab. Theory and practice of advanced techniques in NMR spectroscopy including complex spectra, double resonance, paramagnetic systems, and rate-processes.

CHEM 417-4. Analytical Chemistry I.
Lecture and lab. Emphasis is on chemical equilibrium, quantitative analysis by means of titration, spectrophotometry, electrode potentials, and analytical separation techniques. Prer., Grade of "C" or higher in CHEM 106.

CHEM 418-3. Analytical Chemistry II.
Emphasis is on instrumental methods of analysis, including spectral, electranalytical and separations methods. Prer., PES 112, CHEM 417 with grades of "C" or higher and concurrent enrollment or completion of CHEM 452. Coreq., CHEM 420.

CHEM 420-2. Practical Instrumental Analysis.
Laboratory work in instrumental methods of analysis, including spectro-

chemical, electroanalytical and chromatographic techniques. Prer., CHEM 417 and CHEM 452. Coreq., CHEM 418.

CHEM 451-3. Physical Chemistry I.
The application of thermodynamics to phase changes, chemical reactions and electrochemical cells. The rates and mechanics of chemical reactions. Prer., Grades of "C" or higher in PES 112, PES 115, MATH 136 and CHEM 332.

CHEM 452-3. Physical Chemistry II.
The application of quantum mechanics to atomic and molecular structure and spectra. The application of statistical mechanics to the prediction of thermodynamic properties. Transition state theory of reaction rate. Prer., CHEM 451 with a grade of "C" or higher. Coreq., CHEM 454 or CHEM 455.

CHEM 454-1. Experimental Physical Chemistry.
Laboratory. Error analysis and experiments in thermodynamics and kinetics. Prer., CHEM 417 and CHEM 451 with grades of "C" or higher. Coreq., CHEM 452. Meets with CHEM 455.

CHEM 455-2. Experimental Physical Chemistry.
Laboratory. Instruction in the experimental techniques of modern physical chemistry with emphasis on experiments illustrating the fundamental principles of chemical thermodynamics, quantum chemistry and chemical kinetics for BS chemistry majors. Prer., CHEM 417 and CHEM 451 with grades of "C" or higher. Meets in part with CHEM 454.

CHEM 456-3. Surface Chemistry.
A study of the physical chemistry of surfaces and interfaces. Topics will include interfacial tension, wetting, monolayers, adsorption, heterogeneous catalysis, surface diffusion, kinetics of phase transformations, electrocapillarity, and the characterization of solid surfaces. Prer., CHEM 452 (for chemistry majors); or PES 213 and either PES 340 or PES 342 (for physics and engineering majors). Meets with CHEM 556.

CHEM 481-3. General Biochemistry.
Lecture. Topics include structure, conformation, and structure and functions of properties of proteins; enzymes; mechanisms and kinetics; intermediary metabolism; carbohydrates; lipids; and amino acids; energetics and metabolic control; and photosynthesis. Fall. Prer., Organic Chemistry or consent of instructor. Fall. Meets with CHEM 581, BIOL 481, BIOL 581.

CHEM 482-4. Biochemistry II.
Lecture. Continuation of CHEM 481. Topics include control of metabolic flex through transcriptional and post transcriptional mechanisms, macromolecules; nucleic acids, metabolism of nitrogen-containing compounds; biosynthesis and function of macromolecules including DNA, RNA, and proteins; biochemistry of subcellular systems and special topics. Prer., Organic Chemistry. Meets with CHEM 582, BIOL 482, BIOL 582.

CHEM 483-3. Biochemistry Principles.
A comprehensive one semester introduction to cells, proteins, catalysis; metabolism of carbohydrates, lipids and nitrogen compounds; and storage and utilization of genetic information. Prer., BIOL 110, BIOL 111 and CHEM 332.

CHEM 484-3. Molecular Biology.
Detailed examination of replication, recombination, transposition, transcription and translation in prokaryotes and eukaryotes at the molecular level. Spring. Prer., BIOL 383. Meets with BIOL 484, BIOL 584.

CHEM 486-3. Biochemistry Laboratory.
Designed to provide laboratory skills and techniques. Experiments are selected to demonstrate principles and application of current techniques and the use of instrumentation. Spectrophotometry, enzymology, centrifugation and electrophoresis are stressed. Prer., One semester of biochemistry or cell biology and one semester of organic chemistry. Meets with CHEM 586, BIOL 486, BIOL 586.

CHEM 495-1. Chemistry Seminar I.
A capstone course designed to familiarize students with the chemical literature and to allow for ten to thirty presentations. Prer., CHEM 332 and either CHEM 417 or CHEM 451.

CHEM 496-1. Chemistry Seminar II.
A capstone course designed to familiarize students with the chemical literature and to allow for formal presentations. Prer., CHEM 495.

CHEM 511-3. NMR Spectroscopy.
Lecture and lab. Theory and practice of advanced techniques in NMR Spectroscopy including complex spectra, double resonance, paramagnetic systems, rate process and one and two-dimensional pulse methods. Meets with CHEM 411.

CHEM 517-3. Electrochemistry.
Electrochemical methods of analysis, analytical instrumentation. Topics will include redox thermodynamics and kinetics, electrochemical techniques, and modern applications. Prer., Physical chemistry with a grade of C or higher.

CHEM 518-3. Chromatography and Analysis.
Lecture and labs. Analytical separation processes with special reference to theory and practice of liquid and gas chromatography. Analysis methods include mass spectrometry and nuclear magnetic resonance spectroscopy. Prer., Undergraduate physical chemistry and instrumental methods of analysis.

CHEM 531-3. Advanced Organic Chemistry I.
Lecture. Survey of organic chemistry including mechanistic and synthetic organic chemistry. Prer., One year of organic chemistry with a grade of "C" or higher.

CHEM 532-3. Advanced Organic Chemistry II.
Lecture. Modern concepts of physical organic chemistry and their use in interpreting data in terms of mechanisms or organic reactions and reactivities of organic compounds. Prer., One year of organic chemistry and CHEM 451 with grades of "C" or higher.

CHEM 556-3. Surface Chemistry.
A study of the physical chemistry of surfaces and interfaces. Topics include interfacial tension, wetting, monolayers, adsorption, heterogeneous catalysis, surface diffusion, kinetics of phase transformations, electrocapillarity, and the characterization of solid surfaces. Meets with CHEM 456.

CHEM 581-3. Advanced General Biochemistry.
Lecture. Topics include structure, con-

formation, and structure and functions of properties of proteins; enzymes; mechanisms and kinetics; intermediary metabolism; carbohydrates, lipids; and amino acids; energetics and metabolic control; and photosynthesis. Fall. Prer., Organic Chemistry or consent of instructor. Meets with CHEM 481, BIOL 481, BIOL 581.

CHEM 582-4. Biochemistry II.
Lecture. Continuation of CHEM 581. Topics include control of metabolic flex through transcriptional and post transcriptional mechanisms, macromolecules; nucleic acids, metabolism of nitrogen-containing compounds; biosynthesis and function of macromolecules including DNA, RNA, and proteins; biochemistry of subcellular systems and special topics. Spring. Prer., Organic Chemistry. Meets with CHEM 482, BIOL 482, BIOL 582.

CHEM 586-3. Biochemistry Laboratory.
Designed to provide laboratory skills and techniques. Experiments are selected to demonstrate principles and application of current techniques and the use of instrumentation. Spectrophotometry, enzymology, centrifugation and electrophoresis are stressed. Spring. Prer., One semester of biochemistry or cell biology and one semester of organic chemistry. Meets with CHEM 486, BIOL 486 and BIOL 586.

CHEM 700-1 to 6. Masters Thesis.

CHEM 940-1 to 3. Independent Study in Chemistry.
Undergraduate. Consent of instructor required. For upper-division students.

CHEM 950-1 TO 3. INDEPENDENT STUDY IN CHEMISTRY — Graduate.

CHEM 999-0. Candidate for Degree.

COMMUNICATION

COMM 100-3. Contemporary Mass Media.
Examines the mass media and their interaction with society, looking at journalism and the mass media in historical, intellectual, political, and social contexts. Same as Journalism 100. (Pre-journalism students should register for JOUR 100). Meets with JOUR 100.

COMM 102-3. Interpersonal Communication.
A lecture-discussion-recitation approach to communication theory and its applications in everyday communication. Intended to give students a point of view and certain basic knowledge that will help them become better communicators regardless of their fields of specialization.

COMM 103-3. Principles of Communication.
A study of human communication from its classical foundations in Aristotelian rhetoric through contemporary interpersonal theory. Emphasis include basic models of communication and approaches to communication as a discipline. Contemporary theoretical considerations include current interpersonal research in such areas as person perception, attraction, and conflict. Prer., COMM 102.

COMM 111-3. Introduction to Leadership.
An introductory exploration of the relationship between leadership theory and practice. The course examines both foundational and emerging leadership paradigms to provide the student a basic understanding of leadership.

COMM 210-3. Public Speaking.
A lecture-recitation approach to the basic principles of speechmaking. Intended to give students basic information for the preparation and delivery of a variety of public presentations.

COMM 215-3. Male/Female Communication.
A lecture-discussion approach to the study of contemporary theories and research in male/female communication. The course will involve reading and discussion in such areas as gender differences in self-perception, social and media images of men and women, language usage and nonverbal behavior differences between genders. Prer., COMM 102. Meets with WMST 215.

COMM 224-3. Introduction to Organizational Communication.
An introduction to models of human communication and definitions of organizational communication with emphasis on communication process, information flow, individual communication roles and group process for problem solving and decision making: introduction to auditing. Prer., COMM 102, 103.

COMM 225-3.Introduction to Film and Video.
A study of the principles and techniques of film-making, including practical experience in planning, shooting, lighting, editing, and sound mixing. The study of film as visual language will be integrated with experience and making short video production.

COMM 227-3. Beginning Television Production.
An introductory course in creative television production. Course is geared toward developing the writing, directing, and production skills necessary to make intelligent and imaginative programs in a variety of basic formats. Designed for majors and nonmajors, includes lecture and lab.

COMM 250-3. Research Methods.
Introduction to the nature of social scientific method methods including research design, measurement, survey methods and introductory statistics. Prer., I D 105.

COMM 260-3. Family Communication.
The role of communication in long-term relationships as found in families. It is a descriptive approach designed to provide an understanding of the extent to which communication affects and is affected by the family.

COMM 290-3. Writing for the Media.
Fundamentals of news gathering and writing, news story forms. Assignments include reportorial work for campus publications. Meets with JOUR 290.

COMM 310-3. Directing Studio Performance.
Overview of directing studio and location performance using multicamera, videotape, and/or film formats. Observation and hands-on approach to basic performance techniques in news and entertainment programs.

COMM 315-3. Communication Competency in Groups and Teams.
Theory and practice in group discussion processes, decision making, and participant and laboratory. Prer., COMM 102 or consent of instructor.

COMM 323-3. Nonverbal Communication.
Consists of the study of nonverbal com-

munication through proxemics, kinesics, physical appearance, and paralanguage as well as an application of nonverbal communication theory to work, group, and home settings.

COMM 324-3. Business and Professional Communication.
Theory and practice in oral and written communication competency for business and the professions. Topics include presentational speaking, business writing, interpersonal communication in organizations, small group process and the role of the leader-manager, and communication trends in business organizations of the future. Prer., COMM 102 and COMM 224.

COMM 327-3. Intermediate Television Production.
A study advancing the principles and techniques of television production to include extended experiences doing multicamera studio productions, with an introduction to electronic field production techniques. Topics include production planning and procedures, directing, lighting, and editing. Lecture and lab. Prer., COMM 225, 227.

Comm 328-3. Intercultural Communication.
An examination of the philosophy, process, problems, and potentials unique to communication across cultural boundaries. Implications for personal and social innovations. Comparative study in communication in selected cultures.

COMM 330-3. Scriptwriting.
A course in writing for non-print media. Students will learn key elements of fiction and non-fictional media formats, story structures, and exposition. Prer., JOUR/COMM 290, COMM 225, 227.

COMM 344-3. Leadership Communication.
An examination of contemporary theories and research pertaining to the communication of leadership in interpersonal, group, organizational, and societal settings, including consideration of the nature of power, vision, and creativity in leadership. Prer., COMM 102.

COMM 350-3. American Cinema.
An introductory film course surveying American cinema as art, industry, and system of representation and communication. Students acquire knowledge of film history and genres, technical and critical vocabulary terms, and how popular genres extend to broader social context. Meets with FILM 350.

COMM 365-3. Mass Media and Society.
The interrelationships among mass media, society, and communication are explored. The theoretical foundations of mass communication are delineated.

COMM 400-3. Rhetorical Dimensions in Communication.
The theory of oral discourse is examined in light of classical thought and practice, historical development, and modern rhetorical processes. Prer., COMM 102 and COMM 103.

COMM 410-3. Advanced Public Speaking.
Advanced exploration of the theory, preparation, delivery and evaluation of public speeches. Prer., COMM 210 or equivalent. Meets with COMM 510.

COMM 415-3. Communication for the Classroom Teacher.
This course is intended to be both theoretical and practical in nature and will provide teachers and prospective teachers the rationale for using appropriate communication strategies in the classroom. It will include methods for analysis, development, and facilitation of teachers' and their students' communication behaviors. Meets with COMM 515.

COMM 420-3. Persuasion.
The theory of motivation and change as it operates in individuals and groups, consideration of attitudes, beliefs, values, credibility, message variables, ethic ethics, and effects. Analysis of persuasive campaigns.

COMM 422-3. Creative Communication.
Exploration of the relationship between creativity and communication. Topics include: theories and models of creativity and language, the creative process in groups and organizations, and creative influence. Meets with COMM 522.

COMM 424-3. Advanced Organizational Communication.
Major perspectives for the study of organizational communication, communication auditing procedures, and communication training and development practices. Prer., COMM 102, COMM 224 COMM 324 and COMM 250. Meets with COMM 524.

COMM 425-3. Advanced Interpersonal Communication: Conflict Management.
A lecture-discussion approach to the study of contemporary theories and research in conflict. Course will involve reading and discussion of both original research reports and secondary sources in such areas as perception, destructive communication, manipulative communication, and communication in developing and terminating relationships. Prer., COMM 102.

COMM 426-3. Organizational Communication in the Global Environment.
Theory-based examination of virtual and changing organizational forms, international/intercultural communication, telemediated organizational communication, and legal issues in communication in the workplace. Course additionally prepares students for both technical and human proficiencies necessary for the workplace of the future. Prer., COMM 224.

COMM 427-3. Advanced Television Production.
Studio and advisory support for video programs initiated, designed, organized, and produced by advanced students. Students work in production groups to arrange and gain approval for program plans prior to execution. May be repeated up to a maximum of 6 hours. Prer., COMM 227, COMM 327.

COMM 445-3. Advertising Media.
A seminar in the theory and practice of advertising as an art and science. Students will participate in cases and campaigns providing a dynamic approach to the field.

COMM 450-3. Media Management.
Analysis of managerial problems in industrial, governmental, and nonprofit media organizations. Case studies, local managers, and outside readings will examine public relations/marketing, inventory, personnel, and legal aspects of managing a media facility. Prer., COMM 100, 227.

COMM 451-3. Quantitative Methods for Communication Research.
Course covers introductory statistics, t-tests, simple ANOVAs, bivariate regression and measurements issues. Students are also introduced to the use of statistical software. Prer., COMM 250 and I D 105. Concurrent enrollment with COMM 424. Meets with COMM 551.

COMM 460-3. Contemporary Theories of Human Communication.
An exploration of essentials of theory development and construction as related to the human communication process with primary emphasis on contemporary theories of human communication. Taught in a seminar format. Prer., COMM 102 and COMM 103. Meets with COMM 560.

COMM 461-3. Principles and Practice of Public Relations.
Designed to privide majors and non-majors an introduction to the principles and practice of contemporary public relations. Students will increase their understanding and knowledge of the formation and implication of public opinion, and the elements and the practice of public relations in contemporary society.

COMM 469-3 to 6. Internship in Communication.
Supervised opportunities for obtaining knowledge and experience concerning the role of communication in the world of work. Prer., For Org Comm and Media Management majors only.

COMM 490-1 to 3. Special Topics in Communication.
Advanced exploration of timely topics and issues related to communication in various contexts. Topics vary from semester to semester. May be taken up to two times for credit with permission of department chair. Prer., Vary from topic to topic.

COMM 499-3. Multicultural Diversity and Communication — A Team Teaching Approach.
It will examine the process and theory of communication and its application to a multicultural society. It will explore cases of successes and failures in interpersonal, group, and mass communication. It will also examine the process of verbal and nonverbal communication expressed in a variety of channels, systems, and codes. Meets with COMM 599.

COMM 510-3. Advanced Public Speaking.
Advanced exploration of the theory, preparation, delivery and evaluation of public speeches. Prer., COMM 210 or equivalent. Meets with COMM 410.

COMM 515-3. Communication for the Classroom Teacher.
This course is intended to be both theoretical and practical in nature and will provide teachers and prospective teachers the rationale for using appropriate communication strategies in the classroom. It will include methods for analysis, development, and facilitation of teachers' and their students' communication behaviors. Meets with COMM 415.

COMM 522-3. Creative Communication.
Exploration of the relationship between creativity and communication. Topics include: theories and models of creativity, creativity and language, the creative process in groups and organizations, and creative influence. Meets with COMM 422.

COMM 524-3. Seminar in Organizational Communication.
Explores major theoretical perspectives for the study of organizational communication, examines culture and communication relationships, describes the role and responsibilities of organizational communication professionals, and surveys current research in organizational communication. Students make application of organizational communication principles to a variety of case studies and organizational experiences. Meets with COMM 424.

COMM 551-3. Quantitative Methods Communication for Research.
Course begins with a review of elementary statistics and measurement concerns and moves on to T-test, ANOVA, Chi-squares, bivariate and multivariate regression. Prer., COMM 250 and I D 105. Meets with COMM 451.

COMM 560-3. Contemporary Theories of Human Communication.
An exploration of essentials of theory development and construction as related to the human communication process with primary emphasis on contemporary theories of human communication. Taught in a seminar format. Meets with COMM 460.

COMM 569-1 to 3. Problems Iin Radio-Television and Film.
Opportunity for students to explore, upon consultation with the instructor, areas in radio-TV and film which the normal sequence of offering will not allow. Prer., Consent of instructor.

COMM 570-3. Instructional Media.
Comprehensive examination of communication and learning theory, instructional design, and media production.

COMM580-3. Qualitative Research Practices in Communication Studies.
Introduces graduate students to the qualitative communication research process by: locating and critically reviewing scholarly literature, critically analyzing scholarly research, describing various qualitative research methods used in communication research, developing a communication research proposal, and carrying out a project. Prer., Suggested - COMM 601.

COMM 599-3. Multicultural Diversity and Communication.
It will examine the process and theory of communication and its application to a multicultural society. It will explore cases of successes and failures in interpersonal, group, and mass communication. It will also examine the process of verbal and nonverbal communication expressed in a variety of channels, systems, and codes. Meets with COMM 499.

COMM 601-3. Introduction to Graduate Work in Communication.
Intended to familiarize students with the philosophical, ideological and methodological bases of study in communication. Required for all departmental graduate students.

COMM 602-3. Communication Research Practicum.
A project-based graduate course designed to involve students in communication research and/or creative work from the proposal stage through conference pres-

entation/publication/production. Prer., COMM 601 and/or instructor consent.

COMM 610-3. Communication Competency: Theory, Assessment, and Pedagogy.
In a seminar format, this course examines the historical development of various theories, present conceptualizations, and models of communication competency. Models are related to assessment in various contexts. Students develop and present an oral communication competency assessment program.

COMM 625-1 to 6. Problems in Communication.
Explores various graduate-level subjects in communication not normally offered on a regular basis. See Schedule of Courses for current offerings and prerequisites.

COMM 626-3. Communication, Training, and Development.
Examines the field of training and development from both theoretical and pragmatic perspectives. Although the primary emphasis will be on corporate training and development, the course will also address broad principles relating to adult education in a variety of training contexts.

COMM 651-3. Intermediate Quantitative Methods for Communication Research.
Course begins with a review of elementary statistics and measurement concerns and moves to t-test, ANOVA, Chi-Squares, bivariate and multiple regression. Prer., COMM 451/551 or permission of instructor.

COMM 699-3. Emerging Communication Technologies.
Examination of new communications technologies with regard to use and capability and impact on interpersonal, small group, organizational, and international contexts. Special emphasis on impact of technologies for problem solving, decision making, power relationships, geographically diverse work teams, and changing communication theory.

COMM 700-1 to 9. Masters Thesis.
COMM940-1 to 4. Independent Study in Communication. Individually developed and implemented research projects in communication. Prer., COMM 102, COMM 103 and consent of instructor.

COMM 950-1 to 6. Independent Study in Communication.
Individually developed and implemented research projects in communication. A student desiring independent study credit must present to the faculty a well-defined topic for research. Prer., Graduate status.

COMM 999-0. Candidate for Degree.

ECONOMICS

ECON 100-3. The Economics of Social Issues.
The Economics of Social Issues introduces the student to economics in a less rigorous manner than ECON 102. Economic issues are introduced in examining wealth, poverty, energy, crime, education, health, discrimination, unemployment and inflation.

ECON 101-3. Introduction to Microeconomics.
An analysis of the market system and its role in allocating goods and services; problems of market failure (e.g., monopoly, environmental pollution, and public goods), and alternative government responses to such problems.

ECON 102-3. Introduction to Macroeconomics.
An examination of the forces which determine national income, employment, and prices; use of government policy to combat inflation and unemployment; balance of payments problems; theories of growth for developed and less developed economies, poverty, and consideration of alternative economic systems.

ECON 281-3. Introduction to Statistics and Computing in Economics.
Uses of descriptive and inferential statistics in economics. Introduction to probability, random sampling, confidence intervals, hypothesis testing and simple linear regression.

ECON 301-3. Intermediate Microeconomic Theory.
Production, price, and distribution theory under conditions of perfect and imperfect competition. Prer., ECON 101.

ECON 302-3. Intermediate Macroeconomic Theory.
Keynesian, classical, and monetarist theories of national income determination. Problems of unemployment, inflation, international exchange, and growth. Prer., ECON 102.

ECON 315-3. Great Books of Economics.
A study of economic principles as developed in the original works of great writers, especially Adam Smith, David Ricardo, and Karl Marx. Prer., ECON 101 and ECON 102.

ECON 321-3. Economics of the Public Sector.
Analysis of the role of government in a capitalist economy. Effects of alternative tax structures; local, state, and federal expenditure and revenue policies. Use of fiscal policy in seeking goals of full employment, stable prices, and growth. Prer., ECON 101.

ECON 330-3. Environmental Economics.
An examination of the economic basis for and possible solutions of the environmental crisis. Particular attention will be placed on the ways in which legal and political institutions affect economic decisions that have an impact on the environment. Specific problems considered will include air and water pollution, solid waste disposal, population control, energy resources, and conservation. Prer., ECON 101 or consent of instructor.

ECON 341-3. International Economics.
Analysis of the basis for and consequences of opening an economy to the international arena. Specific issues considered are the benefits and costs of international trade, the reason for barriers to trade, the determination of exchange rates and the effect of government policies of international good and factor flows. Prer., ECON 101, 102 or consent of instructor.

ECON 350-3. Economic History of the United States.
American economic organization and institutions and their development from colonial times to the present. Prer., ECON 101 and ECON 102.

ECON 361-3. Economics of Inequality: Income, Poverty and Distribution.
Explores how wages are set in a market economy, why incomes differ, the effects of gender or race discrimination, immigration, educational policy, poverty programs

and unions. Prer., ECON 101 or consent of instructor.

ECON 366-3. Economics and Community Problems.
Students build on an introductory level knowledge of economics to see the economic aspects of social problems and their solutions through service-learning assignments in the community. Individual journals and oral presentations also required. Prer., ECON 100 or ECON 101 or ECON 102.

ECON 371-3. Comparative Economic Systems.
Comparison of resource allocation and stabilization policies under capitalism, socialism, and fascism. Examination of experiences of selected countries. Prer., ECON 101 or consent of instructor.

ECON 377-3. Economic Development.
This course examines the sources of economic development and underdevelopment. Through examination of the situation of high, middle, and low income countries recommendations for growth strategies are developed. Prer., ECON 101 or ECON 102.

ECON 398-3.Special Topics in Economics.
A study of special topics in economics. Topics vary from semester to semester and generally emphasize the application of economic analysis to current issues. Prer., ECON 100 or ECON 101 or ECON 102.

ECON 401-3. Advanced Microeconomic Theory.
Study of the core of microeconomic theory using calculus. Topics include: consumer theory of the firm, profit maximization, efficiency and market failure. Several advanced topics from recent developments in microeconomics are also examined. Prer., ECON 301 and MATH 112 (or 135) or consent of instructor.

ECON 402-3. Advanced Macroeconomic Theory.
Study of the core of macroeconomic theory using math and calculus. Several advanced topics from recent developments in macroeconomics are also examined. Prer., ECON 302 and MATH 112 (or 135) or consent of instructor.

ECON 416-3. Seminar: History of Economic Thought.
A study of economic thought as developed in the original works of great economic writers such as Adam Smith, Karl Marx, John Maynard Keynes, and Milton Friedman. Prer., ECON 301 or 302; ECON 315 recommended.

ECON 423-3. Public Expenditures Evaluation and Policy Analysis.
Provides training in methods of public policy analysis and evaluation. Covers benefit-cost and cost- effectiveness analysis and research design. Prer., ECON 301, ECON 321 is recommended or consent of instructor. Meets with P AD 5320.

ECON 431-1 to 3. Understanding Our Economy.
Explores a variety of topics applicable to the study and teaching of economics. The emphasis will be on themes, topics and structures as ways to motivate students interested in economics. This course will be taught through the Division of Continuing Education.

ECON 441-3. International Trade.
Theories of interregional and international trade, tariffs and commercial policy, international economic organization, and economic integration. Prer., ECON 301, 341 or consent of instructor.

ECON 450-3. Seminar in US Economic History.
An examination of selected topics in US economic history, including the emergence of property rights, the changing role of government, and economic growth. Special emphasis will be given to the economic development of the west. Prer., ECON 301, 302, 350 recommended, or consent of instructor.

ECON 461-3. Labor Economics.
The determination of wages and working conditions in the U.S. Economy. A study of the supply and demand for labor under competitive and noncompetitive conditions. Includes the economic effects of trade unions, internal labor markets, migration and labor mobility, as well as analysis of occupational choice, women in the labor force, and the causes and consequences of discrimination. Prer., ECON 101.

ECON 469-3. Industrial Organization.
Reviews the major economic theories of the determinants of market structure, conduct of the individual firm and performance of industry. Empirical evidence from the U.S. Economy is analyzed, and competitive markets are contrasted with monopolistic and oligopolistic markets. The effects of antitrust action and of government regulation on the U.S. Economy are reviewed in both historical and current terms. Prer., ECON 101 or consent of instructor.

ECON 481-3. Introduction to Econometrics.
Development and application of multiple regression techniques in testing economic theories. Prer., ECON 301 or 302; ECON 281 or consent of instructor.

ECON 631-1 to 3. Teaching Economics.
The seminar will explore a variety of topics applicable to the study and teaching of economics. The emphasis will be on themes, topics and strategies most appropriate to motivate students' interest in economics. Courses offered through the council for economic education. Not an option for ECON majors or grad students.

ECON 940-1 to 3. Independent Study in Economics.

ECON 941-1 to 3. Independent Study in Macroeconomics.

ECON 950-1 to 3. Independent Study in Economics.

ENGLISH

ENGL 099-3. Components of Writing.
Introductory writing course offered through Extended Studies: 262-4071. Students develop strategies for managing academic reading and writing assignments. Emphasizes the writing process: generating topics, drafting, revising and editing academic prose. Students receive one-on-one support throughout the writing process with special attention to writing conventions and the development of ideas. Critical reading and discussion skills are an integral part of this course. ENGL 099 is taught in a computer- mediated environment. Designed to prepare students for ENGL 131. Placement Criteria: ACT English score of 18 or below; SAT English score of 449 or below. For additional placement information, call the Writing Program: (719) 262-4040.

ENGL 131-3. Composition I.
First semester of a two-semester course, required of all students. Introduces students to academic reading and writing processes. Students develop critical reading, writing and thinking skills through class discussion, the rhetorical analysis of academic texts and the writing of analytical essays. Students write for a variety of purposes and audiences. Emphasis is given to reading and writing processes as multiple, and rhetorically diverse. Students may variously explore multicultural approaches to reading and writing, interdisciplinary approaches to reading and writing, community-specific definitions of literacy and language practices and/or the impact of technology upon academic reading and writing processes. Requirements include an in-class essay exam and three analytical essays. ENGL 131 is taught in a computer-mediated environment. Students needing additional work on sentence-level editing skills may be asked to enroll concurrently in ENGL 135. Prer., Successful completion of ENGL 099 or equivalent; score of 19+ on the English ACT; or score of 450+ on the English SAT. See general information section of the Schedule of Courses or the Course Bulletin for additional information.

ENGL 135-1. Composition I Laboratory.
A course in sentence structure and strategies, to be taught in small group workshops in the Writing Center. Students will learn and apply basic grammatical and stylistic principles in small, computer-assisted, interactive group sessions, while also working individually with peer tutors on their own writing. One-hour workshops meet weekly in the Writing Center beginning the third week of classes. Supplements composition courses. Cannot be repeated for credit.

ENGL 141-3. Composition II.
Second-semester course that offers extensive practice in writing arguments (Toulmin and Rogerian) for multiple purposes and audiences, and introduces students to the reading and writing activities integral to academic research. Students analyze the components of argument, investigate issues, evaluate and analyze sources, integrate primary and secondary materials into their own arguments, use a variety of rhetorical strategies that appropriately respond to audience and purpose, and learn the principles of research documentation. Taught in a computer-mediated environment. Students may be asked to concurrently enroll in ENGL 145 for individualized support through their writing and research activities. Prer., ENGL 131 or equivalent, or score of 29+ on English ACT, or a score of 650+ on the English SAT.

ENGL 145-1. Composition II Laboratory.
A self-study lab course in grammar, sentence structure, and basic writing principles. Student programs are individually designed to meet the student's particular area of need. English 145 students will complete grammatical and syntactical exercises, writing revisions, and/or assigned readings, while working collaboratively with a peer tutor on their academic writing assignments. Requires a weekly, two-hour commitment. Allows for concentrated study and ongoing individualized support. Supplements composition courses. Can be taken twice for credit.

ENGL 150-3. Introduction to Literature for Non-Majors.
Fundamental literary analysis of poetry, drama and fiction. ENGL 131 must be completed prior to this course. Students who have taken a composition course elsewhere and wish to use that course to satisfy the prerequisite for ENGL 150 must have earned a C- or better in that course. This course is a prerequisite to all other literature courses.

ENGL 190-3. Introduction to Literary Studies (For English Majors Only).
Introduction to study of poetry, drama and fiction designed specifically to prepare majors for advanced work in literature. ENGL 131 must be completed prior to this course. Students who have taken a composition course elsewhere and wish to use that course to satisfy the prerequisite for ENGL 190 must have earned a C- or better in that course. This course is a prerequisite to every other literature course in the department of English except ENGL 150.

ENGL 203-3. Introduction to Creative Writing — Poetry.
For the beginning student who wants to write poetry. Workshop approach.

ENGL 204-3. Introduction to Creative Nonfiction.
Focusing on writing nonfiction pieces, the course explores this burgeoning genre, represented by literary journalism, essays, memoirs, personal narratives, and confessional writing. Students will write in these formats, and their work will be critiqued in class. Reading includes some of today's best nonfiction. Prer., ENGL 131.

ENGL 205-3. Introduction to Creative Writing — Fiction.
Exercises in perception and voice designed to develop students' abilities to write fiction. Workshop approach.

ENGL 251-3. Survey of British Literature I.
Chronological study of major British writers from the beginnings (Beowulf) through the works of Shakespeare. Prer., ENGL 131 or validated equivalent and ENGL 150 or ENGL 190.

ENGL 252-3. Survey of British Literature II.
Chronological study of major British writers from the period following the English Renaissance through the eighteenth century, or from John Donne and John Milton to Thomas Gray and Jane Austen. Prer., ENGL 131 or validated equivalent and ENGL 150 or ENGL 190.

ENGL 253-3. Survey of British Literature III.
Chronological study of major British writers from the Romantic period through the rest of the nineteenth century, or from the Romantics (Blake, Burns, etc.) to Yeats. Prer., ENGL 131 or validated equivalent and ENGL 150 or ENGL 190.

ENGL 254-3. Survey of British Literature IV.
Chronological survey of major British writers from Joyce to Beckett, or from the start of the twentieth century to the contemporary era. Prer., ENGL 131 or validated equivalent and ENGL 150 or ENGL 190.

ENGL 260-3. Literature: The Global Perspective I.
Designed to introduce students to literature from the ancient and early modern world; particular attention to emerging notions of Western culture and an indebtedness to exchanges with the East. Prer., ENGL 131 and either ENGL 150 or ENGL 190.

ENGL 261-3. Literature: The Global Perspective II.
Examines modern works with particular attention to literature outside North America and Great Britain and to how a quickly and often violently changing world affects regional cultures. Prer., ENGL 131 and either ENGL 150 or ENGL 190.

ENGL 280-3. Film and Fiction.
This is a course that examines the "transformational" process by which a novel (or short story) is adapted to film. What is gained, lost, altered in that process is then used as a means of coming to understand that novel or short story. Most typically what will not really "transform" itself to film is used as the basis of critical analysis. Prer., ENGL 131 or validated equivalent and ENGL 150 or ENGL 190.

ENGL 290-3. Topics in Literature.
While the topic varies by semester and instructor, this course will always focus on national diversity and/or global awareness through the study of how literature and socio-political conditions are reciprocally influenced. Prer., ENGL 131 or validated equivalent and ENGL 150 or ENGL 190.

ENGL 291-3. Topics in Literature.
Topics will vary from year to year and may or may not be offered in any given semester. See individual course schedules for Fall or Spring. May be repeated for credit with permission of department chair. Prer., ENGL 131 or validated equivalent and ENGL 150 or ENGL 190.

ENGL 300-3. Literary Criticism in Theory and Practice.
Introduces students to various critical methods, which they will apply to novels and works from other literary genres; students will also have opportunities to hear English faculty members engage in critical interchange. Prer., ENGL 131 or validated equivalent and ENGL 150 or ENGL 190.

ENGL 301-3. Advanced Composition.
Writing workshop that offers students the opportunity to work on advanced writing projects and enhance their repertoire of rhetorical strategies. Specific writing projects may vary. TEP sections of ENGL 301 also emphasize instructional strategies for managing the writing process in public school settings.

ENGL 303-3. Intermediate Creative Writing — Poetry.
For the experienced writer of poetry. Workshop approach. Prer., ENGL 203 or consent of instructor. May be taken twice for credit.

ENGL 306-3. Intermediate Creative Writing: Fiction.
Exercises in perception and voice and critical discussion of student work in the forms of fiction. Limited to 21 students. By consent of instructor only. Based upon demonstrated desire and ability to write. Workshop approach. May be taken twice for credit.

ENGL 307-3. Business and Administrative Writing.
For all students and especially for engineering, business, and science students who foresee the need for proposal writing, report writing, data collection, and presentation. Prer., ENGL 131 or validated transfer credit or a bachelor's degree.

ENGL 309-3. Technical Writing and Presentation.
This course is designed to teach students how to present technical information effectively both through written reports and through oral presentations. It is taught in an electronic classroom with access to software tools for the design of both written and oral presenations. Prer., ENGL 131.

ENGL 311-3. Advanced Grammar.
Provides a theoretical, historical, and practical study of grammar and the rules governing language use, particularly as they apply to professional writing. The emphasis is on the standard conventions of grammar, usage, mechanics, and syntax. Students will practice a variety of techniques for applying these skills to their own writing. Prer., ENGL 131 or validated transfer credit or a bachelor's degree.

ENGL 312-3. Technical Editing and Style.
Focuses on editing strategies for improving the stylistic features of professional writing. In particular, it is concerned with a document's organization, clarity, conciseness, consistency, completeness, and accuracy. Students will practice a variety of techniques for applying these skills to their own writing. Prer., ENGL 131 or validated transfer credit or a bachelor's degree.

ENGL 313-3. Designing Documents for Business and Industry.
Examines print and web-based design strategies in specific types of documents for a variety of professional audiences. Each project requires a proposal, a progress report, and a preliminary draft for peer review before submission of the final copy. Prer., ENGL 131 or validated transfer credit or a bachelor's degree.

ENGL 314-3. Managing Writing Projects in Business and Industry.
Provides a theoretical framework for managing writing projects and practice in working collaboratively in self-managed teams. Each team completes major writing projects collaboratively produced. Prer., ENGL 131 or validated transfer credit or a bachelor's degree.

ENGL 315-1 to 3. Professional Writing Internship.
Gives students an opportunity to apply writing theory to a work environment and to gain practical experience in writing on the job. Working for an organization participating in the Internship Program, students perform 40 hours of writing-related duties over the course of the semester for 1 credit, 80 hours for 2 credits, and 120 hours for 3 credits. Interns are evaluated by a supervisor at the host organization, keep a weekly log of their experiences, and write a final report to the instructor, summarizing and evaluating their internship experience. Prer., ENGL 131 or validated transfer credit or a baccalaureate degree, and at least 9 credits in Professional Writing courses.

ENGL 316-3. Tools for Technical Writers.
Students will learn to use the standard software tools critical to technical writers in print and online documentation including, FrameMaker, Adobe Acrobat, MS Word, MS PowerPoint, FrontPage, and PaintShop Pro among others. Prer., ENGL 131 or equivalent transfer.

ENGL 320-3. Women Writers and Women's Experience.
Study of some women writers deserving attention because of their artistry and depiction of women's lives. May be repeated for credit with permission of department chair. Prer., ENGL 150 or ENGL 190. Meets with WMST 320.

ENGL 332-3. Born in the USA: Masterpieces of American Literature.
Study of selected authors, works, or themes of American literature. Prer., ENGL131 or validated equivalent and either ENGL 150 or ENGL 190.

ENGL 338-3. Survey of American Literature I.
Surveys the foundational texts of American Literary history from the literatures of European encounters with New World Amerindians (Columbus, Cabeza de Vaca, Smith), through the American Romantics (Poe, Hawthorne, Melville) with attention to the cultural and social contexts in which these literatures were produced. Includes study of Puritan literary forms (the Jeremiad, the Captivity Narrative, the meta- physical poetry of Bradstreet and/or Taylor) and reflects on how these forms were revised by such authors as Douglass and Whitman in light of antebellum engagements with the problems of race, class, and gender. Prer., ENGL 131 or validated equivalent and ENGL 150 or ENGL 190.

ENGL 339-3. Survey of American Literature II.
Surveys the development of American Literary voices from the Civil War era experimentations of Davis, Crane and Dickinson, through development of American Modernism in poetry and prose (Williams, Eliot, Stevens, Anderson, Hemingway, Faulkner), concluding with the Native American Renaissance of the 1960s and 70s. Includes such writers as Twain, James, Wharton and/or Chopin with the attention to race-relations, immigration and the New Woman, as well as surveying the development of the African-American literary tradition through the writings of Washington, DuBois, Toomer, Wright, and/or Hurston. Prer., ENGL 131 or validated equivalent and ENGL 150 or ENGL 190.

ENGL 346-3. Race, Writing & Difference in the Contemporary American Novel.
A study of major writers and developments in the fast-expanding field of American ethnic minority literature, the course examines a representative group of novelists who write of the African American, Latino/a or Hispanic, Asian American, and Native American experiences. The ethnic minority novel transmits ethnic identity and cultural history and recovers lost histories and suppressed voices. Prer., ENGL 131 or validated equivalent and ENGL 150 or ENGL 190 or EST 200. Meets with EST 346.

ENGL 353-3. Literature of the English Renaissance, Excluding Shakespeare.
Explores the cultural currents in the time of Shakespeare through four important literary genres: lyric, drama (non-Shakespearean), epic/romance, and various forms of prose. Prer., ENGL 131 or validated equivalent and ENGL 150 or ENGL 190 or EMST 200.

ENGL 355-3. Native American Literature.
Provides students with the cultural and literary background required to understand and appreciate some of the major works of Native American literature. Prer., ENGL 131 or validated equivalent and ENGL 150 or ENGL 190. Meets with EMST 355.

ENGL 360-3. Contemporary African American Literature.
Provides students with the cultural and literary background required to understand and appreciate some of the major works of African American Literature. Prer., ENGL 131 or validated equivalent and ENGL 150 or ENGL 190 or EMST 200. Meets with EMST 360.

ENGL 380-3. Peer Tutoring, Writing Across the Curriculum.
Instruction and practice in the principles of teaching/tutoring writing as required in a variety of academic disciplines in the University. Examines one- on-one conferencing techniques, discipline-specific writing demands, differences in individual learning styles and cultural values, and individual writing processes. Students will further develop their own writing abilities as well as understanding of basic grammatical principles. An interactive, collaborative class that includes one hour of supervised tutoring in the Writing Center weekly. Students in all majors are encouraged to enroll. A required class for employment as a Writing Center peer tutor. Prer., ENGL 131 and ENGL 141, or equivalent.

ENGL 390-3. Topics in Literature.
While the topic varies by semester and instructor, this course will focus on national awareness and/or global awareness through the study of how literature and socio-political conditions are reciprocally influenced. Prer., ENGL 131 and either ENGL 150 or ENGL 190.

ENGL 391-3. Topics in Literature.
Topics will vary from semester to semester. May be taken up to two times for credit with permission of department chair. Prer., ENGL 131 validated equivalent and ENGL 150 or 190.

ENGL 395-3. Chaucer.
Study of major works with emphasis on "Canterbury Tales." Readings will be in middle English; short introduction to the language will precede study of the poetry. Prer. ENGL 131 or validated equivalent and ENGL 150 or ENGL 190.

ENGL 397-3. Shakespeare I.
Comedies and Histories. Prer., ENGL 131 or validated equivalent and ENGL 150 or ENGL 190.

ENGL 398-3. Shakespeare II.
Tragedies and Romances. Prer., ENGL 131 or validated equivalent and ENGL 150 or ENGL 190.

ENGL 420-3. The Eighteenth-Century British Novel: Defoe to Austen.
Traces the emergence of the novel from its subliterary roots in early 18th century to its stunning transformation by early 19th century. Examines historical context, narrative techniques, theory of character, and major themes. Authors include Defoe, Richardson, Fielding, and Austen. Prer., ENGL 131 or validated equivalent and ENGL 150 or ENGL 190. Meets with ENGL 520.

ENGL 421-3. The Nineteenth-Century British Novel.
Continuation of 420, but may be taken without previous novel course. Examines major British novels of the 19th century and early 20th century. Authors include Bronte, Dickens, Eliot, and Hardy. Prer., ENGL 131 or validated equivalent and ENGL 150 or ENGL 190. Meets with ENGL 521.

ENGL 423-3. Development of the American Novel I.
Study of the American novel from its beginnings, with the work of Charles Brockden Brown, through the 19th century, concluding with the work of Henry James. Will examine both artistic development of American writers and the novels' functions as vehicles of cultural

history. Prer., ENGL 131 or validated equivalent and ENGL 150 or ENGL 190. Meets with ENGL 523.

ENGL 424-3. Development of the American Novel II.
Continuation of ENGL 423. Covers development of the "modern" realistic novel, from beginning of the 20th century through 1945, and examines work of Wharton, Hemingway, Fitzgerald, Dreiser, Wright and others. Prer., ENGL 131 or validated equivalent and ENGL 150 or ENGL 190. Meets with ENGL 524.

ENGL 425-3. Contemporary Novel.
Study of major novelists and developments in the genre, with emphasis on British and American novels written since 1965. Prer., ENGL 131 or validated equivalent and ENGL 150 or ENGL 190. Meets with ENGL 525.

ENGL 430-3. Studies in American Literature and Culture.
Advanced study of such topics as early American and modern American poetry and literature of the American frontier. May be repeated for credit with permission of department chair. Prer., ENGL 131 or validated equivalent and ENGL 150 or ENGL 190. Meets with ENGL 530.

ENGL 440-3. Genre Studies.
Topics may include medieval epic and romance, dramatic comedy, medieval comedy, satire. May be repeated for credit with permission of department chair. Prer., ENGL 131 or validated equivalent and ENGL 150 or ENGL 190. Meets with ENGL 540.

ENGL 450-3. Studies in Anglo-Saxon and Medieval Literature.
Study of major works in prose, poetry, and drama of medieval Europe. May be repeated for credit with permission of the department chair. Prer., ENGL 131 or validated equivalent and ENGL 150 or ENGL 190. Meets with ENGL 550.

ENGL 483-3. Rhetoric and Writing.
Theoretical and practical study of writing processes across diverse contexts. Explores the rhetorical nature of writing, and applies rhetorical theory and research to the teaching and practice of writing. Theoretical topics may vary. See the Schedule of courses for the topic in any given semester. Prer., Upper-division standing or permission of instructor and ENGL 131 and ENGL 141 or course equivalents. Meets with ENGL 583.

ENGL 485-3. History of the English Language.
Outline of the history of the English language including a brief survey of sound changes, of grammatical forms, and of the vocabulary. Meets with ENGL 585.

ENGL 495-3. Seminar in Literary Topics.
Course topic will vary by semester. Check Schedule of Courses each term for specific course content. May be repeated for credit with permission of department chair. Prer., ENGL 131 or validated equivalent and ENGL 150 or ENGL 190. Meets with ENGL 595.

ENGL 498-3. Seminar in Major Author.
Author to vary from semester to semester and may not be offered in any given year. Check schedule of courses for specific information. May be repeated for credit with permission of department chair. Prer., ENGL 131 or validated equivalent and ENGL 150 or ENGL 190. Meets with ENGL 598.

ENGL 520-3. The Eighteenth-Century British Novel: Defoe to Austen.
Traces the emergence of the novel from its subliterary roots in early 18th century to its stunning transformation by the early 19th century. Examines historical context, narrative techniques, theory of character, and major themes. Authors include Defoe, Richardson, Fielding, and Austen. Prer., ENGL 131 or validated equivalent and ENGL 150 or ENGL 190. Meets with ENGL 420.

ENGL 521-3. The Nineteenth-Century British Novel.
Continuation of 520, but may be taken without previous novel course. Examines major British novels of the 19th century and early 20th century. Authors include Bronte, Dickens, Eliot, and Hardy. Prer., ENGL 131 or validated equivalent and ENGL 150 or ENGL 190. Meets with ENGL 421.

ENGL 523-3. Development of the American Novel I.
Study of the American novel from its beginnings with the work of Charles Brockden Brown, through the 19th century, concluding with the work of Henry James. Will examine both artistic development of American writers and the novel's functions as vehicles of cultural history. Prer., ENGL 131 or validated equivalent and ENGL 150 or ENGL 190. Meets with ENGL 423.

ENGL 524-3. Development of the American Novel II.
Continuation of ENGL 523. Covers development of the "modern" realistic novel from beginning of the 20th century through 1945 and examines work of Wharton, Hemingway, Fitzgerald, Dreiser, Wright and others. Prer., ENGL 131 or validated equivalent and ENGL 150 or ENGL 190. Meets with ENGL 424.

ENGL 525-3. Contemporary Novel.
Study of major novelists and developments in the genre, with emphasis on British and American novels written since 1965. Prer., ENGL 131 or validated equivalent and ENGL 150 or ENGL 190. Meets with ENGL 425.

ENGL 530-3. Studies in American Literature and Culture.
Advanced study of such topics as early American and modern American poetry and literature of the early American frontier. May be repeated for credit with permission of department chair. Prer., ENGL 131 or validated equivalent and ENGL 150 or ENGL 190. Meets with ENGL 430.

ENGL 540-3. Genre Studies.
Topics may include medieval epic and romance, dramatic comedy, medieval comedy, satire. May be repeated for credit with permission of department chair. Prer., ENGL 131 or validated equivalent and ENGL 150 or ENGL 190. Meets with ENGL 440.

ENGL 550-3. Studies in Anglo-Saxon and Medieval Literature.
Study of major works in prose, poetry, and drama of medieval Europe. May be repeated for credit with the permission of the department chair. Prer., ENGL 131 or validated equivalent and ENGL 150 or ENGL 190. Meets with ENGL 450.

ENGL 583-3. Rhetoric and Writing.
Theoretical and practical study of writing processes across diverse contexts. Explores the rhetorical nature of writing and applies rhetorical theory and research to the teaching and practice of

writing. Recommended for students and professionals interested in teaching writing in the public schools or at the college level, also intended for students interested in pursuing graduate studies in Rhetoric and Composition. Designed as a graduate seminar. Theoretical topics may vary. See the Schedule of Courses for the topic in any given semester. Meets with ENGL 483.

ENGL 585-3. History of the English Language.
Outline of the history of the English language including a brief survey of sound changes, of grammatical forms and of the vocabulary. Meets with ENGL 485.

ENGL 595-3. Seminar in Literary Topics.
Course topic will vary by semester. Check the Schedule of Courses each term for specific course content. May be repeated for credit with permission of department chair. Prer., ENGL 131 or validated equivalent and ENGL 150 or ENGL 190. Meets with ENGL 495.

ENGL 598-3. Seminar in Major Authors.
Author to vary from semester to semester and may not be offered in any given year. Check Schedule of Courses for specific information. May be repeated for credit with permission of department chairperson. Prer., ENGL 131 or validated equivalent and ENGL 150 or ENGL 190. Meets with ENGL 498 and WMST 498.

ENGL 696-3. Renaissance Drama Exclusive of Shakespeare.
Graduate study in the major plays of Elizabethan and Stuart drama from the 1580s to the closing of the theaters in 1642. Consideration of representative sub-genres of comedy, history, tragedy, and romance in the context of their culture. Prer., ENGL 131 or validated equivalent and ENGL 150 or ENGL 190.

ENGL 940-1 to 3. Independent Study in English.
Students may not enroll for independent study in this course without prior consent of the English faculty. A student desiring independent study credit must present to the faculty, in writing, a well-defined topic for research which is not included in the regular English course offerings. Approval for such study must be secured from the department chair before registration. May be repeated for credit with permission of department chairperson.

ENGL 950-1 to 3. Independent Study in English.

Energy Science

ENSC 150-3. Introduction to Energy Science I.
Survey of present and future energy resources and the technology associated with their use, including economic and environmental considerations. Meets with PES 150.

ENSC 151-3. Introduction to Energy Science II.
Survey of present and future energy resources and the technology associated with their use, including economic and environmental considerations.

ENSC 160-3. Introductory Solar Energy.
Introduction to the technology of solar heating. Includes experience in practical aspects of active and solar collection and conversion. Meets with PES 160.

ENSC 162-1. Solar Energy Laboratory.
Laboratory course designed to provide practical experience in designing and measuring the characteristics of active and passive solar heating systems. Prer., or Coreq., ENSC 160. Meets with PES 162.

ENSC 250-3. Energy Fundamentals.
Energy, work, power, and thermodynamic efficiency. World and U.S. energy sources, consumption, and policy. Conservation methods. Introduction to long- term energy sources: solar, breeder reactors, thermonuclear fusion, geothermal, and tidal. This survey course is designed for science majors and assumes some knowledge of calculus and the physical sciences. Meets with PES 250.

ENSC 320-4. Practical Meteorology.
An introduction to weather elements and meteorological phenomena with emphasis on physical principles and practical applications. Includes weather elements, air masses, clouds, precipitation, storms and other weather systems, weather map analysis, forecasting, weather control and modification, and current developments in the field of meteorology. Local and current weather facilities will be used to relate meteorological principles to actual observations. Meets with GES 320.

ENSC 361-3. Solar Energy Design.
A study of selected design tools for component sizing and performance prediction of active and passive solar thermal systems. Graphic and computer average monthly performance tools and numerical simulation methods will be covered. Meets with PES 361.

ENSC 365-3. Nuclear Energy.
Nuclear structure, radioisotopes, nuclear reactions, fission, and fusion. Emphasis on nuclear power production and its environmental impact.

ENSC 367-3. Exotic Energy Sources.
A survey of the technology of wind, geothermal, and ocean energy conversion, including climatic aspects, site selection, mechanics of the energy system, legal aspects, and environmental relationships.

ENSC 406-4. Introduction to Remote Sensing.
The acquisition and interpretation of environmental and natural resource data by using aerial photography and other imagery. This is a project oriented course which involves the use of various types of photography and analysis techniques. Prer., GES 100 or 101 or GEOL 101. Meets with GES 406 and GEOG 506.

ENSC 409-4. Image Processing.
An introduction to the advance methods of resource analysis using remotely sensed imagery. All relevant portions of the electromagnetic spectrum will be discussed. Emphasis will be placed on the digital image analysis (by microcomputer) or LANDSAT data. No previous programming experience required. Prer., GES 406. Meets with GES 409 and GEOG 509.

ENSC 460-3. Advanced Solar Energy.
Fundamental, technical principles of solar energy. Solar radiation; data and models. Radiative and convective heat transfer. Optical properties of materials. Optical and thermal analysis of flat-plate and concentrating collectors. Analysis of active and passive system performance, including high temperature application. Introduction to photovoltaics. Prer., PES 213 and MATH

236. (PES 250 and 342 are recommended). Meets with PES 460.

Ethnic Studies

EST 200-3. Introduction to Ethnic Studies.
Introduction to Ethnic Studies focuses upon, and historically contextualizes, the perspectives and cultural expressions of U.S. minority groups. Among other things, this course will consider key concepts such as racial/ethnic formation and examine the inter-relationship among race, ethnicity, gender, class and power.

EST 211-3. Introduction to Teatro Chicana/o.
An introductory survey of the historical development of contemporary Teatro Chicana/o from Spanish drama, and an introduction to methods of Theatre: acting, direction, staging and script writing. Meets with THTR 211.

EST 220-3. Introduction to Racial and Ethnic Groups.
A survey of contemporary racial and ethnic group relations in the U.S. Includes discussion of the history and development of the current situation of the largest minority groups, emphasizing comparisons of social situations, values, discrimination, and cultural identities. Meets with SOC 220.

EST 290-3. Special Topics.
Offered to allow lower division study in a specific area on a demand basis. Prer., EST 200 recommended.

EST 305-3. Race and Ethnicity in American Politics.
An examination of the role of U.S. ethnic minority groups in American politics from the perspectives of the groups themselves. Topics will include historical and contemporary perspectives on the political activities, interests and legal status of U.S. ethnic minorities; the relationship of power, race/ethnicity and class in determining the effects of the political system on these groups; and the impact of these groups on the political system. Meets with P SC 305.

EST 310-3. Women of Color: Image and Voice.
An examination of the ways in which the intersections of race, ethnicity, and gender are constructed both within and against traditional American feminism and gender critiques. The course will address areas of divergence from mainstream feminism, and the construction of alternative representations by women of color. Prer., WMST 100 or EST 200. Meets with WMST 310.

EST 323-3. The Chicana/o Community.
The study of the origin, development, and current order of the Chicana/o community. Includes studies of the "barrio," ethnic identity, social organization and values, and the consequences of prejudice and discrimination. Prer., SOC 111 or SOC 220. Meets with SOC 323.

EST 324-3. The African American Community.
The study of the origin, development, and contemporary nature of Black community. Includes understanding of Black culture and values, and the consequences of prejudice and discrimination. Prer., SOC 111 or SOC 220 or EST 200. Meets with SOC 324.

EST 328-3. The Asian American Community.
This course provides a general introduction to Asian American Studies. It surveys Asian American social organization and political history from the 1800s to the present through the lens of immigration, family, labor, community, activism and resistance. Prer., SOC 111 or SOC 220 or EST 200.

EST 329-3. Perspectives on Race and Ethnic Relations.
A survey of racism, discrimination, prejudice, and relationships between dominant and minority groups in selected areas of the world. Prer., SOC 220 or consent of instructor. Meets with SOC 329.

EST 342-3. North American Indians.
A survey of the native cultures of America north of Mexico. Examines major institutions by culture area and type of social organization. Prer., ANTH 104 or ANTH 240 or consent of instructor. Meets with ANTH 342.

EST 343-3. African American Art.
Introduction to contemporary (1970-) African American art forms with inclusion of traditional African art's influence on American Black culture. Meets with A H 343.

EST 346-3. Race, Writing & Difference in the Contemporary American Literature.
A study of the major writers and developments in the fast expanding field of American ethnic minority literature. Prer., ENGL 150 or ENGL 190 or EST 200 and ENGL 131 or validated equivalent. Meets with ENGL 346.

EST 350-3. Chicana/o History to 1910.
A panoramic sketch of Chicana/o history to about 1910. Integrates events, ideas, and personalities from both sides of the border to illuminate the evolution of Spanish-speaking people of the American Southwest. Meets with HIST 350.

EST 351-3. Chicana/o History since 1910.
A broad sketch of Chicana/o history since 1910. This course integrates events, ideas, and personalities from both sides of the border to illuminate the evolution of Spanish-speaking people of the American Southwest. Meets with HIST 351.

EST 355-3. Native American Literature.
This course is designed to provide students with the necessary cultural and literary backgrounds to understand and appreciate some of the major works of Native American literature. Prer., ENGL 190 or ENGL 350 or EST 200 and ENGL 131 or validated equivalent. Meets with ENGL 355.

EST 360-3. African American Literature.
This course is designed to provide students with the necessary cultural and literary background required to understand and appreciate some of the major works of African American literature. Prer., ENGL 150 or ENGL 190 or EST 200 and ENGL 131 or validated equivalent. Meets with ENGL 360.

EST 363-3. Gender and Race in Biblical Literature.
This course examines the presence(s), result(s), and interpretation(s) of gender and race in biblical literature and the issues and problems these categories present to the reader. Prer., EST 200 recommended. Meets with PHIL 363 and WMST 363.

EST 366-3. Ethnic Minority Communities: Service and Learning.
This course provides students the opportunity to put into practice the theoretical knowledge gained in EST courses within the context of placements with community-based organizations that serve the various ethnic minority communities in Colorado Springs. Prer., EST 200 or consent of instructor.

EST 372-3. From Slavery to Freedom: The African American Experience, 1619-1877.
Introduces students to the major political, social, and cultural developments in the history of African Americans from 1619 through reconstruction. Meets with HIST 372.

EST 390-3. Special Topics.
Offered to allow intermediate study in a specific area on a demand basis. Prer., EST 200 recommended.

EST 400-3. Seminar in Ethnic Studies.
A capstone course taken by students minoring in Ethnic Studies. This course is designed to facilitate a synthesis of what has been studied in the Program and provides an opportunity to put that knowledge regarding U.S. ethnic groups and cultures into practice. Prer., EST 200 plus 9 hours in program.

EST 401-3. Special Topics.
Offered to allow intensive study in a specific area. May be repeated for credit with permission of department chair. Prer., EST 200 or consent of instructor.

EST 440-3. Indigenous Peoples and Cultures of the Southwest.
An intensive study in cultural anthropology of the indigenous peoples and cultures of the Southwest. Prer., Consent of instructor. Meets with ANTH 440.

EST 442-3. U.S. Latino/Hispanic Literature.
Study of the works of the leading Chicana/o, Puerto Rican, and Cuban American writers in the United States. Prer., SPAN 301, SPAN 302 or consent of instructor. Meets with SPAN 442 and SPAN 542.

EST 443-3. U.S. Latina/o Drama.
The drama and theatrical work of Chicana/o, Puerto Rican and the Cuban American writers including Valdes, Pinero, Munoz, and Morton. Meets SPAN 443 and SPAN 543.

EST 444-3. Hispanic, Chicana/o, and Mexican American Literature.
The literary manifestation of individuals of Mexican origin or descent in theater, prose, and poetry. Prer., SPAN 319 and SPAN 320. Meets with SPAN 444 and SPAN 544.

EST 445-3. U.S. Cuban Literature.
Since 1960, and even in the 19th century, Cubans migrated to the U.S. and began to write poems, essays, fiction and theater. A study of examples of these works. Prer., SPAN 319 and SPAN 320. Meets with SPAN 445.

EST 940-1 to 3. Independent Study in Ethnic Studies.
Provides an opportunity to advanced students with good scholastic records to independently pursue the study of some subject of special interest. Prer., EST 200 and consent of instructor.

Foreign Culture Studies

F CS 101-4. Selected Topics in Strategic Languages I.
Elementary Language Study-written, oral, and aural in a less commonly taught languages: Arabic, Cambodian, Chinese, Farsi (Persian), Korean, Thai, and Vietnamese. Permission of Department Chair.

F CS 102-4. Selected Topics in Strategic Languages II.
Elementary Language Study continued-written, oral and aural in a less commonly taught languages: Arabic, Cambodian, Chinese, Farsi (Persian), Korean, Thai, and Vietnamese. Permission of Department Chair. Prer., F CS 101.

F CS 318-3. German and Austrian Civilization and Culture.
Lectures, film, readings, discussions in English; knowledge of German not required. Study of development of German and Austrian culture and institutions from 1700 to 1918, emphasizing literature, art, philosophy, and music. Meets with GER 318.

F CS 319-3. 20th Century German and Austrian Civilization and Culture.
Lectures, films, readings, discussions in English; knowledge of German not required. Study of development of German and Austrian cultures and institutions from 1919 to the present emphasizing literature, design, art, and film. Meets with GER 319.

F CS 322-3. Japanese Culture and Civilization.
Main currents of Japanese civilization from its beginning to the contemporary period. History, art, plus case studies of cultural differences (taught in English).

F CS 323-3. Southwestern Culture Studies.
Taught in English. A cultural socio-history of the southwestern United States and its Mexican presence.

F CS 324-3. Modern French Culture and Civilization: France from 1700-1917.
Studies the creation of modern France from its roots in the culture of the Ancient Regime through the upheaval of Enlightenment and Revolution to the Industrial Revolution and World War I. Emphasis will be on intersections of historical schools of thought, cultural movements and institutional structures in the development of France.

F CS 337-3. Origins and Development of Russian Cultural Traditions.
Traces the development of Russian cultural traditions from the earliest recorded history of the Slavic people to contemporary society. The impact of religion, foreign domination and invasion, and geography on the Russian mind and behavior are examined. Special emphasis is given to the flowering of Russian literature, music and art in the 19th and early 20th centuries as well as to the role of the arts in the Soviet period.

F CS 339-1 to 3. Internships in Foreign Cultures.
The Language and Culture department will offer to advanced language students the opportunity to apply their knowledge in settings such as schools, social support agencies, etc. May be repeated up to three times. Prer., 300 Level courses and permission of the department.

F CS 345-3. German and Austrian Film.
Screenings, lecture, discussion; knowl-

edge of German not required. German and Austrian film in a cultural context from beginnings to the present featuring such directors as Lang, von Sternberg, Refenstahl, Herzog, Fassbinder, Schlondorff, and Corti. Meets with GER 345 and FILM 345.

F CS 349-1 to 3. Internship in Foreign Cultures.
The Language and Culture department will offer to advanced language students the opportunity to apply their knowledge in settings such as schools, social support agencies, etc. May be repeated for credit up to three times. Prer., 300 Level courses and permission of the department.

F CS 356-3. German Literature in Translation.
Masterworks of German literature representing the major literary genres. Reading knowledge of German not required (in English). Meets with GER 350.

F CS 359-3. Deaf Culture.
Examines the culture of deaf people. The course will explore their customs, values, norms and heritage of the deaf community in America. Prer., ASL 101 and ASL 102. Meets with ASL 359.

F CS 369-3. Topics in Hispanic Film.
The cinematic manifestations of the richness and the variety of Hispanic culture as expressed through an artistic and humanistic vision. May be repeated twice for credit if the topic is different. Meets with FILM 369.

F CS 398-1 to 3. Field Studies in Language and Culture.
Designed to study both on campus and in the field any aspect of aspects of departmental offerings in language, culture, and/or civilization. May be repeated once for credit, provided that the field trip destination is not duplicated. Prer., consent of instructor.

F CS 399-3. Topics in Foreign Culture.
Offered to allow intensive study in a specific area of interest. Prer., Permission of instructor.

F CS 421-3. The Southwest.
A survey of the major forms of Mexican American culture, with attention to their historical development. Taught in English. Meets with SPAN 421.

F CS 589-3. Field Studies in Language and Culture.
An on-campus and off-campus travel study class that explores a specified topic in language, culture, and civilization. May be repeated once for credit if the topic and field trip are different. Prer., Consent of instructor.

Film Studies

FILM 100-3. Introduction to Film Studies.
Basic film theory, stylistics, and genre analysis in Western dominant and avant garde cinema. Themes include sociopolitical and feminist critique, surrealism, semiotics, metafilm, neorealism, and postmodernism.

FILM 200-3. Narrative Film.
A continuation of basic film study and analysis from FILM 100. This course explores international cinema history and trends in cinema's aesthetic forms as well as the significant personalities and cultural impact of narrative genres. Prer., FILM 100, or consent of instructor.

FILM 280-3. Film and Fiction.
Examines the "transformational" process by which a novel (or short story) is adapted to film. What is gained, lost, and/or altered in that process is then used as a means of coming to understand that novel or short story. Most typically what will not really "transform" itself to film is used as the basis of critical analysis.

FILM 345-3. German and Austrian Film.
Screenings, lecture, discussion; knowledge of German not required. German and Austrian film in a cultural context from beginnings to the present featuring such directors as Lang, Von Sternberg, Riefenstahl, Hartl, Fassbinder, Schlondorff, Export, and Wenders. Meets with GER 345 and F CS 345.

FILM 350-3. American Cinema.
An introductory film course surveying American cinema as art, industry, and system of representation and communication. Students acquire knowledge of film history and genres, technical and critical vocabulary terms, and how popular genres extend to broader social context. Meets with COMM 350.

FILM 369-3. Topics in Hispanic Film.
The cinematic manifestations of the richness and the variety of Hispanic culture as expressed through an artistic and humanistic vision. May be repeated once for credit if the topic is different. Meets with F CS 369.

FILM 371-3. Great European Film Directors: A Historical View, 1945-1994.
A study of the history of cinema, through works of great European directors of Post WWII period: from De Sica, Antonioni, Fellini, Pasolini, to Tarkovsky, Paradjanov, Wajda, Jarman, and Greenway. Course will be a valuable elective for all arts and sciences majors.

FILM 372-3. Russian Avant-Garde Cinema: A Historical View, 1915-1995.
A study of history of nearly 100 years of Russian and Soviet cinema through works of great directors: Eisenstein, Tarkovsky, Paradjanov, Shepit'ko, and others; from 1910's through 1990's. Every 4 hour session includes a complete feature film, some rare and never released on video. A valuable elective for all arts and sciences majors.

FILM 373-3. Russian Art Cinema Today: A Historical View: 1989-1997.
An in-depth study of the latest page in the history of its best directors: classics, such as Ioseliani, Soluiror, Muratova, as well as young talented directors, bound to become classics tomorrow. Every 4 hour session includes a complete feature film, often unavailable commercially. Available elective for all arts and science majors.

FILM 390-3. Special Topics in Film Studies.
Selected topics in the theory, history and aesthetics of film. Prer., FILM 100 or FILM 200, or consent of instructor.

FILM 411-3. French or Francophone Film.
The evolution of French cinema from the 1940's to the "new wave." About six movies will be viewed and analyzed both as objects and as reflections of the evolution of French society from 1940 to present. All lectures, readings, discussions, and films in French. Prer., FR 211, 217, 301, 302. Meets with FR 411.

FILM 940-1 to 3. Independent Study.
Independent work for undergraduates only. By special arrangement with the faculty. Prer., FILM 100 and FILM 200, consent of instructor and program director.

FRENCH

FR 101-4. Beginning French I.
Essentials of French, oral-aural skills stressed with additional reading, writing and grammar.

FR 102-4. Beginning French II.
Essentials of French continued. Additional oral-aural skills practice with increased grammar, reading, and writing. Prer., FR 101 or equivalent.

FR 211-4. Intermediate French I.
French at the intermediate level with concentration on conversation, culture and civilization, or literature at that level. Prer., FR 102 or its equivalency.

FR 212-3. Intermediate French II.
An intermediate French course continuing conversational usage and cultural integration utilizing contemporary materials, newspapers, etc. Prer., FR 211 or equivalent.

FR 293-3. Business French.
The vocabulary and usage of the world of finance and commerce. Applied business correspondence, marketing and accounting terminologies. Prer., FR 212 or FR 217.

FR 300-3. Advanced Grammar.
A course designed to review extensively the functional application of modern French. Prer., FR 212 or 217 or equivalent.

FR 301-3. French Conversation and Composition I.
Practice in conversation with emphasis on pronunciation and diction; exercises in grammar review and oral communication. Prer., FR 212 or equivalent.

FR 302-3. French Conversation and Composition II.
Practice in conversation with emphasis on pronunciation and diction; exercises in grammar review and oral communication. Prer., FR 301 or equivalent.

FR 303-3. Advanced French Conversation & Composition.
Prer., FR 302 or equivalent.

FR 304-2. Advanced Pronunciation and Phonetics.
A supplemental course for the advanced student emphasizing the "why's and wherefore's" of native pronunciations. Working from a solid knowledge structure of French, pronunciation work will stress the whole phrase as well as the relationship between grammar and speech. Prer., FR 300 or 301 or 302 or concurrent enrollment.

FR 310-3. Interpretive Practice: French Literature.
An introduction to approaches to literature and genre studies in French. The course will provide an initial contact with all major literary genres in French as well as practical application of the major schools of literary interpretation. Prer., FR 212 or equivalent.

FR 311-3. Main Currents of French Literature I.
An introductory survey. Selected literary texts representing major trends in the development of French literature. Prer., FR 212 or equivalent.

FR 312-3. Main Currents in French Literature II.
An introductory survey of French literature from Neoclassicism to the present. Prer., FR 212 or equivalent.

FR 317-3. Advanced French Readings, Conversation and Composition.
This course in advanced French bases classroom discussion and written assignment on contemporary journals, newspaper and nonliterary writings. Prer., FR 301, FR 302 or equivalent.

FR 323-1. Applied Conversation.
Conversation at the advanced level on contemporary topics in French culture. Prer., FR 212, 217 or equivalent.

FR 324-3.
Modern French Culture and Civilization: France from 1700-1917.
Study of the creation of modern France from its roots in the culture of the Ancient Regime through the upheaval of Enlightenment and Revolution to the Industrial Revolution and World War I. Emphasis will be on intersections of historical schools of thought, cultural movements and institutional structures in the development of France.

FR 325-3. 20th Century France: Civilization & Culture.
Study of French culture and institutions as they have developed from 1919 to the present, emphasizing the relationship between changing social structures and value systems and their representation in literature, design, art and film. Prer., FR 301, FR 302 or equivalent.

FR 327-3. Francophone Cultures.
An intensive examination of linguistically defined cultures, treating particular cultural difference and issues of choice in relation to the imperial (culturally, politically or economically) culture and language. Readings will be drawn from a variety of sources ranging from historical documents and travel literature to contemporary writings (literary and others) from Francophone areas. Taught in French.

FR 339-1 to 3. Internship in Applied French.
The Language and Culture department will offer to advanced French language students the opportunity to apply their knowledge of French in settings such as schools, social support agencies, etc. May be repeated up to three times for credit. Prer., 300 Level French courses and departmental permission.

FR 349-1 to 3. Internship in Applied French.
The Language and Culture department will offer to advanced French language students the opportunity to apply their knowledge of French in settings such as schools, social support agencies, etc. May be repeated up to three times for credit. Prer,. 300 Level French courses and departmental permission.

FR 350-3. Special Topics in French.
Varying topics of current importance in literary and socio-cultural study. May be repeated once for credit if the topic is different. Prer., FR 212 or equivalent.

FR 411-3. French Film.
The evolution of French cinema from the 1940's to the "new wave." About six movies will be viewed and analyzed both as objects and as reflections of the evolution of French society from 1940 to present. All lectures, readings, discussions, and films in French. Prer., FR 301, 302. Meets with FILM 411.

FR 930-1 to 4. Independent Study in French: Undergraduate.
Independent work for undergraduates. By special arrangement with the faculty. Only for students presenting strong French preparation. May be repeated up to three times for credit. Prer., Consent of instructor.

FR 940-1 to 4. Independent Study in French: Undergraduate.
Independent work for undergraduates. By special arrangement with the faculty. Only for students presenting strong French preparation. May be repeated up to three times for credit. Prer., Consent of instructor and department chair.

FR 950-1 to 4. Independent Study in French: Graduate.
Independent work for graduate students only, by special arrangement with the faculty. Only for students presenting strong French preparation. May be repeated up to three times for credit. Prer., Consent of instructor and department chair.

Gallery Management

G M 404-3. Gallery Management I.
Seminar and practical hands-on experience in administration, fundraising, curatorial selection, publicity, and installation of contemporary exhibits. Organization and research of programs at the gallery for contemporary art will be the focus of activities in addition to case studies and evaluation of pertinent off-campus exhibits.

G M 405-3. Gallery Management II.
Continuation of G M 404 with emphasis on development of concepts of gallery management and exhibition organization.

G M 940-1 to 4. Independent Study in Gallery Management.
Independent study in gallery management to be arranged with director.

Geography

GEOG 500-4. Quantitative Methods.
Research-oriented quantitative methods seminar. Advanced data analysis techniques for use in geographic and environmental research. Meets with GES 400.

GEOG 501-3. Seminar: Geographic Research.
An analysis if research topics and methodologies in geography. Students will define a research topic, review literature in their field of interest, and prepare a research proposal. Required for all MBS students in Geography and Environmental Studies. Prer., BA or BS.

GEOG 505-4. Introduction to GIS for Graduate Students.
Information Systems (GIS) as a research tool. Students will use ArcView or Arc/Info to complete a series of geographic projects and pursue the application of GIS to their own research areas. A basic understanding of cartography and computer use is expected. Prer., GES 305 or consent of instructor. Meets with GES 405.

GEOG 506-4. Seminar: Advanced Remote Sensing.
Intensive work on data acquisition using manual methods of imagery analysis. Specific research methods will be discussed. Students will accomplish several exercises and at least one major independent project. Meets with GES 406, ENSC 406.

GEOG 508-4. Advanced GIS for Graduate Students.
Continued application of GIS for spatial analysis. Students will learn ARC/Info and complete original research projects in their field of interest. Prer., GEOG 505 or consent of instructor. Meets with GES 408.

GEOG 509-4. Image Processing.
An introduction to advanced image processing techniques used by the remote sensing community. Image restoration, enhancement, and classification will be emphasized. Prer., GES 406/GEOG 506. Meets with GES 409 and ENSC 409.

GEOG 516-1 to 4. Workshop in Geographic Education.
A course outlining methods of teaching geography in K- 12. Includes discussion of important geographic concepts and their integration into the classroom. Students will develop teaching activities and materials for incorporation into their curriculum. Prer., Consent of instructor.

GEOG 517-2 to 4. Seminar: Research Methods.
Intensive work in using various forms of data and field investigation for analysis of geographic problems. Case studies and field experience. Meets with GES 405.

GEOG 522-3. Synoptic Climatology.
The physical processes involved with the development and transportation of weather systems. Selected topics include relationships between upper atmospheric flow and surface weather phenomena, synoptic evaluation of air masses and techniques for environmental analysis. Prer., GES 100. Meets with GES 422.

GEOG 526-4. Biogeography.
An examination of the distribution of life on the Earth's surface. The relationship between environmental factors and plant and animal distributions will be the central theme. Changes in distributions through time will also be examined. Required field trip. Prer., GES 100 or consent of instructor. Meets with GES 426 and BIOL 426.

GEOG 527-4. Advanced Biogeography.
A project-oriented class with students studying the distribution of plants as related to environmental factors. This class will combine lecture, field work, and data processing, resulting in maps and reports. The geographical of study will be changed each time. Prer., GES 426/GEOG 526 or consent of instructor. Meets with GES 427.

GEOG 528-4. Plant Communities of the Western United States.
An examination of plant assemblages in the contiguous United States west of the one-hundredth meridian. The distribution of major plant species will be used to illustrate plant community interactions with environmental factors such as climate and landforms. Prer., GES 426/GEOG 526. Meets with GES 428.

GEOG 529-4. Plant Communities of Colorado.
An examination of plant assemblages in Colorado. Major plant communities will be examined in the context of environmental factors such as climate and land forms. Required field trip. Prer., GES 426/GEOG 526 or consent of instructor. Meets with GES 429.

GEOG 531-4. Topics in Geomorphology.
Current research in landform processes.

Focus on the western United States. Prer. GEOL 101, GES 101 or consent of instructor. Field projects, trips required. Meets with GES 431, GEOL 463, GEOL 563.

GEOG 532-3. Mountain Environmental Systems Seminar.
Same as GES 432 but will include additional research work. Field trips optional. Meets with GES 432.

GEOG 534-4. Seminar: Soils.
In-depth study of techniques used in analyzing soil classification systems for global soils. Problems in human use and misuse of soils. Meets with GES 434.

GEOG 541-3. Seminar in Resource Management and Conservation.
An investigation of environmental problems with emphasis on land-planning and land use, pollution, water, energy and natural hazards. Prer., Consent of instructor. Meets with GES 441.

GEOG 545-3. Seminar: Analysis of Environmental Systems.
Problems associated with development of environmental impact studies. Case examples and field work. Meets with GES 445.

GEOG 548-3. Environmental Problems of Colorado.
Specific land and resource use problems in Colorado. In-depth analysis of interacting systems of natural resources and human decision-making processes. Meets with GES 448.

GEOG 550-3. Topics in Water Resource Management.
Experience of water resource management in the United States, prospects for the future and problem solving techniques. Critical analysis of issues important in the western United States. Meets with GES 450.

GEOG 551-3. Applied Hydrology.
Exploration of the principles of hydrology and their applications to environmental investigations. Meets with GES 451.

GEOG 555-3. Disasters and Society.
The impact of extreme geophysical events on human society. Emphasis upon adaptations to extreme events and ways of reducing vulnerability and damage. Meets with GES 455.

GEOG 561-3. Urban Geography.
Course addresses topics in urban location, urban morphology and design, urban function, and urban social issues. We analyze why cities look as they do and the role cities play in society. Emphasis is on cities in the United States. Meets with GES 461.

GEOG 573-3. Seminar: Population Geography.
The geographic aspects of population characteristics including fertility, mortality, migration, distribution, and composition. Both theoretical and empirical considerations are included. Meets with GES 473.

GEOG 575-3. Seminar: Recreation Geography.
An inquiry into the spatial distribution and environmental conditions of recreation. Emphasis is on outdoor recreation in nonurban settings. The implications of recreational values to resource managers and land use decisions will be included. Meets with GES 475.

GEOG 577-3. History and Nature of Geography.
A history of geographical ideas from Greek classical efforts through the 19th century. Prer., Consent of instructor. Meets with GES 477.

GEOG 602-4. Data Processing in Earth Science.
Advanced data processing using digital image models and geographic information systems. Students will be responsible for extensive individual project design and completion. Prer., GEOG 517 or GES 409/GEOG 509.

GEOG 700-1 to 6. Masters Thesis.

GEOG 950-1 to 4. Independent Study in Geography: Graduate.
Independent work for graduate students. By special arrangement with faculty only. Prer., Consent of instructor.

GEOG 960-1 to 4. Independent Study in Geography: Graduate.
Independent work for graduate students. By special arrangement with faculty only. Prer., Consent of instructor.

GEOG 999-0. Candidate for Degree.

GEOLOGY

GEOL 101-4. Physical Geology.
Study of surface features of the earth and how they were formed: rocks that make up the crust of the earth. GEOL 101L must be taken concurrently.

GEOL 102-4. Historical Geology.
Development of the science of geology, study of earth history and development of life forms throughout geologic time. Three lectures and one field trip or laboratory per week. Prer., GEOL 101, GES 101, or concurrent enrollment.

GEOL 153-4. Geological Development of Colorado and the West.
Three lectures and one field trip or laboratory per week. An outline of the development, through time, of the geology of Colorado. Includes a summary of the evolution of life. Last part of course is devoted to history of development of economic resources, including placer and hard rock mining, coal, oil and gas production, and oil shale. This is a course for nonmajors designed as a follow-up for those who have had GEOL 101.

GEOL 317-3. Geology and Our National Parks.
Promotes an interest in and an appreciation of the geologic aspects of our national parks. The student will be given fundamental background in the geological processes which have worked to evolve the spectacular or unique scenery found in the national parks. Because the approach to this class is of a qualitative nature, the prospective student need not have a prior background in the earth sciences. Field trips are included as part of the course content.

GEOL 352-3. Oceanography.
Oceans and their basins, water masses, circulation patterns, climate regulation, life zones, bottom sediments, and resources. Geologic aspects of the sea, both modern and ancient.

GEOL 370-4. Environmental Geology.
Interaction of industrial society with earth resources and geologic processes. Investigation of geologic hazards to engineering systems and problems related to resource development. Evaluation of criteria for urban planning, land utilization, waste disposal, and resource conservation. Prer., GEOL 101 or GES 101. Field trips required.

GEOL 403-4. Introduction to Hydrology and Ground Water.
Occurrence, movement and properties of subsurface water; introduction to groundwater geology and hydrology. Prer., GEOL 101, GES 101 or concurrent enrollment in MATH 104.

GEOL 411-3. Geologic Field Methods.
Methods of geologic mapping including Brounton compass and plane table surveying utilization. Coreq., GEOL 312. Additional field work required. Meets with GEOL 511.

GEOL 436-4. Glacial and Periglacial Geology.
Introduction to glaciology and periglacial geology and their influence on topography, crustal rebound, and sea level; and glacial chronology for northern North America. A study of cold-climate geomorphic and climatic processes. Prer., GEOL 101 OR GES 101. Meets with GEOL 536.

GEOL 463-4. Principles of Geomorphology.
Systematic study of weathering, mass-wasting, fluvial, wind, and marine processes and the landforms resulting therefrom. Field work and trips required. Prer., GEOL 101 or GES 101 or consent of instructor. Meets with GEOL 563, GES 431 and GEOG 531.

GEOL 466-1 to 4. Field Study in Geology.
A field trip to an area of special geologic interest such as the Grand Canyon, Death Valley, Yellowstone, Northern Rockies and the Mojave Desert. Field trips usually occur during the Winter, Spring, or Summer breaks. Prer., GEOL 101. Meets with GEOL 566.

GEOL 491-4. Engineering Geology.
Intensive literature review and field investigations leading to a recognition of the engineering and construction problems associated with natural hazards and earth materials such as mass movement, dam location, highway development, and building construction. Basic courses in physics, mathematics, and geology recommended. Meets with GEOL 591.

GEOL 503-4. Introduction to Ground Water.
Same as GEOL 403 with additional work required.

GEOL 536-4. Glacial and Periglacial Geology.
Same as GEOL 436 with additional work required. Prer., GEOL 101, GES 101, GEOL 463 preferred. Meets with GEOL 436.

GEOL 563-4. Principles of Geomorphology.
Systematic study of weathering, mass-wasting, fluvial, wind, and marine processes and the landforms resulting therefrom. Field work and trips required. Prer., GEOL 101 or GES 101 or consent of instructor. Meets with GEOL 463, and GES 431 and GEOG 531.

GEOL 566-1 to 4. Field Study in Geology.
Same as GEOL 466 with additional work required. Meets with GEOL 466.

GEOL 591-4. Engineering Geology.
Intensive literature review and field investigations leading to a recognition of the engineering and construction problems associated with natural hazards and earth materials such as mass movement, dam location, highway development, and building construction. Basic courses in physics, mathematics, and geology recommended. Will require additional field work. Meets with GEOL 491.

GEOL 700-1 to 6. Masters Thesis.

GEOL 940-1 to 4. Independent Study in Geology: Undergraduate.
Independent work for undergraduates. By special arrangement with faculty. Only for students presenting strong geology preparation. Prer., Consent of the instructor.

GEOL 960-1 to 4. Independent Study in Geology: Graduate.
Independent work for graduate students. By special arrangement with faculty only. Prer., Consent of instructor.

GEOL 999-0. Candidate for Degree.

GERMAN

GER 101-4. Beginning German I.
Essentials of German, oral-aural skills stressed with additional reading, writing, and grammar.

GER 102-4. Beginning German II.
Essentials of German continued. Additional oral-aural skills practice with increased grammar, reading, and writing. Prer., GER 101 or its equivalency.

GER 211-4. Intermediate German I.
German at the intermediate level with concentration on conversation, culture, and civilization or literature at that level. Prer., GER 102 or its equivalency.

GER 212-3. Intermediate German II.
An intermediate German course continuing conversational usage and cultural integration utilizing contemporary materials, newspapers, etc. Prer., GER 211 or its equivalency.

GER 293-3. Business German.
German for business studies: exercises in German business correspondence, terminology, readings and translations in the area of business German. Prer., GER 211 or equivalent.

GER 300-3. Advanced German Grammar.
A course designed to review intensively the functional application of Modern Germany. Prer., GER 212 or 217 or its equivalency.

GER 301-3. German Conversation and Composition I.
Practice in conversation; exercises in written communication. Prer., GER 212.

GER 302-3. German Conversation and Composition II.
Practice in conversation; exercises in written communication. Prer., GER 212 or its equivalency.

GER 313-3. 18th Century German Literature.
A survey of German language literature from 1700 to 1800. Readings and analysis of literature of the phases of the Enlightenment and of Classicism including such authors as Leibnitz, Lessing, Goethe, and Schiller. Prer., GER 300 or 301 or its equivalency.

GER 314-3. 16th and 17th Century German Literature.
A survey of German language literature from 1500 to 1700. Readings and analysis of literature of the Renaissance, Reformation and Baroque including such authors as Martin Luther, Hans Sachs, Gryphius, and Von Grimmelshausen. Prer., GER 300 or GER 301 or its equivalency.

GER 316-3. 20th Century German/Austrian Literature.
A survey of German language literature from 1900 to the present. Lecture course. Readings and analysis of different periods and styles from impressionism through feminism and post-modernism including authors such as Holz, Schnizler, Thomas Mann, Kaiser, Brecht, Boll, Bachmann, Durrenmatt, Muller, and Wolf. Prer., GER 300 or GER 301 or its equivalency.

GER 317-3. 19th Century German/Austrian Literature.
A survey of German language literature from 1800 to 1890S. Lecture course. Readings and analysis of literature of late Romanticism, Realism, Naturalism, including such authors as Goethe, Kleist, Eichendorff, Stifter, Buchner, Keller, Hauptmann. Prer., GER 300 or 301 or its equivalency.

GER 318-3. German/Austrian Civilization and Culture From 1700-1918.
Lectures, films, readings, discussions in English; knowledge of German not required. Study of development of German and Austrian culture and institutions from 1700 to 1918, emphasizing literature, art, philosophy and music. Meets with F CS 318.

GER 319-3. 20th Century German and Austrian Civilization and Culture.
Lectures, films, readings, discussions in English; knowledge of German not required. Study of development of German and Austrian cultures and institutions from 1919 to the present emphasizing literature, design, art, and film. Meets with F CS 319.

GER 323-1. Applied Conversation.
Conversation at the advanced level on contemporary topics in German culture. Prer., GER 212, 217, its equivalency.

GER 345-3. German and Austrian Film.
Screenings, lecture, discussion; knowledge of German not required. German and Austrian film in a cultural context from beginnings to the present featuring such directors as Lang, Von Sternberg, Riefenstahl, Hartl, Fassbinder, Schlondorff, Export and Wenders. Prer. GER 212 or equiv if taken for German credit. Meets with F CS 345 and FILM 345.

GER 350-3. Special Topics in German/Austrian Literature.
Varying topics of current importance in literary and socio cultural study. May be repeated once for credit if topic is different. Prer., GER 300, 301, or its equivalency. Meets with F CS 356.

GER 920-1 to 4. Independent Study.
Independent work for undergraduates. By special arrangement with the faculty. Only for students presenting strong German preparation. May be repeated up to three times for credit. Prer., Consent of instructor.

GER 930-1 to 4. Independent Study.
Independent work for undergraduates. By special arrangement with the faculty. Only for students presenting strong German preparation. May be repeated up to three times for credit. Prer., Consent of instructor.

GER 940-1 to 4. Independent Study.
Independent work for undergraduates only, by special arrangement with the faculty. Only for students presenting strong German preparation. May be repeated up to three times for credit. Prer., Consent of instructor and department chair.

GER 950-1 to 4. Independent Study.
Independent work for graduate students only, by special arrangement with the faculty. Only for students presenting strong German preparation. May be repeated up to three times for credit. Prer., Consent of instructor and department chair.

Geography and Environmental Studies

GES 100-4. Environmental Systems: Climate and Vegetation.
A general introduction to energy and mass budgets, including atmospheric motion, solar radiation, and water budgets. Includes consideration of climatic elements as they interact with vegetation, animals, and humans in ecosystems. This class is taught in a variety of learning situations, including lecture, laboratory, web-based and tutorials.

GES 101-4. Environmental Systems: Landforms and Soils.
An introductory survey primarily concerned with the agents and processes of landform shaping and soil genesis. Major emphasis is on the genesis, distribution, and utility of surface features in a variety of learning situations, including lecture, web-based, laboratory, tutorials, and field trips.

GES 105-2 to 4. Introduction to Map & Compass.
A basic introduction to topographic maps will be given. This will include the process involved with making and field-checking maps; discussion of symbolization, scale, and landform representation. The development of the compass will be outlined and basic skills will be taught.

GES 198-3. World Regional Geography.
A survey of world regions that explores the diversity of human culture within the wider global context. This issues-oriented class examines the cultural, political, economic and environmental forces that shape each region and the impacts of globalization on our increasingly interconnected world.

GES 199-4. Introduction to Human Geography.
A systematic introduction to the broad field of human-land interactions and spatial order. Emphasis is placed on the major themes of geographic inquiry including population numbers and distribution, changing resource use, location decisions, settlements, transportation, political units, and a geography of the future.

GES 200-3. Geographic Regions of the World.
An introduction to the world's geographic realm and their human and physical characteristics. A variety of geographic themes such as population growth, urbanization, economic development and environmental deterioration are set in their regional contexts.

GES 201-3. Economic Geography: Resources, Development, and the Future.
Introductory consideration of the location of resources, the role of natural resources in economic and technological development and resource utilization and the future. Use of the theory of spatial organization and behavior in economic activity including agriculture, manufacturing, transportation, service activities, urban location, systems of cities, and growth patterns. Case studies.

GES 210-3. Humans and Environments.
An overview of global environmental issues including climate change, sustainable agriculture, waste management, deforestation, population and energy. Individual, local, state, regional, national and international decisionmaking tools and implications will be explored through case studies in industrialized and nonindustrialized countries. Meets with SOC 222.

GES 298-1 to 6. Professional Experience I.
Designed experiences involving application of specific, relevant concepts and skills in supervised employment situations.

GES 305-4. Introduction to Cartography.
An introduction to the principles and theory of map-making. The emphasis will be on the design of maps for research and publication using advanced computer hardware and software. The course entails the creation of reproducible, thematic maps using the various computer techniques available to the cartographer.

GES 320-4. Practical Meteorology.
An introduction to weather elements and meteorological phenomena with emphasis on physical principles and practical applications. Includes weather elements, air masses, clouds, precipitation, storms and other weather systems, weather map analysis, forecasting, weather control and modification, and current developments in the field of meteorology. Local and current weather facilities will be used to relate meteorological principles to actual observations. Meets with ENSC 320.

GES 321-4. Basic Weather Analysis and Forecasting.
An expanded application of meteorological principles with emphasis on modern techniques for interpreting and forecasting weather. The course includes a review of basic principles, interpretation of various types of weather charts, and forecast techniques. Lecture sessions will be followed by student preparations of weather analysis and forecast charts. Prer., GES 100 or 320.

GES 325-3. The Geography of Climate Change.
Students investigate the theory and evidence of climate change from a geographical perspective. The course incorporates the interactions and interrelationships of humans and the environmental system while in the study of global environmental changes in different locations. Students use readings, lectures, discussion, research, computer simulation, and their own critical and analytical thinking skills in the process of forming their own conclusions about the status of climate change in different locations. Written and oral presentation skills will be enhanced as the students present and defend their theory and findings to their peers.

GES 360-3. Geography of American Folk and Ethnic Music.
Music is ubiquitous in America today. This course will analyze the geographic context of American folk and ethnic music. A variety of geographic concepts and their relationship to the development of American folk and ethnic music will be discussed.

GES 366-3. Community Service: Theory and Practice.
Combines theory with practical application; includes reading assignments, seminars, and community service. Prer., Sophomore standing and consent of instructor.

GES 380-3. Regional Geography of the Pikes Peak Area.
A regional rather than synoptic approach is taken to the study of two formal regions: the Great Plains and the southern Rocky Mountains, and an informal region to include Colorado Springs, Cripple Creek and the nearby western High Plains.

GES 382-3. Mexico, Central America, and the Caribbean.
Study of human relationship to the physical environment of Mexico, the central American countries, and the central American countries, and the Caribbean islands.

GES 385-3. Historical Geography of the United States.
Historical geography as a method for study of changing and evolving landscapes.

GES 390-3. Historical Geography of the British Isles.
Traces the historical evolution of the British landscape from prehistoric times to the present day. Particular regions like Wales, Yorkshire, the Lake District and Western Ireland will be examined in detail. Meets with HIST 300 SEC 001.

GES 400-4. Statistical Analysis in Geography.
The application of statistical and other quantitative techniques to geographically organized data, areal, distributions, and the solution of geographic research problems. Meets with GEOG 500.

GES 401-4. Technology, Development and Economic Geography.
Theory and issues in contemporary economic geography. Explores process leading to interregional change, spatial interaction between places, and the homogenization of economies and cultures.

GES 405-4. Introduction to GIS.
An introduction to Geographic Information Systems (GIS) as a research tool. Students will use ArcView and/or Arc/Info to complete a series of geographic projects. A basic understanding of cartography and computer use is expected. Prer., GES 305 or instructor consent. Meets with GEOG 505.

GES 406-4. Introduction to Remote Sensing.
The acquisition and interpretation of environmental and natural resource data by using aerial photography and other imagery. This is a project-oriented course which involves the use of various types of photography and analysis techniques. Meets with ENSC 406 and GEOG 506.

GES 408-4. Advanced Geographic Information Systems (GIS).
Continued application of GIS for spatial analysis. Focuses on Arc/Info and complete original research projects. Prer., GES 405 or consent of instructor.

GES 409-4. Image Processing.
An introduction to the advanced methods of resource analysis using remotely sensed imagery. All relevant portions of the electromagnetic spectrum will be discussed. Emphasis will be placed on the digital image analysis (by microcomputer) of LANDSAT data. No previous programming experience required. Prer., GES 406. Meets with ENSC 409 and GEOG 509.

GES 411-4. Introduction to Field Techniques.
Methods of area analysis; classification, measurement, andent, analysis of areal characteristics; methods of mapping natural and cultural features of landscapes; use of compass, transit, level, alidade, and theodolite. Interview and sampling techniques.

GES 416-2 to 4. Teaching Geography.
Practicum and/or tutorial, by special arrangement only, in the teaching of geography (for example, serving as small-group leaders or proctors in introductory courses, or developing and/or testing curriculum materials).

GES 417-3. Research Writing.
Development of skills for research with emphasis on primary and secondary sources, on methods of evaluating source materials, and on geographic writing.

GES 422-3. Synoptic Climatology.
The physical processes involved with the development and transportation of weather systems. Selected topics include relationships between upper atmospheric flow and surface weather phenomena, synoptic evaluation of air masses and techniques for environmental analysis. Prer., GES 100. Meets with GEOG 522.

GES 426-4. Biogeography.
An examination of the distribution of life on the Earth's surface. The relationship between environmental factors and plant and animal distributions will be the central theme. Changes in distributions through time will also be examined. Required field trip. Prer., GES 100 or consent of instructor. Meets with BIOL 426 and GEOG 526.

GES 427-4. Advanced Biogeography.
A project-oriented class with students studying the distribution of plants as related to environmental factors. This class will combine lecture, fieldwork, and data processing, resulting in maps and reports. The geographical area of study will be changed each time. Prer., GES 426/GEOG 526 or consent of instructor. Meets with GEOG 527.

GES 428-4. Plant Communities of the Western United States.
An examination of plant assemblages in the contiguous United States west of the one-hundredth meridian. The distribution of major plant species will be used to illustrate plant community interactions with environmental factors such as climate and landforms. Prer., GES 426/GEOG 526. Meets with GEOG 528.

GES 429-4. Plant Communities of Colorado.
An examination of plant assemblages in Colorado. Major plant communities will be examined in the context of environmental factors such as climate and land forms. Required field trip. Prer., GES 426 or consent of instructor. Meets with BIOL 429.

GES 431-4. Principles of Geomorphology.
Systematic study of weathering, mass-wasting, fluvial, wind, and marine processes and the landforms resulting from these processes. Prer., GES 101, GEOL 101, or consent of instructor. Field projects, trips required. Meets with GEOG 531, GEOL 563, GEOL 463.

GES 432-3. Mountain Environmental Systems.
Field course emphasizing study of landforms produced by weathering and soils, mass movement, erosional processes under all climatic and altitudinal conditions. Includes front range glacial geology and glaciology. Prer., GES 100 or consent of instructor. Meets with GEOG 532.

GES 434-4. Soils.
Covers the nature and distribution of soils through an investigation of the basics of soil genesis and development. It will stress the environmental components involved in soil production and the geographic distribution of soil types. Prer., GES 101 or GEOL 101 or instructor consent. Meets with GEOG 534.

GES 441-3. Resource Management and Conservation.
Inventory, policy, and management of natural resources. Nature, significance, distribution, and problems associated with water, forest, wildlife, soils, and recreational resources. Emphasis is on experience in the United States, but other global problems may be included. Meets with GEOG 541.

GES 445-3. Analysis of Environmental Systems.
An analysis of the various factors involved in the routing of environmental impact statements. Emphasis will be on analytical procedures associated with the evaluation of environmental systems and applications specific environmental impact problems. Meets with GEOG 545.

GES 446-1 to 6. Field Studies in Geography.
Field investigations focused on a specific aspect of the landscape in a selected area. Topic and credit vary from year to year. Field trips required.

GES 448-3. Environmental Problems of Colorado.
A discussion and investigation of the environmental problems of the State of Colorado with an emphasis on land planning and land use, pollution, transportation, energy, and hazards. Programs to alleviate as well as to minimize any further related environmental problems will be developed. Meets with GEOG 548.

GES 450-3. Water Resources and Water Problems.
A descriptive interpretation and detailed inventory of hydroclimatic data, surface water, and ground water. The use of water is critically evaluated with emphasis on problems associated with geographic maldistribution, appropriation, irrigation, industry, pollution, and regional development. Meets with GEOG 550.

GES 451-3. Applied Hydrology.
Exploration of the principles of hydrology and their application to environmental investigations. Prer., GES 100 and GES 320 or consent of instructor. Meets with GEOG 551.

GES 455-3. Disasters and Society.
Case studies of slow and quick developing disasters will be discussed in a local, national, cross- cultural, and global framework. Issues covered will include technological hazards, the role of environmental perception, risk-taking, decision- making and the impact legislative changes at the local, state, and national levels. Meets with GEOG 555.

GES 460-3. The Cultural Landscape.
Students will learn to interpret the American cultural landscape, particularly everyday surroundings that they frequently take for granted. We will emphasize how culture shapes the world around us, from modifications to the natural terrain to the cities in which we live.

GES 461-3. Urban Geography.
Course addresses topics in urban location, urban morphology and design, urban function, and urban social issues. We analyze why cities look as they do and the role cities play in society. Emphasis is on cities in the United States. Meets with GEOG 561.

GES 470-1 to 4. Geographic Issues.
Geographic perspectives or dimensions of selected areas such as pollution, poverty, world conflict, natural hazards, landscape perception or women's communities will be presented. Topics vary from year to year.

GES 473-3. Geography of Population.
National and social patterns of population distribution; organization of populations; and methods of census, demographic analysis and mapping. Meets with GEOG 573.

GES 475-3. Recreation, Tourism, and the Environment.
An inquiry into the spatial distribution and environmental/cultural impacts of recreation and tourism, including international tourism. Recreational values, cultural norms and change, economic tradeoffs, and future trends are included. Meets with GEOG 575.

GES 476-3. Women's Space, Women's Place: Women's Role in Changing the Face of the Earth.
A re-examination of traditional aspects of cultural and regional geography from a feminist perspective. Understanding the full richness of the human experience in utilizing earth as habitat requires a conscious effort to explore the omissions about where, how, and why women live, work, migrate, perceive their environment, and generally contribute to the intricate mosaic of spatial organization. The geographical origins and distributions of differing roles of women in a number of societies are also explored. Meets with WMST 476.

GES 477-3. Development of Geographic Thought.
The course will focus upon discussions and studies of the development of geographic thought and philosophies. Both past and present literature will be analyzed and appraised with particular emphasis placed upon the themes and topics significant to the growth of modern geographic philosophy. Prer., GES 199 or consent of instructor. Meets with GEOG 577.

GES 491-3. The World of Wines and Vines.
Focus on the physical and cultural geography of the world's grape-producing regions. Coverage will include the study of terrain, soils, climate, and other aspects of physical geography; the historical geography of viticulture; the procedures and processes associated with growing grapes and making wines; and a detailed analysis of specific regions such as the Bordeaux area, the Napa Valley, and German wine regions. Prer., Must be 21 years of age.

GES 494-4. Seminar: Practicum in Image Processing.
Prer., GES 405 or GES 409 and consent of instructor required.

GES 497-3. Honors in Geography.
Independent research and thesis for geography majors who have maintained a superior scholastic performance in their overall program and within the department of geography and environmental studies. For superior students who wish to attain honors in the field of geography. May be taken in lieu of GES 499.

GES 498-1 to 6. Professional Experience II.
Designed experiences involving application of specific, relevant concepts and skills in supervised employment situations.

GES 499-3. Senior Thesis.
A one semester research project. The student will write a formal research paper drawing on primary sources and pertinent secondary material. The student will work under the direction of a full time member of the department and have a second member as an additional reader.

GES 940-1 to 4. Independent Study in Geography.
Independent work for undergraduates. By special arrangement with faculty only. Only for students presenting strong geography preparation.

Gerontology

GRNT 204-3. Biomedical Aspects of Aging.
A comprehensive study of the normal and pathological aspects of the aging process in human beings. The course treats cellular through organ system function, examining causes and changes related to aging. Immunity, nutrition and biopsychological factors are studied. The course also examines the concept of wellness as it applies to aging. Meets with BIOL 204 and HSCI 280.

GRNT 300-3. Introduction to Gerontology.
A comprehensive introduction to the experience of aging, including an overview of the biological, psychological, and social aging of individuals as well as the issues that confront us as an aging society.

GRNT 462-3. Sociology of Aging.
Examination of the aging process in American society. Focus on development from late adolescence through old age and death. Meets with SOC 462.

GRNT 463-3. Psychology of Aging.
An overview of gero-psychology covering such topics as the aging central nervous system, cultural contexts of aging, personal transitions in later life, mental disorders, and gero-psychology in the future. Prer., PSY 100. Meets with PSY 351.

GRNT 498-1 to 6. Professional Field Experience in Gerontology.
Designed learning experiences involving application of specific, relevant concepts and skills in supervised Gerontology related employment situations. (Pass/Fail grading only). Prer., GRNT 300 and consent of instructor. Sign up for no more than 3 credits per semester.

GRNT 940-1 to 6. Independent Study in Gerontology: Undergraduate.
Hours and credits to be arranged. Prer., Consent of instructor required.

History

HIST 101-3. The Ancient World.
A survey of major political, economic, religious, and social themes of the ancient world, from the beginnings of civilization in the Near East to the end of the Roman empire in the West. Students will read a selection of original sources.

HIST 102-3. Medieval World.
A survey of major political, economic, religious and social developments in

Europe from the end of the Roman Empire to 1500. This also includes a brief examination of the rise of Islam and the survival of Byzantium. Students will read a selection of original sources.

HIST 103-3. The Rise of Modern Europe, 1500-1815.
A survey of major political, economic, social, and cultural developments from the Reformation through the era of the French revolution. Students will read a selection of original sources.

HIST 104-3. Modern Europe, 1815-Present.
A survey of major political, economic, social, and cultural developments from the fall of Napoleon until today. Students will read a selection of original sources.

HIST 111-3. Asian History: Southeast Asia.
A survey of Southeast Asian society, culture, politics and economy, from early Southeast Asian civilizations to the present.

HIST 112-3. Asian History: The Indian Subcontinent.
Survey of South Asian society, culture, politics and economy, from the birth of Indian civilization to the present.

HIST 113-3. Asian History: China.
The evolution of Chinese society, economy, culture and political systems from the birth of Chinese civilization to the present.

HIST 114-3. Asian History: Japan.
A survey of Japanese society, culture, politics and economy, from the birth of Japanese civilization to the present.

HIST 121-3. History of the Middle East.
A survey course covering the history of the Middle East. Special attention will be given to the birth of Islam; the Ottoman empire; European imperialism; the birth of Israel; the Six-Day War; the Camp David accords; the tragedy of Lebanon; the Irani revolution; the Gulf War; and steps for peace.

HIST 140-3. Latin America to 1810.
Survey of the political, social and economic development of Latin America from pre-Columbian beginnings to 1810.

HIST 141-3. Latin America to 1810.
Survey of the political, social, and economic development of Latin America since 1810.

HIST 151-3. US: Birth of a Nation, 1607-1789.
Survey of the development of the US from the colonial period through the ratification of the Constitution, with emphasis on causes, events, and results of the American Revolution.

HIST 152-3. US: Expansion and Division, 1789-1877.
Survey of the major issues related to interpretation of the Jeffersonian and Jacksonian eras with emphasis on the challenges derived from westward expansion and the social, economic, and political factors contributing to disunion and civil war.

HIST 153-3. US: Emergence of Modern America, 1865-1920.
Survey of the economic, social and political development of industrial America from the reconstruction through World War I.

HIST 154-3. US: Recent America, 1918-Present.
Survey of America's social, political, economic and cultural history during the time the U.S. has been a world power. The roots of contemporary society, with emphasis on the emergence of a multicultural America.

HIST 300-1 to 3. Special Topics.
These courses are usually taught on a one-time basis. The subject matter will change from year to year and will cover an important but rarely taught subject in history. Students may take this course more than once.

HIST 304-3. Sex, Marriage, Death in Pre-Industrial Europe.
Examines the life cycles of Europeans in the pre-industrial period (before c. 1750) through analysis of the theory and practice of procreation, child-rearing, marriage, and death.

HIST 310-3. Great Thinkers of Europe.
An examination of the major currents of recent thought. Thinkers to include some of the following: Freud, Weber, Lenin, Virginia Woolf, Buber, Brecht, Sartre, and Benn.

HIST 311-3. Great Thinkers of Europe: The Nineteenth Century.
Following an introduction to the major trends and movements of nineteenth-century European thought, this course will acquaint students with some of the period's most significant and influential works. Readings will be selected from among such authors as Sir Walter Scott, George Sand, the Brothers Grimm, Marx and Engels, John Stuart Mill, and Ibsen.

HIST 323-3. Fascism and the Holocaust.
An analysis of Nazi Germany's policy of genocide against the Jews in the context of European fascism of the 1920s, 1930s, and 1940s.

HIST 325-3. Germans and the Holocaust.
An analysis of Germans and the Holocaust from several perspectives: the development of German anti- Semitism; the identity of German Jews; genocide as perpetrated by the Third Reich; subsequent efforts of atonement, commemoration.

HIST 335-3. Germany, 1763 to 1866.
An examination of major developments of German politics, society, economic life and culture from the end of the Seven Years War to the Austro-Prussian War. Special attention to nationalism and the emergence of national literature.

HIST 336-3. Germany since 1866.
An examination of major developments of German politics, society, economic life and culture from the end the Austro-Prussian War to today. Inclusion of some German literature.

HIST 337-3. Hitler and German National Socialism.
An examination of the Nazi leader in terms of the historical situation in which he attained power, his historical significance generally and the policy of genocide for which he was responsible. Some use of psycho-historical approach.

HIST 338-3. Germany Since 1945.
An analysis of German politics, economics, society, and culture since the end of World War II.

HIST 342-3. Medieval England.
A survey of the early formation of the English nation, from the coming of the

Anglo-Saxons to c. 1500. The focus will be on major economic, political and religious trends as seen through a variety of original sources.

HIST 344-3. Tudor-Stuart England.
Traces the creation and maintenance of the Tudor state in the 16th century and its dismantlement during the revolutions of the 17th century. The emphasis will be on political, social, and economic structures as seen through a variety of original sources.

HIST 346-3. Early Modern England.
Survey of early Modern English history from 1688 to 1830 with an emphasis on political and economic developments and their impact on social structure.

HIST 349-3. History of Ireland.
Traces developments in Irish history since the 1100's, the century in which Ireland's stormy relationship with Great Britain began. Special emphasis will be placed upon that relationship, but the course will also examine the various social groups that coincided Irish society and their relationships with each other. Irish culture in its many facets will be examined through the study of various works of literature interspersed throughout the course.

HIST 350-3. Chicano History to 1910.
A panoramic sketch of Chicano history to about 1910. This course integrates events, ideas and personalities from both sides of the border to illuminate the evolution of Spanish-speaking people of the American Southwest. Meets with EST 350.

HIST 351-3. Chicano History Since 1910.
A broad sketch of Chicano history since 1910. This course integrates events, ideas, and personalities from both sides of the border to illuminate the evolution of Spanish-speaking people of the American Southwest.

HIST 353-3. Religion and Culture in America, 1500-1865.
Close study using primary and secondary texts of the religious cultures of America from Native American origins to the Civil War.

HIST 354-3. Religion and Culture in the U.S., 1865-2000.
Seminar discussions of the mutual influences of American religion and American culture from the Civil War to the present.

HIST 360-3. The 1960s.
Examines the social, political and cultural changes arising in the turbulent years of the 1960's. Special attention will be given to the Civil Rights Movement, the domestic aspects of the Vietnam War, and challenges to traditional culture and values.

HIST 372-3. "From Slavery to Freedom": Slavery and the African-American Experience in Colonial and Antebellum America.
Introduces students to the major political, social and cultural developments in the history of African Americans from 1619 through Reconstruction.

Meets with EST 372.

HIST 386-3. Popular Culture in 20th Century America.
How do Americans live, relax, and entertain themselves? The answer involves high culture but also popular culture. Over the course of the century, pop culture forces such as the rise of the auto, advertising, the sexual revolution, radio, TV, movies and music from jazz to rock have transformed modern American civilization.

HIST 389-3. History of Colonial India.
A history of India that details the colonization of South Asia. Topics of special attention are British imperialism, rebellions against British control, and the Indian struggle for freedom and independence.

HIST 394-3. Theory and Methods in History.
Seminar discussions and presentations emphasizing research skills and methods in history. Students should take prior to or along with Senior Thesis Seminar, HIST 499.

HIST 411-3. Early Medieval Europe.
Scope of course: 3rd century through 10th century. Themes covered will be Christianization of the Roman Empire, the transformation of the Western Empire into European feudal kingdoms, and the survival of the Eastern Empire.

HIST 412-3. The Twelfth Century Renaissance.
Scope of the course: 11th century through the 13th century. Themes covered will be political, social, religious, and economic developments that shaped Medieval Europe into a unique civilization.

HIST 421-3. History of Christianity: Primitive Church to circa 300.
An exploration of primitive Christianity through its immediate Judaic and Hellenistic roots, to include extended historical and literary discussion of the literature of the New Testament and an analysis of the historical Jesus. Meets with REST 421.

HIST 422-3. History of Christianity: circa 300 to circa 1500.
A history of the Christian church in the West from its acceptance as a legal religion in the 4th century to the eve of its breakup at the Reformation. The focus is especially on theological, organizational, and heretical developments. Meets with REST 422.

HIST 423-3. Renaissance/Late Middle Ages.
A survey of the major political, economic, and social developments in Western Europe from the early 14th through the early 16th century. Included will be the expansion of Europe, notably of Spain and Portugal.

HIST 424-3. The Reformation and Counter-Reformation.
A survey of Europe from the early 16th century through the mid-17th century from Martin Luther through the Thirty Years War. Emphasis will be given to religious themes and their relation to politics, economics and society. Meets with REST 424.

HIST 426-3. Europe in the Age of Enlightenment.
An examination of the eighteenth century, with special emphasis on the enlightenment and popular culture.

HIST 429-3. Europe and the World: 1492-1750.
Europe's relations with major portions of the world with focus on factors that contributed to Europe's dominance over much of the world before the Age of Imperialism.

HIST 449-3. Europe Between the World Wars.
An analysis of the major trends and developments of European politics, society, economics, and culture between the world wars.

HIST 451-3. The American Revolution: The Forging of the Union, 1763-1789.
A comprehensive survey of the social, political, economic and intellectual transformations in America during the revolutionary era. The focus will be on the causes of the war, the war itself, the consequences of independence and the ratification of the constitution.

HIST 453-3. History of the US Civil War.

HIST 454-3. American Religious Cultures 1945-2000.
Intensive research seminar focusing on primary texts of recent American religions from Cold War Protestantism to New Age Buddhism.

HIST 458-3. The American West.
A continuation of the study of the westward movement extended to the region beyond the Mississippi, beginning with the Spanish exploration and continuing through the end of the 19th century. Emphasis on the association of Western interests with those of a rapidly developing industrial society in the east.

HIST 469-3. Colorado History.
A history of Colorado from prehistoric Indians to nuclear projects. Topics covered will include exploration and conquest, the mountain men, settlement and pioneer life, Indians, mining, economic and political developments, exploitation and preservation of the environment, and recent trends.

HIST 472-3.
American Policy in the Pacific.
HIST 473-3. Early China. A history of China from archaeological origins through the Imperial Ages, the Mongol years to the final dynastic era - the Qing. Special attention focuses on early philosophic ideals, aspects of unity and disunity, as well as social, political and economic events.

HIST 474-3. Modern China.
An examination of the fall of the Imperial dynastic system and the rise of new political ideas of governance includ ing republicanism, and communism. Important topics include: the 1911 revolution, the warlord years, the creation of the nationalist and Communist parties, WWII in Asia and the rise and fall of Mao Zedong.

HIST 475-3. Modern Japan.
Included in this semester will be a study of Japan's contact with the West, the Meiji Restoration and the creation of a modern nation, the expansion of the empire, and the rise of militarism and World War II. The course concludes with the postwar occupation and recovery of Japan.

HIST 476-3. Shoguns of Japan.
Course begins with the establishment of the first military feudal regime in 1185 and ends with the "restoration" of imperial rule in 1868. Included is an examination of the political, cultural, economic, and social aspects of each of the three Shoguns that comprise the era of the Shoguns in Japan.

HIST 477-3. Vietnam Wars.

HIST 478-3. History of Modern Southeast Asia.
The countries of Malaysia, Indonesia, the Philippines Singapore, Thailand, Laos, Cambodia and Vietnam in 19th and 20th centuries. Students will consider religious, social, economic and revolutionary trends prior to independence and then look at the problems of post colonial independence from a regional point of view.

HIST 479-3. The American Military Experience.
An objective examination of the military history of the United States from the colonial period to the present. Significant battles and campaigns are carefully analyzed, but equal attention is given to cause and effect relationships of America's wars in a national and global context.

HIST 485-3. War and Society: 20th Century U.S.

HIST 489-3. Environmental History: the West and the World.
A seminar dealing with global environmental history, with particular emphasis being given to the environmental history of the American West.

HIST 490-3. Creators of Mathematics: A Historical View.
Prer., I D 105. Meets with I D 445 and I D 545.

HIST 499-3. Senior Thesis Seminar: Approaches to the Study of History.
A required course for the history degree. The focus is on research methods, organization of ideas, analysis of evidence, and writing history. Under the direction of a faculty member, each member of the seminar will prepare an original piece of research: the Senior thesis. Prer., Junior or Senior status.

HIST 600-3. Historiography.
Introduction to the professional study of history. Required of all graduate students.

HIST 611-3. Readings in Medieval European History.
This graduate course analyzes the major secondary literature and historical interpretations in Medieval history, from c. 300 to c. 1300 A.D. Prer., Graduate status.

HIST 615-3. Reading in the Renaissance and Late Medieval Europe.
This graduate course analyzes the major secondary literature and historical interpretations in the Renaissance and late Medieval Europe, from c. 1300 to c. 1500 A.D. Prer., Graduate status.

HIST 622-3. Readings in the Reformation and Counter Reformation.
This graduate course analyzes the major secondary literature and historical interpretation in the era of the Reformation and the Counter-Reformation, from c. 1500 to c. 1648 A.D. Prer., Graduate status.

HIST 625-3.Readings in the Old Regime, 1648 to 1789.
Graduate-level readings in a period of European history. Prer., Admission to program or permission of instructor.

HIST 631-3. Readings in the Age of Revolution 1789 to 1870.
Graduate-level readings in a period of European history. Prer., Admission to program or permission of instructor.

HIST 635-3. Readings in Modern Europe, 1870 to the Present.
Graduate-level readings in a period of European history. Prer., Admission to program or permission of instructor.

HIST 651-3. Readings in US History, 1765 to 1815.
A graduate reading course designed to familiarize graduate students with the historiography of the American Revolution and the early national period. Students will read major works by past masters as well as current historiography.

HIST 661-3. Readings: US, 1815 to 1876.
Graduate level readings in the major historiographic problems of the early nineteenth century through the Civil War and Reconstruction. Prer., Graduate status in history.

HIST 666-3. Readings in US History: Emergence of Modern America.
Extensive reading of modern historians in the political, economic, social, and cultural history of the US during the period of the emergence of industrialized America. Prer., Graduate status.

HIST 669-3. Special Topics.

HIST 671-3. Readings in US History: The Super Power Era, 1918-Present.
Extensive reading of modern historians in the political, economic, social, and cultural history of the US during the period of America as a world superpower. Prer., Graduate status.

HIST 676-3. Readings in the Trans-Mississippi-West.
A graduate seminar designed to provide an in-depth understanding of the role of the trans-Mississippi American West in the history of the United States.

HIST 679-3. Readings in Latin American History.
Provides students with a broad introduction to the major themes in Latin American history. Indigenous cultures, colonial history, the emergence of nations in the nineteenth century and revolutions of the twentieth century will be covered.

HIST 681-3. Reading in the Indian Subcontinent Since 1556.
Graduate seminar designed to provide an in-depth knowledge of South Asia since the advent of the Mughal Empire.

HIST 686-3. Readings in the Pacific Rim Since 1600.
Graduate seminar designed to provide an in-depth knowledge of East Asia since 1600.

HIST 688-3. Special Topics.
A readings or research seminar in a particular field not covered in regular graduate courses. Prer., Permission of instructor.

HIST 711-3. Research in Medieval European History.
Graduate level research and preparation of a scholarly paper, using primary sources, in Medieval history. Prer., HIST 611.

HIST 715-3. Research in Renaissance and Late Medieval Europe.
Graduate level research and preparation of scholarly paper, using primary sources, in the Renaissance and late Medieval Europe. Prer., HIST 615.

HIST 722-3. Research in the Reformation and Counter-Reformation.
Graduate level research and preparation of a scholarly paper, using primary sources, in the Reformation and Counter-Reformation. Prer., HIST 621.

HIST 725-3. Research in the Old Regime, 1648 to 1789.
Graduate-level research in a period of European history. Prer., HIST 625.

HIST 731-3. Research in the Age of Revolution, 1789 to 1870.
Graduate-level research in a period of European history. Prer., HIST 631.

HIST 735-3. Research in Modern Europe, 1870 to Present.
Graduate-level research in a period of European history. Prer., HIST 635.

HIST 751-3. Research in US History, 1765-1815.
This is a course in primary research in Revolutionary America. Prer., HIST 651.

HIST 761-3. Research in US History: 1815 to 1877.
This is a course in research for MA students. Students will be required to use primary sources in American history (1815/1877).

HIST 766-3. Research in US History: The Super Power Era, 1918 to Present.
Graduate level research in modern American history. Prer., HIST 666.

HIST 771-3. Research in US History: The Super Power Era, 1918 to Present.
Graduate level research in modern American history. Prer., HIST 671.

HIST 776-3. Research in the Trans-Mississippi West.
A graduate seminar in which students will research and write a term paper on a specialized topic in the history of the trans-Mississippi American west. Prer., HIST 676.

HIST 779-3. Research in Latin American History.
Students will engage in primary source research of a topic of their choice within the field of Latin American History. Graduate students only. Prer., HIST 679.

HIST 781-3. Research in the Indian Subcontinent Since 1556.
A graduate seminar in which the students will research and write a term paper on a specialized topic in South Asian history. Prer., HIST 681.

HIST 940-1 to 3. Independent Study in History: Undergraduate.
Prer., Consent of instructor.

HIST 960-1 to 3. Independent Study in History: Graduate.
Prer., Instructor consent.

HUMANITIES

HUM 303-3. Humanities: 1848, The Rise of Modernity.
A year of political, industrial, artistic, and technological revolutions, 1848 is studied from such perspectives as Dickens' Hard Times, Dumas' Camille, the Realism of Courbet, the rise of the women's movement, the Communist Manifesto, and other visual, literary, and aural texts. The theme is the rise of modernity. Prer., ENGL 141 or equivalent.

HUM 311-3. Film, Technology, and Culture.
A study of film as a cultural medium through which people express anxieties and hopes, vent critical reactions against social norms and modes of behavior, and reflect on possible changes. Prer., ENGL 141 or equiv and Junior standing.

HUM 313-3. The Baroque.
This is an interdisciplinary course focusing on world art and culture of the Baroque period. Issues and themes include the impact of political and religious absolutism, and the rise of modern science on theatre, literature, art, and music. Prer., ENGL 141 or equivalent.

HUM 314-3. Mythologies.
An examination of myths central to varying cultures and epochs as they are represented in different fields; including music, art, literature, philosophy, film, politics, history, psychology, and popular culture.

HUM 317-3. Minority Voices.
The voices which celebrate positions and oppositions in race, class, gender, culture and sexual orientation. Selected literature, film, and artistic musical and historical documents. Analysis of social, political, and ethical concerns.

HUM 399-3. Special Topics in Humanities.
The topic will vary by semester and a specific course may be cross-listed with a course in another department. Students should check each semester's Schedule of Courses for specific topics.

HUM 940-1. Independent Study.
Independent Study in Humanities is set aside for those students needing one credit hour in Humanities to satisfy the General Humanities Requirement. Permission of Director of Humanities is required. Prer., Permission of Director of Humanities.

Interdepartmental Studies

I D 101-3. Freshman Seminar.
A three-credit interdisciplinary learning experience to help freshmen succeed in college. Students refine their skills in speaking, writing, teamwork, and technology; examine a topic based on the fundamentals of various disciplines; and work closely with faculty and peers. The course emphasizes faculty coaching, collaborative learning, and campus resources through a variety of assignments, such as electronic journals, PowerPoint oral presentations, and an "Internet Career Journey."

I D 103-3. Fundamentals of Written/Oral Communication.
Fundamentals of written and oral communication necessary for undergraduate academic success. The course focuses on three related components: strategies for writing expository essays; basic conventions of standard written English and oral communication competency. Enrolled students are participants in the pre-collegiate program at UCCS.

I D 105-3. Quantitative and Qualitative Reasoning Skills.
Designed to bring all incoming students up to a minimum competency in quantitative and qualitative skills. It includes such topics as arithmetic skills, graphing, statistics, problem solving skills, and algebraic skills. The exit exam from this course is identical to the proficiency exam which must be passed by all LAS students prior to graduation.

I D 200-3. Mathematics: A Human Endeavor.
An introductory course in mathematics as a liberal art. Designed to demonstrate the beauty of mathematics, its methods and its place in human endeavors. Recommended for those who like the subject and for those who think they don't.

I D 205-3. Beyond the Finite.
Shows how infinity, which plays a key role in mathematics and many other areas of human endeavor, appears in arithmetic, geometry, and foundations of analysis. Just as every intelligent person needs at least some acquaintance with discoveries of Einstein and Freud, one needs exposure to the George Cantor's discovery of the infinite. Strongly recommended for natural science, math and math education majors, but expected to benefit everyone.

I D 301-1 to 3. Transition Seminar.
Specifically designed for first-semester transfer students, this course helps students integrate into the UCCS campus community; refine speaking, writing, and technology skills through project-based learning; cultivate critical research competence; and explore academic and career options. Each semester, a topic is investigated according to three broad academic perspectives. Prer., Not open to students who have taken I D 101.

I D 366-3. Service Learning: Theory and Practice.
Combines theory with practical application; includes reading assignments, discussion, and a service learning project. Prer., Sophomore standing or consent of instructor.

I D 410-1 to 3. A Sense of Place.
Focuses on the character of a particular place. An understanding of these places will be accomplished through an analysis of selected aspects such as history, culture, literature, art and geography.

I D 445-3. Creators of Mathematics.
An introduction to the history of mathematics and its creators. Traces the lives and works of the greatest mathematicians of all time. Explores discovery of new ideas. Designed for math, math education, and history majors but may also be a valuable experience for science and art majors. Meets with I D 545 and HIST 490.

I D 446-3. Emergence of Graph Theory: A Historical Exploration of a Mathematical Theory.
Explores the emergence of Graph Theory through its history. Studies original pioneering papers and their creators. A valuable elective for math., math., ed., history, physics and other majors. Prer., I D 105 or consent of instructor. Meets with I D 546.

I D 450-3. A Serious Course in Recreational Mathematics.
An exciting, unique introduction to mathematics through the study of mathematical games, puzzles and competition with emphasis on the beauty, elegance, paradoxy, and ingenuity of mathematical ideas. As part of the course, students and instructor will organize the annual Colorado Mathematical Olympiad for Junior and Senior high school students. Meets with I D 550.

I D 480-3. What is Mathematics?
Demonstrates how mathematicians create new results in mathematics; how problems of high school geometry lead to open problems-to mathematical frontiers; how several areas of mathematics join together to solve a problem. Invaluable for math majors and math teachers but may be of understanding of mathematics.

Prer., High school algebra or ID 105 and high school geometry. Meets with I D 580.

I D 485-3. Geometric Insight in Combinatorial Mathematics.
Geometric insight is a strikingly beautiful tool in mathematics. It demonstrates the power of visualization, experimentation, and imagination in combinatorial

mathematics. Designed for math, math education, and natural science majors, but may be taken by anyone who enjoys mathematics. Prer., High school geometry.

I D 490-3. Mathematical Coloring.
Shows how coloring can solve mathematical problems; traces ideas of coloring through geometry, combinatorics, number theory, and other areas of mathematics. Allows students to visit a "studio of a mathematician." Invaluable for math majors and math teachers as well as science majors. Prer., High school geometry. Meets with I D 590.

I D 499-6 to 12. Argonne Semester.
Students apply to Argonne National Laboratories during their Junior year for acceptance into the long- standing Argonne Scientific research program for undergraduates. Prer., Acceptance by the Argonne National Laboratory and approval by the dean of the college.

I D 545-3. Creators of Mathematics: A Historic View.
An introduction to the history of mathematics and its creators, the greatest mathematicians of all time, their lives and their works, through birth and discovery of new ideas. Prer., I D 105. Meets with I D 445 and HIST 490.

I D 546-3. Emergence of Graph Theory: A Historical Exploration of a Mathematical Theory.
Explores the emergence of Graph Theory through its history. Studies original pioneering papers and their creators. A valuable elective for math., math. ed., history, physics and other majors. Prer., I D 105 or consent of instructor. Meets with I D 446.

I D 550-3. A Serious Course in Recreational Mathematics.
An introduction to mathematics through the study of mathematical games, puzzles, and competitions with the emphasis on the beauty, elegance, paradoxy, and ingenuity of mathematical ideas. As a part of the course, students and instructor may participate in organizing the Colorado Mathematical Olympiad. Prer., I D 105 or consent of instructor. Meets with I D 450.

I D 580-3. What is Mathematics?
Demonstrates how mathematicians create new results in mathematics; how problems of high school geometry lead to open problems-to mathematical frontiers; how several areas of mathematics join together to solve a problem. Invaluable for math majors and math teachers buy may be of interest to science majors or others who wish to have a better understanding of mathematics. Prer., High school algebra or I D 105 and high school geometry. Meets with I D 480.

I D 585-3. Geometric Insight in Combinatorial Math.
Geometric insight is a strikingly beautiful tool in mathematics. It demonstrates the power of visualization, experimentation, and imagination in combinatorial mathematics. Designed for math, math education, and natural science majors, but may be taken by anyone who enjoys mathematics. Prer., High school geometry.

I D 590-3. Mathematical Coloring.
Shows how coloring can solve mathematical problems; traces ideas of coloring through geometry, combinatorics, number theory, and other areas of mathematics. Allows students to visit a "studio of a mathematician." Invaluable for math majors and math teachers as well as science majors. Prer., High school geometry. Meets with I D 490.

I D 940-1 to 3. Independent Study: Undergraduate.
Independent study in interdepartmental studies (Upper Division).

JOURNALISM

JOUR 100-3. Contemporary Mass Media.
Examines the mass media and their interaction with society, looking at journalism and the mass media in historical, intellectual, political, and social contexts. Meets with COMM 100.

JOUR 290-3. Writing for the Media.
Fundamentals of new gathering and writing news story forms. Assignments include reportorial work for campus publications. Meets with COMM 290.

JOUR 666-3. Media Ethics.
Selected topics in the area of journalistic ethics and issues. Students examine current theory and practice in journalism and apply these concepts to simulated communications problems. Topics vary each semester; examples include media ethics and social problems from cases in advertising, news and entertainment programming.

JAPANESE

JPNS 101-5. Beginning Japanese I.
Skills in listening to and speaking Japanese. Emphasis on useful expressions with cultural orientation. Hiragana and Katakana.

JPNS 102-5. Beginning Japanese II.
Continued skills in listening to and speaking Japanese. Reading and writing intensified with further study of Hiragana and basic Kanji. Prer., JPNS 101 or its equivalency.

JPNS 211-3. Intermediate Japanese I.
Conversational Japanese at the intermediate level. Reading and writing with additional study of Kanji. Prer., JPNS 102 or its equivalency.

JPNS 212-3. Intermediate Japanese II.
Japanese at the advanced intermediate level. Speaking, reading and writing with additional study of Kanji. Prer., JPNS 211 or consent of instructor.

JPNS 320-3. Japanese Culture and Civilization.
Elements of history, culture, art, music and rituals of the Japanese experience. Meets with F CS 310.

JPNS 920-1 to 3. Independent Study in Japanese.
Selected topics in Japanese language, literature and culture. May be offered to meet specific student needs. May be repeated up to three times for credit. Prer., JPNS 102.

JPNS 930-1 to 3. Independent Study in Japanese.
Selected topics in Japanese language, literature and culture. May be offered to meet specific student needs. May be repeated up to three times for credit. Prer., JPNS 211.

LATIN

LAT 101-4. Beginning Latin I.
Essentials of Latin. Elements of grammar, reading and writing.

LAT 102-4. Beginning Latin II.
Continued study of Latin grammar with

expanded reading and writing. Prer., LAT 101 or equivalent.

Military Science

M S 101-1. Fundamental Concepts of Leadership.
An introduction to the fundamentals of leadership. The course helps students be more effective leaders and managers in the future, whether serving in the military or in civilian life. Topics include values, leadership, and "life skills" (communication theory/ practice, interpersonal relationships, and fitness). Students should be prepared to receive more complex leadership instruction by the course end. Lab is required once a week.

M S 102-1. Basic Leadership.
An introduction to the "life skills" of problem solving, decision making, and leadership. The course is designed to help students in the near-term as leaders on and off campus. Topics include critical thinking, problem solving methods, leadership theory, followership, group cohesion, goal setting, and feedback mechanisms. Lessons emphasize student discussions and practical exercises. Lab is required once a week.

M S 201-2. Advanced Leadership.
Course delves into the theoretical and practical leadership topics. Several communication and leadership topics are examined (assertiveness, motivation, written/oral communication, organizational culture, etc.). A major leadership problem solving case study is included. Students will be grounded in fundamental leaderhip principles by course end and be able to apply the principles to future life experiences. Lab is required once a week.

M S 202-2. Tactics and Officership.
Focuses on the practical application of decision making and leadership and examines the roots of national and Army values and ethics. Students will use a case study that traces the Army's successes and failures from the Vietnam War to the present to help them put previous lessons on values, communications, decision making, and leadership in real-work context. Lab is required once a week.

M S 301-3. Fundamentals of Military Leadership and Training I.
Focuses on building leadership competencies and military skills in preparation for a student's future responsibilities as a military leader. Topics include the principles of war, decision- making, planning models, and risk assessment. Advanced leaderhip instruction is on motivational theory, the role and actions of leaders, and organizational communications. Lab is required once a week and physical training is required three times per week.

M S 302-3. Fundamentals of Military Leadership and Training II.
Builds on the skills and knowledge attained in M S 301. Instruction will include individual leader development, planning and execution of small unit operations, individual and team development, and the Army as a career choice. Students should be prepared to attend Advanced Camp at Fort Lewis, Washington the following summer by course completion. Lab is required once a week and physical training is required three times per week.

M S 303-3. Advanced Camp.
Mandatory 5-week practicum conducted at Fort Lewis, WA for all advanced course Army ROTC students. Students are assigned leadership positions at various levels of responsibility, in varied environments and are evaluated on their ability to function within the Army team. Contract Army ROTC students only. Prer., M S 301 and M S 302.

M S 401-3. Military Staff Functions.
Provides the student with an understanding of the U.S. Army staff organizations, the interrelationships of these staffs and their role in support of the commander. Prer., M S 301 and M S 302. Lab is required once a week and physical training is required three times per week.

M S 402-3. Transition to Lieutenant.
Course completes the transition from student to lieutenant. It delves into the legal and ethical aspects of decision making and leadership. Other topics include how the Army organizes for tactical/ strategic operations and how to manage administration and logistics at unit level. The semester will culminate with a major capstone exercise in small unit leadership. Lab is required once a week and physical training is required three times per week.

M S 498-3. Special Studies in Leadership.
Course is for the student participating in the Army ROTC Advanced Course who wants to pursue further studies in the application of leadership principles and group dynamics. This course is by arrangement with the Professor of Military Science only. Students must be Army ROTC Advanced Course participants. Prer., M S 402.

Music

MUS 100-3. Introduction to Music.
Basic knowledge of music literature and development of discriminating listening habits. Concert attendance will be stressed.

MUS 101-3. Music Theory I.
Fundamentals of music, including functional harmony, rhythm, and musical forms. The development of written and aural skills. No prerequisite; Music 103 is recommended as essential companion to theory.

MUS 131-1. University Choir.
Study and performance of choral music. Open to all qualified students. May be repeated three times for a total of 3 hours' credit.

MUS 150-1. Applied Music-Private Instruction.
This instruction is open to all students regardless of musical background. Fourteen 45-minute lessons per semester are offered with the meeting time and place to be arranged with the instructor. All students are required to perform or attend two recitals. Lessons will cover technique, interpretation and musical style.

MUS 201-3. Advanced Music Theory.
Advanced theory is a continuation of MUS 102. Topics include harmonization of a given part, harmonization of an original melody, textured part-writing, chromatic harmonies and harmonic analysis. Prer., MUS 101 or consent of instructor.

MUS 205-3. Introduction to Jazz.
A listener's introduction to the history, literature and aesthetics of American jazz music. Guided listening to recorded and, where possible, live jazz performances.

MUS 210-3. Rock and Roll Music.
This introductory level history and music appreciation course will survey the major musical, social and economic trends in Rock and Roll music from its roots in the popular music of the late 1800's to the present. Students will sharpen their musical analysis skills through listening and active participation.

MUS 225-1. Jazz Ensemble.
Perfomance oriented course of music from the Jazz tradition in the United States. Prer., Prior musical experience. Meets with MUS 205.

MUS 315-3. Introduction to Non-Western Music.
An introduction, from the listener's point of view, to the music of various non-western cultures, including those of Africa, Asia and the Americans. Examination, through recordings, readings, and films, of musical styles and esthetics and the relationships between music and culture.

MUS 375-3. 20th Century Music.
A survey of significant works of music literature in this century. Prer., MUS 101/102 or 185 or consent of instructor.

MUS 385-3. Symphonic Literature.
Orchestral masterpieces from the Baroque period to the present, with emphasis on the 19th century. Concerti will be included. Concert attendance will be stressed.

MUS 493-1 to 3. Advanced Special Topics.
Special topics usually taught on a one time basis. Subjects offered will respond to special interest or rapidly changing topics. Can be taken twice for credit but not more than 6 hours may apply toward graduation. Prer., Basic knowledge of topic.

MUS 495-1 to 3. Special Topics.
Special topics are usually taught on a one-time basis. Subjects offered will respond to special interest or rapidly changing topics.

Political Science

P SC 101-3. Introduction to Global Politics.
Introductory analysis of the contemporary international system and major state and non-state actors in world politics. Considerable attention is given to internal political features and to the problems/perceptions of the various actors that shape their external behavior.

P SC 110-3. The American Political System.
A general introduction to the American political system with emphasis on the inter-relations among the various levels and branches of government, formal and informal political institutions, processes, and behavior. Required of all majors. Not open to those who have had other beginning courses in American government.

P SC 210-3. Politics and Policy in State and Local Communities.
Focuses on regional, state, and local government where politics is face to face and where political decisions regularly affect our daily lives. The political systems that teach children, issue building permits, collect garbage, determine welfare eligibility, operate parks, issue drivers licenses, and enforce traffic rules.

P SC 250-3. Introduction to Political Inquiry.
An introduction to the basic methods and tools of research in political science. Topics will include discussions of the resources available for political research, the study of politics as a science, common techniques of political analysis, the development of research designs, research report writing, and the ethics of political research. The course will be largely experiential, directly involving students in research experiences.

P SC 301-3. Women in Politics.
An examination of the role of women in American politics. Topics will include an historical perspective of women's political activity, the political interests and group activities of women, the legal status of women, political attitudes of and toward women, and women's political behavior. Meets with WMST 301.

P SC 303-3. Political Parties.
Party politics in the United States. Nature, structure, organization, and functions of political parties. Analysis of political behavior.

P SC 305-3. Race and Ethnicity in American Politics.
An examination of the role of U.S. ethinic minority groups in American politics from the perspectives of the groups themselves. Topics will include historical and contemporary perspectives on the political activities, interests and legal status of U.S. ethnic minorities; the relationship of power, race/ethnicity and class in determining the effects of the political system on these groups; and the impact of these groups on the political system. Meets with EST 305.

P SC 311-3. Emerging Nations.
Analysis of third world developmental problems such as lack of economic growth, corruption, military coups, arms sales, international debts, and sustainable development. Approaches to theory are discussed.

P SC 321-3. Western European Political Systems.
Governments and politics of selected countries of contemporary western Europe, with emphasis on Britain, France, Germany and certain others.

P SC 322-3. Eastern European Political Systems.
Government and politics in contemporary political systems of central and eastern Europe, to include the Russian Federation. Development and present status of political economy and foreign policy.

P SC 330-3. The Bureaucrats.
National, state, and local public service career systems in the United States and selected foreign countries. How the bureaucracy makes public policy.

P SC 348-3 to 6. Legislative Internship.
The department places students in legislative internships, usually with state legislators, but Washington internships are possible. Student normally spends 15-20 hours per week working with a legislator or legislating office in the Capitol of Denver. Credit dependent upon hours worked. Prer., 2.8 cum GPA; 45 hrs; consent of instructor.

P SC 398-3 to 6. Intern: Political Science.
The department works with students placed in a public agency (governmental or non-profit agencies). Students spend 12 hours weekly working for the host organization in return for 3 credit hours. Prer., Open to upper division students of good academic record and with consent of the instructor.

P SC 402-3. The American Congress.
A survey of the development, practice, and theory of the contemporary Congress. Particular attention is paid to the origins of lawmaking and institutional change.

P SC 404-3. Political Interest Groups.
Nature, structure, organization, and functions of pressure groups. Analysis of pressure politics.

P SC 406-3. State Political Systems.
National, state, and interstate relations; constitutional development; legislative, executive, and judicial processes and problems; administrative organization and reorganization; state finances; major state services; future of the states. Special attention is given to the government of Colorado.

P SC 407-3. Urban Politics.
Political and social influence in urban areas; selection of urban leadership; relationship of the political system to governmental and social institutions. Meets with P AD 5626.

P SC 408-3. US Electoral Process.
Examines campaigns and voting, as well as the roles of parties interest groups and the media in the electoral process in the United States, with special attention to the legal and institutional context in which US elections take place. Prer., P SC 110.

P SC 413-3. Latin-American Political System.
Governments and politics of selected countries of Latin America. Constitutions and governments in theory and practice. Political parties, movements, and conflicts. The relationships between political problems and physical and social environments. Meets with P SC 514.

P SC 415-3. United States Space Policy.
Examination of historical origins, policy evolution, and future prospects of the US civilian space program. Meets with P SC 515.

P SC 421-3. International Politics.
The system of national states, concepts of national interest, goals of foreign policies, conduct of diplomacy, the role of non-state actors, and the bearing of these elements on the problem of peace. Great powers and regions of the earth in international politics today, their roles in international tensions, and the development of international relations theory. Meets with P SC 521.

P SC 422-3. Comparative Politics.
Advanced course examining and comparing the political process in a broad range of political, economic, and sociocultural environments. Case studies and cross- national analysis of states and non-state actors are utilized to explain and predict political phenomena across a range of states and societies. Prer., P SC 101.

P SC 423-3. The United States in World Politics.
The foundations, assumptions, objectives, and methods of U.S. Foreign policy. The domestic and external problems of adapting U.S. Policy to the changing world environment.

P SC 424-3. Russian Foreign Policy.
Foreign policy of the Russian Federation, its impact on international politics, and its relations to domestic developments.

P SC 425-3. International Law.
A survey of public international law with special emphasis on source of international law and instruments for adjudication as well as on international treaties and the rules of land and sea warfare. Meets with P AD 598 SEC 003.

P SC 426-3. International Organization.
A comparative analysis of governmental and non- governmental international organizations. Special attention is paid to the United Nations and certain regional organizations such as the European community, NATO and the organization of American states.

P SC 427-3. Latin America in World Politics.
Basic elements in Latin American international relations. United States-Latin American relations and policies. Foreign policy formulation in major Latin American republics. Formerly P SC 477. Not open to those who have taken P SC 477.

P SC 428-3. International Political Economy.
Overview of the world political economy, especially in the post-WWII period. The central goal of the course is to provide information and develop analytical tools necessary for students to grasp the political issues inherent in international economic relations.

P SC 432-3. Public Administration.
Role of administration in government; trends in American public administration; problems in organization; techniques of management. Meets with P AD 5001.

P SC 434-3. National Security Organization and Policy Making.
Analysis of the governmental structure and the and the policy-making processes for American national security planning, decision making, and action.

P SC 435-3. Environmental Policies and Administration.
Resources in the American economy; consideration of constitutional, political, and geographic factors in the development of resources policy; organization, procedures, and programs for administration and development of natural resources.

P SC 439-3. The Presidency.
An examination of the historical, functional, constitutional, and political aspects of the presidency. An analytical comparison of the presidency with other executive systems.

P SC 440-3. Government and Society.
Examines the normative and positive theoretical underpinnings of government processes and policies in the United States. Emphasis is placed on the formal theoretical analysis of institutions and policies. Prer., P SC 110.

P SC 442-3. Political Ideas.
Main currents of political thought from ancient times to the present as seen in the writings of political theorists from Plato and Aristotle through Locke, Hobbes, Rousseau, Kropotkin, and Marx to contemporary exponents of ideologies from right to left.

P SC 445-3. American Political Thought.
History and development of American political theories and ideas from colonial period to present.

P SC 446-3. Administrative Law.
General nature of administrative law, types of administrative action and enforcement, analysis of rule-making and adjudication, and administrative due process. Meets with P AD 5240.

P SC 447-3. Introduction to Constitutional Law.
Role of the Supreme Court in development of principles of constitutional law, beginning with the concept of judicial review. Federalism, jurisdiction of the federal courts, separation of powers, the taxing power, the commerce power, the doctrine of implied powers and other principles and doctrines which are relevant to contemporary interpretation of the constitution.

P SC 448-3. The Constitution and Individual Rights.
Nature and scope of American constitutional principles as developed by the U.S. Supreme court, with emphasis on the war power, power of the president, citizenship, the Bill of Rights, and the Civil War amendments.

P SC 449-3. The Judicial System.
Examination of the principal actors in the legal system police, lawyers, judges, citizens and the roles they play in the political process.

P SC 450-3. Senior Research Seminar.
A course designed to directly involve Senior students in political science in major research projects. The emphasis of the course will be on the development by the students of research topics and designs which fit their individual interests. Major papers will be required of all students. Research reports will be presented orally and critiqued in class. Required of all majors.

P SC 451-3. Defendant's Constitutional Rights.
Nature and scope of American constitutional principles as developed by the United States Supreme Court, with emphasis on habeas corpus, search and seizure, grand jury, double jeopardy, self-incrimination, due process of law, speedy and public trial, right to counsel, trial by jury, bail, and cruel and unusual punishment.

P SC 452-3. Model Organization of American States (MOAS).
The course assists and supervises students in the preparation and execution of the Model Organization of American States for Universities (MOAS) in Washington, D.C. Students learn about the role, structure and operation of the MOAS by representing a member-state in the Inter-American system, students gain broad understanding of issues in International Politics and the practice of diplomacy and international organizations. Prer., Application and consent of instructor.

P SC 498-1 to 3. Special Problems in Political Science.
A study of special problems relevant to political science taught by a highly qualified person in the particular problem area. Each semester that the course is offered, a different problem of high impact is studied.

P SC 515-3. United States Space Policy.
Examination of historical origins, policy evolution, and future prospects of the US civilian space program. Meets with P SC 415.

P SC 598-3. Special Topics.
Each semester that the seminar is offered a different area of political science will be the focus of intensive study and analysis.

P SC 940-1 to 3. Independent Study in Political Science.
Intended to give an opportunity for advanced students with good scholastic records and with appropriate courses completed to pursue independently the study of some subject of special interest. Subjects are chosen and arrangements are made to suit the needs of each student. Prer., Senior standing, 15 semester hours of political science and consent of instructor.

P SC 948-3. Prelaw Internship.
Studies are undertaken concerning the practice of law or the administration of justice while the student has full or part-time employment with a law office, court, prosecutor, public defender, administrative hearing officer, or other individual or agency involved with the practice of law or the administration of justice. Prer., Consent of instructor; above average score on LSAT; and Senior status.

Physics and Energy Science

PES 100-3. Physics in Everyday Life.
A non-mathematical overview of physics and how it affects our everyday life. Topics to be included are balancing and equilibrium, tornadoes, weather patterns, shock waves, superconductivity, fiber optics and electron microscopes. Recommended for students with no science or mathematics background. Students needing lab should take PES 114.

PES 101-4. Physics for Life Science I.
General physics with an emphasis on applications to life sciences and health professions. Prer., Two years of high school algebra or equivalent.

PES 102-4. Physics For Life Science II.
General physics with an emphasis on applications to life sciences and health professions. Prer., PES 101.

PES 104-3. Physics in Science Fiction.
A study of the physics that exists in commonly occurring science fiction themes. Topics include a general discussion of conditions for life on other planets, orbital motion, Einstein's theory of relativity, and electromagnetic phenomena.

PES 105-3. General Astronomy I.
The methods and results of modern astronomy (solar systems, stars, galaxies, blackholes, quasars, cosmology) at an elementary level.

PES 106-3. General Astronomy II.
The methods and results of modern astronomy (solar systems, stars, galaxies, blackholes, quasars, cosmology) at an elementary level.

PES 109-1. General Astronomy Laboratory I.
Evening viewing and field trips.

PES 110-1. General Astronomy Laboratory II.
Evening viewing and field trips.

PES 111-4. General Physics I.
Rigorous calculus-level course in classical physics for science and engineering students. Includes measurements, vectors, motion in one dimension, motion

in a place, particle dynamics, work and energy, momentum conservation, rotational dynamics, rigid bodies, oscillation, and gravity. Coreq., MATH 135.

PES 112-4. General Physics II.
Topics covered include electrostatics, the electric field, Gauss's law, electric potential, capacitors and dielectrics, current and resistance, the magnetic field, Ampere's law, Faraday's law, inductance, oscillations, and electromagnetic waves. Prer., PES 111, Coreq., MATH 136.

PES 114-1. Introduction to Physics Laboratory.
Experiments designed to qualitatively verify concepts in mechanics, light, hear and optics. To be taken concurrently with PES 100 only. This lab is not required but must be taken if the student wishes credit for a natural science lab course in the natural science requirements. Open only to PES 100 students.

PES 115-1. General Physics Lab I.
Designed to be taken with PES 111 or PES 101. Experiments on mechanics and graphical analysis of results.

PES 121-3. Introduction to Physical Science.
An integrated presentation of the basic concepts of physics and chemistry for non-science majors. Topics include motion, heat, sound, light, atomic and molecular structure, chemical reactions, acids and bases, and radioactivity. Prer., Two years of high school mathematics. Meets with CHEM 121.

PES 124-1. Physical Science Laboratory.
A laboratory to accompany CHEM/PES 121. Includes experiments on mechanics, heat, sound, light, electricity, chemical reactions, stoichiometry, acid-base chemistry, and reaction kinetics. Meets with CHEM 124.

PES 131-3. A Lab of Her Own — Science and Women.
Introduction to natural science and its methods for non-science majors. It focuses on women's participation in both the formation of scientific concepts and the development of methodology. Modern concepts of science and mathematics with an emphasis on women's contributions to these fields will be presented. This course will also offer a feminist critique of the traditional methods of science. Meets with PHIL 131 and WMST 131.

PES 150-3. Introduction to Energy Science I.
Survey of present and future energy resources and the technology associated with their use. Includes economic and environmental considerations. Meets with ENSC 150.

PES 151-3. Introduction to Energy Science II.
Survey of present and future energy resources and the technology associated with their use. Includes economic and environmental considerations.

PES 160-3. Introductory Solar Energy.
Introduction to the technology of solar heating. Includes experience in practical aspects of solar collection and conversion. Meets with ENSC 160.

PES 162-1. Solar Energy Laboratory.
Course designed to provide practical experience in designing and measuring characteristics of active and passive solar heating systems. Prer., or Coreq., PES 160. Meets with ENSC 162.

PES 213-3. General Physics III.
A continuation of PES 112. Topics covered include fluid mechanics, waves temperature, heat and the first law of thermodynamics, kinetic theory of gases, entropy and the second law of thermodynamics, geometrical optics, interference, diffraction, light, and quantum physics. Prer., PES 112; Coreq., MATH 235.

PES 215-1.Physics Laboratory II.
Radiation physics, electrostatics, AC and AC circuits, magnetic fields. Prer., PES 115.

PES 250-3. Energy Fundamentals.
Energy, work, power, and thermodynamic efficiency. World and U.S. Energy sources, consumption, and policy. Conservation methods. Introduction to long- term energy sources: solar, breeder reactors, thermonuclear fusion, geothermal, and tidal. This survey course is designed for science majors and assumes some knowledge of calculus and the physical sciences. Meets with ENSC 250.

PES 306-3. Astrophysics.
A classic look at stellar characteristics, the structure and content of our galaxy and the universe in a rigorously mathematical fashion. The theory of stellar spectra is stressed along with stellar distances, magnitudes, and stellar evolution on the Hertzsprung-Russell diagram. Prer., PES 213.

PES 313-3. Modern Physics.
Special relativity, development of wave-particle duality, atomic structure, Schroedinger wave equation, the hydrogen atom, atomic and molecular spectra, introduction to the solid state and band theory. Prer., PES 213.

PES 315-2. Modern Physics Laboratory.
Teaches the methods and procedures of experimental physics at an advanced level, including such topics as physical optics, high resolution spectroscopy, and energies of radioactive decay products.

PES 317-2. Instrumentation Laboratory I.
Design and operation of integrated circuits used in the making of computer interfaces. Interfacing computers with real world experiments. Requires a knowledge of BASIC. Prer., PES 215.

PES 318-2. Instrumentation Laboratory II.
Design and operation of integrated circuits used in the making of computer interfaces. Interfacing computers with real world experiments. Requires a knowledge of BASIC. Prer., PES 215.

PES 321-3. Classical Mechanics I.
Newtonian mechanics, oscillations, Lagrange's and Hamilton's equations, central forces, scattering, and rigid body motion. Employs vector analysis and calculus. Prer., PES 213; Prer., or Coreq., MATH 235.

PES 325-3. Mathematical Methods of Physics and Engineering.
Survey of mathematical methods as preparation for advanced physics and engineering courses. Includes vector calculus, partial differential equations, special functions, Fourier analysis, and generalized functions such as the Dirac delta function.

PES 331-3. Principles of Electricity and Magnetism.
Elements of the mathematical theory of electricity and magnetism, including

electrostatics, magnetostatics, polarized media, direct and alternating current theory, and introduction to electromagnetic fields and waves. Prer., PES 213 and MATH 235.

PES 332-3. Principles of Electricity and Magnetism II.
Elements of the mathematical theory of electricity and magnetism, including electrostatics, magnetostatics, polarized media, direct and alternating current theory, and an introduction to electromagnetic fields and waves. Prer., PES 331.

PES 341-3. Thermodynamics and Statistical Mechanics.
Statistical mechanics applied to macroscopic physical systems; statistical thermodynamics; classical thermodynamic systems; applications to simple systems. Relationship of statistical mechanics to thermodynamics. Prer., PES 313.

PES 365-3. Nuclear Physics and Energy Technology.
Nuclear structure, radioisotopes, nuclear reactions, fission, and fusion. Emphasis on nuclear power production and its environmental impact. Prer., PES 313.

PES 367-3. Wind Energy.
A survey of the technology of wind energy conversion, including climatic aspects, site selection and tower height, generator and propeller design, control systems, and legal aspects.

PES 397-1 TO 3. Special Topics.
Course covering subjects of current interest on a one- time basis. See schedule of courses for titles. Prer., PES 313.

PES 415-2. Solid State Laboratory.
Advanced laboratory on the measurement of fundamental properties of solids. Includes introduction to vacuum and cryogenic technologies. One lecture and one laboratory session per week. Prer., PES 215 and 313. Meets with PHYS 515.

PES 416-1. Thin Films Laboratory.
Introduction to thin film deposition and characterization.

Facilities include evaporation, sputtering, Auger electron spectroscopy, ellipsometry and scanning electron microscopy. Coreq., PES 449

PES 425-3. Quantum Mechanics.
A sophisticated treatment of quantum theory for students intending graduate work in physics. Topics included are foundation of wave mechanics, wave pockets and the uncertainty principle, Schroedinger's equations, operators and eigenfunctions, scattering and matrix mechanics. Prer. PES 313.

PES 426-3. Quantum Mechanics II.
A sophisticated treatment of quantum theory for students intending graduate work in physics. Topics included are foundations of wave mechanics, wave pockets and the uncertainty principle, Schroedinger's equation, operators and eigenfunctions, scattering and matrix mechanics. Prer. PES 425.

PES 442-3. Physics of Materials.
An introduction to the physics of materials. Topics will include crystallography and defects, phase diagrams, phase transformations, diffusion, mechanical properties, and electrical properties. Prer., PES 313.

PES 446-3. Solid State Physics.
Theory of solids including crystal structure, x-ray diffraction, phonons, thermal properties of insulators, theories of metals, band structure, semiconductor impurities and doping semiconductors, junctions, superconductivity, and magnetism. Prer., PES 313. Meets with PHYS 546.

PES 448-3. Surface and Interface Physics.
An introduction to the solid state physics of surfaces and interfaces including structural, thermodynamic and electrical properties. Gas-surface interactions and characterization techniques will also be examined. Prer., PES 313.

PES 449-3 to 4. Physics of Thin Films.
A combined lecture/lab course covering common techniques for the production and characterization of thin films and the physics which underlies these methods. Lab equipment includes evaporation, Auger spectroscopy, ellipsometry and scanning electron microscopy. Offered as 3 credit lecture or 4 credits with integrated lab. Prer., PES 313. Meets with PHYS 549.

PES 451-3. Optics.
An advanced undergraduate treatment of topics in geometrical, physical, and quantum optics. Prer., PES 213 and either PES 313 or 331.

PES 472-3. Stellar Structure and Evolution.
Basic stellar astronomy and astrophysics. H-R diagrams. Principles of stellar structure including generation and energy transport. Stellar formation and evolution to compact objects. Prer., PES 306 and PES 341.

PES 481-2. Senior Physics Seminar.
Presentation methods in physics. Students present on a wide variety of topics in physics culminating in a formal presentation by the student on a current research topic. Student is graded by a faculty panel on his/her presentation, defense of topic and general knowledge of physics. Prer., Senior status in physics or consent of instructor.

PES 485-3. Senior Project.
Special experimental or theoretical research project in a field of physics or physics-related energy science. Project to be chosen in conjunction with instructor and should represent a new contribution to knowledge in the field, or a repetition of current experimental research, or a literature search and demonstrated knowledge of current theoretical research. A written report is required. Prer., Senior status in department and permission of instructor.

PES 930-1 to 3. Independent Study for Physics, Undergraduate.
Prer., Consent of instructor.

PHILOSOPHY

PHIL 100-3. Introduction to Philosophy.
An introduction to the fundamental questions of philosophy through a study of several major philosophers in the history of philosophy.

PHIL 102-3. Ethics.
Introductory study of major philosophies on the nature of the good for humans, principles of evaluation, and moral choice. Some attention is given to contemporary topics such as violence and abortion.

PHIL 104-3. Philosophy and Society.
Critical introduction to ideas and values used to justify key institutions of advanced technological society.

PHIL 105-3. Philosophy and Religion.
An introduction to philosophy through religious topics such as sacredness, faith, reason, revelation, creation, immortality, and God's existence.

PHIL 110-3. Introduction to Religious Studies.
An introduction to the study of religious phenomena such as myth, symbols and rituals as they relate to religious beliefs. The concepts of sacred narratives, sacred histories, and religious experiences will be discussed along with different approaches (e.g., psychological, sociological, anthropological) to the study of religion.

PHIL 112-3. Critical Thinking.
Introduction to the formal and informal standards and critical techniques used in the evaluation of daily reasoning and argument.

PHIL 115-3. Ethics in the Professions.
An examination of the applicability of some standard ethical theories to the specific moral issues raised by and encountered in the practice of professions such as business, engineering, law, health care, politics, and teaching.

PHIL 131-3. A Lab of Her Own — Science and Women.
An introduction to natural science and its methods for non-science majors. It focuses on women's participation in both the formation of scientific concepts and the development of methodology. Modern concepts of science and mathematics with an emphasis on women's contributions to these fields will be presented. This course will offer a feminist critique of the traditional methods of science. Meets with PES 131 and WMST 131.

PHIL 220-3. Women's Equality, Women's Difference.
An introductory course that presents both the history of philosophical treatments of women and contemporary philosophical analyses of women's social, political, artistic, scientific, and philosophical roles. Meets with WMST 220.

PHIL 255-3. Women and Religion.
A study of the philosophical issues pertinent to women and religion from the ancient to the modern world.

PHIL 310-3. Comparative Religions.
A reading-discussion course which explores the major world religions and the nature of their appeal to the spiritual aspirations of members of the human family.

PHIL 316-3. Philosophical Issues in Death and Dying.
The meaning of death and dying in the history of Western philosophy from antiquity to contemporary Existentialism. Detailed examination of ethical issues raised in the care of the dying. Euthanasia and termination of treatment, care of the seriously ill newborn, etc.

PHIL 317-3. Theories of Knowledge.
Consideration of the classical and contemporary, contributions to the analysis of the nature, limits, and conditions of knowledge. Meets with PHIL 518.

PHIL 320-3. Politics and the Law.
Examination of the most influential recent works expressing the conservative, liberal, Marxist and anarchist contributions to contemporary social and political theory.

PHIL 322-3. Philosophy of Law.
A consideration of various views of the nature of law, its role in society and its relation to other disciplines. Examination of the philosophic commitments that underlie and affect legal convention and procedures. Meets with PHIL 526.

PHIL 330-3. Philosophy of Mind.
Consideration of the central problems in the philosophy of mind, including the mind-body problem; the knowledge of other minds; free will and determinism; as well as discussion of concepts such as action, intention, motive, desire, memory, etc.

PHIL 335-3. Metaphysics.
Traditional and contemporary theories of the basic categories used to describe reality and the human relationship to it, including concepts such as substance, identity, space and time, causality, determination, and systematic ontology. Prer., three hours of philosophy.

PHIL 339-3. Philosophy of Psychology.
Course covers classical and contemporary discussions of philosophical issues raised by psychological theory. Issues include introspectionism (James), psychoanalytical models of the self (Freud, Horney), learning theory (Piaget), depth psychology (Jung), behaviorism (Skinner), feminist psychology (Chodorow, Gilligan), cognitive science, psychology and language (Lacan), and existential psychology (Merleau- Ponty).

PHIL 340-3. Holocaust.
Detailed analysis of the holocaust and its educational importance. Main focus is the Jewish holocaust with attendant eugenic policies, with possible attention to other examples of holocaust. Examination of philosophies that support organized social violence and principles that achieve a humane philosophy of life.

PHIL 344-3. Symbolic Logic.
An exposition of the ideas and techniques of modern symbolic logic including several formal systems to distinguish between valid and invalid arguments and discussion of the foundations of arithmetic and set theory. Meets with PHIL 544.

PHIL 348-3. History of Philosophy: Philosophies of India.
Historical development and a critical analysis of the major philosophical texts and school of India, including the Vedas, Upanishads, and Bhagavad-Gita; the 6 orthodox schools; Jainism; Buddhism; and modern Indian thinkers including Gandhi and Radhakrishnan. Meets with REST 348.

PHIL 349-3. History of Philosophy: China.
Historical development and critical analysis of the major philosophical schools and texts of China, including Confucianism, Taoism, Ch'an (Zen) Buddhism, Neo-Confucianism and modern Chinese thought. Meets with REST 349.

PHIL 350-3. Buddhist Philosophy.
General survey of key Buddhist philosophical concepts of both the Theravada and Mahayana traditions, such as dukha, nirvana, anatman and voidness. The relationship between Pali Sutta's and the Theravada tradition will be discussed as well as the relationship between Mahayana and the Prajna Paramita Suttas. Key schools of Mahayana, such as Cittamattra and Madhyamaka will also be introduced. Meets with REST 350.

PHIL 351-3. History of Philosophy: Ancient.
Systematic examination of the development of western philosophy from its inception among the pre-Socratics through Socrates to Plato and Aristotle.

PHIL 353-3. History of Philosophy: Hellenistic.
History of Western Philosophy during the Hellenistic period (c. 310 B.C.E. To 450 C.E.). Covers Stoicism, Epicureanism, Skepticism, Atomism, neo-Platonism and the introduction of Jewish and Christian thought into philosophy via Philo of Alexandria and St. Augustine, respectively.

PHIL 354-3. History of Philosophy: Medieval and Renaissance.
History of Western Philosophy from the Medieval period to the beginning of modern times. Course covers Christian, Jewish and Islamic philosophers, including Augustine, Anselm, Avicenna, Averroes, Maimonides, Aquinas, Ockham, Machiavelli, and F. Bacon. Meets with REST 354.

PHIL 356-3. History of Philosophy: Modern Classical.
Systematic examination of some fundamental philosophic problems treated by Rationalists and Empiricists in the 17th and 18th centuries (Hobbes, Descartes, Locke Spinoza, Leibniz, Berkeley, Hume), especially those concerning the foundations and limits of knowledge and attempts to overcome the limitations of these two traditions.

PHIL 357-3. History of Philosophy: Kant and the Enlightenment.
Study of the Enlightenment (Age of Reason) with special emphasis on Kant's work and some of his precursors and critics.

PHIL 358-3. History of Philosophy: From Hegel to Nietzsche.
In-depth survey of some of the major thinkers in the 19th century such as hegel, marx, kierkegaard, and Nietzsche.

PHIL 360-3. Philosophy of Religion.
Detailed analysis of religious experience from Eastern and Western traditions, including mysticism, mythology, cosmology, knowledge of God and the divine attributes, salvation, immortality, and the influence of secularism.

PHIL 361-3. Philosophical Approaches to the Hebrew Bible.
The formation of the Old Testament; manuscript traditions and canonization; an investigation of the major genres within the Old Testament (history, poetry, prophecy); the historical developments of the ancient Near East as they reflect upon the Old Testament and the history of biblical interpretation.

PHIL 362-3. Philosophical Approaches to the New Testament.
An investigation of the development of the New Testament, incorporating the history of the individual books and the Hellenistic and Jewish background to the New Testament itself. The course focuses on the historical problem of the emergence of various theological perspectives within the New Testament writings, especially the contrast between the teachings of Jesus and those of Paul.

PHIL 363-3. Gender and Race in Biblical Literature.
Course examines the presence(s), result(s), and interpretation(s) of gender and race in biblical literature and the issues and problems those categories present to the reader. Meets with EST 363 and WMST 363.

PHIL 370-3. Aesthetic Theory.
Investigation of concepts such as the aesthetic object, the artistic experience, and creative expression and a critique of certain theories designed to solve problems of aesthetic evaluation. Meets with PHIL 570.

PHIL 373-3. Philosophy and Literature.
A study of the intersection of philosophy and literature, the benefits each derives from the other and of philosophical themes expressed in literary works and philosophical problems raised by literature. Meets with PHIL 573.

PHIL 404-3. Twentieth Century Philosophy.
Critical analysis of such influential 20th century philosophical movements as logical positivism, analytical philosophy, pragmatism, Marxism, existentialism, phenomenology, hermeneutics, and deconstruction. Meets with PHIL 504.

PHIL 407-3. Existentialism.
Main themes of existentialist thought from its origins in Kierkegaard and Nietzsche to such 20th century figures as Jaspers, Heidegger, Sarte and Camus. Meets with PHIL 507.

PHIL 408-3. Contemporary Continental Philosophy.
An intensive examination of major figures, such as Husserl, Heidegger, Habermas, Foucault and Derrida; and of major movements, such as phenomenology, critical theory and deconstruction.

PHIL 410-3. American Pragmatism.
Analysis and appreciation of America's most important contribution to intellectual life, pragmatism. Also discussed are two of pragmatism's predecessors, transcendentalism and naturalism. Meets with Phil 510.

PHIL 414-3. Environmental Philosophy.
The philosophical significance of ecology for establishing an environmental ethic. Application of environmental ethics to such issues as responsibilities to future generations, the problem of the moral standing of nonhuman species and wilderness, and the deficiencies of cost-benefit analysis as a basis for decision making. Meets with PHIL 514.

PHIL 415-3. Ethical Theory.
The problem of rational justification of ethical standards, including a selected treatment of the history of ethics. Prer., PHIL 100 or 102 or 104. Meets with PHIL 515.

PHIL 416-3. Business and Management Ethics.
Designed to teach students to appreciate the ethical dimensions of the decision-making process in which most business managers are engaged during their careers. Meets with PHIL 516.

PHIL 417-3. Health Care Ethics.
Ethical dimensions of the patient-physician relationship and the impact of medical technology. Topics include informed consent and experimentation with human subjects, technological manipulation of birth and death processes, allocation of medical resources, genetic screening in the work-place, and genetic engineering. Meets with PHIL 517.

PHIL 420-3. Consciousness.
Consciousness has re-emerged as a fundamental topic in psychology,

neuroscience, cognitive science, and philosophy. This course introduces students to some of the recent neuroscientific studies of consciousness and surveys some of the philosophical problems posed by consciousness. Meets with PHIL 520.

PHIL 425-3. Topics in Social Theory.
In-depth examination of a particular trend in contemporary social theory such as critical theory, the Frankfurt school, Marxism and post-Marxism, economic democracy, deep ecology, postmodernism and deconstruction. Prer., Three hours of philosophy. Meets with PHIL 524.

PHIL 435-3. Analytic Philosophy.
"Analytic Philosophy" is a term used to describe both a particular method and a style of philosophizing. This course examines that method and that style and shows the promise the former once held for settling traditional philosophical issues and problems and the continuing influence of the latter. Meets with PHIL 535.

PHIL 440-3. Philosophy of Science.
A close examination of issues in the history, philosophy and sociology of science. Attention will be given to contemporary debates on such topics as the methodology of science, the growth of scientific knowledge, the logic of scientific discovery and the value-neutrality of science. Meets with PHIL 540.

PHIL 443-3. Logical Theory.
An intensive study of issues in philosophy of logic and advanced logic. Topics examined include: modal logic, many-valued logic, second-order logic, fuzzy logic, semantics and syntax, and incompleteness. Prer., PHIL 344. Meets with PHIL 543.

PHIL 446-3. Theories of Human Nature.
An examination of the meaning of human nature from various perspectives, including Greek thinking, religious explanations, naturalist, existentialist and pragmatist theories.

PHIL 449-3. Philosophy of Language.
A historical survey of developments in philosophy of language. Topics covered include sense and reference, signifier and signified, rule-following, ordinary language philosophy, deconstruction, and casual theories of reference. Authors covered include Frege Husserl, De Saussure, Wittgenstein, Austin, Derrida, and others. Meets with PHIL 549.

PHIL 455-3. Feminism, Sexuality, and Culture.
An examination of selected philosophical issues in the context of recent developments in feminist thought. Course will consider the question of whether traditional patterns of philosophical thought express gender bias, and if so, why. Meets with PHIL 555 and WMST 455.

PHIL 460-3. Theory of Film.
Relation between philosophical issues and film to show how philosophical concepts are embodied in film and filmmaking. Meets with PHIL 560.

PHIL 491-3. Systematic Philosophy.
A thorough study of a single philosophical problem, system, or single philosopher. Meets with PHIL 591.

PHIL 493-3. Advanced Topics in Philosophy.
Detailed examination of a special topic taken from the history of philosophy which is not covered by the regular departmental course offerings (variable content). Prer., Philosophy majors, consent of instructor or deep ecology students from Spring 2000. Meets with PHIL 593 and WMST 490.

PHIL 495-3. Senior Seminar and Thesis.
A research project directed under the supervision of a full time departmental faculty member. The topic of the research is chosen by the student in consultation with the project advisor. Required of all philosophy majors.

PHIL 504-3. Twentieth Century Philosophy.
Critical analysis of such influential 20th century philosophical movements as logical positivism, analytical philosophy, pragmatism, Marxism, existentialism, phenomenology, hermeneutics, and deconstruction. Meets with PHIL 404.

PHIL 507-3. Existentialism.
Main themes of existen Main themes of existentialist thought from its origins in Kierkegaard and Nietzsche to such 20th century figures as Jaspers, Heidegger, Sarte and Camus. Meets with PHIL 407.

PHIL 508-3. Contemporary Continental Philosophy.
An examination of major figures, such as Husserl, Heidegger, Habermas, Foucault, and Derrida; and of major movements, such as phenomenology, critical theory, and deconstruction.

PHIL 510-3. American Pragmatism.
Analysis and appreciation of America's most important contribution to intellectual life, pragmatism. Also discussed are two of pragmatism's predecessors, transcendentalism and naturalism. Meets with PHIL 410.

PHIL 514-3. Environmental Ethics and Deep Ecology.
The philosophical significance of ecology for establishing an environmental ethic. Application of environmental ethics to such issues as responsibilities to future generations, the problem of the moral standing of non-human species and wilderness, and the deficiencies of cost-benefit basis for decision making. Meets with PHIL 414.

PHIL 515-3. Ethical Theory.
The problem of rational justification of ethical standards including a selected treatment of the history of ethics. Prer., PHIL 100, PHIL 102 or PHIL 104. Meets with PHIL 415.

PHIL 516-3. Business and Management Ethics.
Designed to teach students to appreciate the ethical discussions of the decision-making process in which most business managers are engaged during their careers. Meets with PHIL 416.

PHIL 517-3. Health Care Ethics.
Ethical dimensions of the patient-physician relationship and the impact of medical technology. Topics include informed consent and experimentation with human subjects, technological manipulation of medical resources, genetic screening in the workplace, and genetic engineering. Meets with PHIL 417.

PHIL 520-3. Consciousness.
Consciousness has re-emerged as a fundamental topic in psychology, neuroscience, cognitive science, and philosophy. This course introduces students to some of the recent neuroscientific studies of consciousness and surveys some of the philosophical problems posed by consciousness. Meets with PHIL 420.

PHIL 524-3. Selected Topics in Social Theory.
In-depth examination of a particular trend in contemporary social theory such as critical theory, the Frankfurt school, Marxism and post-Marxism, economic democracy, deep ecology, post-modernism and deconstruction. Variable content. Meets with PHIL 425.

PHIL 526-3. Philosophy of Law.
Consideration of various views of the nature of law, its role in society and its relation to other disciplines. Examination of the philosophic commitments that underlie and affect legal convention and procedures. Meets with PHIL 322.

PHIL 530-3. Philosophy of the Mind.
Consideration of the central problems in the philosophy of mind, including the mind-body problem; the knowledge of other minds; free will and determinism; as well as discussion of concepts such as action, intention, motive, desire, memory, etc. Meets with PHIL 330.

PHIL 535-3. Analytic Philosophy.
'Analytic Philosophy' is a term used to describe both a particular method and a style of philosophizing. This course examines that method and that style and shows the promise the former once held for settling traditional philosophical issues and problems and the continuing influence of the latter. Meets with PHIL 435.

PHIL 540-3. Philosophy of Science.
A close examination of issues in the history, philosophy and sociology of science. Attention will be given to contemporary debates on such topics as the methodology of science, the growth of scientific knowledge, the logic scientific discovery and the value-neutrality of science. Meets with PHIL 440

PHIL 543-3. Logical Theory.
A study of issues in philosophy of logic and advanced logic. Topics examined include: modal logic, many- valued logic, second order logic, fuzzy logic, semantics and syntax, and incompleteness. Prer., PHIL 344. Meets with PHIL 443.

PHIL 544-3. Symbolic Logic.
An exposition of the ideas and techniques of modern symbolic logic including several formal systems to distinguish between valid and invalid arguments and discussion of the foundations of arithmetic and set theory. Meets with PHIL 344.

PHIL 546-3. Theories of Human Nature.
An examination of the meaning of human nature from various perspectives including Greek thinking, religious explanations, naturalist, existentialist and pragmatist theories.

PHIL 549-3. Philosophy of Language.
A historical survey of developments in philosophy of language. Topics covered include sense and reference,, signifier and signified, rule-following, ordinary language philosophy, deconstruction, and casual theories of reference. Authors covered include Frege Husserl, De Saussure, Wittgenstein, Austin, Derrida, and others. Meets with PHIL 449.

PHIL 560-3. Theory of Film.
Relation between philosophical issues and film to, show how philosophical concepts are embodied in film and filmmaking. Prer., A B.A. in any LAS field. Meets with PHIL 460.

PHIL 591-3. Systematic Philosophy.
A thorough study of a single philosophical problem, system or single philosopher. Variable content. Meets with PHIL 491

PHIL 593-1 to 3. Advanced Topics in Philosophy.
Detailed examination of a special topic taken from the history of philosophy which is not covered by the regular departmental course offerings. Variable content. Prer., Consent of instructor. Meets with PHIL 493 and WMST 490 001.

PHIL 940-1 to 3. Independent Study in Philosophy: Undergraduate.
Prer., Prior consent of faculty required.

PHYSICS

PHYS 503-3. Mathematical Methods in Physics.
Survey of classical mathematical physics. Includes complex variable theory, boundary value problems, Green's functions, matrices, and vector spaces, and the use of numerical methods for solving physical problems. Prer., PES 325 or equivalent.

PHYS 515-3. Solid State Laboratory.
Advanced lab on the measurement of fundamental properties of solids. Includes introduction to vacuum and thin film technologies. One lecture and one lab session per week. Meets with PES 415.

PHYS 516-1. Thin Films Laboratory.
Introduction to thin film deposition and characterization. Facilities include evaporation, sputtering, Auger electron spectroscopy, ellipsometry and scanning electron microscopy. Coreq., PHYS 549

PHYS 520-3. Computational Physics.
An introduction to methods of solving physics problems via computers. Topics include molecular dynamics, calculation of electromagnetic fields, electronic states, Monte Carlo methods applied to statistical mechanics and quantum systems. Prer., C S 105 or equivalent.

PHYS 541-3. Statistical Mechanics.
An introduction to equilibrium statistical mechanics. Topics include classical or Bollzmann statistics, Fermi-Dirac and Bose-Einstein statistics, partition functions and ensembles. Also included are applications to the liquid and solid states.

PHYS 542-3. Physics of Materials.
An introduction to the physics of materials. Topics will include crystallography and defects, phase diagrams, phase transformations, diffusion, mechanical properties, and electrical properties.

PHYS 546-3. Introduction to Solid State Physics.
Theory of solids including crystal structure, x-ray diffraction, phonons, thermal properties of insulators, theories of metals, band structure, semiconductors, impurities and doping in semiconductors, junctions, superconductivity, and magnetism. Meets with PES 446.

PHYS 548-3. Surface and Interface Physics.
An introduction to the solid state physics of surfaces and interfaces including structural, thermodynamic and electrical properties. Gas-surface interactions and characterization techniques will also be examined.

PHYS 549-3 to 4. Physics of Thin Films.
A combined lecture/lab course covering common techniques for the production and characterization of thin films and the physics which underlies these methods. Lab equipment includes evaporation, Auger spectroscopy, ellipsometry and scanning electron microscopy. Offered as a 3 credit lecture or 4 credits with integrated lab. Meets with PES 449.

PHYS 572-3. Stellar Structure and Evolution.
Basic stellar astronomy and astrophysics. H-R diagrams. Principles of stellar structure including energy generation and energy transport. Stellar formation and evolution to compact objects.

PHYS 595-1 to 6. Special Topics.
Various topics in physics, energy science, astronomy and related fields.

PHYS 621-3. Theoretical Mechanics.
Variational principles, Lagranges's equations, Hamilton's equations, motion of a rigid body, relativistic mechanics, transformation theory, continuum mechanics, small oscillations, Hamilton-Jacobi theory.

PHYS 625-3. Introduction to Quantum Mechanics.
Quantum phenomena, relation to classical physics, Schroedinger and Heisenberg picture, application to problems, approximation techniques; angular momentum; scattering; theory; Pauli spin theory; radiation theory; relativistic wave equations with simple applications; introduction to field theory and second quantization. Prer., PES 426.

PHYS 626-3. Quantum Mechanics II.
Quantum phenomena, relation to classical physics, Schroedinger and Heisenberg picture, application to problems, approximation techniques; angular momentum; scattering theory; Pauli spin theory; radiation theory; relativistic wave equations with simple applications; introduction to field theory and second quantization.

PHYS 631-3. Electromagnetic Theory I.
Electromagnetic fields; applications of Maxwell's equations to electromagnetic wave propagation, and fundamental properties of light; relativistic electrodynamics, radiation theory. Prer., PES 331, PES 332 or equivalent.

PHYS 632-3. Electromagnetic Theory II.
Electromagnetic fields; applications of Maxwell's equations to electromagnetic wave propagation, and fundamental properties of light; relativistic electrodynamics, radiation theory. Prer., PHYS 331-332, or equivalent.

PHYS 695-3. Special Topics in Physics.
Various topics such as group theory in quantum mechanics, collision, astrophysics, surface physics, magnetism.

PHYS 700-1 to 6. Masters Thesis.
An approved problem in theoretical or experimental physics under the direction of faculty members. Intended to introduce the student to procedures in research and development work. Work of an original nature is expected.

PHYS 950-1 to 6. Independent Study: Graduate.
PHYS 999-0. Candidate for Degree.

PSYCHOLOGY

PSY 100-4. General Psychology.
An introduction to the scientific study of behavior. Covers psychoanalytic and Jungian theory, physiological bases of behavior, behaviorism and humanistic/existential theories. Includes psychology discipline areas of clinical, experimental, developmental, abnormal, and social.

PSY 210-4. Introduction to Psychological Statistics.
Descriptive statistics including graphs, frequency distributions, measures of central tendency and variability. Inferential statistics such as correlation, T-tests, chi-square tests, and analysis of variance including two-factor designs and multiple comparison tests. Prer., PSY 100 and Math 104 or equivalent.

PSY 211-4. Introduction to Psychological Research and Measurement.
An introduction to research methods used in psychology including experimental designs, quasi-experiments, correlation research and developmental methods. Methods of measuring psychological concepts, as well as the reliability and validity of those measurements are discussed. Students will write reports in APA format. Prer., PSY 210 or equivalent.

PSY 230-3. Psychology of Adjustment.
A survey of concepts bearing upon the processes of normal psychological adjustment, with emphasis upon using the concepts to understand common human problems in personal growth and relationships with others.

PSY 245-3. Social Psychology of Social Problems.
An examination of social psychological aspects of a variety of social issues and problems in contemporary society. Issues may include television violence, race and I.Q., ethics of human experimentation, privacy, and pornography. Psychological theory and research relevant to these areas will be considered as will the processes involved in defining social behavior as a problem. Prer., PSY 100. Meets with WMST 245.

PSY 300-3. Honors Seminar.
Advanced seminar focused on research methods and the nature of psychological research. Open only to students formally accepted into the Department of Psychology honors program. Prer., PSY 210, 211, Junior status and consent of instructor.

PSY 303-1 to 3. Undergraduate Practicum.
Students participate in supervised service or research activities. Prer., Consent of instructor.

PSY 306-3. Psychology and Health.
Introductory course on the application of psychological principles to the enhancement of physical health. Class utilizes an experiential format with students actually conducting their own health behavior change program. Prer., PSY 100.

PSY 310-3. Statistical Models in Psychology.
The role of statistical models in psychological research, including models of error and inference, and analysis of selected variance. Prer., PSY 210.

PSY 313-3. Learning and Cognition.
Survey of animal and human theories of learning and an introduction to contem-

porary theories of human cognition including memory and information processing. Prer., PSY 100.

PSY 314-4. Cognitive Psychology.
A survey of the core areas of human cognition: attention, reasoning, memory, problem-solving, and decision making. History, theory, methodology, and research from related disciplines are discussed. Prer., PSY 210 and PSY 211.

PSY 315-3. Psychology of Motivation.
Psychological and physiological factors in the motivation of behavior. Prer., PSY 100.

PSY 320-4. Psychology of Learning.
This course is designed to provide an overview of learning. An emphasis will be placed on the theoretical formulation of the conditions that are necessary for learning and retention. Practical applications of learning principles will be considered. Prer., PSY 200 and PSY 211.

PSY 321-3. Human Sexuality.
Covers in substantive form the interdisciplinary field of human sexuality. The topic is approached from the perspectives of physiology, endocrinology, behavior, sociology, ethnology, and anthropology. Prer., PSY 100. Meets with WMST 321.

PSY 324-3. Psychology of Personality.
A review of various theories of personality including psychodynamic, behavioristic, humanistic, and existential approaches. Prer., PSY 100.

PSY 326-4. Comparative Psychology.
Behavior of animals from an evolutionary perspective. Principles of behavior in a variety of animal species, including humans. Prer., PSY 100, or consent of instructor.

PSY 327-4. Introduction to Biopsychology.
A broad survey course in the biological basis of behavior. Anatomy, physiology and chemistry of the nervous system (with special emphasis on the brain), endocrinology, and genetics are discussed as they apply to the study of behavior. Prer., PSY 100 or consent of instructor.

PSY 328-3. Abnormal Psychology.
The origin, symptoms, classification, and treatment of abnormal behavior. Prer., PSY 100.

PSY 340-3. Social Psychology.
Survey of contemporary social psychological theory and research. Analysis of basic principles underlying human social behavior. Prer., PSY 100.

PSY 345-3. Psychology of Diversity.
A basic survey of myths and realities of multiculturalism and diversity using the theories and data from several subfields with psychology. Racial and ethnic diversity are emphasized, but diversity due to gender, age, sexual preference, and SES will also be explored. Prer., PSY 100.

PSY 348-1 to 4. Selected Topics in Psychology.
Subject matter will change depending upon individual instructors and time of offering. The topic for any given semester will be specified in the Schedule of Courses. May be repeated for credit.

PSY 351-3. Psychology of Aging.
An overview of gero-psychology covering such topics as the aging central nervous system, cognitive aging, cultural contexts of aging, personal transitions in later life, mental disorders, and gero-psychology in the future. Prer., PSY 100. Meets with GRNT 463.

PSY 355-3. Psychology of Women.
A survey of female psychology and the study of sex differences through an examination of theories and determinants of female personality, traditional and alternative lifestyles, women in psychotherapy, and women at work. Prer., PSY 100.

PSY 362-3. Developmental Psychology.
Survey of human development from conception to death emphasizing physical, cognitive, emotional, and psychosocial development. Prer., PSY 100.

PSY 364-3. Psychology of the Exceptional Child.
This survey course studies children with learning and cognitive differences, behavioral and emotional disorders, and sensory and physical differences. Emphasis on etiology, diagnosis, treatment, and prevention of various disorders from different theoretical perspectives. Prer., PSY 100.

PSY 365-3. Clinical Neuropsychology.
Organization, function, and dysfunction of the human brain across the life span. Neuropsychological assessment techniques. Reviews behavioral, cognitive, and personality changes as a result of disease, injury, and aging. Prer., PSY 100 or consent of instructor.

PSY 366-3. Community Service: Theory and Practice.
As a service-learning course, students will serve in the community and learn beginning helping skills. Assistance will be provided in locating volunteer positions. Prer., PSY 211 and consent of instructor.

PSY 371-3. Survey of Clinical Psychology.
A view of the area of clinical psychology including such topics as clinical assessment, therapies, and community intervention. Prer., PSY 100.

PSY 372-3. Community Psychology and Mental Health.
Focus on issues in the organization, financing, and delivery of mental health services within the community, innovative techniques for the provision of mental health-related services, the role of community factors in the production of emotional disorders, and technologies of community change. Prer., PSY 100 and PSY 328.

PSY 384-3. SPSS and other Statistical Packages.
The use of computers for statistical analysis of social science data. Topics include how to organize data collections, the selection and use of appropriate statistical packages, and storing and retrieving files. Prer., PSY 210 or equivalent.

PSY 385-3. Principles of Psychological Testing.
A psychological and statistical analysis of the principles underlying construction and use of tests of ability and personality. Prer., PSY 210.

PSY 386-3. Theories of Psychotherapy.
An introduction for the upper-division undergraduate into the theories and techniques of psychotherapy. Various approaches to psychotherapy will be examined (e.g., psychoanalysis, behav

ioristic, and humanistic/ existential). Prer., PSY 100 and 328.

PSY 393-3. Industrial/Organizational Psychology.
An introduction to the scientific study of people in work organizations. Emphasis on understanding people in organizations and applying this knowledge to resolve problems of human behavior at work. Prer., PSY 100.

PSY 394-3. Psychology and the Law.
An introductory survey course covering selected topics relating to the interaction of psychology and the law. Prer., PSY 100.

PSY 395-3. Applied Psychology.
Examines the application of psychological research and theory to "real world" issues; organizational behavior, health and health care, environmental, legal, educational issues, and public policy. Prer., PSY 100.

PSY 400-3. Honors Seminar.
Advanced seminar focused on contemporary issues in psychology. Open only to students formally accepted into the Department of Psychology Honors program. Prer., PSY 210, 211, 300, junior status, and consent of instructor.

PSY 405-3 to 4. Physiological Psychology.
The morphological, neurochemical, and physiological bases of behavior. Topics include the physical substrate for emotion, motivation, consciousness, sleep, learning, and memory. Prer., PSY 327 or consent of instructor. If course is taken for 4 hours credit, one 2 hour lab per week is required.

PSY 406-3. Seminar in Health Psychology.
In-depth focus on selected topics in health psychology. Topics will vary. Prer., PSY 211 and PSY 306.

PSY 411-3. Seminar in Methodology.
In-depth focus on selected topics in methodology, statistics, and measurement. Topics will vary. Prer., PSY 210 and PSY 211.

PSY 412-3. Human Memory.
Psychological research and theories about memory. Its focus will be on the memory abilities of normal- functioning adults. Memory functions and structures will be inferred from research studies, several of which will be demonstrated in class. Some implications for improving memory will be discussed. Prer., PSY 100.

PSY 413-3. Seminar in Learning and Cognition.
In-depth focus on selected topics in learning and cognition. Topics will vary. Prer., PSY 211, PSY 313, or PSY 314.

PSY 417-3 to 4. Sensation and Perception.
Introduction to psychophysical scaling, the physical senses (with special emphasis on audition and vision), and perceptual phenomena. One 2-hr. lab. per week required if course taken for four hours credit. Prer., PSY 210 and PSY 211 or consent of instructor.

PSY 419-3. Conditioning: Principles and Application.
Principles of classical and operant conditioning in n humans and other animals. Presentation of the theoretical basis of behavior modification. One 2-hour lab required of course taken for 4 hours credit. Prer., 10 hours of psychology and PSY 211.

PSY 421-1 to 3. Practicum in Experimental Psychology.
Laboratory for advanced psychology majors. Emphasis will be on individual projects. Prer., Consent of instructor.

PSY 424-3. Seminar in Psychology of Personality.
In-depth focus on selected topics in personality. Topics will vary. Prer., PSY 211 and PSY 324.

PSY 427-3. Seminar in Biopsychology.
In-depth focus on selected topics in biopsychology. Topics will vary. Prer., PSY 211 and PSY 327.

PSY 428-3. Seminar in Abnormal Psychology.
In-depth focus on selected topics in abnormal psychology. Topics will vary. Prer., PSY 211 and PSY 328.

PSY 440-3. Seminar in Social Psychology.
In-depth focus on selected topics in social psychology. Topics will vary. Prer., PSY 211 and PSY 340.

PSY 443-3. Seminar in Social Issues.
In-depth focus on social issues. Topics will vary. Prer., PSY 211.

PSY 444-3. Drugs and Behavior.
A behavioral analysis of the effects of psychoactive compounds including stimulants, depressants and antidepressants, antipsychotics, anxiolytics, opiates, and psychedelics. Presentation of neurobiological models of affective disorders (e.g. schizophrenia, endogenous depression, mania, and anxiety). Prer., 10 hours of PSY or consent of instructor, PSY 327 or introductory biology and/or chemistry recommended.

PSY 451-3. History of Psychology.
Outline of the development of psychological theories since the Greek philosophies. The story of experimental psychology and its problems. Schools of psychological thinking. Readings of original sources in English and English translations. Prer., PSY 211.

PSY 462-3. Seminar in Developmental Psychology.
In-depth focus on selected topics in developmental psychology. Topics will vary. Prer., PSY 211 and PSY 362.

PSY 499-1 to 3. Teaching of Psychology.
A consideration of problems, techniques, and subject matter related to the teaching of psychology. Prer., Consent of instructor.

PSY 570-1. Ethical, Legal, and Professional Issues for Clinicians.
This course covers extent legal and ethical principals and standards for professional conduct in clinical psychology. It considers legal and ethical decisions that clinicians must make, such as scope of professional competence, confidentiality, duty to warn and protect, and dual relationships. Prer., Psych graduate status or consent of instructor.

PSY 571-3. Clinical Skills Laboratory.
An introductory practicum course which emphasizes psychotherapy skills and concepts related to therapeutic interaction. A prerequisite for the clinical practicum, PSY 671. Prer., Psy graduate status or consent of instructor.

PSY 580-3. Behavioral Science Statistical Packages.
The use of the computer for statistical analyses will be reviewed. Topics include how to organize data collections, selection and use of appropriate statistical packages and storing and retrieving files. Prer., PSY 585 or equivalent, grad status in psych or consent of instructor.

PSY 585-3. Research Statistics.
Advanced statistical techniques for research psychologists, including specialized in-depth treatment of analysis of variance. Prer., Introductory statistics, psychology graduate status, or consent of instructor.

PSY 587-3. Multivariate Statistics.
Multivariate procedures are described extensions of the general linear model. Procedures include: multiple regression, canonical correlation, MANOVA, factor analysis, discriminant function analysis, and other selected topics. Prer., PSY 585.

PSY 590-3. Basic and Applied Research Methods.
Advanced survey of research design and methodology. Prer., PSY 585 and psychology graduate status or consent of instructor.

PSY 595-3. Psychometric Theory.
Theory of psychological test construction. Emphasis on scaling models and the assessment of reliability and validity by univariate and multivariate methods. Prer., PSY 585, Psychology graduate status, or consent of instructor.

PSY 603-3. Research Practicum.
Students will be placed in a clinical or research program for the application phase of their psychology training. Prer., Psychology graduate status.

PSY 610-3. Proseminar: Developmental.
Prer., Psychology graduate status or consent of instructor.

PSY 611-3. Proseminar: Cognition.
Prer., Psychology graduate status or consent of instructor.

PSY 612-3. Proseminar: Neuropsychology.
Prer., Psychology graduate status or consent of instructor.

PSY 613-3. Proseminar: Social.
Prer., Psych grad status or consent of instructor.

PSY 614-3. Proseminar: Personality.
Study of measurement methods and their psychological and mathematical bases, with special emphasis on the measurement of attitude. Prer., Psychology graduate status or consent of instructor.

PSY 648-1 to 3. Selected Topics in Psychology.
Subject matter will change depending upon individual instructor and time of offering. The topics for any given semester will be specified in the semester schedule. May be repeated for credit. Prer., Psychology graduate status or consent of instructor.

PSY 667-1 to 3. How to Teach More Effectively.
Designed to help college professors become more effective teachers. Readings, discussions, and videotaped consultation. Prer., Psychology graduate status or consent of instructor.

PSY 671-3. Practicum in Clinical Psychology.
Direct clinical experience for M.A. candidates in psychology only includes 2 hours of weekly group supervision. Prer., PSY 571; for Psychology master's candidates only.

PSY 678-3. Advanced Psychopathology.
An intensive survey of the major theories, research findings, and behavioral characteristics associated with deviant reaction patterns. Prer., Psych grad status or consent of instructor.

PSY 685-3. Clinical Interviewing.
Theory and practice in interviewing for the purpose of determining a diagnosis using the DSM. Practical skill instruction in mental status exams, interviewing strategies, integration of interview and testing data, and report writing. Prer., PSY 571, psychology graduate status in psychology or consent of instructor.

PSY 686-3. Objective Testing in Clinical Psychology.
Course will focus on administering and interpreting objective test results commonly used in clinical psychology practice. Case study format and test battery interpretation will also be considered. Probable tests: MMPI, CATI, and others. Prer., PSY 571; for Psychology master's candidates only.

PSY 692-3. Seminar: Psychotherapy.
Readings and discussion of the psychotherapeutic process from various theoretical perspectives. Prer., Psychology graduate status or consent of instructor.

PSY 700-1 to 6. Masters Thesis.
A research project under the supervision of the graduate faculty of the psychology department.

PSY 930-1 to 3. Independent Study in Psychology: Undergraduate.
Prer., 20 hours of psychology or equivalent and consent of instructor.

PSY 950-1 to 3. Independent Study in Psychology: Graduate.
Prer., Consent of instructor.

PSY 999-0. Candidate for Degree.

Religious Studies

REST 100-3. Introduction to Religious Studies.
An introduction to the study of religious phenomena such as myth, symbols and rituals as they relate to religious beliefs. The concepts of sacred narratives, sacred histories, and religious experiences will be discussed along with different approaches (e.g., psychological, sociological, anthropological) to the study of religion.

REST 105-3. Philosophy and Religion.
An introduction to philosophy through religious topics such as sacredness, faith, reason, revelation, creation, immortality, and God's existence.

REST 255-3. Women and Religion.
A study of the philosophical issues pertinent to women and religion from the ancient to the modern world.

REST 281-3. Survey: Medieval Art.
A survey of the arts of early Christian, Byzantine, early Medieval, Romanesque, and Gothic periods as an expression of early Christian theology and history.

REST 310-3. Comparative Religions.
A reading-discussion course which explores the major world religions and the nature of their appeal to the spiritual aspirations of members of the human family.

REST 320-3. History of Hebrew Bible: The Old Testament.
The formation of the Old Testament: manuscript traditions and canonization; an investigation of the major genres within the Old Testament (history, poetry, prophecy); the historical developments of the ancient Near East as they reflect upon the Old Testament.

REST 321-3. History of the Bible: The New Testament.
An investigation of the development of the New Testament, incorporating the history of the individual books and pertinent fields such as form and redaction, criticism, paleography, and transmission of the manuscripts.

REST 346-3. Anthropological Theories of Religion.
Classic and recent anthropological theories of religion are evaluated in light of ethnographic data on shamanism, totemism, magic, witch killing, divination, myths and ancestor worship. Prer., ANTH 104 or ANTH 240 or permission of instructor. Meets with ANTH 346.

REST 348-3. History of Philosophy: India.
Historical development and critical analysis of major philosophical schools and texts of India, from Vedic times to the twentieth century. Meets with PHIL 348.

REST 349-3. History of Philosophy: China.
Historical development and critical analysis of the major philosophical schools and texts of China, including Confucianism, Taoism, Ch'an (Zen) Buddhism, Neo-Confucianism and modern Chinese thought. Meets with PHIL 349.

REST 354-3. Medieval and Renaissance.
History of Western Philosophy from the Medieval period to the beginning of modern times. Course covers Christian, Jewish and Islamic philosophers, including Augustine, Anselm, Avicenna, Averroes, Maimonides, Aquinas, Ockham, Machiavelli, and F. Bacon. Meets with PHIL 354.

REST 360-3. Philosophy of Religion.
Detailed analysis of religious experience from Eastern and Western traditions, including mysticism, mythology, cosmology, knowledge of God and the divine attributes, salvation, immortality, and the influence of secularism.

REST 380-3. Sacred Spaces of the World.
An examination of the architecture and sites of the world's religions with a focus on the relationship of the form of these sacred spaces to the history and philosophy of the religion. Meets with A H 380.

REST 415-3. Contemporary Religious Issues.
Study and discussions of writings of selected authors representative of three major groups within our Western tradition.

REST 421-3. History of Christianity: The Primitive Church to c. 300.

An exploration of primitive Christianity through its immediate Judaic and Hellenistic roots, to include extended historical and literary discussion of the literature of the New Testament and an analysis of the historical Jesus. Meets with HIST 421.

REST 422-3. Medieval Church, c. 300 to c. 1500.

A history of the Christian Church in both the West and Byzantium from its acceptance as a legal religion in the 4th century to the eve of its breakup at the Reformation. Focus especially on theological, organizational, and heretical developments. Meets with HIST 422.

REST 424-3. Reformation and Counter-Reformation, c. 1500-1648.
The break-up of the Medieval Catholic Church into a "reformed" Catholic Church and various Protestant churches; how they clashed in the 16th and 17th centuries, culminating in the last of the great religious wars, the Thirty Years War. Meets with HIST 424.

REST 432-3. Sociology of Religion.
Social origin of religion. Religious factor in culture. Significance of religion as social control in contemporary society. Religion as an institution and its relation to other institutions. Prer., 6 hours of sociology or consent of instructor.

REST 497-3. Advanced Topics in Religious Studies.
Detailed examination of a special topic taken from the history of religious studies that are not covered by the regular program offerings (variable content).

REST 940-1 to 3. Independent Study in Religious Studies: Undergraduate.

Russian

RUSS 101-5. Beginning Russian I.
Skills in listening to and speaking Russian. Emphasis on useful expressions with cultural orientation.

RUSS 102-5. Beginning Russian II.
Continued skills in listening to and speaking Russian. Reading and writing intensified with further study of Russian civilization. Prer., RUSS 101 or its equivalency.

RUSS 211-3. Intermediate Russian I.
Russian at the intermediate level. Speaking, reading, and writing. Prer., RUSS 102 or its equivalency.

RUSS 212-3. Intermediate Russian II.
An intermediate Russian course continuing conversational usage and cultural integration utilizing contemporary materials, newspapers, etc. Prer., RUSS 211 or its equivalency.

RUSS 920-1 to 4. Independent Study: Undergraduate.
Independent work for undergraduates. By special arrangement with the faculty. Only for students presenting strong Russian preparation. May be repeated up to three times for credit. Prer., Consent of instructor.

RUSS 930-1 to 4. Independent Study: Undergraduate.
Independent work for undergraduates. By special arrangement with the faculty. Only for students presenting strong Russian preparation. May be repeated up to three times for credit. Prer., Consent of instructor.

RUSS 940-1 to 3. Independent Studies in Russian.
May be repeated up to three times for credit. Prer., Consent of instructor.

Sports and Leisure

S L 220-3. Introduction to Fitness Management.
Applied introduction to fitness management; leadership and teaching skills; fitness screening and appraisal; weight management and eating disorders.

S L 270-1. Introduction to Sport/Recreation Activity.
Basic instruction and participation in sport and recreational activities to include, but not limited to, volleyball, cross-country, tennis, golf, basketball, aerobics, dance and ranger challenge. Students may enroll in a maximum of three (3) different activities for a total of three(3) hours of credit. Each activity can only be taken once for credit. Furthermore, the student can take S L 270 and then S L 275 in that order, but cannot take S L 275 and then S L 270 in the same sport. Prer., Consent of instructor required.

S L 271-1. Self-Defense and Empowerment.
A physical activity course focusing on self-defense and personal empowerment through the development of physical skills, awareness, and respect for self and others. Students will develop and employ skills in role-playing situations.

S L 275-1. Intercollegiate Sports.
Students certified as members of intercollegiate sport teams may earn up to one (1) hour of credit for a full season of participation. May be repeated for up to a total of three (3) hours of credit.

S L 279-1. Introduction to Strength Conditioning.
Introduction to proper use of exercise machines and weights in developing strength and physical health and fitness. Supervised training sessions on weight room equipment in relation to sport performance. This course may not be repeated for credit. Prer., S L 251.

S L 301-1 to 3. Special Topics in Sports and Leisure.
Special courses designed to meet the needs of students with specialized academic interests related to fitness, exercise, leisure and sport.

S L 400-3. Perspectives on Sport and Leisure Studies.
An in-depth sociological analysis of leisure time behavior in industrialized countries. Emphasis will be given to the forms and types of leisure activities, current trends, and future needs and alternatives. Sports will be considered as a special form of leisure. Meets with S L 500 and SOC 330.

S L 402-1. Effectiveness in Coaching.
The ACEP approved course for coaches, including an introduction to sport, exercise and management science and coaching pedagogy. Certifies student as Level I Coach. Students who complete S L 402, S L 403 and S L 451 cannot take S L 401 for credit. Meets with S L 502.

S L 404-3. Principles of Sport Psychology.
Motivation, communication, stress management, the use of mental imagery and other topics for enhancing coach-athlete relationships and for stimulating improved sport performance will be covered. Meets with S L 504.

S L 405-1. Principles of Sport Physiology.
Principles and methods of developing muscular and energy fitness. Provides coaches with the information and guidance to develop training programs appropriate for particular sport and athletes. Meets with S L 505.

S L 432-1. Principles of Sport Law.
Explains a coach's legal responsibility in easy to understand terms and gives practical advice for improving standards of care and safety for athletes. Meets with S L 532.

S L 440-3. Dimensions of Athletic Administration.
Analysis of administration at junior and senior high schools, colleges, and universities. Examine the independent coordinates involved in management for athletic/sports administration, such as internal and external affairs, compliance and governance, student- athlete support service, human resource issues, and working with coaches. Prer., Junior or Senior status. Meets with S L 540.

S L 452-1. Sports, Drugs, and Society.
Surveys the effects of drug use on personal development and athletic performance. Evaluates proposals for drug testing and discusses programs to prevent drug use and drug abuse. Meets with S L 552.

S L 461-1 to 4. Sport Specific: Basic Techniques and Tactics for Beginning Coaches.
Provides a beginning coach with sport-relevant information on coaching, skills, drills, and strategy necessary to coach effectively. May also be used as a special topics course.

S L 462-1 to 4. Sport Specific: Intermediate Techniques and Tactics in Coaching.
Instruction in coaching specific sports at a competitive level. Includes review of basic planning and development of team players, but will concentrate more on strategy, game/match preparation and skill development. Also offered as a special topics course. Prer., S L 461 or equivalent.

S L 463-1 to 3. Sport Specific: Advanced Techniques and Tactics.
Principles and strategies for coaching at the most advanced and competitive levels. May integrate exercise physiology, biomechanics, psychology, etc. in sport specific manner. Prer., S L 461, S L 462 or instructor consent. MEETS WITH S L 563.

S L 490-1. Internship in Sport and Leisure.
Placement in agency or organization related to the student's area of specialization; student keeps journal and attends regular seminars to discuss experiences. Prer., S L 400 or equivalent. Meets with S L 590.

S L 499-1 to 3. Selected Topics in Sport and Leisure.
This course will be offered to meet student demand for instruction in specific areas of this field which are not routinely offered in the curriculum. Topics covered will generally be current issues and problems, emerging knowledge or highly specialized inquiry. Prer., Consent of instructor. Meets with S L 599 and SOC 401.

S L 500-3. Perspectives on Sport and Leisure Studies.
An in-depth sociological analysis of leisure time behavior in industrialized countries. Emphasis will be given to the forms and types of leisure activities, current trends, and future needs and alternatives. Sports will be considered as a special form of leisure. Meets with S L 400 and SOC 330.

S L 502-1. Effectiveness in Coaching.
The ACEP approved course for coaches, including an introduction to sport, exercise and management science and coaching pedagogy. Certifies student as Level I Coach. Students that complete S L 402, S L 403 and S L 451 cannot take this course for credit. Meets with S L 402.

S L 504-1. Principles of Sport Psychology.
Motivation, communication, stress management, the use of mental imagery and other topics for enhancing coach-athlete relationships and for stimulating improved sport performance will be covered. Meets with S L 404.

S L 505-1. Principles of Sport Physiology.
Principles and methods of developing muscular and energy fitness. Provides coaches with the information and guidance to develop training programs appropriate for particular sport and athletes. Meets with S L 405.

S L 530-3. Management of Sport and Leisure Programs.
Analysis of administration and policies of park and recreation agencies. Topics will include financing, marketing, capital budgeting, user fees, alternative service delivery systems and cooperative arrangements with both the commercial and non-profit sectors. Meets with S L 430.

S L 532-1. Principles of Sport Law.
Explains a coach's legal responsibility in easy to understand terms and gives practical advice for improving standards of care and safety for athletes. Meets with S L 432.

S L 540-3. Dimensions of Athletic Administration.
Analysis of administration at junior and senior high schools, colleges, and universities. Examine the independent coordinates involved in management for athletic/sports administration, such as internal and external affairs, compliance and governance, student- athlete support service, human resource issues, and working with coaches. Meets with S L 440.

S L 552-1. Sports, Drugs and Society.
Surveys the effects of drug use on personal development and athletic performance. Evaluates proposals for drug testing and discusses programs to prevent drug use and drug abuse. Meets with S L 452.

S L 561-1 to 4. Sport Specific: Basic Techniques and Tactics for Beginning Coaches.
Provides a beginning coach with sport-relevant information on coaching, skills, drills, and strategy necessary to coach effectively. May also be used as a special topics course. Meets with S L 461.

S L 562-1 to 4. Intermediate Techniques and Tactics in Coaching.
Instruction in coaching specific sports at a competitive level. Includes review of basic planning and development of team players, but will concentrate more on strategy, game/match preparation and skill development. Also offered as a special topics course. Prer., S L 561 or equivalent. Meets with S L 462.

S L 563-1 to 3. Sport Specific: Advanced Techniques and Tactics.
Principles and strategies for coaching at the most advanced and competitive levels. May integrate exercise physiology, biomechanics, psychology, etc., in sport specific manner. Prer., S L 461, S L 462 or instructor consent. Meets with S L 463.

S L 590-1 to 6. Internship in Sport and Leisure.
Placement in agency or organization related to the student's area of specialization; student keeps journal and attends regular seminars to discuss experiences. Prer., S L 400 or equivalent. Meets with S L 490.

Sociology

SOC 111-4. Introduction to Sociology.
General survey of the field of sociology. Sociology as a science; society and culture; social groups; social institutions; social interaction; social change.

SOC 212-4. Introduction to Social Research.
An elementary examination of the various methods used in social research with emphasis on the scientific method and the role of empirical inquiry in sociology.

SOC 220-2. Introduction to Racial and Ethnic Groups.
A survey of contemporary racial and ethnic group relations in the U.S. Includes discussion of the history and development of the current situation of the largest minority groups, emphasizing comparisons of social situations, values, discrimination, and cultural identities. Meets with EST 220.

SOC 222-3. Environment and Society.
Examines how forms of social organization, power and meaning shape the definition of nature and relationships with the natural environment. Explores the social causes and consequences of environmental practices to provide a context for understanding environmental issues and alternatives. Meets with GES 210.

SOC 224-3. Childhood Socialization.
An examination of the process through which children define themselves as members of their culture. The influence of such "cultural communicators" as the family, school, television, day care, children's literature, games, toys and peer relations will be examined. Meets with WMST 224.

SOC 225-3. Introduction to Sociology of Women.
Study of the images of women in American society, relating these stereotypes to actual conditions and experiences of women. Recommended to the returning student. Meets with WMST 225.

SOC 250-3. Social Problems.
An introduction to the sociological perspective on social issues and problems such as deviance, race and ethnic relations, aging, crime and delinquency, war, drug abuse, alienation, mental illness, etc.

SOC 315-3. Modern Sociological Theory.
A review of major theorist in sociology from the late 19th century through recent and current works. Prer., 9 Hours of sociology or consent of instructor.

SOC 317-4. Social Statistics.
Quantitative techniques used in analyzing social phenomena, including an introduction to the use of calculators and SPSS computer programs in statistical analysis. PRER., SOC 212 or equivalent

SOC 322-3. Urban Sociology.
The city in terms of its social structure, residential and institutional patternings, processes of interaction, demographic processes and patterns of growth and change. Prer., SOC 111 or consent of instructor.

SOC 323-3. The Chicano Community.
Study of the origin, development, and current order of the Chicano community. Includes studies of the "Barrio," ethnic identity, social values, consequences of prejudice and discrimination. Prer., SOC 111 or 220. Meets with EMST 323.

SOC 324-3. African American Community.
Study of the origin, development, and contemporary nature of black community. Includes understanding of black culture and values, consequences of prejudice and discrimination. Prer., SOC 111 or 220.

SOC 329-3. Perspectives on Race and Ethnic Relations.
A survey of racism, discrimination, prejudice, and relationships between dominant and minority groups in selected areas of the world. Prer., SOC 220 or consent of instructor. Meets with EST 329.

SOC 330-3. Sociology of Sport.
Analysis of sport and its place in the culture life of contemporary societies. Focus on how sport and sport experiences are related to social development, social relations and major spheres of social life such as the economy, political order, education and religion. Prer., SOC 111 or consent of instructor. Meets with S L 400 and S L 500.

SOC 331-3. Sociology of the Family.
The family as a social institution. Historical development and contemporary cross-cultural analysis with emphasis on the contemporary American family. Prer., 6 Hours of sociology.

SOC 340-3. Criminology.
A basic survey course in criminology. The nature and development of law, theories of causation, empirical studies, crime, delinquency, courts, police, and corrections are studied. Approach is multidisciplinary.

SOC 341-3. Sociology of Law.
Emphasis is on the sociology of law, and the "new criminology" the criminal justice system is analyzed principally from the sociological viewpoint.

SOC 357-1 to 3. Field Experience in Sociology.
Opportunity to obtain academic credit for directed learning in an ongoing social organization. The experience may be paid or volunteer. It is the principle responsibility of the student to obtain access to an appropriate placement. One hour of credit may be earned for each three hours a week of experience, up to a maximum of three credit hours.

SOC 360-3. Introduction to Social Psychology.
A survey of the filed of social psychology, with an emphasis on socialization, relationships, self- concept, and identity. Prer., SOC 111 or consent of instructor.

SOC 361-3. Gender and Social Behavior.
Causes and consequences of gender differentiation at the individual, group, and societal levels. Review of biological, psychological, and sociological explanations for gender differences; emphasis on socialization processes. Prer., 6 Hours of SOC or instructor consent. Meets with WMST 361.

SOC 364-3. Leisure and Popular Culture.
Survey of critical approaches to leisure popular culture. Specific topics may include advertising, television, music, sport, subcultures and the body in popular culture. Prer., SOC 111.

SOC 401-3. Special Topics in Sociology.
Offered to allow intensive study in a specific area on a "demand" basis. Meets with SOC 501.

SOC 404-3. Sociology of Gender and Sexuality.
Examines historical and contemporary theories of gender and sexuality; the course is structured around questions which consider the relationship between masculinities/femininities, ideologies of the family, and the politics of sexuality. Prer., SOC 225 or WMST 101. Meets with SOC 504 and WMST 404.

SOC 407-4. Research Methods.
Problems and procedures of research design and data processing in social research. Topics covered include role of theory in research, concept formulation, design of proof and hypothesis, testing, schedule construction, sampling, interviewing, scaling techniques, analysis procedure and report preparation. Includes some limited participation in conducting research. Prer., SOC 317. Meets with SOC 507.

SOC 409-3. Research Practicum.
Practical experience in application and principles of research design and data processing to a social research problem selected by instructor. Prer., SOC 507 or consent of instructor.

SOC 415-3. Social Theory II.
Explicit focus on contemporary social theory and the sociology of knowledge, with special attention to the proposed nature of the relationship between knowledge and reality. Prer., SOC 315.

SOC 417-4. Advanced Statistics and Methods.
Designed to provide student competence in the appropriate use and interpretation of statistical techniques through multivariate analysis. Advanced research methodology is also introduced. Instruction in the use and application of the SPSS computer program package is stressed. Includes practice in assessing and analyzing large scale databases available on internet. Prer., SOC 315. Meets with SOC 517.

SOC 418-3. Community Organization and Analysis.
Study of community variables; economic, cultural, political and social. Comparative analysis of race, class, gender, and ethnicity in community settings and review of a range of research methods. Prer., Upper division social science major.

SOC 419-3. Deviant Behavior.
An examination of the definition, nature, perspectives and theories, consequences, and social control of deviant behavior. Various forms of problematic deviant behavior will be examined such as drug abuse, alcoholism, mental illness, suicide, and crime. Prer., SOC 111 or consent of instructor.

SOC 420-3. Sociology of Poverty.
Consideration of structural origins of poverty; the underclass and the dual economy. Analysis and evaluation of consequences of poverty, especially in relation to family, children, and career. Review of antipoverty programs. Meets with WMST 420 and EMST 401 SEC 001.

SOC 431-3. Social Inequalities.
An examination of social inequalities and the process of social stratification in

various social systems (small groups, formal organizations, communities, and societies) with emphasis on the American class system. Economic, status, and power differentials will be explored as well as life styles, life chances, class correlates, and social mobility. Prer., 6 hours of sociology or consent of instructor. Meets with SOC 531 and WMST 431 and EMST 401 SEC 002.

SOC 432-3. Sociology of Religion.
Social origin of religion. Religious factor in culture. Significance of religion as social control in contemporary society. Religion as an institution and its relation to other institutions. Prer., 6 hours of sociology or consent of instructor.

SOC 433-3. Sociology of Education.
Analysis of the school as a social organization. Among the topics considered are power and control in the school; classroom organization and procedures and their relation to learning and personality development in children; role of educators; and reciprocal relations of school and community. Prer., 9 Hours of sociology.

SOC 434-3. Political Sociology.
Analysis of the political order by means of specific sociological theory and method to relate power to social contexts, structural forms, and behavioral patterns. Prer., SOC 111 or consent of instructor.

SOC 435-3. Formal Organization.
An examination of the nature and types of formal organizations; their growth and development; the connections between them and the larger social context of which they are a part; and of various aspects of their internal structure, such as peer group and hierarchical relations, bureaucracy, processes of communication, management, and impersonal mechanisms of control. Prer., 6 Hours of sociology. Meets with SOC 535.

SOC 438-3. Globalization and Global Culture.
In-depth examination of the growth and development of global interdependency with a focus on trans-national and trans-cultural processes. Prer., SOC 111.

SOC 440-3. Work in Formal Organizations.
Introductory course to COR program. Modern workplace organizations-historical development, overview of various types of these organizations, relationship with individual work and client/consumer, organizational theory, management structures and the changing nature of work and workforce in modern society.

SOC 441-3. Applied Criminology.
Social and personal characteristics of the high rate street offender will be examined with a special emphasis on how the code of the street develops within the structural conditions of poverty and racism. Issues of gender, age, class, and ethnicity will be given special consideration, especially as these are related to programs of prevention, control, treatment and rehabilitation of offenders. Prer., SOC 340 or instructor's permission. Meets with SOC 541.

SOC 442-3. Senior Seminar in Criminal Justice.
A comprehensive review of the criminal justice curriculum for each student, with special emphasis on integration, analysis, and application. Each student will prepare a senior project as part of the course requirements. Prer., Senior Standing; SOC 356 or 358. Meets with SOC 599 and C J 5520.

SOC 443-3. Social Work Practice with Individuals and Families.
Public welfare services including problems involved in reconstructing personalities and improving relationships between them; the scope of social case work; and social worker as visiting teacher, family case worker, and investigator in other fields. Prer., Upper division social science major. Meets with SOC 543.

SOC 450-4. Applied Sociology: Organizational Applications.
Includes 1 credit hour for class related field experience. Applying critical analysis, social theory, social research methods to individual, organizational, and community problems. Participants work on projects involving problem assessment, development and implementation of plans and programs, and evaluation of outcomes.

SOC 451-3. Social Work Practice in the Community.
Study and analysis of selected social work agencies in the context of the community. Relationship of needs of identifiable community groups to the service capability and potential of the network of social agencies. Prer., SOC 443. Meets with SOC 551.

SOC 452-3. Sociology of Corrections and Rehabilitation.
Reviews programs demonstrated as effective in reducing criminal and delinquent behavior. Examines social, psychological and behavioral problems that influence intervention within custodial settings in comparison to community based alternatives. Meets with SOC 552.

SOC 456-3. Internship in Applied Sociology.
Participate in supervised activities in a structured program to facilitate learning in conjunction with concurrent cognate course. One hour class time per week plus 3 hours internship for each one hour of credit. Prer., SOC 453/553 or SOC 451/551 or permission of instructor and must be upper division social science major. Meets with SOC 556.

SOC 461-3. Sociology of Adolescence.
Adolescence in primitive, traditional, and modern society, with special emphasis on the contemporary United States. The possible existence of a "youth culture" is investigated. The relationship between social climates and individual academic orientations, dating patterns, etc., is analyzed. Prer., 6 Hours of sociology or consent of instructor.

SOC 462-3. Sociology of Aging.
Examination of the aging process in American society. Focus on development from late adolescence through old age and death. Meets with GRNT 462.

SOC 467-3. Sociology of Death and Dying.
Study of mortality, who dies and how, the experience of dying, and ethical and political issues related to life and death. Also includes study of the hospice ideal, social and cultural norms regarding death, and the disruption of interpersonal relationships.

SOC 480-3. Sociology of the Military.
Sociological perspective on the organization and function of the military, considered as a social institution. Prer., 9 Hours of social science.

SOC 496-3. Juvenile Delinquency.
Factors involved in delinquent behavior. Problems of adjustments of delinquents and factors in treatment and post-treatment and adjustment.

SOC 501-1 to 3. Seminar: Special Topics in Sociology.
Prer., Consent of instructor and graduate status. Meets with SOC 401.

SOC 502-1. Social Statistics.
An intensive introduction to basic and intermediate statistics for graduate students.

SOC 504-1 to 3. Seminar: Sociology of Gender Roles.
Advanced and detailed analysis of sex roles in present and past societies. Sex stratification-its causes, consequences, and measurement. Theoretical perspectives on sex role differentiation and stratification by various social and biological scientists. Emphasis on empirical studies of sex differences in socialization, personality, institutions, and culture. Meets with SOC 404 and WMST 404.

SOC 505-1. Proseminar in Sociology.
Introduction to professional sociology for graduate students. Course will explore careers in sociology and discuss research, teaching, and publishing as the relationship between academics and applied work. Prer., Permission of instructor. Graduate student in Sociology.

SOC 507-4. Seminar: Research Methods.
Problems and procedures of research design and data processing in social research. Topics covered include role of theory in research, concept formulation, design of proof and hypothesis, testing, schedule construction, sampling, interviewing, scaling techniques, analysis procedure and report preparation. Includes some limited participation in conducting research. Prer., SOC 317. Meets with SOC 407.

SOC 509-1 to 3. Research Practicum.
Practical experience in application and principles of research design and data processing to a social research problem selected by the instructor. Prer., SOC 507 or consent of instructor.

SOC 514-3. Seminar: Applied Sociology.
Exploration of the role of sociology and the sociologist in relation to the solution of social issues and problems. Addresses the questions of knowledge for what and for whom and assesses the possibility of a relevant social science. Meets with SOC 450.

SOC 515-1 to 4. Seminar: Social Theory I.
A review of the major sociological theorists of the 20th century. Will consider the major works of such pre-World War II writers as Emile Durkheim and Max Weber and the post war work of Merton and others.

SOC 516-3. Seminar: Social Theory II.
Explicit focus on continuing social theory and the sociology of knowledge, with special attention to the proposed nature of the relationship between knowledge and reality. Prer., SOC 315.

SOC 517-4. Advanced Statistics and Methods.
Designed to provide student competence in the appropriate use and interpretation of statistical techniques through multivariate analysis. Advanced research methodology is also introduced. Instruction in the use and application of the SPSS computer program package is stressed. Includes practice in assessing and analyzing large scale databases available on the internet. Prer., SOC 317. Meets with SOC 417.

SOC 518-3. Community Organizations and Analysis.
Study of community variables; economic, cultural, political and social. Comprehensive analysis of race, class, gender, and ethnicity in community settings and review of a range of research methods.

SOC 519-3. Seminar: Deviant Behavior.
An examination of the various perspectives, theories, and research on deviant behavior and its control.

SOC 526-1 to 3. Seminar: Urban Sociology.
Intensive examination of the social and cultural organization of the urban complex. History, contemporary growth, and future of the city are major perspectives; cross-cultural aspects of urban development also are emphasized.

SOC 531-3. Seminar: Social Inequalities.
A critical analysis of the perspectives, theories, and research in the field of social stratification with emphasis on the American class system. Meets with SOC 431 and WMST 431 and EMST 401 SEC 002.

SOC 534-3. Seminar on Sociology of Politics.
Analysis of the political order by means of specific sociological theory and method to relate power to social contexts, structural forms, and behavioral patterns.

SOC 535-3. Seminar: Topics in Cultural Studies.
An introduction to the cultural studies which focuses on the key theoretical debates and applied studies which have constituted the field. Topics may include ideology and power, subcultures, media studies, ethnographic and interpretive methods and the cultural politics of science. Meets with SOC 435.

SOC 541-3. Applied Criminology.
Social and personal characteristics of the high rate street offender will be examined with a special emphasis on how the code of the street develops within the structural conditions of poverty and racism. Issues of gender, age, class, and ethnicity will be given special consideration, especially as these are related to programs of prevention, control, treatment and rehabilitation of offenders. Prer., SOC 340 or instructor's permission. Meets with SOC 441.

SOC 543-3. Social Work Practice with Individuals and Families.
Public welfare services including problems involved in reconstructing personalities and improving relationships between them; the scope of social case work; and social worker as visiting teacher, family case worker, and investigator in other fields. Meets with SOC 443.

SOC 551-3.Social Work Practice in the Community.
Study and analysis of selected social work agencies in the context of the community. Relationship of needs of identifiable community groups to the service capability and potential of the

network of social agencies. Prer., SOC 443 or SOC 543. Meets with SOC 451.

SOC 552-3. Sociology of Corrections and Rehabilitation.
Reviews programs demonstrated as effective in reducing criminal and delinquent behavior. Examines social, psychological and behavioral problems that influence intervention within custodial settings in comparison to community based alternatives. Meets with SOC 452.

SOC 555-3. Seminar: The Family.
Recent trends in research and theory with emphasis on the American family in a comparative perspective. Family function and dysfunction will be considered.

SOC 556-3. Internship in Applied Sociology.
Participate in supervised activities in a structured program to facilitate learning in conjunction with concurrent cognate course. One hour class time per week plus 3 hours internship for each one hour of credit. Prer., SOC 452/552 or SOC 451/551 and must be upper division social science major. Meets with SOC 456.

SOC 583-1 to 3. Seminar: Race and Ethnic Relations.
A rigorous examination of macro-level theory in race/ ethnic relations and its applicability both to race/ ethnic relations case studies drawn from a number of societies and to the general topics of ethnic communities, protest and change, assimilation, prejudice-discrimination, and contemporary social policies.

SOC 590-3. Seminar: Analysis of Criminal Justice.
Analysis of the policies and practices of agencies involved in the criminal justice process. Comparison of due process and crime control models; of social and legal justice; and decision making and discretion. Prer., Graduate standing. Meets with C J 5100.

SOC 594-1 to 3. Seminar: Sociology of Law.
Analysis of legal procedures encountered by juvenile and adult offenders, and the effect of these procedures on goals.

SOC 595-1 to 3. Seminar: Criminology.
Theories of causation of crime as a social phenomenon; theories of rehabilitation and disposition of cases. Meets with C J 5120.

SOC 640-1 to 3. Social Psychology.
Sociological approaches in the study of the self, role theory, persons in situations, identifications, socialization, and other characteristics of persons in society. Studies of group processes bearing upon personality processes.

SOC 700-1 to 6. Masters Thesis.

SOC 940-1 to 4. Independent Study in Sociology: Undergraduate.
In order to obtain an independent study course, the student must submit a written description of learning objectives and procedures to a full-time faculty member. Each faculty member may supervise a maximum of three students per semester. This course is specifically to allow individual students to study intensively in areas which are within the fields of specialization of faculty members but not offered as a regular part of the course curriculum. Offered annually.

SOC 950-1 to 3. Independent Study in Sociology: Graduate.
In order to obtain an independent study course, the student must submit a written description of learning objectives and procedures to a full-time faculty member. Each faculty member may supervise a maximum of three students per semester. This course specifically allows individual students to study intensively in areas which are within the fields of specialization of faculty members but not offered as a regular part of the course curriculum.

SOC 999-0. Candidate for Degree.

SPANISH

SPAN 101-4. Beginning Spanish I.
Essentials of Spanish, oral-aural skills stressed with additional reading, writing, and grammar.

SPAN 102-4. Beginning Spanish II.
Essentials of Spanish continued. Additional oral- aural skills practice with increased grammar, reading, and writing. Prer., SPAN 101 its equivalency.

SPAN 211-4. Intermediate Spanish I.
Spanish at the intermediate level with concentration on conversation, culture, and civilization or literature at that level. Prer., SPAN 102 or its equivalency.

SPAN 212-3. Intermediate Spanish II.
An intermediate Spanish course continuing conversational usage and cultural integration utilizing contemporary materials, newspapers, etc. Prer., SPAN 211 or its equivalency.

SPAN 213-1. Applied Conversation.
Conversation at the intermediate level on contemporary topics in Spanish culture. Prer., SPAN 102 or its equivalency.

SPAN 292-3. Spanish for Health Profession.
The vocabulary and usage of the world of health care. Applied language and cultural values of Latino cultures. Prer., SPAN 212 or its equivalency.

SPAN 293-3. Business Spanish.
The vocabulary and usage of the world of finance and commerce. Applied business correspondence, marketing and accounting terminologies. Prer., SPAN 212 or its equivalency.

SPAN 300-3. Spanish Grammar.
A course designed to review intensively the functional application of modern Spanish. A skill-development approach featuring material encountered in everyday conversational situations. Prer., SPAN 212 or its equivalency.

SPAN 301-3. Spanish Conversation and Composition I.
Practice in conversation with emphasis on pronunciation and diction together with exercises in oral composition and grammar review. Prer., SPAN 212 or its equivalency.

SPAN 302-3. Conversation and Composition II.
Practice in conversation with emphasis on both oral and written composition. Prer., SPAN 212, 217 or its equivalency.

SPAN 310-3. Literary Analysis.
Students read different genres - narrative, essay, short story, drama and poetry to facilitate the acquisition of critical skills in the identification of basic ideological and formalistic issues within texts being studied. Prer., SPAN 212 or the equivalent.

SPAN 319-3. Introduction to Hispanic Literature I.
Introduction to literary form and expression through selected masterpieces of Peninsular, Hispanic American and U.S. Latino literatures - essay, short story, and novel. Prer., SPAN 310 or consent of instructor.

SPAN 320-3. Introduction to Hispanic Literature II.
Introduction to literary form and expression through selected masterpieces of Penisalor, Hispanic American, and U.S. Latino Literatures - poetry and drama. Prer., SPAN 310 or consent of instructor.

SPAN 323-1. Applied Conversation.
Conversation at the advanced level on contemporary topics in Spanish culture. Prer., SPAN 212 or its equivalency.

SPAN 325-3. Hispanic Culture Studies.
Cultural history of Spain. Readings of selected masterworks with discussion about art, music, architecture, folklore, and customs.

SPAN 336-3. Hispanic Short Story.
Readings and discussions of first-rate Hispanic short stories with which to build reading and verbal skill on an intermediate level. Provides a wide variety of language learning experiences. Prer., Survey of literature course.

SPAN 337-3. The Latin American Essay.
Readings from essay. Writings from the conquest to contemporary society including Las Casas, Sarmiento, Hostos, Sierra, Gonzalez, Prada, Rodo, Paz. Prer., Survey of literature courses.

SPAN 349-1 to 3. Internship in Applied Spanish.
The Language and Culture department will offer to advanced language students the opportunity to apply their knowledge in settings such as schools, social support agencies, etc. May be repeated up to three times for credit. Prer., Departmental permission.

SPAN 369-3. Hispanic Culture Through Film.
The cinematic manifestations of the richness and the variety of Hispanic culture as expressed through an artistic and humanistic vision. May be repeated once provided the topic is different. Meets with F CS 369 and FILM 369.

SPAN 391-1 to 3. Spanish Theatre Workshop.
A theatre practicum in Spanish stressing proper diction, articulation, and pronunciation as well as active involvement in public presentation of selected dramatic writers. Prer., Permission of instructor.

SPAN 392-3. Advanced Spanish for Health Care.
Advanced study of the vocabulary, language and cultural values of Latino cultures for the health care professional. Prer., SPAN 292.

SPAN 393-3. Advanced Business Spanish.
Advanced study of the vocabulary and usage of the world of business and commerce. Prer., SPAN 293.

SPAN 401-3. Advanced Spanish Communication I.
Designed to improve written expression Spanish. Detailed study of the nuances of grammar. Attention given to points most difficult for students, to composition skills, and to various styles of written Spanish. Prer., SPAN 302 or permission of instructor.

SPAN 403-3. Advanced Conversation and Composition.
Active involvement in the oral and written discussion of relevant contemporary themes: urban life, prejudice, cultural conflict, machismo and marianismo, etc. Weekly short compositions and presentation. Interaction with native informants. Prer., SPAN 302. Meets with SPAN 503.

SPAN 411-3. Women in Hispanic Literature.
An overview of Hispanic women as seen by Hispanic male and female writers; may be included as part of women's studies program. Prer., SPAN 310 or consent of instructor. Meets with Span 511.

SPAN 415-3. Masterpieces of Spanish Literature.
Masterworks of major Spanish authors: readings and discussions. Prer., SPAN 310 or consent of instructor.

SPAN 421-3. The Mexican-American Culture of the Southwest.
A survey of the major forms of Mexican-American culture, with attention to their historical development. Taught in English. Meets with F CS 421.

SPAN 425-3. The Cultural Heritage in Latin America.
The historical, cultural and political currents in Latin America beginning with Pre-Colombian indigenous cultures and continuing to the present. Prer., SPAN 302 or its equivalency. Meets with SPAN 525.

SPAN 428-3. Generation of 1898.
Reading and discussion of selected works by Unamuno, Barojo, ValleInclan, Azorin, and A. Machado. Study of the significance of this celebrated generation's contribution to Hispanic literature and thought. Prer., Survey course in literature. Meets with SPAN 528.

SPAN 440-3. Topics in Contemporary Literature.
Selected topics in Spanish or Latin American literature. Contents will vary according to the instructor and the research interests of the class. Possible themes include post World War II novelists, the boom, post-Franco Spanish drama and Cuban American writers. May be repeated once for credit if the topic is different. Prer., Survey course in literature.

SPAN 442-3. Hispanic/Latino US Literature.
Study of the works of the leading Chicano, Puerto Rican, and Cuban-American writers in the U.S. Taught in Spanish. Prer., SPAN 310 or consent of instructor. Meets with SPAN 542 and EMST 442.

SPAN 443-3. Hispanic US Drama.
Theatrical work of Chicano, Puerto Rican and US Cuban writers including Valdes, Pinero, Munoz and Morton. Taught in Spanish. Prer., Survey course in literature. Meets with SPAN 543 and EST 443.

SPAN 444-3. Hispanic, Chicano, and Mexican-American Literature.
The literary manifestation individuals of Mexican origin in theater, prose, and poetry. Taught in Spanish. Prer., Survey course in literature. Meets with SPAN 544 and EST 444.

SPAN 445-3. US Cuban Literature.
Since 1960, and even in the 19th century, Cubans migrated to the US and began

to write poems, essays, fiction, and theater; a study of these works. Taught in Spanish. Prer., Survey course in literature. Meets with SPAN 545 and EST 445.

SPAN 451-3. Contemporary Hispanic American Literature.
Reading and discussion of contemporary Hispanic American masterworks. Prer., Survey course in literature. Meets with SPAN 551.

SPAN 461-3. Latin American Authors.
Bilingual. Reading and discussion of selected material. Prer., Good command of Spanish.

SPAN 462-3. Don Quijote I.
Background and study of the first part of Cervantes' Don Quijote (1605); the 52 chapters. Prer., Survey course in literature.

SPAN 463-3. Don Quijote II.
Background and study of the second part of Cervantes' Don Quijote (1615). Prer., SPAN 462.

SPAN 465-1. Spanish or Latin American or Chicano Authors.
Offered as three five-week mini-courses (each course carrying 1 credit). This course sequence will deal with three engaging writers of either Spanish or Latin American or Chicano masterpieces. Students are encouraged to take the entire three-course sequence, which will be offered during the regular semester in successive segments during the same day/time block. See the schedule of courses for specific topics. Prer., Survey course in literature. Meets with SPAN 565.

SPAN 466-1. Spanish Authors — Poetry.
Offered as three five-week mini-courses (each course carrying one credit). This course sequence will deal with three engaging writers of either Spanish or Latin American or Chicano masterpieces. Students are encouraged to take the entire three-course sequence, which will be offered during the regular semester in successive segments during the same day/time block. See schedule of courses for specific topics. Prer., Survey course in literature. Meets with SPAN 566.

SPAN 467-1. Spanish Authors — Drama.
Offered as three five-week mini-courses (each course carrying 1 credit). This course sequence will deal with three engaging writers of either Spanish or Latin American or Chicano masterpieces. Students are encouraged to take the entire three-course sequence, which will be offered during the regular semester in successive segments during the same day/time block. See the schedule of courses for specific topics. Prer., Survey in course literature. Meets with SPAN 567.

SPAN 497-3. Senior Seminar: Spanish.
Required capstone course for graduate with a major in Spanish. Monographic study of a period, author, genre or topic. Prer., Five previous literature courses. Consent of instructor. Senior status only.

SPAN 511-3. Women in Hispanic Literature.
Prer., Graduate status. Meets with Span 411.

SPAN 516-3. Masterpieces of Hispanic American Literature.
Advanced work beyond the SPAN 416 course. Prer., Graduate status. Meets with SPAN 416.

SPAN 525-3. Cultural Heritage in Latin America.
The historical, cultural and political currents in Latin America beginning with Pre-Columbian indigenous cultures and continuing to the present. Prer., Graduate status. Meets with SPAN 425.

SPAN 528-3. Generation of 1898.
Reading and discussion of selected works by Unamuno, Baroja, ValleInclan, Azorin and A. Machado. Study of the significance of this celebrated generation's contribution to Hispanic literature and thought. Prer., Graduate status. Meets with SPAN 428.

SPAN 541-3. Modernism.
Study of Spanish-American literary movement of late 19th century. Additional work required beyond the SPAN 441 level. Prer., Graduate status.

SPAN 542-3. Hispanic/Latino US Literature.
Study of the works of the leading Chicano, Puerto Rican, and Cuban-American writers in the US. Advanced work beyond SPAN 442. Taught in Spanish. Prer., Graduate status. Meets with SPAN 442 and EMST 442.

SPAN 543-3. Hispanic US Drama.
Theatrical work of Chicano, Puerto Rican, and US Cuban writers including Valdes, Pinero, Munoz, and Morton. Taught in Spanish. Prer., Graduate status. Meets with SPAN 443 and EST 443.

SPAN 544-3. Hispano/Chicano/ Mexican American Literature.
The literary manifestation of individuals of Mexican origin theater, prose and poetry. Taught in Spanish. Prer., Graduate status. Meets with SPAN 444 and EST 444.

SPAN 545-3. US Cuban Literature.
Since 1960, and even in the 19th century, Cubans migrated to the US and began to write poems, essays, fiction and theater. Taught in Spanish. Prer., Graduate status.

SPAN 551-3. Contemporary Hispanic American Literature.
Advanced work beyond the SPAN 451 course. Prer., Graduate status. Meets with SPAN 451.

SPAN 561-3. Latin American Authors.
Three Latin American authors: Luisa Valenzuela, Isabel Aslant, and Marta Trapa. Reading and discussion of selected material. Advanced work beyond SPAN 461 course. Prer., Graduate status.

SPAN 562-3. Don Quijote I.
Background and study of the first part of Cervantes' Don Quijote (1605) the 52 chapters. Prer., Graduate status.

SPAN 563-3. Don Quijote II.
Background and study of the second part of Cervantes' Don Quijote (1615). Prer., Graduate status.

SPAN 565-1. Spanish or Latin American or Chicano Authors.
Offered as three five-week minicourses (each course carrying 1 credit). Course sequence will deal with three writers of either Spanish, Latin American, or Chicano masterpieces. Students are encouraged to take the entire three-course sequence, which will be offered during the regular semester in successive segments during the same day/time

block. See Schedule of Courses for specific topics. Advanced work beyond SPAN 465, 466, 467 level. Prer., Graduate status. Meets with SPAN 465.

SPAN 566-1. Spanish Authors Poetry.
Offered as five three-week minicourses (each course carrying 1 credit). Course sequence will deal with three writers of either Spanish or Latin American or Chicano masterpieces. Students are encouraged to take the entire three-course sequence, which will be offered during the regular semester in successive segments during the same day/time block. See Schedule of Courses for specific topics. Prer., Graduate status. Meets with SPAN 466.

SPAN 567-1. Spanish Authors — Drama.
Offered as three five week minicourses (each course carrying 1 credit). Course sequence will deal with three writers of either Spanish or Latin American or Chicano masterpieces. Students are encouraged to take the entire three-course sequence, which will be offered during the regular semester in successive segments during the same day/time block. See Schedule of Courses for specific topics. Advanced work beyond the SPAN 465, 466, 467 level. Prer., Graduate status. Meets with SPAN 467.

SPAN 920-1 to 4. Independent Study in Spanish.
May be repeated up to three times for credit. Prer., Consent of instructor.

SPAN 930-1 to 4. Independent Study in Spanish.
May be repeated up to three times for credit. Prer., Consent of instructor.

SPAN 940-1 to 4. Independent Study in Spanish.
Independent work for undergraduates only. By special arrangement with the faculty. Only for students presenting strong Spanish preparation. May be repeated up to three times for credit. Prer., Consent of instructor.

SPAN 950-1 to 4. Independent Study in Spanish: Graduate.
Independent work for graduate students only, by special arrangement with the faculty. May be repeated up to three times for credit. Prer., Graduate status.

THEATER

THTR 100-3. Introduction to Theater.
An introduction to the art and practice of theatre, including acting, directing, playwriting, scenic and lighting design. Course includes required attendance at theatre productions.

THTR 200-3. Introduction to Technical Theatre.
An introduction to scene design, stage lighting, and all the fundamentals of technical theatre. Students will actively participate in university stage production. May be taken as an alternative to THTR 100.

THTR 201-1. Stagecraft Laboratory.
A hands-on practicum in stagecraft. Students will be given specific responsibilities in production work. Required of all students taking THTR 233 or 234.

THTR 202-3. Acting Workshop I.
An introduction to stage acting, with an emphasis on theatre games designed to develop imagination and concentration. Several physical and improvisational exercises and a basic approach to character development.

THTR 203-3. Acting Workshop II.
Continuation to THTR 202, designed for those who have completed 202 or who have had previous acting experience. Increased emphasis on character development and scene work. Prer., THTR 202.

THTR 204-3. Voice and Articulation I.
Special training of the voice. Topics include breathing techniques, voice quality, projection, articulation, and basic IPA (International Phonetic Alphabet). Prerequisite for THTR 304-Voice and Articulation II.

THTR 211-3. Introduction to Teatro Chicano.
An introductory survey of the historical development of contemporary Teatro Chicano from Spanish drama and an introduction to methods of theatre: acting, directing, staging and script writing. Meets with EMST 211.

THTR 220-3. What's Funny: The Nature and Form of Dramatic Comedy.
A survey of dramatic comedy from ancient times to the present, with particular emphasis on continuity of routines, comic acting, and variety of comic forms.

THTR 250-3. Movement for the Actor.
Focuses on the physical training of the actor. Stage combat, period movement, mask work, and various character development work will be explored. Performance required in either Fall Student Showcase or Spring Festival.

THTR 260-3. Theatre for Children.
A lecture and practicum in Children's Theatre and educational theatre techniques. Various sources examined for dramatizing: children's stories, fairy tales, poems, and existing scripts. Recommended for actors and soon-to-be educators. Fall only. Prer., THTR 100.

THTR 280-2. Theatre Tour.
Class will travel to a major city (London, New York) to attend stage productions. Readings, discussion, and written assignments organized around productions chosen. Additional fees.

THTR 290-3. Special Topics in Theatre.
Topics will vary from year to year, and may be taught by guest instructors.

THTR 302-3. Advanced Acting Studio I.
Intensive studio work on scenes and monologues (Shakespearean and contemporary). Prer., Open ONLY to those who have completed THTR 203, or by special audition and permission of instructor PRIOR to first day of class. Performance required in Fall Student Showcase.

THTR 303-4. Advanced Acting Studio II.
A continuation of THTR 302, or by special permission of the instructor. Students will study, research, and perform a variety of works by one playwright. Class will culminate with a performance project to be showcased in the Spring Student Theatre Festival. Prer., THTR 202, 203, 302.

THTR 304-3. Voice and Articulation.
Continuation of the THTR 204. Intense study of Edith Skinner's vocal technique

and the IPA. Introduction of dialects and voice-over commercial work. Prer., THTR 204 or permission of instructor.

THTR 310-3. On-Camera Performance.
An introduction to skills necessary for communicating through a camera, to include basic acting techniques. This is a studio course which will involve on-camera experiences with commercial copy, commentary, news copy, dramatic scenes and industrial copy.

THTR 320-3. History of Theater I: Greeks through Restoration.
The basic development of theatre from the Greeks through Restoration. The emphasis is on theatre as a performance art. Satisfies a General Humanities requirement.

THTR 321-3. History of Theater II: Realism to the Present.
The development of theatre from Realism (Henrik Ibsen) to the present. Examination of 19th and 20th century drama in Europe and America, with emphasis on Contemporary theatre. Satisfies a General Humanities requirement.

THTR 336-1 to 6. Theatre in Production: Technical Practicum.
Participation and technical assistance in the spring student production and the Student Theatre Festival. Enrollment by permission of instructor only. Prer., THTR 200 or permission of instructor.

THTR 337-1 to 6. Theatre in Production: Acting Practicum.
Participation and performance in the Spring Student Production. Prer., Enrollment by audition and/or permission of instructor only.

THTR 338-1 to 6. Shakespeare in Production.
Special production-related projects in conjunction with the Theatreworks Summer Shakespeare Festival. Enrollment by permission of instructor only. Prer., THTR 100.

THTR 350-3. Theatre for Children.
A seminar and practicum in Children's Theatre. Students examine various sources for dramatizing children's stories, fairy tales, poems, and existing scripts. Course includes a full production to be toured to area schools. Recommended for actors and soon-to-be teachers. Prer., THTR 100 and 203/Special permission and/or by audition.

THTR 403-1 to 6. Internship/Cooperative Education.
Designed theatrical experiences involving specific application of relevant concepts and skills in supervised employment situations off campus at reputable professional theatre companies. Prer., Theatre Minor, Jr. standing w/2.75 GPA and Permission of Department Chair.

THTR 406-3. Directing I.
An introduction to directing for the stage. Exploration of various staging techniques and the essential technical areas (lights, sound and design) as well as intense script analysis. Prer., THTR 100 and/or THTR 203.

THTR 407-3. Directing II.
A seminar and practicum in directing for the stage. Students will apply learned techniques from THTR 406 by directing one-act plays, which will be performed in the Spring Student Theatre Festival. Prer., THTR 406.

THTR 940-1 to 6. Independent Study in Theatre.
Independent study in theatre history, production or performance by permission of department chair.

Visual Arts

V A 101-3. Beginning Studio 2D.
A basic course exploring fundamental two-dimensional concepts used in the production of visual art, including color theory, composition, and patterning. Prer. to all 200 and 300 level V A courses in two- dimensional art.

V A 102-3. Beginning Studio 3D.
A basic course in fundamental three-dimensional concepts and processes including problems in form, space, and 3D construction techniques. Prer. to all 200 and 300 level courses in three-dimensional art.

V A 103-3. Introduction to Photography.
An introduction to the techniques and concepts of photography as it relates to the fine arts. Practical assignments will involve the fundamental use of light, camera, lens, and darkroom equipment in the production of black and white negatives and prints. Students must have access to an adjustable camera.

V A 104-3. Beginning Drawing.
A basic course in drawing, exploring the principles of line, form, and space in a variety of drawing techniques and media. Concentration on still life subject matter with some drawing of the human model.

V A 201-3. Intermediate Drawing.
Continuation of the study of line, form, and space in a variety of drawing media with emphasis on the nude model. Prer., V A 104 or consent of instructor.

V A 202-3. Printmaking.
Introduction to selected printmaking techniques, including silkscreen, Xerox, intaglio, and etching. Specific content will be determined by instructor.

V A 203-3. Intermediate Photography.
Continuation of the study of black and white photography as a controlled creative art media. Prer., V A 103 or consent of instructor.

V A 204-3. Beginning Painting.
Introduction to painting, using a variety of paint media.

V A 205-3. Ceramics.
Introduction to hand-built ceramic forms with a variety of clay bodies.

V A 206-1 to 3. Two-Dimensional Topics.
A mixed media course concentrating on surface design. Technical aspects may include airbrush, blueprinting, dyeing, stamp-printing, and Xerox. Specific content will be determined by the instructor. Meets with V A 306.

V A 207-1 to 3. Three-Dimensional Topics.
A mixed media course concentrating on structural form. Specific content will be determined by the instructor. Media may include paper, wood, fabric, and plastic.

V A 208-3. Begin Figure Sculpture.
Introduction to sculpture and to several media including wood, paper, metal and plastics.

V A 209-3. Textiles.
Introduction to various nonloom fiber processes, including sewn forms, cro-

chet, knotting, net-making, and handmade felt. Meets with V A 307 and V A 309.

V A 210-3. Introduction to Computer Art.
Visual problem-solving using the computer and menu- driven software as tools for art and graphic design. Drawing and painting in color from two and three dimensional observation, exercises in competition and use of fonts, digitization from video, photographic and print documentation of work. Prer., V A 101, V A 104, or consent of instructor.

V A 219-3. Weaving.
Introduction to the four-harness loom, including pattern drafting, 3D forms, and basic weaving techniques.

V A 230-3. Introduction to Watercolor/Watermedia.
Designed to familiarize students with the materials and techniques of watercolor painting with attention to past and contemporary masters of the medium and their techniques.

V A 244-3. Papermaking.
Students will be taught to work with paper and pulp in the creation of handmade papers and related two-dimensional and three-dimensional objects.

V A 301-3. Advanced Drawing.
Drawing with emphasis on development skills and concepts including work with a human model.

V A 302-3. Advanced Printmaking.
Continuation of V A 202, with emphasis on experimentation and development of skills and concepts.

V A 303-3. Advanced Photography.
Exploration of advanced techniques and concepts dealing with the development of personal expression through photographic media.

V A 304-3. Advanced Painting.
Continuation of V A 204, with emphasis on development of skills and concepts in contemporary painting.

V A 305-3. Advanced Ceramics.
Continuation of V A 205, with emphasis on development of skills and concepts in ceramic sculpture.

V A 306-1 to 3. Two-Dimensional Topics.
Advanced work in surface design principles and techniques. Meets with V A 206.

V A 307-1 to 3. Three-Dimensional Topics.
Advanced work with structural form in mixed media. Credits may be offered as 1 or 2 or 3 hours. Meets with V A 209 and V A 309.

V A 308-3. Advanced Sculpture.
Continuation of V A 208, with emphasis on development of skills and concepts in a variety of sculpture media.

V A 309-3. Advanced Textiles.
Fiber sculpture using basic fiber construction principles and processes. Meets with V A 209 and V A 307.

V A 310-3. Advanced Computer Art.
Introduction to advanced paint software, collaborative painting project, portfolio development in computer painting with focus on development of personal aesthetic, extension to other fine arts disciplinary areas. Photographic documentation of portfolio work; emphasis on quality of hard copy.

V A 319-3. Advanced Weaving.
Continuation of V A 219, with both four and eight- harness loom work and concentration on 3-D form.

V A 344-3. Advanced Papermaking.
A continuation of V A 244 with advanced processes and dyeing techniques.

V A 398-3. Seminar in Studio Problems.
Intended for the advanced visual art student, will emphasize thematic development, articulation of content and considerations of processes necessary for the completion of a body of work reflecting personal expressiveness.

V A 410-3. Advanced Projects in Electronic Imaging.
Emphasizes the articulation of a personal aesthetic, as well as the development of expertise in use of multiple platforms, visual communication with remote sites and comparison of hard copy alternatives. It is planned for students intending to pursue studies in electronic media at the graduate level.

V A 444-3. Contemporary Handmade Papermaking Techniques.
Supplemented with lectures on historical methods. Includes in-depth exploration of pulp varieties and coloring processes, as well as numerous three- dimensional possibilities.

V A 498-3. Professional Seminar.
A required course for studio area majors, this deals with the preparation of a resume, slide portfolio, graduation school applications and exhibition organization and installation.

V A 940-1 to 4. Independent Study in Visual Art.
Independent Study in Visual Arts undergraduate. May be taken in any media with any full-time professor for up to 4 credit hours, by arrangement.

Women's Studies

WMST 131-3. A Lab of Her Own-Science and Women.
Introduction to natural science and its methods for non-science majors. It focuses on women's participation in both the formation of scientific concepts and the development of methodology. Modern concepts of science and mathematics with an emphasis on women's contributions to these fields will be presented. This course will also offer a feminist critique of the traditional methods of science. Meets with PES 131 and PHIL 131.

WMST 200-3. Introduction to Women's Studies.
An interdisciplinary course designed to introduce students to theories, concepts, and debates through which women's historical, material, and cultural conditions have come to be understood. Considers these theories as they have developed within and across disciplines. Analysis of the intersections of Race, Class, Gender and Sexuality, i.e., the diversity Women's experience, is central to course consideration.

WMST 204-3. Women and Cross-Cultural Perspective.
WMST 204 is an interdisciplinary course designed to introduce students to basic theories, concepts, and debates through which women's sociocultural, historical, and material conditions have been understood. This course examines roles and statuses of women in both a national

and global perspective. Meets with ANTH 204.

WMST 215-3. Male and Female Communication.
A lecture/discussion approach to the study of contemporary theories and research in male/female communication. The course will involve reading and discussion in such areas as gender differences in self-perception, social and media images of men and women, language usage and nonverbal behavior differences between genders. Prer., COMM 102. Meets with COMM 215.

WMST 220-3. Women's Equality, Women's Difference.
An introductory course that presents both the history of philosophical treatments of women and contemporary philosophical analyses of women's social, political, scientific, and philosophical roles. Meets with PHIL 220.

WMST 224-3. Childhood Socialization.
An examination of the process through which children define themselves as members of their culture. The influence of such "cultural communicators" as the family, school, television, day care, children's literature, games, toys and peer relations will be examined. Meets with SOC 224.

WMST 225-3. Images of Women in Society.
Study of the images of women in American society, relating these stereotypes to actual conditions and experiences of women. Recommended to the returning student. Meets with SOC 225.

WMST 245-3. Social Psychology of Social Problems.
An examination of social psychological aspects of a variety of social issues and problems in contemporary society. Meets with PSY 245.

WMST 255-3. Women and Religion.
Examines the question of the historical place of women in religion from a cross-cultural perspective, and asks how the role of women in religion relates to their greater role in society. The course also poses questions of feminine versus masculine spirituality, and the relationship of matriarchal to patriarchal religions. Meets with REST 255 and PHIL 255.

WMST 290-3. Special Topics in Women's Studies.
A detailed examination of a special topic taken from any field of women's studies which is not covered by the regular women's studies course offerings.

WMST 301-3. Women in Politics.
An examination of the role of women in American politics. Topics will include a historical perspective of women's political activity, the political interests and group activities of women, the legal status of women, political attitudes of and toward women, and women's political behavior. Meets with P SC 301.

WMST 310-3. Women of Color: Image and Voice.
An examination of the ways in which the intersections of race, ethnicity, and gender are constructed both within and against traditional American feminism and gender critiques. The course will address areas of divergence from mainstream feminism and the construction of alternative representations by women of color. Prer., WMST 200 or EMST 200. Meets with EMST 310.

WMST 320-3. Women Writers and Women's Experience.
Study of some women writers deserving attention because of their artistry and depiction of women's lives. Meets with ENGL 320.

WMST 321-3. Human Sexuality.
Covers in substantive form the interdisciplinary field of human sexuality. The topic is approached from the perspectives of physiology, endocrinology, behavior, sociology, ethnology, and anthropology. Prer., PSY 100. Meets with PSY 321.

WMST 325-3. Perspectives on the Study of Women.
A survey of the approaches to the study of women characterized in the various disciplines in the social sciences and humanities with an emphasis on common themes and issues. Meets with SOC 325.

WMST 327-3. Images of Women in Art and Society.
A consideration of some recurrent images of women artists in relation to the male art of the same culture. Meets with A H 327.

WMST 331-3. Sociology of the Family.
The family as a social institution. Historical development and contemporary cross-cultural analysis with emphasis on the contemporary American family. Prer., Six hours of sociology. Meets with SOC 331.

WMST 355-3. Psychology and Women.
A survey of female psychology and the study of sex differences through an examination of theories of female personality development, biological determinants of female personality, traditional and alternative lifestyles, women in psychotherapy, and women at work. Prer., PSY 100. Meets with PSY 355.

WMST 361-3. Gender and Social Behavior.
Causes and consequences of gender differentiation at the individual, group, and societal levels. Meets with SOC 361.

WMST 363-3. Gender and Race in Biblical Literature.
This course examines the presence(s), result(s), and interpretation(s) of gender and race in biblical literature and the issues and problems those categories present to the reader. Prer., WMST 200 recommended. Meets with PHIL 363 and EST 363.

WMST 390-3. Special Topics in Women's Studies.
A detailed examination of a special topic taken from any field of women's studies which is not covered by the regular women's studies course offerings.

WMST 404-3. Gender and Sexuality.
Focus on the various roles of women in American society within historical, socioeconomic, and cultural contexts; changes of these roles and contexts. Meets with SOC 404 and SOC 504.

WMST 411-3. Women and Hispanic Literature.
An overview of hispanic women as seen by Hispanic male and female writers. Prer., SPAN 301, SPAN 302 or consent of instructor. Meets with SPAN 411.

WMST 412-3. The Body, Culture, and Power.
Considers sociological-cultural studies that question the relationship between the body, power and meaning. Meets with SOC 412.

WMST 420-3. Sociology of Poverty.
Consideration of structural origins of poverty; the underclass and the dual economy. Analysis and evaluation of consequences of poverty, especially in relation to family, children, and career. Review of antipoverty programs. Meets with SOC 420.

WMST 431-3. Social Inequalities.
An examination of social inequalities and the process of social stratification in various social systems (small groups), formal organizations, communities and societies with emphasis on the American class system, economic, status, and power differentials will be explored as well as life styles, life chances, class correlates and social mobility. Prer., Six hours of sociology or consent of instructor. Meets with SOC 431 and SOC 531.

WMST 455-3. Feminism, Sexuality, and Culture.
An examination of selected philosophical issues in the context of recent developments in feminist thought. Course will consider the question of whether traditional patterns of philosophical thought express gender bias, and if so why. Meets with PHIL 455 and PHIL 555.

WMST 476-3. Women's Space, Women's Place: Women's Role in Changing the Face of the Earth.
A re-examination of traditional aspects of cultural and regional geography from a feminist perspective. eets with GES 476.

WMST 490-3. Special Topics in Women's Studies.
A detailed examination of a special topic taken from any field of women's studies which is not covered by the regular women's studies course offerings.

WMST 491-3. Selected Topics in History and Women.
These courses are usually taught on a one-time basis. The subject matter will change from year to year and will cover an important but rarely taught subject in history.

WMST 498-3. Seminar on Major Authors: Virginia Woolf.
An intensive investigation into the life, the times, and especially the writing of Virginia Stephen Woolf (1882-1941). Readings will include several of Woolf's novels, including To The Lighthouse and Mrs. Dalloway, a large sampling of her short stories, plus various of her essays critical pieces and journals. Collateral readings will include the standard biography by Bell and de Salvo, Virginia Woolf: The Impact of Childhood Sexual Abuse on Her Life and Work. Prer., ENGL 150. Meets with ENGL 498 and ENGL 598.

WMST 940-1 to 3. Independent Study in Women's Studies.
A student desiring independent study credit must present to the faculty a well-defined written project for research which is not included in the ordinary offerings of the departments whose courses are included in the W. S. Program. Students must secure approval from the faculty member with whom they wish to work, as well as from the Women's Studies program director. Prer., Consent of instructor and Women's Studies program director.

Beth-El College of Nursing

Health Sciences

HSCI 100-3. Basic Emergency Services.
Provides the beginning preparation for Basic Emergency Medical Technician practice. Introduces the basic concepts foundational to emergency care which includes baseline assessment, history, airway management, physical assessment skills, communication and documentation.

HSCI 101-1. Pharmacological Math.
A prerequisite for medication administration. Prepares the student to work with common drug calculations applicable to concepts of measurement, conversions, and calculation of oral, parenteral, and intravenous drug dosages.

HSCI 104-3. Physiological Chemistry.
Introduces basic chemical principles through the investigation of human biochemical and physiological process. Basic chemistry, biochemistry, organic chemistry and pharmacological concepts are foundational to understanding human physiology and pathophysiology.

HSCI 105-3. Introduction to Basic Emergency Services.
Introduces students to clinical experiences in emergency service settings. Prer., HSCI 100.

HSCI 110-1. Interpersonal Skills for Health Care.
Introduces communication theory and skills as a foundation for human caring and the therapeutic relationship. Personal effectiveness is enhanced through the development of group process skills, assertiveness and critical thinking. Meets with NURS 110.

HSCI 120-3. Future of Health Care.
A futuristic perspective of health care. Finance and delivery systems, professional roles, changing consumer involvement, ethical issues, impact of technology and world-views of tomorrow are explored. A dynamic learning environment will allow students to foster creativity and critical thinking.

HSCI 200-3. Professional Practice Foundations.
Provides the foundation for the evolving professional practice in health care services and systems as they effect the practice of service delivery within the community are introduced. Provider roles and critical thinking models are emphasized. Prer., Current certified EMT-P or enrolled in an accredited EMT-P program.

HSCI 205-3. Pharmacology.
Provides foundation for understanding pharmacodynamics and drug administration. Therapeutic interventions are emphasized, including patient teaching, safety considerations and legal and ethical issues. Prer., BIOL 201 and BIOL 202. Concurrent: HSCI 101.

HSCI 206-3. Health Science Statistics.
Introduction to statistical methods utilized for analysis of health sciences data. Includes descriptive statistics such as frequency distribution, measures of central tendency and variability. Inferential statistics such as correlation, T-test and analysis of variance are studied.

HSCI 207-3. Nutrition for Health Professionals.
An introductory course for health sciences students which focuses on biological and environmental influences on nutritional needs and status. The role of nutrients in energy metabolism and physiology, and the teaching role of the health professional will be emphasized,

as well as personal dietary assessment. Meets with BIOL 205.

HSCI 210-3. Patient Assessment (EMS).
Focuses on the empirical knowledge necessary to provide initial, focused, detailed and ongoing assessments. Evaluation of the accident scene and mechanism of injury focus on the development of general impression and plan of treatment. Ethical implications of assessment findings are explored. Meets with NURS 210.

HSCI 245-3. Health Care Environment.
Introduces students to the complex health care environment and role of health personnel. Focuses on the historical and contemporary forces on the health care delivery system, roles of health professionals, social, political and economic influences will be explored.

HSCI 248-3. Computer Applications in Health Care.
An overview of technological applications in health care systems. Addresses types of computerized information systems and how they can support clinical practice, research, administration, and education. Explores federal regulation on computer use and access.

HSCI 280-3. Biomedical Aging: Myths and Realities.
Study of the processes related to biological, medical and physical aspects of aging. Meets with BIOL 204 and GRNT 204.

HSCI 301-3. Pathophysiology.
Pathophysiological concepts build on previous principals and basic science. Correlates underlying pathophysiological process at the cellular system level with manifestations in individuals as signs, symptoms, or laboratory findings. Explores various factors in relationship to the pathogenesis of disease process. Prer., BIOL 201, BIOL 202, BIOL 203, CHEM 101 and CHEM 102.

HSCI 302-3. Intro to Emergency Medical Service.
An overview of the roles and responsibilities of the professional prehospital care provider. Explores relation to socio-political, medical/legal and ethical considerations. Emphasizes meeting the emotional and physical need of patients throughout the life span.

HSCI 306-3. Pathophysiology (RN).
Builds on basic sciences. Correlates underlying pathophysiological processes at the cellular/system level to manifestations in individuals as signs, symptoms, or laboratory findings. Various factors will be discussed in relationship to the pathogenesis of disease process.

HSCI 311-3. Fundamental Emergency Skills (EMS).
Introduces fundamental skills associated with emergency care, including patient assessment, airway management, medication administration, and cardiac monitor application and interpretation. Clinical lab required.

HSCI 312-3. Cardiac Emergencies (EMS).
Introduces the interpretation of the cardiac rhythm, variations, and presenting signs and symptoms of common cardiac conditions. Includes 12-lead monitoring, electrical and pharmacologic interventions for cardiac dysrhythmias. Includes psychological and sociological perspectives of care.

HSCI 313-3. Pulmonary and Neurological Disorders (EMS).
Introduces the pathophysiology evaluation and emergent treatment of patients with acute pulmonary and non-traumatic neurological disorders across the lifespan.

HSCI 345-3. Trends and Issues.
Provides the student with an historical perspective of the social political context of the health care delivery system and concepts include health care economics, medical ethics, health care politics and professional empowerment.

HSCI 348-3. Sports for Special Populations.
Provides the opportunity to adapt sport principles and activities to meet the needs of individuals with disabilities. Concepts include theories of motivation, psychology of adjustment, adapted physical education and coaching principles.

HSCI 350-3. Prehospital Nursing.
Expands critical thinking skills to the prehospital environment. Prepares the student to provide basic and advanced life support skills in emergency situations. Provides entry level knowledge and skills for advanced prehospital practice in collaboration with EMTs, paramedics, nurses, and physicians.

HSCI 401-3. Health Science Research.
Develops a fundamental understanding of the research process. Enables students to critically analyze the merit of published health science research. Students begin to derive a theoretical and research knowledge base of therapeutic care interventions. Meets with NURS 401.

HSCI 410-4. Advanced Emergency Skills (EMS).
Introduces participants to advanced skills associated with emergency care, including cardiac arrest management, needle thoracostomy, trauma management skills, and specialized pediatric techniques. Environmental disasters, major incident response and rescue modalities are addressed.

HSCI 412-3. Medical Emergencies (EMS).
Introduces medical complications likely to present in the pre-hospital setting. Includes pathophysiology, common presentations of complications and emergency stabilization of diabetic and endocrine disorders, toxicologic emergencies, environmental emergencies, allergies, anaphylaxis, infectious disease, OB/GYN emergencies and behavioral disorders.

HSCI 413-3. Trauma Management (EMS).
Introduces the epidemiology and common injury patterns seen in varipid traumatic situations. Includes pathophysiology, common presentations, and emergency stabilization of head, chest, abdominopelvic, spine, and extremity trauma.

HSCI 416-3. Community and Home Care (EMS).
Provides an overview of home health and community based health care service. Models of patient and family education for self management and rehabilitation are introduced. Community assessment, collaboration and networks, and mobilization are explored.

HSCI 417-3. Paramedic Practicum I (EMS).
Provides an opportunity to apply specific clinical concepts, strategies, and skills in supervised clinical setting. Clinical skills included are patient interviews, physical assessment, airway management, cardiac rhythm interpretation and

treatment, administration of medications and the assessment and management of neurologic emergencies.

HSCI 418-3. Paramedic Practicum II (EMS).
This field internship is the culmination of the paramedic practicum program, and provides an opportunity to practice as a paramedic under the direct supervision of a clinical preceptor. Clinical skills included in this practicum encompass the entire scope of practice.

HSCI 429-3. Legal Aspects of Forensic Science: Civil and Criminal.
Criminal, civil and family law will be discussed as they relate to forensic issues. Prer., HSCI 200, HSCI 245 or permission of instructor. Meets with NURS 636.

HSCI 430-3. Sexual Assault: Implications for Health Care Delivery.
Focuses on the problem of sexual violence and medicolegal aspects of health care. Explores the interdisciplinary and holistic approach to enhance quality of care for victims, perpetrators and involved families are explored. Models for preventive strategies and public education are investigated. Meets with NURS 630.

HSCI 431-3. Introduction to Forensics.
Provides an introduction to clinical forensics with an emphasis on emergency department and community health forensic issues through the study of forensic science. Explores the principles and philosophy of clinical forensics and role of forensic practitioners in community based settings. Meets with NURS 631.

HSCI 432-3. Investigation of Injury and Death.
An exploration of concepts and principles related to investigation of injury and death. Forensic pathology and forensic autopsy procedures are included. Specialized topics in clinical practice such as medicolegal evidence, violence injury and environmental pathology are included. Meets with NURS 632.

HSCI 433-3. Criminalistic and Forensic Science.
Introduces the areas of crime scene preservation, investigation and the scientific tactics, procedures, and techniques employed by forensic experts. As an advanced course, attention will be given to homicide investigation and its central role in forensic examinations. Meets with NURS 633.

HSCI 434-3. Psychosocial and Legal Aspects of Forensic Science.
Introduces the psychological, neurocognitive, social-sociological and legal dimensions of forensics. Attention will be given to assessment and diagnosis of mental disorders, and the interface between the psychosocial effects of injury and illness and the judicial system. Criminal, civil and family law applications of forensics will be considered. Meets with NURS 634.

HSCI 435-2. Internship in Clinical Forensics.
Arranged to expand clinical application of theory content in forensics. Arrangements can be made for experiences with coroners, emergency departments, crime investigation units, prisons or other clinical settings which are congruent with student goals. Meets with NURS 635.

HSCI 436-2 to 3. Management.
Provides the framework for the managerial role in the health care context. Leadership in healthcare organizations is addressed with the focus on models, motivational theory, organizational communication, management and strategic planning. Prer., All third year courses. Meets with NURS 430.

HSCI 437-3. Violence and Human Right Issues.
Provides the opportunity to explore the impact of violence in relation to the responsibilities of the investigator, assessor, evaluator and therapist. Includes strategies of care for individual, family, and community survivors. Principles and philosophies of victimology, traumatology, domestic violence. Meets with Nurs 637.

HSCI 438-3. Substance Abuse.
Presents the most recent findings regarding the pathology of substance abuse. The misuse of drug and alcohol and the associated effects that influence key dynamic processes in family system functioning are discussed.

HSCI 439-3. Forensic Photography.
Designed to assist professionals in forensic science and health care in the basic principles and techniques associated with forensic photography at the crime scene, in the hospital setting, or in the autopsy laboratory. Meets with NURS 650.

HSCI 440-1 to 3. Forensic Practicum.
Allows the student the opportunity to implement skills and knowledge assigned with a preceptor in a health delivery setting. Student initiated contract with approval of faculty and preceptor.

HSCI 441-3. Forensic Chemistry and Toxicology.
Introduces the chemical science of forensic investigative techniques including the principles of biochemistry, toxicology, and serology.

HSCI 450-3. Legal/Ethical Issues.
A theoretical basis for ethical/legal decision-making is applied to contemporary situations encountered in nursing and medical practice.

HSCI 451-3. Hearing and Vision Alterations.
Designed for students who desire greater depth of knowledge in special health care and communication needs of individuals with alterations in hearing and vision. Prer., All second year courses or consent of lead faculty.

HSCI 452-3. Health Teaching.
The principles of learning/teaching are applied to problems in clinical settings. Teaching programs for individuals and groups are planned, implemented and evaluated as part of the course.

HSCI 453-3. Therapeutic Touch.
Provides an opportunity to explore and experience energy based healing methods. Therapeutic touch is studied as a healing modality.

HSCI 454-3. Death and Dying.
A comprehensive introduction to the study of death and dying with integration of a wide range of interdisciplinary approaches. Providing a theoretical basis and current research on the topic. The course also allows for the opportunity to apply theory to life situations and personal experiential discovery.

HSCI 455-3. Complementary Healing Methods.
A survey course which presents an overview of the history, theoretical bases, applications, resources, and trends of complementary healing methods. The evolution of Western scientific thought and Eastern medical theories is examined as a basis for understanding current health perspectives and treatment modalities. The course is not intended as an endorsement of any of the methods studied.

HSCI 456-3. Women's Health Care Issues.
Selected women's issues are explored from a historical, psychological and socio-political focus in order to increase understanding of the experience and impact on the woman, her significant others, health care professionals and the health care system.

HSCI 457-3. Creative Journey.
This interdisciplinary course explores the concepts which link the esthetic experience and holistic healing within a cultural framework. The idea of life as a journey provides the foundation for the student to encounter deep dimensions of their inner being through experiential learning techniques.

HSCI 459-3. Concepts of Health & Disease.
Provides background and rationale for the dynamic biological, sociological and spiritual influences on health and illness and dimensions of illness that affect the individual and family. Implications of long-term catastrophic illness and life threatening illnesses are addressed. Prer., BIOL 201, BIOL 202 and HSCI 301.

HSCI 460-3. Fitness and Wellness Concepts.
Introduces the concepts and frameworks for health promotion and fitness. Provides an overview of factors influencing wellness of individuals, families and society. Prer., BIOL 201, BIOL 202, HSCI 110, HSCI 200, and HSCI 301. Meets with BIOL 403.

HSCI 461-3. Sports Injury and Prevention.
Focuses on empirical and esthetic knowledge of emergency treatment, rehabilitation mechanisms, and prevention of sports injury. Emphasis will be on prevention of injury by incorporating fitness principles related to cardiovascular endurance, flexibility, strength training, muscular endurance, and nutrition and body composition. Meets with BIOL 423 and BIOL 523.

HSCI 462-3. Internship in Sports Health.
Provides a clinical opportunity within the community to develop and apply sports medicine concepts. Field work will be supervised in public and private agencies and institutions. Prer., Arrangement with faculty. Contact department chair.

HSCI 463-3. Culture and Health.
Explores health/illness concepts of various populations and introduces cross cultural assessment skills. Cultural health belief systems, biological variation and patterns of adaptation to the environment are included.

HSCI 464-3. Program Planning and Implementation.
Provides introductory knowledge for planning and developing health promotion programs. Delineates criteria for development of health related programs and addresses ethical and legal issues in health promotion and education. Content includes issues related to resource development, community assessment and mobilization, marketing and adapting to diverse audiences in a variety of settings.

HSCI 465-3. Principles of Instructional Design.
Provides an opportunity to begin to develop the skill of planning instructional designs to facilitate the learning process for a variety of learners. The course introduces teaching/learning theory and principles, and teaching-learning methodologies and addresses the application to classroom and clinical settings. The course provides an overview of methods of evaluation including the use of tests and measurements.

HSCI 466-3. Teaching Internship.
This clinical course provides the student the opportunity to teach in a classroom and/or clinical setting under the direction of an assigned preceptor. A variety of settings are available for internships. Students contract for teaching experience in identified settings. The internship provides the student the opportunity to work with expert teachers and function as a part of a teaching team.

HSCI 467-3. Health Assessment.
Provides the knowledge and skills necessary for holistic health assessment of individuals. Includes parameters for physical, emotional, spiritual and social assessments. Ethical implications of assessment and findings are explored. Introduces the variety of tools to facilitate health assessment and documentation of findings.

HSCI 468-3. Health Promotion and Wellness.
Introduces the concepts and a framework for health promotion in a pluralistic society. Provides an overview of factors influencing health promotion behaviors of individuals and families. Introduces the student to models and theories related to health behavior and provides a framework for assisting the person or family to adapt or to cope with change.

HSCI 469-3. Clinical Practicum.
A clinical course that provides the health science student the opportunity to function as a member of a health care team under the direction of an assigned preceptor. Clinical placements are assigned based on the student's career plans and goals.

HSCI 470-3. Critical Care Transport I.
Introduces issues related to providing transport for critical care patients of all ages. Introduction of clinical conditions which are common to ICU/CCU patients, and advanced assessment techniques for patients with cardiovascular, pulmonary, neurologic, and GI/GU/renal conditions. Clinical relevance of various laboratory tests and purpose and operation of various critical care instruments. Prer., Registered nurse or certification as a paramedic.

HSCI 471-3. Critical Care Transport II.
Introduces issues related to providing transport for critical care patients of all ages. Introduction of clinical conditions which are common to ICU/CCU patients, and advanced assessment techniques for patients with cardiovascular, pulmonary, neurologic, and GI/GU/renal conditions. Clinical relevance of various laboratory tests and purpose and operation of various critical care instruments. Prer., Registered nurse or certification as a paramedic.

HSCI 472-3. Health Care Finance.
Introduces the health care financial system, accounting, budgeting and resource allocation. Includes mechanisms of financial management, credit and debits, and balances. Social and political influences are explored. Prer., FIN 305 and ACCT 201.

HSCI 473-3. Community Network Development.
Focuses on the assessment, purpose and development of community networks. Methods and types of partnerships and collaborative relationships are explored. Students are involved in assessing community resources, coalitions and existing networks. Prer., HSCI 200, HSCI 245 or permission of instructor.

HSCI 477-3. Management Practicum.
Designed to integrate the theoretical concepts and knowledge of health care management into a variety of health care settings. Students will function with a management preceptor in the community agency. Prer., HSCI 472 and HSCI 473.

HSCI 478-3. Management Internship.
Students will work directly with a health care management leader in the community to develop, implement and/or evaluate a specific management project. Provides the student with real-life experience in using management knowledge and skills from the curriculum. Prer., HSCI 472 and HSCI 473.

HSCI 479-3. Management Synthesis Seminar.
Explores the dynamic role of the health care manager, focusing on personal skills, theory and outside influences. Provides a framework for developing professional debate skills associated with health care management issues and synthesis of role. Prer., ACCT 201, MK 300 and FIN 305.

HSCI 489-3. Special Topics in Health Sciences.
This course provides the opportunity to investigate and obtain empirical knowledge in an area of health care associated with their career plans and goals. Students develop learning objectives and evaluation methodology in collaboration with the assigned faculty. Prer., Faculty consent must be secured prior to registration.

HSCI 521-3. The Healing Power of Dreams.
Prepares student to work with patients' dreams by teaching basic dream analysis principles according to Carl Jung.

HSCI 930-1 to 3. Independent Study —Undergraduate.
Arranged with a specific faculty member in an area of interest. Independent study can fulfill elective or core course requirements. Prer., Permission of instructor required.

HSCI 940-1 to 3. Independent Study — Undergraduate.
Arranged with a specific faculty member in an area of interest. Independent study can fulfill elective or core course requirements. Prer., Permission of instructor required.

NURSING

NURS 110-1.Health Communications.
Introduces communication theory and skills as a foundation for human caring and the therapeutic relationship. Meets with HSCI 110.

NURS 123-3. Theoretical Foundations of Nursing Practice.
Introduction to the philosophical and theoretical underpinnings of nursing practice. Concepts foundational to the college's conceptual framework are explored. Legal aspects of nursing practice, issues and trends within nursing are presented.

NURS 208-3. Health Promotion.
Health promotion behaviors throughout the life span. Students will develop personal insight integral to health risk behaviors and clients across the life span. Clinical settings vary. Prer., NURS 123.

NURS 210-3. Basic Health Assessment.
Focuses on the empirics and esthetics of health assessment. Develops knowledge and skills integral to the acquisition of health assessment in clinical practice lab. Prer., BIOL 201, 202, and 205 or consent of lead of faculty. Meets with HSCI 210.

NURS 220-6. Fundamentals of Nursing Practice.
Presents the empirical fundamental knowledge of basic nursing care. Clinical practice labs and seminars provide the student the opportunity to develop psychomotor skills and recognize the impact of personal, esthetic and ethical knowing on caring in beginning nursing practice. (Theory and clinical laboratory) Prer., NURS 110, NURS 210, HSCI 205 and HSCI 101.

NURS 299-1 to 3. Basic Clinical Practicum.
Offers a clinical laboratory experience in settings that increase proficiency in technical skills, communication, health assessment and the nursing process. Prer., NURS 210 and NURS 220. Meets with NURS 399.

NURS 304-3. Patterns of Knowing (RN).
An overview of concepts of professional nursing practice for the registered nurse student. Includes history and trends of professional nursing, universal theories and professional roles, College philosophy and conceptual framework.

NURS 305-3. Health Assessment (RN).
Focuses on the empirics and esthetics of health assessment. Enhances further development of health assessment skills in laboratory. Prer., RN Status, BIOL 201 and BIOL 202, or consent of lead faculty.

NURS 310-6. Mental Health Nursing.
Focuses on the practice of mental health nursing. Students develop critical thinking skills to create the environment for exploring the human health experience. (Theory and clinical laboratory) Prer., All second year courses.

NURS 311-3. Gerontological Nursing.
Provides an opportunity for the student to build a positive perspective toward the aging process and the elderly. Emphasizes theory and clinical experience with elders and their families. (Theory and clinical laboratory) Prer., All second year courses.

NURS 320-5. Nursing Care of Adults I.
Emphasizes the art and science of nursing care for the adult. Explores medical-surgical nursing concepts using a scientific problem-solving approach. Clinical laboratory experiences are in

the acute care setting. (Theory and clinical laboratory) Prer., All second year courses; prior or concurrent enrollment in HSCI 301.

NURS 321-5. Nursing Care of Adults II.
Emphasizes the art and science of nursing care of the adult. Continues to explore medical-surgical concepts from Adult Health I. Clinical laboratory experiences are in the acute care settings. Prer., All second year courses, NURS 320.

NURS 357-3. Therapeutic Touch and Health.
Provides an opportunity to explore and experience energy based healing methods. Other selected healing modalities will include stress reduction techniques, meditation, centering, creative visualization, use of color and other energy techniques.

NURS 370-1 to 3. Partners in Practice I.
Provides nursing students the opportunity to refine nursing skills in actual practice situations. Provided through a collaborative agreement with acute care delivery settings and therefore credit to contact hours may vary dependent on the educational/work relationship established. Prer., NURS 210 and NURS 220, and permission of instructor.

NURS 385-3. Nursing Externship.
Externs, under the preceptorship of a registered nurse, provide direct patient care in selected clinical areas. Enhances competency and critical decision making in the reality of the practice setting. Prer., All third year courses.

NURS 399-1 to 3. Clinical Practicum.
Offers a clinical laboratory experience in settings that increase proficiency in technical skills, communication, health assessment and the nursing process. Prer., NURS 220 and NURS 320 or consent of lead faculty. Meets with NURS 299.

NURS 401-3. Nursing Research.
Develops a fundamental understanding of the research process. Enables students to critically analyze the merit of published nursing research. Prer., All second year courses, PSY 210 or HSCI 206 may be taken concurrently. Meets with HSCI 401.

NURS 410-6. Nursing Care of Children.
Explores the holistic care of children from infancy to adolescence, and their families in ambulatory, outpatient and acute care settings. (Theory and clinical laboratory) Prer., All third year courses.

NURS 420-6. Nursing Care of the Childbearing Family.
Provides an opportunity to explore family dynamics and the health care experience during the childbearing process. Expands critical thinking skills specific to the childbearing arena. (Theory and clinical laboratory) Prer., All second year courses.

NURS 425-4. Professional Nursing Practice (RN).
Focuses on selected nursing practice topics that build upon the student's personal knowledge. Opportunities are provided to enhance principles of teaching, utilize critical thinking and further explore nursing roles. (Theory and clinical laboratory) Prer., R.N. status NURS 304, NURS 305 and HSCI 301 or HSCI 306; or consent of lead faculty.

NURS 429-5. Advanced Nursing.
Synthesizes nursing content necessary for therapeutic interventions for the care of complex adult patients in the acute and critical care settings. Emphasis on prioritization of care and management of groups of complex patients. (Theory and clinical laboratory) Prer., All third year courses.

NURS 430-3. Leadership and Management.
Introduces and develops leadership and management theories, professional issues and trends, enhances organizational and personnel issues. Prer., All third year courses. Meets with HSCI 436 and NURS 435.

NURS 435-4. Nursing Management (RN).
Develops management theories and professional issues and trends. Emphasizes organizational and financial principles. Clinical preceptors provide the student with opportunities to explore application of management skills. (Theory and clinical laboratory) Prer., RN status.

NURS 440-6. Community Health Nursing.
Focuses on health promotion and prevention in the delivery of nursing care to aggregates. Studies high risk individuals, families and groups. Develops community health nursing competencies. (Theory and clinical laboratory) Prer., All third year courses.

NURS 445-6. Community Health Nursing (RN).
Focuses on health promotion and prevention in the delivery of nursing care to aggregates. Studies high risk individuals, families and groups. Develops community health nursing competencies. (Theory and clinical laboratory) Prer., RN Status, NURS 305 or consent of lead faculty. Meets with NURS 440.

NURS 449-3. Clinical Capstone.
Provides an opportunity to integrate and synthesize theory and clinical from all prior courses in a student selected setting. Seminar allows student to explore professional issues encountered in clinical.

NURS 453-3. Creativity and Critical Thinking.
Creativity will be explored experientially and conceptually through innovative processes of art and literature, whole brain learning, imagery. Critical thinking will be theoretically analyzed as well as practiced.

NURS 454-3. Images of British Nursing: Past and Present.
A study of the life, work and times of Florence Nightingale and exploration of the current status of nursing in England. Both historical and contemporary perspectives on nursing will be explored. The setting for the course is in London, England. Prer., Consent of lead faculty.

NURS 455-1 to 3. Partners in Nursing Practice II.
Provides nursing students the opportunity to enhance nursing skills in actual practice situations. Assigned expert clinicians will facilitate learning in an identified clinical setting. Provided through a collaborative agreement with acute care delivery settings. Credit to contact hours may vary dependent on the educational/work relationship established. Prer., NURS 210, NURS 220 and NURS 320.

NURS 456-3. Lactation Counselor.
Prepares nurses to be Lactation counselors in a clinical setting. A Lactation Counselor Certificate is granted at the completion of the study.

NURS 457-3. Emergency Nursing.
Incorporates theoretical and didactic learning in the specialty area of emergency care including assessment, diagnosis, triage, and treatment of both emergent and non-emergent conditions. Opportunities are provided for application of skills in the lab setting. Prer., NURS 210, HSCI 205 and NURS 220.

NURS 458-1 to 3. Basic EKG Interpretation.
Provides students with the skills necessary for basic electrocardiogram (EKG) interpretation. All basic dysrhythmias will be covered. The clinical portion of this course will allow students to observe EKG monitoring in local facilities. Prer., BIOL 201 and BIOL 202.

NURS 459-3. Advanced Practicum: Clinical.
Elective course in selected clinical placements. Promotes synthesis of nursing skills and advanced clinical concepts. Clinical experience develops increased depth of practice in specific clinical settings. Prer., All first and second year courses, NURS 429, or by permission of the instructor. Recommended: NURS 458.

NURS 462-3. Dynamics of Unity.
Explores the scientific and cultural underpinnings of holistic thought. The evolution of Western Science, the essential unity of diverse spiritual traditions, and the development of society from industrialism and isolation to the age of information and global economy. Prer: RN status. Meets with NURS 642.

NURS 463-3. Psychophysiology of Holistic Health.
Provides an advanced foundation in the physiological phenomena associated with holistic health. Explores mind/body concepts such as stress and disease, alternative medicine outcomes, spontaneous healing, psychoneuroimmunology and the placebo effect. Prer., RN Status Meets with NURS 643.

NURS 465-3. The Art of Holistic Nursing.
Explores theories of esthetics and art for application in healing. Theories of the psychology of the spirit are considered within the caring context of nursing. The processes of imagination are investigated. Prer: RN Status. Meets with NURS 645.

NURS 469-2. Holistic-World Views of Health & Healing.
Explores various cultural traditions in health and healing. Traditional Chinese Medicine, Auyerveda, Shamanism, Curanderismo, Native American healing, and selected complementary and alternative therapies are examined. Prer., RN status.

NURS 489-1 to 3. Special Topics in Nursing.
Elective course which provides an in-depth study of a specific topic in nursing. Students may repeat this course as long as the topic changes each time it is repeated. Prer., Permission of instructor required.

NURS 601-3. Models of Clinical Supervision.
Identifies major models of clinical supervision, examines models which have been empirically validated. Explores how these models can be applied in variety of settings. Issues and factors related to clinical supervision will be delineated.

NURS 610-3. Philosophical Foundations of Advanced Nursing Practice.
Explores theoretical and philosophic foundations of human caring and nursing's epidemiology and ontology. Contents include methods for analysis and evaluation of nursing knowledge, ethical, and moral foundations, and frameworks for caring/healing practice. Prer., Graduate admission or permission of instructor.

NURS 611-3. Advanced Nursing Practice and Health Care Policy.
Focuses on the knowledge and skills to effect change in health care policy and delivery. Advanced nursing practice is explored in the health care system in relation to financing, delivery and reimbursement models, regulatory issues, and the legal/ethical parameters.

NURS 612-3 to 4. Nursing Research.
Explores methods of disciplined inquiry to investigate nursing phenomena and establishes a basis for research in advanced practice nursing. Applies data analysis techniques and synthesis of the research process and critique of published research. Prer., Inferential Stats and NURS 401.

NURS 614-2. Dynamics of Holistic Practice.
Enhances personal and esthetic ways of knowing through the exploration of creativity and critical thinking. Examines conceptual and experiential creativity and encourages the expression of self as an esthetic being. Incorporates theories from decision making and logic. Prer., Admission to graduate program or instructor permission.

NURS 615-3. Clinical Nurse Specialist Seminar.
Historical, theoretical, and conceptual basis of the clinical nurse specialist (CNS) role will be explored. Collaborative and problem solving skills within advanced nursing practice are presented as well as acquisition of knowledge through patterns of knowing.

NURS 621-3. Transformational Teaching Strategies.
Promotes understanding of the political, philosophical and personal tenets of a caring curriculum. Explores advanced concepts of teaching and learning and examines learning theory. Studies the art and science of effective teaching strategies. Includes techniques of media production.

NURS 622-3. Collaborative Health Care Management with the Elderly.
Provides students with empirical knowledge needed to manage care of elderly individuals. Sets foundation for an advanced practice role in providing primary care to older adults and their families within a framework of collaborative practice. Prer., NURS 612 (Recommended).

NURS 623-3. Physiological Problems of Aging.
Explores the various aspects of aging from a physiological perspective. Health promotion of mature and aging families will be addressed. Management of minor acute health problems will be systematically covered. Cultural and ethnic differences are elucidated.

NURS 624-3. Managed Care Environment.
Explores the managed care environment and its evaluation. Explores philosophy of managed care and case management methods, the shift from illness care to illness prevention and community based practice. Focuses on interdisciplinary collaboration, ethics and accountability.

NURS 625-3. International and Cross-Cultural Health Care.
Study of selected international health care and nursing issues. Theoretical and conceptual aspects of cross-cultural health care are included. Travel to England with this class and complete graduate requirements with emphasis on social and health care policy in England.

NURS 626-1 to 3. Topics in Nursing.
Designed to focus on the explorations of selected topics in advanced nursing practice.

NURS 627-3. Family Theory and Intervention.
Explores family theories and their application to advanced nursing. Utilizes a variety of assessment tools to evaluate and plan care for selected families. Applies statistics, demographics of changing families structures, and examples of cultural diversity to the care of families.

NURS 628-4. Clinical Pharmacotherapeutics.
Introduces the pharmaceutical management of a range of illnesses which are common in the primary care setting. Emphasizes both acute episodic and chronic illnesses across the age span. Applies pharmacotherapeutic approach in the management of patients in a primary care setting.

NURS 629-3. Resource Management: Budget and Finance.
Introduces systems of resource management that may be applied in health care delivery. Emphasis given to strategies of finance and budget, personnel management, management research, and information systems as tools used by nurse managers to impact the health environment.

NURS 630-3. Sexual Assault: Implications for Nursing Practice.
Focuses on sexual violence and expands personal knowledge of medicolegal aspects of health care. The alliance of nursing, law enforcement and forensic sciences is explored. Models for preventive strategies and public education are investigated. Meets with HSCI 430.

NURS 631-3. Forensic Nursing.
Introduces clinical forensic nursing with an emphasis on emergency room and community health forensic issues. Explores principles and philosophy of clinical forensic nursing and the role of the forensic nurse in advanced nursing practice in clinical and/or community based settings. Meets with HSCI 431.

NURS 632-3. Injury and Death Investigation.
Explores principles related to investigation of injury and death. Forensic pathology and forensic autopsy procedures are included. Explores topics medicolegal evidence, violence injury and environmental pathology. Meets with HSCI 432.

NURS 633-3. Criminalistic and Forensic Science.
Introduces the student to the areas of crime scene preservation, investigation and development and to the scientific tactics, procedures, and techniques employed by forensic experts and sophisticated scientific techniques by forensic nurses. Meets with HSCI 433.

NURS 634-3. Psychosocial/Legal Aspects of Forensic Science.
Introduces the psychological, neurocognitive, sociological and legal dimensions of forensic nursing, assessment and diagnosis of mental disorders, and the interface between the psychosocial effects of injury and illness and the judicial system. Explores criminal, civil and family law applications. Meets with HSCI 434.

NURS 635-2. Internship in Clinical Forensics.
Arranged to expand clinical application theory content in forensic nursing. Arrangements can be made for experiences with coroners, emergency rooms, crime investigation units, prison or other clinical settings which are congruent with student goals. Prer., NURS 631, NURS 632, NURS 634, NURS 633, and NURS 630. Meets with HSCI 435.

NURS 636-3. Legal Aspects of Forensics: Civil and Criminal.
Criminal, civil and family law will be discussed as they relate to forensic issues. Meets with HSCI 429.

NURS 637-3. Violence and Human Rights Issues.
Provides the opportunity to explore the impact of violence in relation to the responsibilities of the investigator, assessor, evaluator, and therapist. Includes strategies of care for individual family and community survivors. Principles and philosophies of victimology, traumatology and domestic violence. Meets with HSCI 437.

NURS 639-3. School Based Nurse Care.
Management of the child as a client within the family and school community. Includes pediatric health assessment, health education, family centered care, legal guidelines and related laws. Links the child, the school and geographic community by leadership and management.

NURS 641-3. Complementary Healing Methods.
Presents an overview of the history, theoretical bases, applications, resources, and trends of complementary healing methods. The evolution of Western scientific thought and Eastern medical theories will be examined as a basis for understanding current health perspectives and treatment modalities.

NURS 642-3. Dynamics of Unity.
Explores the scientific and cultural underpinnings of holistic thought. The evolution of Western Science, the essential unity of diverse spiritual traditions, and the development of society from industrialism and isolation to the age of information and global economy.

NURS 643-3. Psychophysiology of Holistic Health.
Provides an advanced foundation in the physiological phenomena associated with holistic health. Explores mind/body concepts such as stress and disease, alternative medicine outcomes, spontaneous healing psychoneuroimmunology and the placebo effect.

NURS 644-3. Advanced Assessment of Holistic Health.
Facilitates the recognition and nurturance of the nurse's unique, individual expression of wholeness. Holistic nursing philosophy and the nurse-focused standards of care and practice are discussed. Emphasis is placed on self-reflection, empowerment, personal responsibility, growth, and mutual support. Prer., NURS 642, NURS 643 and NURS 645.

NURS 645-3. The Art of Holistic Nursing.
Explores theories of esthetics and art for application in healing. Theories of the psychology of the spirit are considered

within the caring context of nursing. The processes of imagination are investigated. Prer., NURS 642. Meets with NURS 465.

NURS 647-3. Holistic-Praxis: Therapies of the Imagination.
Applies imagery, memory and reflection, dreams and the creative processes to holistic nursing practice. The focus is on the nurse's role and the practical application of theories and techniques of these therapies in various clinical situations. Prer., NURS 642, NURS 643, NURS 644 and NURS 645.

NURS 648-2. Holistic-Praxis: Therapies of the Human Energy Fields.
Theories and practices of healing modalities which emphasize touch, energy systems, and movement that nourish and strengthen the body/mind/spirit are interpreted artistically and scientifically. Learners explore the use of these modalities in experiential situations. Prer., NURS 642, NURS 643 and NURS 645.

NURS 649-3. World Views of Health and Healing.
Explores various cultural traditions in health and healing. Traditional Chinese Medicine, Auyerveda, Shamanism, Curanderismo, Native American Healing, and selected complementary and alternative therapies are examined.

NURS 650-3. Forensic Photography.
Designed to assist professionals in forensic science and health care in the basic principles and techniques associated with forensic photography at the crime scene, in the hospital setting, or in autopsy laboratory. Meets with HSCI 439.

NURS 651-3. Perinatal/Newborn Health Assessment, Stabilization and Care.
Provides the basis for advanced practice nursing care necessary to meet the assessment, stabilization and early care needs of healthy and at risk newborns and their families. Clinical practicum further develops assessment skills and provides opportunities to practice. Prer., Concurrent with NURS 652, NURS 653, NURS 654.

NURS 652-4. Pathophysiology of the Newborn.
Synthesis of concepts of embryology, neonatal physiology and pathophysiology and relates these concepts to the rationale for comprehensive management of and the outcomes for illnesses/problems in at risk newborns. Prer., Concurrent with NURS 651, NURS 653, NURS 654.

NURS 653-3. Clinical Management of High Risk Newborn.
Integrates research based knowledge of disease/ disorders of the newborn within clinical practice. The multiple facets of the advanced practice neonatal nurse and nurse practitioner roles are analyzed. Prer., NURS Concurrent with NURS 651, NURS 652, NURS 654.

NURS 654-4. Neonatal Clinical Pharmacotherapeutics.
Introduces pharmaceutical management of a range of fetal and neonatal conditions which are commonly seen in perinatal/newborn settings. Integrates patterns of knowing as applied to the pharmacotherapeutic approach in the management of patients in neonatal care settings. Prer., Completion of or concurrent registration in NURS 651, NURS 652 & NURS 653.

NURS 656-3. Women's Health Care Issues.
Presents an overview of selected women's experiences and health issues. Exploration from a historical, psychological and socio-political focus in order to increase understanding regarding the impact on the woman, her significant others, health care professionals and the health care system.

NURS 657-2 to 3. Neonatal Nurse Practitioner Transitions.
Facilitates the certificate non-masters neonatal nurse practitioner to meet the neonatal nurse practitioner masters requirements. Involves documentation of functioning in following areas: advanced neonatal nurse practitioner practice issues, family and staff education, discharge planning, leadership/management role and clinical practice. Prer., NNP Certificate, NURS 611, NURS 605, NURS 612, NURS 610, NURS 614; or permission of NNP Director.

NURS 661-3. Primary Health Care of Childbearing Families.
Provides a basis for the practice of advanced practice nursing care through the exploration of the health needs in the childbearing family. Focuses on comprehensive assessment, intervention, andention, and preventive care for the childbearing family in primary health care settings.

NURS 662-4. Primary Health Care of Families I.
Assessment and management of common childhood developmental issues, injury prevention, and common acute/chronic disease alterations in children. Application of theory, research, and accepted modalities of advanced practice nursing relevant to the family nurse practitioner role with child rearing families. Prer., MSN 600 series core courses; Completion of or concurrent registration in NURS 674, NURS 628, NURS 673.

NURS 663-2. Community and Rural Health.
Provides the student with the opportunity to examine concepts and theoretical frameworks relevant to community and rural health. The major emphasis of this course is to provide a foundation for advanced nursing practice in community and rural settings.

NURS 664-4. Primary Health Care of Families II.
The application of theory, research, and accepted modalities of advanced nursing practice relevant to the family nurse practitioner role with young through aging families, including pregnant women and their families. Prer., MSN 600 series core courses; Completion or concurrent registration in NURS 627, NURS 628, NURS 673, and NURS 674.

NURS 666-3. Promoting Health and Preventing Disease.
Introduces concepts for development of community health practice, the factors that determine health status, and the legal concepts on which public health practice is based. Methodologies and tools to manage a community health practice are described.

NURS 667-3. Primary Health Care of Families III.
Focuses on comprehensive assessment, intervention, and preventive care for childbearing, adult, and geriatric families in primary health care settings. Explores acute and chronic health issues through the application of theory and research. Prer., MSN 600 series core courses; completion of or concurrent registration in

NURS 627, NURS 628, NURS 673, NURS 673, and NURS 674.

NURS 672-1. Assessment Validation.
Validation of health assessment skills. Recommended for students who have not been involved with health assessments in past four years.

NURS 673-1 to 4. Advanced Health Assessment.
Incorporates the principles and techniques of advanced health assessment across the life span into a plan for advanced nursing care. Clinical practicum develops advanced health assessment skills and provides an opportunity to develop skills for an advanced practice.

NURS 674-3. Advanced Pathophysiology.
Synthesizes pathophysiologic concepts and theories relating these concepts to the rationale for therapeutic assessment and diagnosis. Provides fundamental knowledge of primary intervention, collaborative interactions, and case management of complex patients in a variety of settings across the age span.

NURS 678-3. Primary Health Care of Adults I.
Explores preventive and acute health needs of young through aged adults. Focuses on comprehensive assessment, intervention, and preventive care for young through aged adults in primary health care settings. Prer., MSN 600 series core courses; completion of or concurrent registration in NURS 628, NURS 673, NURS 674. Meets with NURS 664.

NURS 679-3. Primary Health Care of Adults II.
Exploration of the acute and chronic health needs of young through aged adults with special emphasis on the health needs of aging adults. Focuses on comprehensive assessment, intervention, and preventive care. Prer., NURS 678 Primary Health Care of Adults I.

NURS 689-1 to 3. Topics in Nursing.
Designed to focus on the explorations of selected topics in advanced nursing practice.

NURS 700-1 to 5. Research Thesis.
Provides an opportunity for graduate students to participate in the research process under the direction of an advisory committee. Synthesis of knowledge and skill in selected areas of the research process necessary to organize and conduct a research study. Prer., NURS 612; and the satisfactory completion of a minimum of 20 credit hours in the MSN program.

NURS 702-2 to 3. Clinical Research Application.
Offers the opportunity to develop and/or revise nursing clinical protocols derived from scientifically rigorous empirical and qualitative evidence. Includes a program evaluation and a brief review of research process and research critique. Prer., NURS 610, NURS 612, NURS 614 and NURS 673.

NURS 704-3. Health Care Administration.
Defines the work of health care organizations. Relates critical aspects of productivity to result oriented management. Defines standards of performance including risk management, qualitative and quantitative measures. Elements of a comprehensive human resource management system and strategies for supportive services are addressed. Prer., NURS 610, NURS 611 and NURS 612.

NURS 705-3. Health Care Ethics and Law.
Provides an analysis of the principles of ethics and law as they impact the health care delivery system and role of the health care administrator. Students will analyze federal and state statues as adopted and interpreted through case law.

NURS 777-2. Role Synthesis in Family Nurse Practitioner Practice.
Synthesis course that brings together the diverse roles of the family nurse practitioner. Collaboration, negotiation, and other intra-organizational strategies. Emphasis is placed on the development of an employment plan including budget development, legal, and key practice issues. Prer., NURS 610, NURS 612, NURS 614 and NURS 673.

NURS 780-5. Neonatal Nurse Practitioner Clinical Preceptorship I.
Provides concentrated clinical experiences that prepare the student for entry level functioning in the role of the neonatal nurse practitioner and assuming responsibility for the direct management and care of healthy and acutely ill newborns. Prer., NURS 651, NURS 652, NURS 653.

NURS 781-5. Neonatal Nurse Practitioner Clinical Preceptorship II.
Provides concentrated clinical experiences that prepare the student for entry level functioning in the role of the neonatal nurse practitioner and assuming responsibility for the direct management and care of healthy and acutely ill newborns. Prer., NURS 651, NURS 652, NURS 653.

NURS 782-1 to 5. Clinical Specialist Practicum.
Provides the opportunity to enact advanced practice nursing roles in a variety of settings. Applying advanced nursing skills, the student will coordinate, collaborate, network, and develop interdisciplinary skills in the provision of care to clients as they transition through health experiences.

NURS 783-1. Community Assessment Practicum.
Application of a selected model of population based assessment to a specific community and/or rural aggregate population. Collaboration with health providers is expected to manage health related data and form the foundation for community based advanced practice.

NURS 784-1 to 3. Primary Care Practicum.
Offers the opportunity to practice the skills and knowledge related to the provision of Primary Care. Provision of primary and specialty care with a preceptor to selected adolescent, adult and geriatric patients in a variety of clinical settings.

NURS 789-1 to 9. Primary Care of Families Practicum.
This clinical practicum is a lab course designed to offer the Family Nurse Practitioner student an opportunity to implement skills and knowledge obtained in family focused theory courses. This practicum focuses on the application of comprehensive assessment, intervention, and preventive care for families in various primary and specialty health care settings.

NURS 790-1 to 3. Administrative Internship.
Provides administrative experience with

an assigned preceptor. Provides foundation for practicum. Prer., NURS 629 and NURS 704.

NURS 791-2. Administrative Practicum.
Provides an opportunity to apply principles and skills in advanced health care administration. Student will coordinate, collaborate, network and develop interdisciplinary skills in health care administration in collaboration with preceptor.

NURS 930-1 TO 3. Independent Study.
Undergraduate independent study is arranged with a specific faculty member in an area of interest. Independent study can fulfill elective or core course requirements. Prer., Permission of instructor required.

NURS 940-1 to 3. Independent Study.
Undergraduate independent study is arranged with a specific faculty member in an area of interest. Independent study can fulfill elective or core course requirements. Prer., Permission of instructor required.

NURS 950-1 to 3. Independent Study.
Graduate students investigate an area of interest in the field of health care with the guidance of a faulty member in nursing. Prer., Permission of supervising faculty member.

NURS 960-1 to 6. Independent Study.
Graduate students investigate an area of interest in the field of health care with the guidance of a faulty member in nursing. Prer., Permission of supervising faculty member.

NURS 999-0. Candidate for Degree.

Administration and Faculty

General Administration

LINDA BUNNELL SHADE, Chancellor; Professor of English. B.A., Baylor University; M.A., Ph.D., University of Colorado, Boulder.

BERNICE FORREST, Assistant Vice Chancellor for Academic and Multicultural Affairs; Associate Professor of History. B.A., Scripps College; A.M., Brown University; Ph.D., Tulane University.

CLEVE McDANIEL, Vice Chancellor for Administration and Finance, B.A., Washington University; M.A., Southern Illinois University; Ph.D. University of Missouri, Columbia.

C. DAVID MOON, Associate Vice Chancellor for Academic Affairs. Associate Professor of Political Science. B.A., Austin College, M.A., Ph.D., University of Texas - Austin.

EDWARD M. PARIS, Associate Vice Chancellor for Administration and Finance. B.A., M.P.A., University of Colorado, Boulder.

JOHN C. PIERCE, Vice Chancellor for Academic Affairs; Professor of Political Science. B.A., University of Puget Sound; M.A., Ph.D., University of Minnesota.

PAMELA S. SHOCKLEY, Vice Chancellor for Student Success; Professor of Communication. B.A., M.A., Oklahoma State University, Ph.D., University of Colorado, Boulder.

Academic Divisions

KATHLEEN M. BEATTY, Dean, Graduate School of Public Affairs; Professor of Political Science and Public Administration. B.A., University of Colorado, Boulder; M.A., Tufts University; M.P.A., Harvard University; Ph.D., Washington State University.

ELIZABETH S. GROBSMITH, Dean, College of Letters, Arts and Sciences; Professor of Anthropology. Bach. Mus., The Ohio State University; M.A., Ph.D., University of Arizona.

LESLIE A. MANNING, Dean, Kraemer Family Library; Professor of Library Science. B.A., University of Colorado; M.A.L.S., University of Denver.

DAVID E. NELSON, Dean, College of Education; Professor of Educational Leadership and Teacher Education. B.A., M.Ed., Northern Illinois University; M.A., DePaul University; Ph.D., Northwestern University.

JOSEPH C. RALLO, Dean, College of Business; Professor of International Business, B.A., Lafayette College, J.D., Western New England College; M.A., Ph.D., Syracuse University.

DAVID K. SCHMIDT, Dean of the Graduate School and Senior Faculty Associate for Research; Professor of Mechanical and Aerospace Engineering; Director of Flight Dynamics and Control Laboratory. B.S.A.E., Purdue University; M.S.A.E., University of Southern California; Ph.D., Purdue University.

CAROLE SCHOFFSTALL, Dean, Beth-El College of Nursing and Health Sciences. Professor of Nursing. Diploma, St. Joseph School of Nursing, Lancaster, Pennsylvania; B.S., University of Colorado, Colorado Springs; M.S., University of Colorado Health Sciences Center; Ph.D., University of Maryland, College Park.

RONALD M. SEGA, Dean, College of Engineering and Applied Science; Professor of Electrical and Computer Engineering; B.S., U.S. Air Force Academy; M.S., Ohio State University; Ph.D., University of Colorado.

RONALD E. WISNER, Dean of Student Life. B.A., Wittenberg University; M.A., Michigan State University; Ph.D., University of Michigan.

Other Divisions

KATHY ANDRUS-WALCK, Director of Visual Arts Technology and Curriculum; Assistant Professor Attendant Rank. B.A., SUNY at Buffalo; M.A., Ph.D., University of North Carolina, Chapel Hill.

DEBORAH BAKER, Director of University Counseling Center. B.S., M.S., and Ph.D., Colorado State University.

IDA BAUER, Director of Family Development Center, B.A., Brooklyn College

MISSYE BONDS, Director of Sponsored Programs. B.A., Colorado Women's College; M.F.A., Edinburgh College of Art.

DANNY V. BRISTOL, Director of Bookstore. B.A., University of Colorado, Colorado Springs.

STEPHEN CHAMBERS, Director of Institutional Research and Assessment; Associate Professor Attendant Rank. B.S., M.A., Ph.D., Northern Arizona University.

JUDITH N. CONROY, Coordinator of the Language Technology Center. B.A., University of Illinois; M.A., University of California, Los Angeles.

RUBEN A. CUBERO, Director of Athletics, Professor Adjoint in Sports and Leisure Program. B.S., United States Air Force Academy; M.A., University of New Mexico; Ph.D., University of Denver.

KASSANDRA FLANAGAN, Director of External Relations/College of Business, B.S., Manchester College.

CHARLES E. FOSHA JR., Space Operations Program/Distance Learning Coordinator; Senior Instructor in Mechanical and Aerospace Engineering. B.S., M.S., Ph.D., University of Florida at Gainesville.

BARBARA A. GADDIS, Director of the Science Learning Center. B.S., University of Colorado, Colorado Springs; M.S., University at Colorado, Boulder; M.A.T., Colorado College.

KATHY GRIFFITH, Director of University Events & Outreach.

VICKIE HILTY, Director of Personnel.

TOM HUTTON, Director of University Relations. B.S., University of Kansas.

LEE INGALLS NOBLE, Director of Financial Aid and Student Employment. B.A., M.A., University of Colorado, Colorado Springs.

ADRIANA KARCH, Director of Oral Communication Lab. B.S., M.A., San Diego State University, Ph D, Bowling Green State University.

RANDALL E. KOUBA, Director of Enrollment Management. B.A., M.P.A., University of Colorado, Colorado Springs.

DAVID W. LOHMANN, Director of UNIX Laboratory; Senior Instructor Attendant Rank. B.S., University of Houston; M.S., University of Colorado, Colorado Springs.

WILLIAM J. LYONS, Director, Center for Community Development and Design; B.A., M.A. University of Nebraska.

DREW MARTORELLA, Producing Director,. Theatreworks. B.A., Drew University.

RICK MEADOWS, Director of Student Health Center. B.S., Florida State University at Tallahassee; M.S., University of Colorado Health Sciences Center.

SUE MITCHELL, Director of Student Success Center.

BETTINA MOORE, Director of Student Support/College of Engineering and Applied Science. B.A., Lehigh University.

HARRIET NAPIERKOWSKI, Director, English Composition and Technology Curriculum. B.S., University of Wisconsin-Oshkosh; M.S., University of Colorado.

SYLVIA A. NOLTE, Director, Teacher Education Program; Assistant Professor Attendant Rank of Education. B. A., University of Missouri at Kansas City; M.A., Ed.D., University of Colorado, Boulder.

DEBORAH A. ODELL, Director of Center for Advancement of Excellence in Writing. B.A. Northwestern University, M.A., University of Colorado.

THOMAS F. OSTENBERG, P.E., Director of Facilities Planning and Construction. B.S., U.S. Military Academy, West Point; M.A., Central Michigan University; M.S., Stanford University.

CONNIE OTT, Director of External Relations, College of Letters, Arts and Sciences; B.A., Alverno College.

WILLIAM GERALD RIGGS, Director of the Gallery of Contemporary Art; Assistant Professor Attendant Rank in Visual Arts. B.F.A., M.Lib. St./ME, University of Oklahoma.

MURRAY ROSS, Manager of Performing Arts; Instructor Attendant Rank in Theatre. B.A., Williams College; M.A., University of California, Berkeley.

SHANNON SCHUMANN, Director of Math Learning Center, B.A., University of Guam, Ph D., University of Wyoming.

SUSAN SZPYRKA, Director of Public Safety, B.A., University of Colorado at Colorado Springs.

JANICE L. THARP, Director of Affirmative Action and Student Enrichment Services. B.A., University of Denver, M.A., University of Colorado, Colorado Springs.

R. JERRY WILSON, Director of Computing/Information Technology. A.A., Pikes Peak Community College; B.S., University of Southern Colorado.

ROBERT WONNETT, Director of Student Auxiliary Services. B.S., M.A., University of Colorado, Boulder, M.P.A., University of Colorado at Denver, J.D., University of Denver.

MARIAN YACKO, C.P.M., Director of Purchasing. B.S., Indiana University; M.B.A., University of Colorado, Colorado Springs.

Faculty

GENE D. ABRAMS, Professor of Mathematics. B.A., University of California, San Diego; M.S., Ph.D., University of Oregon.

JOSHUA ALSPECTOR, Professor of Electrical and Computer Engineering, University Endowed Chair. B.S., Rensselaer Polytechnic Institute; Ph.D., Massachusetts Institute of Technology.

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