University of Colorado Bulletin. (USPS 651-060)
364 Willard Administrative Center, Boulder, Colorado 80309
Vol. LXXX, No. 11, April 10, 1980
General series No. 2009. Published three times
monthly by the University of Colorado.
Second class postage paid at Boulder, Colorado.
Colleges and Schools

Business and Administration
Graduate School of Business Administration
Education
Engineering and Applied Science
Environmental Design
Graduate School
Liberal Arts and Sciences
Music
Public Affairs
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### ACADEMIC CALENDAR

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<th>Summer 1980</th>
<th>Spring 1981</th>
<th>Fall 1981</th>
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</thead>
<tbody>
<tr>
<td>June 2, 3</td>
<td>January 19-23</td>
<td>August 1981</td>
</tr>
<tr>
<td>June 9</td>
<td>January 26</td>
<td>August 20-22, 25-29</td>
</tr>
<tr>
<td>July 4</td>
<td>March 23-27</td>
<td>September 2</td>
</tr>
<tr>
<td>August 15</td>
<td>May 15</td>
<td>November 27, 28</td>
</tr>
<tr>
<td>Registration.</td>
<td>Registration.</td>
<td>Registration.</td>
</tr>
<tr>
<td>First day of classes.</td>
<td>First day of classes.</td>
<td>First day of classes.</td>
</tr>
<tr>
<td>Holiday (no classes).</td>
<td>Holiday (no classes).</td>
<td>Thanksgiving holidays.</td>
</tr>
<tr>
<td>End of term.</td>
<td>End of term.</td>
<td>(no classes).</td>
</tr>
</tbody>
</table>

#### Notes:

1. The University reserves the right to alter the Academic Calendar at any time.
2. Consult the Schedule of Courses for application deadline dates and deadlines for changing programs (dropping and adding classes).
<table>
<thead>
<tr>
<th>DEGREE PROGRAMS AT A GLANCE</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Baccalaureate Programs</strong></td>
</tr>
<tr>
<td>BUSINESS</td>
</tr>
<tr>
<td>(areas of emphasis) accounting, finance, information systems, international business, marketing, minerals land management, organization management, personnel management, production and operations management, public agency administration, real estate, small business management, statistics, transportation and traffic management rehabilitation services, teacher education program</td>
</tr>
<tr>
<td>EDUCATION</td>
</tr>
<tr>
<td>civil engineering, civil engineering and business, electrical engineering, electrical engineering and business, electrical engineering and computer science, electrical engineering and computer science and business, applied mathematics, applied mathematics and business, mechanical engineering, mechanical engineering and business</td>
</tr>
<tr>
<td>ENVIRONMENTAL DESIGN</td>
</tr>
<tr>
<td>offered only at Boulder</td>
</tr>
<tr>
<td>HUMANITIES</td>
</tr>
<tr>
<td>communication and theatre, creative arts, English, fine arts, French, German, philosophy, Spanish, writing program</td>
</tr>
<tr>
<td>MUSIC</td>
</tr>
<tr>
<td>music and media</td>
</tr>
<tr>
<td>NATURAL AND PHYSICAL SCIENCES</td>
</tr>
<tr>
<td>PUBLIC AFFAIRS</td>
</tr>
<tr>
<td>SOCIAL SCIENCES</td>
</tr>
<tr>
<td>Type of Applicant</td>
</tr>
<tr>
<td>--------------------------------------------------------</td>
</tr>
</tbody>
</table>
| FRESHMAN                                               | **IN GENERAL:**
| (Students seeking a bachelor's degree who have never attended a collegiate institution) | a) Rank in upper half of high school graduating class.
|                                                         | b) Have 15 units of acceptable high school work.
|                                                         | c) Test scores:
|                                                         | ACT comp: 23
|                                                         | or SAT comb: 1000                                          | Complete application           | Not later than:
|                                                         |                                                           | $10 application fee             | Aug. 1 for fall
|                                                         |                                                           | Official high school transcript showing rank-in-class, date of graduation, 7th semester grades, 8th semester courses | Dec. 1 for spring
|                                                         |                                                           | Official ACT or SAT score report | May 1 for summer
|                                                         |                                                           |                                      | Seniors who meet or exceed all admission criteria may apply as early as Oct. 1 for fall. |
|                                                         |                                                            |                                      |                               | For specific requirements refer to the college sections of this bulletin. For example, Music requires an audition. |
| TRANSFER                                               | **IN GENERAL:**
| (Students seeking a bachelor's degree who have attended a collegiate institution other than CU) | Must be in good standing and eligible to return to all institutions previously attended. Residents must have a minimum 2.0 (C) GPA on all work attempted. Nonresidents must have a minimum 2.5 (C+) GPA on all work attempted. Business and Engineering applicants may be required to have higher GPAs. | Complete application           | Not later than:
|                                                         |                                                           | $10 application fee             | Aug. 1 for fall
|                                                         |                                                           | Two official transcripts sent from each college attended | Dec. 1 for spring
|                                                         |                                                           |                                      | May 1 for summer
|                                                         |                                                           |                                      | Transfers to the School of Education consult that section for additional requirements. Liberal arts and music transfers with less than 12 sem. hrs. of college work (business and engineering transfers with less than 24 sem. hrs.) must also submit all freshman credentials. |
| SPECIAL                                                | Must be at least 21 years old (except in summer). Must be a high school graduate. | Complete application | Not later than:
| (Students who are not seeking a degree at this institution) |                                                           |                                      | Aug. 1 for fall
|                                                         |                                                           |                                      | Dec. 1 for spring
|                                                         |                                                           |                                      | May 1 for summer
|                                                         |                                                           |                                      | Application will also be accepted at registration if space allows. |
| RETURNING CU STUDENT                                   | Must be in good standing | Former student application | Same as for special students | Students under academic suspension in certain schools or colleges at the University of Colorado may enroll during the summer terms as a means of improving their grade-point averages. |
| (Returning special students, returning degree students who have not attended another institution since CU) | | | | |
| RETURNING CU STUDENT                                   | Same as for transfers | Complete application           | Same as for transfers | |
| (Returning degree students who have attempted 12 or more hours at another institution since attending CU) | $10 application fee | Two official transcripts from each intervening college | | |
| CHANGE OF STATUS: SPECIAL TO DEGREE                    | Same as for transfers | Same as for transfers | Same as for transfers | |
| (former CU special students who wish to enter a degree program) | | Plus CU transcript | | |
| CHANGE OF STATUS: DEGREE TO SPECIAL                     | Must have completed degree. | Special student application | Same as for special students | Only students who have completed and received degree are eligible to change to special status. |
| (former CU special students who have graduated and wish to take additional work) | | | | |
| INTERCAMPUS TRANSFER                                   | Must be in good standing | Former student application | Transfer to Denver: same as for specials | Transfers from Denver to another campus of CU should refer to appropriate bulletin for additional requirements. |
| (Students who have been enrolled on one CU campus and wish to take courses on another) | | | Transfer from Denver: refer to appropriate bulletin | |
| INTRAUNIVERSITY TRANSFER                               | Same as for transfers | Intrauniversity transfer application | Same as for transfers | |
| (Students who wish to change from one CU college to another, e.g., from the College of Liberal Arts and Sciences to the College of Business) | CU transcript | | | |

1Applications will be accepted only as long as openings remain.
2Requirements for individual schools or colleges may vary.
General Information

THE UNIVERSITY OF COLORADO AT DENVER: AN URBAN UNIVERSITY CAMPUS

The University of Colorado at Denver (UCD) is an urban nonresidential campus located in downtown Denver. The campus is easily accessible to commuters from a four-county area and is close to major business and government offices in downtown Denver, as well as to civic and cultural centers. UCD is one of the largest state-supported institutions of higher education in Colorado in terms of enrollment, with an average of 8,500 students (approximately 5,300 FTE—full-time equivalent—students) enrolled during a semester.

The UCD Administration Building is located at 1100 Fourteenth Street. UCD shares library, laboratory, classroom, and recreation facilities with two other metropolitan institutions on a single campus, the Auraria Higher Education Center.

Academic Programs

UCD is committed to meeting the needs of the metropolitan Denver community. Academic, public service, and research activities are geared to the needs of the urban population and environment, encompassing both traditional and nontraditional fields of study. Students enrolled at UCD can earn undergraduate degrees in 36 fields and graduate degrees in over 50 fields.

The colleges and schools at UCD are:

- College of Business and Administration and Graduate School of Business Administration
- School of Education
- College of Engineering and Applied Science
- College of Environmental Design
- College of Liberal Arts and Sciences
- College of Music
- Graduate School
- Graduate School of Public Affairs

The undergraduate colleges admit freshmen and offer programs leading to the baccalaureate degree in the arts, sciences, humanities, business, engineering, and music. The College of Liberal Arts and Sciences also provides preprofessional training in the fields of education, law, journalism, and the health sciences. The School of Education offers programs leading to the baccalaureate degree in education and teacher certification to students with two years of college work. The Graduate School offers master's programs in the arts, sciences, humanities, engineering, business, education, and music to students with baccalaureate degrees. The College of Environmental Design, the Graduate School of Business Administration, and the Graduate School of Public Affairs provide programs leading to the master's degree in their specialized areas. The Graduate School of Public Affairs also offers a doctorate in public administration.

Students

Highly motivated people from all walks of life make up UCD's student body. The diversity of backgrounds, interests, occupations, and ages stimulates a unique learning experience for the men and women enrolled at UCD. Students range in age from 16 to 70. Approximately 84% of the students hold full-time or part-time jobs and 38% are enrolled at the graduate level. In order to give students maximum flexibility in planning both educational and employment goals, more than half of the courses are offered during the evening hours. Students may begin studies in most areas at the beginning of the fall or spring semester, or the summer term.

Faculty and Accreditation

More than 230 highly qualified faculty members teach full time at UCD; most have doctoral degrees. The faculty is alert to the challenges of the urban environment and responsive to the needs of the commuter student. UCD is accredited by or holds membership in the following organizations:

ACCREDITATION

- North Central Association of Colleges and Secondary Schools
- National Council for the Accreditation of Teacher Education
- National Architecture Accrediting Board
- Engineers' Council for Professional Development
- National Association of Schools of Music

MEMBERSHIP

- Association of Urban Universities
- American Assembly of Collegiate Schools of Business
- Association of Collegiate Schools of Architecture and Collegiate Schools of Planning
- National Association of Schools of Public Affairs and Administration
University of Colorado System

UCD is one of four campuses of the University of Colorado. The University was founded in Boulder in 1876, and the University of Colorado, Boulder, now serves over 20,000 students enrolled in undergraduate, graduate, and professional programs. The Health Sciences Center in Denver provides education and training to medical, dental, nursing, and allied health personnel. The University of Colorado at Colorado Springs serves over 3,000 students in the Pikes Peak region, offering undergraduate, graduate, and professional programs. UCD's special role within the University system is to provide urban-oriented educational programs for students in the Denver metropolitan area.

Students have access to the library resources of all campuses and to cultural events sponsored within the University system.

The official transcript of any student who first enrolled in the spring semester 1978 or afterwards and who graduates from an undergraduate program operated solely by UCD will indicate that the degree was conferred at Denver. At present the only undergraduate program operated solely by UCD is the College of Liberal Arts and Sciences.

Auraria Higher Education Center

The Auraria Higher Education Center is the site for the University of Colorado at Denver, Metropolitan State College, and the Auraria campus of the Community College of Denver. The three institutions share library, classroom, and related facilities on the Auraria campus, a 168-acre site in downtown Denver. Certain courses and programs are cooperatively offered.

The Auraria campus includes three administration buildings, five classroom buildings, the Learning Resources Center, the student center, child care and development centers, the physical education building, and two service buildings.

The Auraria Library is housed in the Learning Resources Center, with a branch in the Community College/Auraria Administration Building, and the College of Environmental Design library in the Bromley Building. The library collection includes books, reserve and reference materials, journals, microforms, records, slides, tapes, and other media in various formats. Microform equipment and listening and viewing facilities are provided. General reference service, interlibrary loans, and assistance with individual library problems are available at the reference counter. UCD students may use the interlibrary loan service to obtain materials not held by the Auraria Libraries.

The new buildings share the campus with reminders of Denver's past—historic Ninth Street Park, churches, and the Tivoli brewery built in 1882.

Equal Opportunity

The University of Colorado at Denver follows a policy of equal opportunity in education and employment.

In pursuance of this policy, no UCD department, unit, discipline, or employee shall discriminate against an individual or group on the basis of race, sex, creed, color, age, national origin, or individual handicap. 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 administered on a nondiscriminatory basis subject to the provisions of Titles VI and VII of the Civil Rights Act of 1964 and Title IX of the Education Amendments of 1972, and Section 504 of the Rehabilitation Act of 1973.

A UCD Equal Opportunity/Affirmative Action Program has been established to implement this policy. For information about these provisions on equity, discrimination, or fairness, consult the following persons who will advise individuals of existing complaint procedures within and outside the University: Affirmative Action Director Nereyda Bottoms, Room 803, 1100 Fourteenth Street (telephone: 629-2621); or Paul Kopecky, Rehabilitation Act Coordinator, Room 801, 1100 Fourteenth Street (telephone: 629-2642).

I. ADMISSION POLICIES AND PROCEDURES

All questions and correspondence regarding admission to UCD and requests for application forms should be directed to:

Office of Admissions and Records
University of Colorado at Denver
1100 Fourteenth Street
Denver, Colorado 80202
(303) 629-2660

General Policies

UCD seeks to identify applicants who are likely to complete an academic program successfully. Admission decisions are based on many factors, the most important being:

1. Level of previous academic performance.
2. Evidence of scholarly ability and accomplishment, as indicated by scores on national aptitude tests.
3. Maturity, motivation, and potential for academic growth.

UCD reserves the right to deny admission to new applicants or readmission to former students whose total credentials indicate an inability to assume those obligations of performance and behavior deemed essential by the University in order to carry out its lawful missions, processes, and functions as an educational institution.

Admission of Undergraduate Degree Students

APPLICATION DEADLINES

<table>
<thead>
<tr>
<th>Undergraduate Students</th>
<th>Fall 1980</th>
<th>Spring 1981</th>
<th>Summer 1981</th>
</tr>
</thead>
<tbody>
<tr>
<td>New Students</td>
<td>Aug. 1</td>
<td>Dec. 1</td>
<td>May 1</td>
</tr>
<tr>
<td>Transfer Students</td>
<td>Aug. 1</td>
<td>Dec. 1</td>
<td>May 1</td>
</tr>
<tr>
<td>International Students</td>
<td>June 1</td>
<td>Nov. 1</td>
<td>April 1</td>
</tr>
<tr>
<td>Former University of</td>
<td>Aug. 1</td>
<td>Dec. 1</td>
<td>May 1</td>
</tr>
<tr>
<td>Colorado Students</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Intrauniversity Transfer Students</td>
<td>60 days prior to the beginning of the term</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
ADMISSION REQUIREMENTS FOR FRESHMEN

New freshmen may apply for admission to the Colleges of Business and Administration, Engineering and Applied Science, Liberal Arts and Sciences, and Music.

1. General Requirements. The applicant must be a high school graduate or have been awarded a High School Equivalency Certificate by completing the General Education Development (GED) Test. Applicants with a High School Equivalency Certificate must have an average standard score of 45 with no one score below 36 on each section of the GED test to be considered for admission. Applicants who have completed the Spanish Language General Educational Development Test must also submit scores from Test VI, “English as a Second Language.”

Applicants should have completed 15 units of acceptable secondary school (grades 9-12) credit. A unit of credit is one year of high school course work. While the College of Liberal Arts and Sciences does not specify particular units, the other undergraduate colleges have the following requirements:

<table>
<thead>
<tr>
<th>College of Business and Administration</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>English</td>
<td>3</td>
</tr>
<tr>
<td>Mathematics</td>
<td>3</td>
</tr>
<tr>
<td>Natural sciences (laboratory type)</td>
<td>2</td>
</tr>
<tr>
<td>Social sciences (including history)</td>
<td>2</td>
</tr>
<tr>
<td>Electives</td>
<td>5</td>
</tr>
<tr>
<td>(Such as foreign languages and additional academic courses. May include up to 2 units in business areas.)</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>15</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>College of Engineering and Applied Science1</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>English (literature, composition, grammar)</td>
<td>4</td>
</tr>
<tr>
<td>Mathematics distributed as follows:</td>
<td></td>
</tr>
<tr>
<td>Algebra</td>
<td>2</td>
</tr>
<tr>
<td>Geometry</td>
<td>1</td>
</tr>
<tr>
<td>Additional mathematics</td>
<td>1</td>
</tr>
<tr>
<td>Natural sciences (physics and chemistry recommended)</td>
<td>2</td>
</tr>
<tr>
<td>Social studies and humanities</td>
<td></td>
</tr>
<tr>
<td>(Foreign languages and additional units of English, history, and literature are included)</td>
<td>3</td>
</tr>
<tr>
<td>Electives</td>
<td>3</td>
</tr>
<tr>
<td>Total</td>
<td>16</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>College of Music</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>English</td>
<td>3</td>
</tr>
<tr>
<td>Theoretical music</td>
<td></td>
</tr>
<tr>
<td>Physical science</td>
<td>8</td>
</tr>
<tr>
<td>Social science</td>
<td></td>
</tr>
<tr>
<td>Foreign language</td>
<td></td>
</tr>
<tr>
<td>Mathematics</td>
<td></td>
</tr>
<tr>
<td>Additional high school academic units</td>
<td>4</td>
</tr>
<tr>
<td>Total</td>
<td>15</td>
</tr>
</tbody>
</table>

It is expected that all students will have had previous experience in an applied music area. Two years of piano training are recommended.

The College of Music requires an audition of all entering freshmen and undergraduate transfer students. In lieu of the personal audition, applicants may substitute tape recordings (about 10 minutes in length on 7½ ips monaural) or a statement of excellence by a qualified teacher. Interested students should write to the College of Music, UCD, for audition or interview applications.

2. All Applicants. All applicants who meet the above requirements are classified in two ways for admission purposes:

a. Preferred consideration is given to Liberal Arts and Sciences and Music applicants who rank in the upper half of their high school graduating class and have a composite score of 23 or higher on the American College Test (ACT) or a combined score of 1000 or higher on the Scholastic Aptitude Test (SAT). Engineering applicants are expected to have a strong mathematics and science background, somewhat higher scores on the mathematics portion of the ACT or SAT, and higher class rank. Business students are expected to have a strong mathematics background, higher class rank and higher test scores. Music requires an audition.

b. Applicants for any of the above four colleges who rank in the lower half of their high school graduating class, and/or have combined SAT scores below 1000 or a composite ACT score below 23, and/or do not have 15 units of acceptable high school credit are considered on an individual basis.

How to Apply

1. Students should obtain an Application for Admission from their Colorado high school counselor or the UCD Office of Admissions and Records.

2. The application must be completed in full and sent to the Office of Admissions and Records. A $10 nonrefundable application fee must accompany the application. An applicant who is granted admission, but who is unable to enroll for the term applied for, will have the $10 fee valid for 12 months, provided the applicant informs Admissions and Records that he or she intends to enroll for a later term.

3. Students are required to have their high school send an official transcript of their high school grades, including class rank, to the Office of Admissions and Records.

4. Students also are required to take either the American College Test (ACT) or the Scholastic Aptitude Test (SAT) and request that scores be sent to UCD (ACT code 0533 or SAT code R-4875). High school students may obtain information from their counselors regarding when and where tests are given. Applicants who took one of these tests earlier and did not designate UCD to receive scores must request the testing agency to send scores to UCD. This is done by completing a Request for Additional Score Report available at test centers or from the offices listed below.

1See the College of Engineering and Applied Science section of this bulletin for more specific information.
ADMISSION REQUIREMENTS FOR
TRANSFER STUDENTS

Transfer students may apply for admission to the Colleges of Business and Administration, Engineering and Applied Science, Liberal Arts and Sciences, and Music. Students interested in the field of education should contact the School of Education office for information (629-2717).

Transfer students are given priority consideration for admission as follows:

1. **College of Liberal Arts and Sciences and College of Music.** Both Colorado residents and nonresidents must have at least a 2.0 cumulative college grade-point average (on a 4.0 scale) for all work attempted and must be eligible to return to all institutions previously attended. Course work in progress cannot be used in calculating the cumulative average. Music applicants must also successfully pass a music audition. Contact the College of Music for audition information.

2. **College of Business and Administration and College of Engineering and Applied Science.** Colorado residents must have at least a 2.5 and nonresidents must have at least a 2.75 cumulative college grade-point average (on a 4.0 scale) for all work attempted and must be eligible to return to all institutions previously attended. Course work in progress cannot be used in calculating the cumulative average.

In addition to the above academic requirements, preferred consideration is given to transfer applicants who have completed more than 12 semester credit hours (18 quarter hours) at an institution of university rank or to transfer applicants who have completed at least 45 semester credit hours (68 quarter hours) at a two-year college or a four-year state college.

**Important Note:** Applicants who do not meet the above grade-point average or credit hour requirements will still be considered for admission, but on an individual basis.

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The primary factors used when considering students individually are (1) the academic program to which admission is desired; (2) the quality of prior academic work; (3) age, maturity, and noncollegiate achievements; and (4) time elapsed since last attendance at previous colleges.

**How to Apply**

1. The student should obtain a transfer application from the UCD Office of Admissions and Records.
2. The application form must be completed and returned to the Office of Admissions and Records with the $10 nonrefundable application fee.
3. The student is required to have two official transcripts sent to the Office of Admissions and Records from each collegiate institution attended. If a student is currently enrolled, a transcript listing all courses except those taken in the final term should be sent. Another transcript must be submitted after completion of the final term. (Transcripts from foreign institutions must be presented in the original language and accompanied by a certified literal English translation.)
4. Applicants with less than 12 semester hours (18 quarter hours) of college work completed must also submit a high school transcript and ACT or SAT test scores (24 semester hours or 36 quarter hours for business or engineering transfers).
5. Applicants to the College of Liberal Arts and Sciences should be aware that they may be able to receive credit for foreign language taken during the high school years provided they furnish an official high school transcript to the dean's office. Further information may be obtained from the College of Liberal Arts and Sciences.

All credentials presented for admission become the property of the University of Colorado and must remain on file.

**Transfer of College-Level Credit**

The Office of Admissions and Records and the appropriate academic unit will determine which courses taken at another institution can be applied to a degree program at UCD after all transcripts have been received and the applicant has been admitted. In general, transfer credit will be accepted insofar as it meets the degree, grade, and residence requirements at UCD.

College-level credit may be transferred to the University if it was earned at a college or university of recognized standing, by advanced placement examinations, or in military service or schooling as recommended by the Commission on Accreditation of Service Experiences of the American Council on Education; if a grade of C or higher was attained; and if the credit is for courses appropriate to the degree sought at this institution.

The University may accept up to 72 semester credits (108 quarter credits) of work from a two-year institution toward the baccalaureate degree requirements, and may accept up to 102 semester credits (168 quarter hours) from a four-year college or university. No credit is allowed for vocational/technical, remedial, or religious/
doctrinal work. A maximum of 60 semester credits of extension and correspondence work (not to include more than 30 semester credits of correspondence) may be allowed if the above conditions are met.

The College of Business and Administration generally limits transfer credit for business courses taken at the lower division level. All courses in the area of emphasis must be taken at the University of Colorado unless written approval is obtained from the division head. A maximum of 60 semester hours (90 quarter hours) of junior college work and 9 semester hours of business courses taken through correspondence study may be applied toward baccalaureate degree requirements. All correspondence courses are evaluated to determine their acceptability, and required business courses and those in the area of emphasis may not be taken through correspondence.

Readmission Requirements for Former Students

1. Students Who Have Not Attended Another Institution. Former students of the University of Colorado who have not attended another collegiate institution since their last enrollment at the University must submit a Former Student Application (available from the Office of Admissions and Records), by the deadline for the term desired. No application fee and no supplementary credentials are required.

2. Students Who Have Attended Another Institution. Former students of the University of Colorado who have attended another collegiate institution since their last enrollment at the University must submit a Former Student Application and two official transcripts from any institutions attended in the interim. Applicants who have completed 12 semester hours or 18 quarter hours at another institution since last attending the University also must submit a $10 nonrefundable evaluation fee.

International Students

Undergraduate. International students who desire to attend the University of Colorado at Denver must present at least one full year of academic study from another accredited American collegiate institution before they may be considered for admission. A minimum of a 2.75 grade-point average (on a 4.0 scale) on all work attempted and proof of English proficiency are required. An application form may be obtained from the UCD Office of Admissions and Records.

Application and supporting credentials are to be presented to the admissions office three months prior to the start of the term for which the student is applying. Transcripts from foreign institutions must be presented in the original language and accompanied by a certified literal English translation.

Graduate. International students who desire graduate study at UCD must possess the equivalent of an American baccalaureate (undergraduate) degree and fulfill other requirements as designated by the graduate program to which they are applying. Applications can be obtained from the individual graduate schools. Application and credentials should be presented to the individual graduate school 6 months prior to the term for which the student is applying.

UCD Intrauniversity Transfer or Change of Campus

UCD students may change academic programs within UCD provided they are accepted by the college or school to which they wish to transfer. UCD Intrauniversity Transfer Forms may be obtained from the Office of Admissions and Records. Students should observe application deadlines indicated in the current Schedule of Courses. Decisions on intrauniversity transfers are made by the academic unit to which the student wishes to transfer.

UCD students may change campuses by applying directly to the Admissions Office of the University of Colorado campus to which they wish to transfer. Change of Campus applications and deadline information also must be obtained from the campus to which the student is applying.

High School Concurrent Enrollment

High school juniors and seniors with proven academic abilities may be admitted to UCD with special approval. Credit for courses taken may subsequently be applied toward a University degree program. For more information and application instructions, contact the UCD Office of Admissions and Records.

Admission of Graduate Degree Students

All correspondence and questions regarding admission to the graduate programs at UCD should be directed to the following:

Programs in Business
Office of Graduate Studies
Graduate School of Business Administration
629-2605

Programs in Environmental Design
College of Environmental Design
629-2877

Programs in Public Affairs
Graduate School of Public Affairs
629-2825

All Other Programs
Graduate School
629-2663

GRADUATE PROGRAMS

As a principal part of its mission, UCD offers graduate- and professional-level programs for the convenience of Denver residents. During the 1978-1979 academic year, approximately 38 percent of the student body was enrolled at the graduate level.

Graduate degree programs are offered through the Graduate School by its member schools and colleges, and outside the Graduate School by the Graduate School of
Business Administration, the College of Environmental Design, and the Graduate School of Public Affairs. The particular admission and graduation requirements established by each of these academic units are detailed in the following sections.

Students holding baccalaureate degrees but who are not accepted to specific degree programs may enroll for graduate course work as graduate special students. Several types of students make use of the special student category. Among these are students who have attained whatever degree or credential status they feel is desirable, but who wish to take additional course work for professional or personal improvement; students who, for whatever reason (weak undergraduate background, change of discipline, or length of time since previous formal course work), feel the need to make up deficiencies before entering a degree program; and students who have not decided about entering a specific degree program. Such students should be aware that, generally, only limited course credits taken as a special student may be applied toward a degree program. Also, a 2.0 minimum grade-point average must be maintained to permit continuing registration as a graduate special student. Students interested in applying as graduate special students should contact the Office of Admissions and Records for applications.

GRADUATE ADMISSION REQUIREMENTS AND APPLICATION DEADLINES

Admission requirements and application deadlines vary according to the individual graduate program. The Graduate School has general admission requirements which are supplemented by specific requirements of the major departments of graduate study (i.e., electrical engineering, education, English, etc.). Applicants in the fields of education, engineering, and the arts, sciences, and humanities should consult the general information section of the Graduate School portion of this bulletin as well as the following sections dealing with requirements and deadlines for specific programs. Applicants in the fields of business administration, public affairs, and environmental design should refer to the sections of this bulletin on the Graduate School of Business Administration, the Graduate School of Public Affairs, and the College of Environmental Design.

Admission of Nondegree Special Students

All correspondence and questions regarding admission as a special student should be directed to the UCD Office of Admissions and Records.

Persons desiring admission as special students for the purpose of teacher certification should contact the School of Education, 629-2717.

SPECIAL STUDENT APPLICATION DEADLINES

<table>
<thead>
<tr>
<th>Special Students</th>
<th>Fall 1980</th>
<th>Spring 1981</th>
<th>Summer 1981</th>
</tr>
</thead>
<tbody>
<tr>
<td>Those who want to take undergraduate or graduate courses</td>
<td>Aug. 1</td>
<td>Dec. 1</td>
<td>May 1</td>
</tr>
<tr>
<td>Those who want to change from special to degree status</td>
<td>Aug. 1</td>
<td>Dec. 1</td>
<td>May 1</td>
</tr>
<tr>
<td>Those who want teacher certification</td>
<td>Feb. 1</td>
<td>N.A.</td>
<td>Feb. 1</td>
</tr>
</tbody>
</table>

REQUIREMENTS FOR SPECIAL STUDENT ADMISSION

Persons who want to take University courses but do not plan to work toward a University of Colorado degree are admitted as special students. Except during the summer term, special students must be at least 21 years of age. Courses taken as a special student are fully credited and can be used for transfer to other institutions or for professional improvement. Persons who do not have an undergraduate degree are encouraged to apply to an undergraduate degree program rather than apply as special students. UCD will enroll persons without an undergraduate degree as special students for 12 semester hours, after which the student must apply to a regular degree program. Persons with a baccalaureate degree who seek teacher certification or renewal of certification may be admitted as special students if they meet the requirements of the School of Education. Special students must maintain a grade-point average of 2.0 at UCD.

HOW TO APPLY FOR SPECIAL STUDENT ADMISSION

To apply for admission as a special student, obtain a Special Student Application Form from the Office of Admissions and Records. Return the completed application by the deadline for the term desired. There is no application fee, and no additional credentials are required. Applicants who seek teacher certification or renewal of teacher certification must apply separately to the School of Education and submit the required credentials.

Special students are advised that registration for courses is on a space available basis.

CHANGING STATUS FROM SPECIAL TO DEGREE STUDENT

Special students may apply for admission to an undergraduate degree program by completing the Special to Degree Application available from the Office of Admissions and Records. Academic credentials (i.e., transcripts and/or test scores) and a $10 nonrefundable application fee also must be submitted. Special students who are accepted as undergraduate degree students may generally transfer a maximum of 12 semester credits for courses taken as a special student to an undergraduate degree program, with approval by the dean. (Students enrolled as special students prior to the fall semester of 1970 are subject to the policies in effect between January of 1969 and August of 1970.)

Special students may apply for admission to a graduate degree program by completing the application required by the particular program. The graduate dean, upon recommendation by the department, may accept up to 8 semester hours of credit toward the requirements for a master's degree for courses taken as a special student at the University or at another recognized graduate school, or some combination thereof. The department may recommend acceptance of additional credit for courses taken as a special student during the semester the student has applied for admission to the desired degree program.
Official Notification of Admission

Official notification of admission to UCD as an undergraduate, graduate, or special student is provided by the Office of Admissions and Records on a Statement of Admission Eligibility Form. Letters from the various schools and colleges indicating acceptance into a particular program are subject to official admission to the institution. Applicants who do not receive official notification of admission within a reasonable period of time after submitting application materials should contact the Office of Admissions and Records, (303)629-2660.

II. TUITION AND FEES, EXPENSES, AND FINANCIAL ASSISTANCE

Tuition and Fees

All tuition and fee charges are established by the Board of Regents, the governing body of the University of Colorado, in accordance with legislation enacted annually (usually in the spring) by the Colorado General Assembly. The Regents reserve the right to change tuition and fee rates at any time. A tuition schedule is published prior to registration for each term, and students should contact the Office of Admissions and Records for further information on the tuition and fee charges for a particular term. The rates below are for the 1979-80 academic year and are provided to assist prospective students in anticipating cost.

TUITION RATES PER SEMESTER FOR 1979-80

<table>
<thead>
<tr>
<th>Credit Hours of Enrollment</th>
<th>Undergraduate Students</th>
<th>Graduate Students</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Resident</td>
<td>Nonresident</td>
</tr>
<tr>
<td>0-1</td>
<td>$23</td>
<td>$77</td>
</tr>
<tr>
<td>2</td>
<td>46</td>
<td>154</td>
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<td>3</td>
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<td>1146</td>
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<tr>
<td>9</td>
<td>207</td>
<td>1146</td>
</tr>
<tr>
<td>10-18</td>
<td>216</td>
<td>1146</td>
</tr>
</tbody>
</table>

Each credit hour over 18

| 18 | 18 | 77 | 19 | 80 |

OTHER FEES

1. Student activity fee (mandatory for all students):
   - Fall semester 1979 ........................................ $17
   - Spring semester 1980 .................................... $17

2. Matriculation fee (mandatory for all new students):
   - Degree students .......................................... $15
   - Special students ........................................... $5

This is a one-time nonrefundable fee charged at the time of initial registration. No further charges will be made for adding or dropping courses or for ordering transcripts. A special student who becomes a degree student will be charged $10 at the initial registration as a degree student.

3. Health insurance fee (automatic for all students unless waived):
   - Fall or spring semester ................................... $44.00
   - Summer term ............................................... $30.75

Health insurance coverage is automatic unless waived by the student by signing a waiver card and turning it in at the time of registration. Dependent coverage (spouse and/or children) is also available at an additional charge. Further information on health insurance is available from the Office for Student Affairs, 629-2861.

4. Doctoral dissertation fee (mandatory for all students certified by the Graduate School for enrollment for doctoral dissertation):
   - Dissertation fee ............................................ $109
   - CoPITG fee (automatic for all students unless waived): .................................................. $2.25

5. Comprehensive examination fee (mandatory for graduate student enrolled for a comprehensive examination only):
   - Minimum resident graduate tuition ....................... $72

Graduate students enrolled for a comprehensive examination will be assessed regular tuition and fees if they need hours toward graduation.

7. Laboratory breakage fee (mandatory for students enrolled in a chemistry laboratory course):
   - Breakage deposit ........................................... $10

This fee will be refunded at the end of the term if appropriate.

8. Music laboratory fee (mandatory for College of Music students and others enrolled in certain music courses):
   - Music fee ...................................................... $18

College of Music students and others enrolled in piano, sound recording and reinforcement, and electronic music must pay this fee. No student is charged more than one $18 fee.

PAYMENT OF TUITION AND FEES

All tuition and fees are assessed and payable when the student registers for the term. Arrangements may be made through the Finance Office at the time of registration to defer payment of part of the charges. A minimum down payment consisting of the resident tuition for 0-3 hours or one-half of the total tuition and fees, whichever is greater, must be made at the time of registration. Specific information on deferred payment is included in the Schedule of Courses published before each semester or summer term.

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\(^1\)Includes bond retirement fee.
Students who register for courses are liable for payment of tuition and fees even though they may drop out of school. Refund policies for students who withdraw from the University are included in the Schedule of Courses. A student with financial obligations to the University will not be permitted to register for any subsequent term, to be graduated, or to be listed among those receiving a degree or credit. The only exception to this regulation involves students with loans and other types of indebtedness which are payable after graduation.

Personal checks are accepted for any University obligation. Any student who pays with a check which is not acceptable to the bank may be immediately dropped from the rolls of the University.

Residency Classification for Tuition Purposes

General Policies. A student is initially classified as a resident or nonresident student for tuition purposes at the time of application to the University. The classification is based on information furnished by the student and other relevant sources. To be eligible for instate tuition (resident) status the following requirements (as defined in the Colorado Revised Statutes, Chapter 124, Article 18) must be met by students who are 21 years of age or older (or emancipated minors as defined by law): (1) the student must have been domiciled in Colorado for 12 consecutive months preceding the first day of classes for the term in which in-state status is desired; (2) the student must demonstrate significant intent to make Colorado a fixed and permanent residence. Intent is demonstrated by compliance with other mandatory laws of the state for 12 consecutive months (i.e., valid driver's license, valid motor vehicle registration, payment of state income tax, voter registration etc.). An unemancipated minor assumes the domicile of his or her parents.

Once the student's status is established, it remains unchanged unless satisfactory information to the contrary is presented. A student who, due to subsequent events, becomes eligible for a change in classification from resident to nonresident or vice versa must inform the Office of Admissions and Records within 15 days after such a change occurs. An adult student or emancipated minor who moves outside of Colorado must send written notification of the Office of Admissions and Records within 15 days of the change.

Petitioning for a Change in Residency Classification. Any student who is 22 years of age or older, or an emancipated minor as defined by law, may change his or her residence and tuition classification status. Detailed information on the procedures which must be followed, including necessary petition forms, is available from the Office of Admissions and Records. Petitions will not be considered until an application for admission and supporting credentials have been received by the University. Changes in classification are effective at the time of the student’s next registration. A student who willfully gives wrong information in order to avoid paying out-of-state tuition is subject to legal and disciplinary action.

Estimated Expenses

Educational expenses at UCD include tuition, fees, and the cost of books and related instructional materials. Students who do not live with their parents must also include the cost of housing and food expenses. All students should consider transportation and personal expenditures (i.e., clothing, entertainment, etc.) in determining their expenses. Students who wish to review estimates of the cost of attendance at the University of Colorado at Denver should contact the Office of Financial Aid and Student Employment.

The financial aid program at the University is designed to assist those students who would be unable to attend the University without aid. While the primary responsibility for meeting the costs of education rests with individual students and their families, financial aid funds are offered to supplement whatever funds students and their families can provide. Since requests generally exceed the availability of funds, students and their families should be aware of procedures and deadlines in order to receive maximum consideration. Questions and requests for forms should be directed to the Office of Financial Aid and Student Employment at UCD.

Determination of Financial Need and Award

Financial need is defined as the difference between the cost of attendance as defined by the institution (tuition and fees, books and supplies, room and board, transportation and essential incidental expenses) and total resources available to the student. These resources include a family contribution (summer savings, term earnings, a spouse contribution, and a parental contribution) and awards from agencies outside the University.

Financial need is determined by a national uniform needs analysis system administered by agencies such as the American College Testing Program. This system analyzes income and assets, family size, number of children in post-secondary education, student independence, etc., to determine a reasonable student and/or family contribution.

After the financial need is determined, students are ranked in order of financial need and are aided accordingly until all funds are committed. The financial aid package normally consists of a self-help component (loans and/or employment) and a gift aid component (grants and scholarships) proportionate to the available funds and to the number of needy students applying.

How to Apply

Application forms may be obtained by contacting the Office of Financial Aid and Student Employment. Students are asked to complete an institutional application and a needs analysis form. Students will be contacted if additional information is necessary to complete the application.

Parents are expected to contribute toward a student’s educational costs. However, in certain cases students may be considered financially independent of their parents. To be eligible for financial aid as a self-
supporting student, a student (1) cannot be claimed as a tax exemption, (2) cannot receive $750 or more, or (3) live at home for more than six consecutive weeks for the year aid is received and for the entire preceding calendar year. For example, for a student to receive aid as a self-supporting student during the 1980-81 academic year, the above three criteria must be met for 1979, 1980, and 1981.

Note: Requirements for receiving aid as a self-supporting student are subject to change by the federal government.

Self-supporting students must document their status by providing income tax forms or other supporting documents to show sufficient income to be self-supporting during the appropriate period of time. In some cases, additional documentation from parents is required to complete a student's application. The information provided on the institutional application for financial aid is analyzed according to the uniform needs analysis formula to determine the student's ability to contribute to his or her educational costs during the academic year.

To be eligible for financial aid, students must be U.S. citizens or permanent residents or have a refugee visa. Eligible foreign students are advised to include a photocopy of their visa cards with their applications to facilitate processing.

Available Funds

Undergraduate Students. Undergraduate students are eligible to submit the following three applications:

1. The University application plus the Family Financial Statement (FFS). Under this two-part application the student will be considered for:

   - Federal Basic Educational Opportunity Grant (BEOG)
   - Federal Supplemental Educational Opportunity Grant (SEOG)
   - Federal Work-Study Assistance
   - Federal National Direct Student Loan (NDSL)
   - State Colorado Student Grant (CSG)
   - State Colorado Work-Study Assistance
   - State and Federal Colorado Student Incentive Grant (CSIG)
   - Institutional Grant Assistance

   (Students classified as nonresident for tuition purposes are not eligible for state financial aid funds.)

2. Basic Educational Opportunity Grant. This is a separate federal grant program which students can apply for if they do not apply for financial aid under number one above.

3. Federally Insured Student Loan/Guaranteed Student Loan. See the Types of Aid Available section for details.

Graduate Students: Graduate students are eligible to submit the following two applications:

1. The University application plus the Family Financial Statement (FFS). Under this two-part application, the student will be considered for:

   - Federal Work-Study Assistance
   - Federal National Direct Student Loan (NDSL)
   - State of Colorado Graduate Grant

2. Federally Insured Student Loan/Guaranteed Student Loan. See the Types of Aid Available section for details.

Preferential Filing Dates

April 2 —All undergraduate students applying for financial aid for the summer term and/or academic year.

October 1 —All undergraduate students applying for spring semester financial aid.

April 1 —Graduate students applying for summer term financial aid.

June 15 —Graduate students applying for financial aid for the fall and spring semesters.

October 1 —Graduate students applying for financial aid for the spring semester.

Special Note: An application for financial aid does not constitute an application for admission to the University. Please contact the UCD Office of Admissions and Records for application forms and procedures. Applicants will not receive financial aid until they are enrolled in a degree program at the University. Special students are not eligible for financial aid.

Types of Aid Available

SCHOLARSHIPS

UCD Scholarships. UCD scholarships provide up to $400 for entering Colorado residents of the Denver metropolitan area who are freshmen or transfer applicants. These awards are funded by the State of Colorado. Students should contact the Office of Admissions and Records for application information.

Colorado Scholarships. Colorado Scholars Awards provide up to $400 for Colorado residents who have at least a 3.0 grade-point average and have attended the University for at least 24 semester credit hours. These scholarships are funded by the State of Colorado. Information and application materials are available in the Office of Financial Aid.

GRANTS

Basic Educational Opportunity Grant. The Basic Educational Opportunity Grant is a source of federal grant aid for which students pursuing their first undergraduate degree may apply. Application can be made by submitting the Family Financial Statement or the separate Basic Grant application. Applications can be obtained from the Office of Financial Aid. Grant amounts vary depending on financial need, costs at the institution, and Congressional allocation. This program is the base of all financial aid.

Colorado Student Grant. The Colorado Student Grant is an undergraduate grant for Colorado residents. This grant is based on financial need and funds are allotted to the University by the State of Colorado. Amounts vary from approximately $100 to $1,000 per year. Application for this grant is made by submitting the University Application for Financial Aid and the Family Financial Statement.
Supplemental Educational Opportunity Grant. Supplemental Educational Opportunity Grants are undergraduate federal grants varying in amounts from $200 to $1,500 per year. The total that may be awarded to one student is $4,000 for a four-year course of study. These grants are based on student need and availability of funds. This aid cannot exceed 50 percent of financial need for a student and must be matched with some other form of financial aid. Application for this grant is made by submitting the University application and the Family Financial Statement.

Graduate Grant. Grants for graduate students are available on a limited basis and will be awarded to students as eligibility and funds allow. Application is made by submitting the University application and the Family Financial Statement of the Office of Financial Aid.

LOANS

National Direct Student Loans. National Direct Student Loans are federal loans available to undergraduate and graduate students with financial need. A student may borrow up to (a) $2,500 during the freshman and sophomore years; (b) $5,000 total for undergraduate study; (c) $10,000 for total graduate and undergraduate study. Application for the loan is made by submitting the University Application for Financial Aid and the Family Financial Statement.

Federally Insured Student Loan/Guaranteed Student Loan Programs. These two programs enable undergraduate and graduate students to borrow directly from a bank, credit union, savings and loan association, or other participating lenders who are willing to make the educational loan. The loan is guaranteed by a state or private nonprofit agency and insured by the federal government. Information and applications may be obtained from the lender.

EMPLOYMENT

College Work-Study Program. The College Work-Study Program is designed to provide jobs to undergraduate and graduate students who have financial need. The program is funded by the federal government and the State of Colorado. Employment is arranged whenever possible in the student’s major area of interest, with job opportunities both on- and off-campus. Awards average up to $1,600 per academic year. For details contact the Office of Student Employment. Application for this aid is made by submitting the University Application for Financial Aid and the Family Financial Statement.

Part-time Student Employment. The Office of Financial Aid and Student Employment assists students in obtaining part-time employment other than that based on financial need. Further information and application may be obtained from the office.

OTHER SOURCES OF AID

See the Office of Financial Aid and Student Employment for details of these programs:

Bureau of Indian Affairs. Grants are available to Native American students.

LEEP Grants and Loans. Grants and loans for tuition and fees are available to personnel working full time in law enforcement.

Short-Term Loans. Small, temporary loans are made to students facing financial emergencies. These loans are to be repaid during the semester.

Academic Requirements

Students receiving financial aid must demonstrate that they are maintaining normal progress and are in good standing at the University. Normal academic progress is defined as completing the minimum number of hours stipulated on the notification of financial aid by obtaining a grade of D or better for that number of hours. Less than normal progress can result in the loss of future financial aid. Aid received while suspended under Satisfactory Progress Policy must be repaid.

Duration of Aid

Financial aid is offered for one year (two academic semesters). Students must reapply for summer and for each academic year, prior to the established deadlines.

Use of Funds

All financial aid awards are to be used only for immediate educational expenses. These expenses include tuition, fees, books, supplies, room and board, transportation and essential miscellaneous expenses, such as clothing, medical, etc.

Refunds

The University tuition refund policy is published in the Schedule of Courses for each term. Students receiving financial aid may be required to return any refund to the University’s financial aid accounts.

Student Rights and Responsibilities

Students have certain rights and responsibilities regarding financial aid and student employment. Students may review applicable policies and procedures in the UCD Office of Financial Aid. Specific application procedures and policies are subject to change.

III. REGISTRATION: SELECTING A PROGRAM AND COURSES

Selecting a Program and Courses

New and continuing UCD students are urged to review Section VI and the following sections of this bulletin. Section VI describes the traditional and nontraditional instructional programs available at UCD, and the sections which follow it give information by school or college on the various majors available, course requirements by major, graduation requirements, course load policies, and other information and specific policies.
Courses available during a particular semester or summer term are listed in the Schedule of Courses, published several weeks before registration and available from the Office of Admissions and Records and the various deans' offices.

Undergraduate students who need assistance in planning a program or selecting courses should contact the academic unit in which they are enrolled to arrange for a counseling appointment. The appointment should be made prior to registration. Graduate students should contact their graduate department for assistance.

Orientation
An orientation program for all new students is held at the beginning of the fall semester, usually on the first day of registration. The program is conducted by the Office of Admissions and Records and the various deans' offices, and introduces the programs, activities, and services available at UCD, in addition to providing information on degree requirements, how to register, and similar matters.

Registration
GENERAL PROCEDURES
Registration for new students is held the week before classes begin on the dates indicated in the Schedule of Courses. Only students who have been accepted for enrollment for a particular term may register for courses.

LATE REGISTRATION
Late registration dates are indicated in the Schedule of Courses. Students who register late may be charged a late fee and are subject to limited course selection.

PAYMENT OF TUITION AND FEES
All tuition and fees are assessed and payable at registration. Arrangements may be made with the Finance Office at the time of registration to defer payment of a portion of the charges with a minimum down payment or one-half of the tuition, whichever is greater. Specific information on deferred payment is included in the Schedule of Courses.

INTERINSTITUTIONAL REGISTRATION
UCD students may register for courses offered by Metropolitan State College and the Community College of Denver-Auraria with approval of their dean. Refer to the Schedule of Courses for more information.

IV. ACADEMIC POLICIES AND REGULATIONS
Advanced Standing and Advanced Placement Credit
Undergraduate students may obtain credit for lower-level courses in which they demonstrate proficiency by examination. By passing an examination, the student will be given credit for the course to satisfy lower division requirements and may be eligible to enroll in higher level courses than indicated by the student's formal academic experience. Credit granted for courses by examination is treated as transfer credit without a grade but does count toward graduation and other requirements for which it is appropriate. There are three types of examinations as described below.

ADVANCED PLACEMENT PROGRAM
The Advanced Placement Program of the College Entrance Examination Board (CEEB) allows students to take advanced work while in high school and then be examined for credit at the college level. Students who take advanced placement courses and subsequently receive scores of 3, 4, or 5 on the CEEB Advanced Placement Examination are generally given college credit for lower-level courses in which they have demonstrated proficiency and are granted advanced standing in those areas. Students with scores below 3 are considered for advanced placement by the discipline concerned. For more information, contact your high school counselor or the Office of Admissions and Records.

CREDIT BY EXAMINATION
Students may receive credit by examination for work completed by private study or through employment experience. To qualify for an examination, the student must be formally working toward a degree at UCD and have a grade-point average of at least 2.0. Examinations are arranged through the Office of Admissions and Records, and a nonrefundable fee is charged. Students should contact the office of the dean of the academic unit in which they are enrolled.

COLLEGE-LEVEL EXAMINATION PROGRAM
An exciting challenge is available to incoming UCD students who may earn University credit by examination in subject areas in which they have excelled at college-level proficiency. Interested students are encouraged to take appropriate subject examinations provided in the College-Level Examination Program (CLEP) of the College Entrance Examination Board testing service. The cost for a single examination is $20.

Students who are interested in CLEP examinations must contact the office of their school or college.

Credit for Military Service and Schooling and ROTC
MILITARY SERVICE AND SCHOOLING
Applicants with military experience should submit the following with their application in order to have credit for educational experiences evaluated: (1) a copy of DD Form 214 and (2) DD Form 295. Application for the Evaluation of Educational Experience During Military Service. USAF personnel may present an official transcript from the Community College of the Air Force in lieu of the DD Form 295. Credit will be awarded as recommended by the Commission on the Accreditation of Service Experiences of the American Council on Education to the extent that such credit is applicable to

1Students in the College of Engineering and Applied Science must receive scores of 4 or 5 for credit to be granted; students with scores of 3 may be considered by the department concerned. All credit must be validated by subsequent academic performance.
the degree sought at UCD. Credit for courses completed through the U.S. Armed Forces Institute will be evaluated on the same basis as transfer credit from collegiate institutions.

RESERVE OFFICERS' TRAINING CORPS (ROTC)

Students enrolled in Army or Air Force ROTC programs should consult with their college or school regarding the application of ROTC course credit toward graduation requirements. The College of Liberal Arts and Sciences allows a maximum of 12 semester hours of ROTC credit to be applied toward baccalaureate degree requirements. The College of Business and Administration stipulates that ROTC courses may be used for credit only for nonbusiness elective requirements and that no credit may be given for freshman and sophomore ROTC courses. Furthermore, a maximum of 12 semester hours may be applied toward baccalaureate degree requirements in business and only if the ROTC program is completed.

Grading System and Policies

The following grading system and procedures for pass/fail registration, dropping and adding courses, and withdrawal from the University have been standardized for all academic units of the University effective with the 1974-75 academic year.

GRADE SYMBOLS

The instructor is responsible for whatever grade symbol (A, B, C, D, F, IF, IW, or IP) is to be assigned. Special symbols (NC, W, and Y) 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.

A—superior/excellent—4 credit points per credit hour.
B—good/better than average—3 credit points per credit hour.
C—competent/average—2 credit points per credit hour.
D—minimum passing—1 credit point per credit hour.
F—failing—no credit points per credit hour.
IF— incomplete—conversion after one academic year to F.
IW— incomplete—conversion after one academic year to W.
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.
H/P/F—honors/pass/fail—intended for honors courses; credit hours count toward the degree but are not included in the grade-point average.

SPECIAL SYMBOLS

NC — indicates registration on a no-credit basis.
W—indicates withdrawal without credit.
Y—indicates the final grade roster was not received by the time grades were processed.

PASS/FAIL PROCEDURE

1. Any student who wishes to register for a course on a pass/fail basis should do so during regular registration procedures. (Up to 16 semester hours of regular course work may be taken on a pass/fail basis and credited toward the bachelor's degree). Changes to or from a pass/fail basis may be effected only during the regular drop/add period.

2. The record of pass/fail registration is maintained by the Office of Admissions and Records.

3. Academic deans and faculty will not be informed of special pass/fail registration. All students who register on a pass/fail basis appear on the regular class roster, and a normal letter grade is assigned by the professor. When grades are received in the Records Office, those registrations which require a pass/fail designation are included credit received through CLEP and advanced standing examinations
Includes courses taken in the honors program
Does not include courses taken in honors, physical education, cooperative education, and certain teacher certification courses
Includes courses taken in the honors program

PASS/FAIL OPTION RESTRICTIONS

<table>
<thead>
<tr>
<th>College</th>
<th>General</th>
<th>16 Hours Maximum</th>
<th>Transfer Students</th>
</tr>
</thead>
<tbody>
<tr>
<td>Business and Administration</td>
<td>May not be used for &quot;core&quot; courses required for graduation and courses in area of emphasis.</td>
<td>Includes credit received through CLEP and advanced standing examinations.</td>
<td>Maximum of 1 semester hour of pass/fail for every 8 semester hours attempted at the University.</td>
</tr>
<tr>
<td>Education</td>
<td>No restrictions.</td>
<td>Includes courses taken in the honors program.</td>
<td>Maximum of 1 semester hour of pass/fail may be applied toward graduation for every 9 semester hours taken in the college.</td>
</tr>
<tr>
<td>Engineering and</td>
<td>Courses must be designated by major department; students without major not eligible; recommended maximum—one course/semester.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Applied Science</td>
<td></td>
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</tr>
<tr>
<td>Graduate School</td>
<td>Not applicable toward degree.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Liberal Arts and Sciences</td>
<td>May be restricted in certain majors; not included in 30 hours of C or better work required for major.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Music</td>
<td>Same as business.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Adding and Dropping Courses

Adding Courses. Students may add courses to their original registration during the first 5 days of classes, provided there is space available. Approval signatures are not required.

Dropping Courses:
1. Students will be able to drop courses during the first 12 days of the fall or spring semesters (7th day of the summer term). Tuition will not be charged for the courses which are dropped and signatures are not required.
2. After the 12th day of a fall or spring semester (7th day of a summer term), only the instructor's signature must be obtained and the instructor must indicate either a drop without discredit or failing. Tuition will be charged and the courses will appear on the student's permanent record with a W grade.
3. After the 10th week of a fall or spring semester (5th week of a summer term), courses may not be dropped unless there are circumstances clearly beyond the student's control. In addition to the instructor's certification (as in 2 above), the student must petition the academic dean for approval to drop the courses. Tuition will be charged even though the drop is allowed.

Withdrawal From the University

To withdraw from the University, the student obtains approval of the dean's office, Finance Office, and the Office of Admissions and Records. The withdrawal date is recorded on the student's permanent record page. If the withdrawal date is prior to the 13th day of the semester (7th day of the summer term), the courses will not appear on the student's permanent record. If the withdrawal date is after the 12th day, the courses will appear with W grades. Students may not withdraw after the 10th week of the semester (5th week of the summer term) except under documented circumstances clearly beyond their control.

Students who are receiving veterans' benefits or financial aid also must obtain the required signature of the appropriate office(s).

A student who ceases to attend classes without officially withdrawing from the University will receive a grade of F for all course work enrolled for during that term.

A graduate student who desires to withdraw from the University must apply to the associate dean of the Graduate School for permission to withdraw in good standing. Students who withdraw without communicating with the associate dean and filing the appropriate Withdrawal Form will be marked as having failed their courses for the term.

For specific signatures and refunds the student must refer to the Schedule of Courses published prior to the beginning of each term.

Inspection of Educational Records

Periodically, but not 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 educational records, to establish the right of students to inspect and review their educational 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 educational records maintained on students by this institution may be found in the offices 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. Such information may be disclosed by the institution for any purpose, at its discretion. These items are: name, address, telephone number, dates of attendance, registration status, class, major field of study, awards, honors, degree(s) conferred, past and present participation in officially recognized sports and activities, physical factors (height, weight) of athletes, date and place of birth.

Currently enrolled students may withhold disclosure of any category of 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 11th day of classes in any given term. Forms requesting the withholding of directory information are available in the Offices of Admissions and Records.

The University of Colorado assumes that failure on the part of any student to request specifically the withholding of categories 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.

Good Standing

To remain in good standing within a particular department, a student must maintain a minimum grade-point average of 2.0 (C) in all course work attempted. A minimum grade-point average of 2.0 must also be
maintained to qualify for an undergraduate degree. Policies on academic probation, suspension, and dismissal vary by college or school, and students should refer to the sections of this bulletin dealing with the colleges and schools for information.

Student Classification

Students who have passed fewer than 30 semester hours are classified as freshmen. To be classified as a sophomore, a student must have passed 30 semester hours; to be classified as a junior, 60 hours; and to be classified as a senior, 90 hours of credit. All transfer students will be classified on the same basis according to their hours of credit accepted by the University of Colorado.

Student Indebtedness

A student with financial obligations to the University will not be permitted to register for any subsequent term, to be graduated, or to be listed among those receiving a degree or credit from the University. Transcripts will not be released to a student with a financial obligation to the University. The only exception to this policy involves students who have loans or other types of indebtedness which mature after graduation.

V. SERVICES FOR STUDENTS

The Division of Student Affairs offers educational and personal support services and programs designed to assist students in meeting their educational and personal growth objectives. The division office telephone number is 629-2861.

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

Academic Honorary Societies

Academic honorary societies are affiliated with each of the schools and colleges. Further information may be obtained from the deans’ offices.

Alumni and Friends Program

The UCD Alumni and Friends organization was established in 1975 to support the University of Colorado at Denver. Membership is open to all University of Colorado graduates, former students, and friends of the University.

The organization publishes a newsletter on alumni and University activities and sponsors legislative breakfasts to aid in keeping alumni, students, and faculty informed about the legislative process.

Members work with students to select the campus’ outstanding faculty member, assist with student recruitment and registration, sponsor a reception for each graduating class, and coordinate the UCD Distinguished Service Award program. Functions are planned which bring alumni and friends back to the campus. The office is located in Room 706 of the UCD Administration Building, telephone 629-2665.

Counseling Center

The services of the Counseling Center are open to all students and prospective students. Personal and vocational counseling, group experiences, and testing are provided by trained counselors. Interviews are confidential and there is no fee for counseling. The office telephone number is 629-2861.

Disabled Student Services

This office provides specialized services for disabled students. Services are developed as the need arises and include preadmission advising and orientation; academic, vocational, and personal counseling; registration assistance; notetaker and interpreter services; close-in parking permits; locker usage; and a monthly newsletter. Telephone, 629-8354.

Health Insurance Program

The student medical-hospital-surgical plan is automatic for all students unless waived. Dependent coverage is available at an additional charge. Students may waive this coverage by checking the appropriate box on the Registration Authorization Card at the time of registration. Information may be obtained at 629-2861.

International Student Services

The Office for Student Affairs provides assistance to the more than 300 international students who attend UCD. The office helps foreign students with such requirements as immigration certifications and passport assistance, and supplies information on study abroad programs, international student I.D. cards, and overseas travel.

Special Services Program

Special Services is a program designed to assist selected students to be successful in their university lives by providing a variety of supportive services. Services are provided for low income students, physically disabled students, students with limited English-speaking ability, and other students with special needs. A variety of supportive services are offered including tutoring, English as a second language classes, testing, counseling, and academic skill development. Call 629-8345 for further information.

Student Conduct, Policies and Standards

The Office for Student Affairs, which protects student rights and responsibilities, administers the Code of Student Conduct. When a student enrolls in the University, he or she agrees to participate meaningfully in the life of the University and to share in the obligation to
preserve and promote its educational endeavors. Each student preserves his or her rights as a citizen and has a basic obligation not to commit or to tolerate any impingement on the rights of others. Copies of the code and information regarding all student grievance procedures may be obtained in the Office for Student Affairs. Telephone, 629-2861.

Student Employment Opportunities

The Office of Financial Aid offers job listings to all enrolled UCD students. Both on-campus and off-campus job openings are listed.

Students receiving financial aid may use this service only if the Office of Financial Aid has determined that earnings from the job in question will not exceed the amount of their unmet need. Telephone, 629-2886.

For information on career-related job opportunities, refer to Cooperative Education under Academic Programs.

Career Services

This office coordinates career planning, career counseling, vocational interest exploration, and career placement for UCD students and alumni.

Counseling programs are available to help students plan their futures and attain skills necessary for the achievement of career goals. Assistance is provided in developing skills essential for resume preparation and interviewing techniques.

Local and national employers list available career vacancies and visit the campus to recruit qualified personnel. Students are advised to register for this service early in their senior year. Telephone, 629-2861.

Job Placement

The Job Placement Office of UCD is centralized with the other colleges on the Auraria campus. Assistance in finding full-time employment is provided. Individual files are maintained, interviews are arranged, and workshops in job-seeking skills and resume writing are conducted. Call UCD at 629-2861 for location of the Job Placement Office.

Study Skills Center

The Study Skills Center is administered by the College of Liberal Arts and Sciences on behalf of UCD. The purpose of the center is to help UCD students develop methods of efficient study. Services are available to help specifically with particular academic and research skills. Telephone, 629-2802.

Veterans Affairs

The Office of Veterans Affairs offers all student veterans counseling regarding school attendance requirements, benefits, personal and vocational assistance, and other program information. Consult the veterans' representative, 629-2630.

Women's Center

The Women's Center provides counseling regarding vocational choices and personal and school-related problems. The center is also a place to meet other women students or join a discussion group. Telephone, 629-2815.

VI. ACADEMIC PROGRAMS

Degree Programs

For complete bachelor's and master's degree programs offered by UCD, see the Degree Programs at a Glance chart at the beginning of this bulletin.

UCD also offers preprofessional programs in law, journalism, and the health sciences (child health associate, dental hygiene, dentistry, medical technology, medicine, nursing, optometry, osteopathy, pharmacy, physical therapy, podiatry, and veterinary medicine). Courses in many other undergraduate and graduate areas are offered at UCD, but degrees must be completed at the University of Colorado at Boulder.

The remaining sections of this bulletin discuss in detail each school and college and provide information on their specific policies on requirements for graduation, course requirements for various majors, course load policies, and similar information. Course offerings appear in a separate section of this bulletin.

Cooperative Education Program

1047 Ninth Street
629-2892

The Cooperative Education Program provides students with an opportunity to find work experience relevant to their academic programs. The program is open to all students in the colleges and schools of UCD who have completed their freshman year and have maintained a grade-point average of at least 2.5. However, only the Colleges of Liberal Arts and Sciences and Music award credit for the work experience.

The cooperative internship program consists of jobs developed by the program staff in a wide variety of federal, state, and private agencies and businesses. Positions are specifically geared to students' academic and career goals. Cooperative education students can either work full time by alternating semesters of work with semesters of full-time school or they can work part time year around.

Educational Opportunity Program

Room 212, 1100 Fourteenth Street
629-2700

The Educational Opportunity Programs assist all educationally disadvantaged students at UCD. Support programs include specialized recruiting, intensive counseling, tutorial services, and community out-reach programs. The program is designed to provide assistance to minority students and to acquaint students with the history and culture of Asian Americans, Blacks, Mexican Americans, and Native Americans. Student organizations provide assistance with recruitment,
counseling, and tutoring; financial assistance is available through grants and the Work/Study Program. Courses are offered in Asian American, Black, Mexican American, and Native American Studies. These courses are open to all students and are described in the Course Description section of this bulletin.

Reserve Officer Training Programs

U.S. Army Reserve Officer Training Corps (ROTC) Department of Military Science, University of Colorado at Denver, 1015 9th Street, 629-3491.

The Department of Military Science offers two Army ROTC programs leading to a commission in the active Army, the Army Reserve, or the Army National Guard Forces.

TWO-YEAR PROGRAM

The abbreviated two-year program consists of the same courses offered in the advanced course. However, both undergraduate and graduate students may become qualified for this program by successful completion of a six-week summer basic camp, an on-campus summer program, or by completion of specially designed compression courses offered during the spring or fall semesters. If selected for the abbreviated program under these options, students may receive an early commission with the Reserve or National Guard while continuing their college education at the undergraduate or graduate level.

FOUR-YEAR PROGRAM

The standard four-year program consists of two phases. The basic course, normally completed during the freshman and sophomore years, consists of courses in military science, officer career development, and leadership theory and management. The advanced course coincides with the junior and senior years. Subject areas include psychology and methods of instruction, tactics, and unit operations, military law, history, national strategy and army policies. Completion of a six-week advanced camp during the summer is required prior to commissioning.

Students should contact the Professor of Military Science (629-3491, 1015 9th Street) for specific requirements and options available based on each student’s status at the time of program entry. Students who are veterans of military service or participated in Junior ROTC, Civil Air Patrol, or similar organizations may have a portion or all of the basic course requirements waived by the Professor of Military Science.

SCHOLARSHIPS

Students selected for a U.S. Army scholarship receive full tuition, books, laboratory fees, classroom materials, and a monthly allowance of $100 during each academic year. Only high school seniors are eligible to apply for four-year scholarships. Both ROTC and non-ROTC students, enrolled on campus as full-time students, may compete for the three-, two-, and one-year scholarships. All scholarship benefits are tax free and competition is open to both men and women.

FLIGHT TRAINING

Students selected for the advanced course may become qualified, as a cadet, to participate in the Army Aviation Program. These individuals will attend flight school after completion of their officer’s basic course while on active duty.

Army ROTC course credit for graduation varies with each college. Students should contact the Professor of Military Science or dean of their college to clarify the number of credit hours to be awarded.

U.S. Air Force Reserve Officer Training Corps (AFROTC), Folsom Stadium, Gate 3, University of Colorado at Boulder, Boulder, Colorado 80309, 492-8351.

U.S. Air Force ROTC offers two programs leading to commission in the U.S. Air Force upon receipt of the baccalaureate degree. Graduate students may be commissioned upon the completion of 12 hours of the professional officer course and a six-week summer training program.

STANDARD FOUR-YEAR COURSE

This program is in three parts: the general military course for lower-division (freshman and sophomore) students, the professional officer course for upper-division students, and corps training (attended by all students). Completion of the general military course is a prerequisite for entry into the professional officer course. Completion of a four-week summer training course is required prior to commissioning.

MODIFIED TWO-YEAR PROGRAM

This program is offered to full-time, regularly enrolled degree students at both undergraduate and graduate levels who will have two years remaining at the University of Colorado at Boulder when they enroll. Selection is on a competitive basis. Applicants should apply directly to the Professor of Aerospace Studies not later than March 15 of the spring semester immediately preceding the academic year in which they desire to enroll in the program. Those selected for this program must complete a six-week field training program during the summer months as a prerequisite for entry into the professional officer course the following fall or spring semester.

FLIGHT TRAINING

Expense-paid ground school and flight training are open to cadets approved and qualified for future USAF pilot training.

AIR FORCE COLLEGE SCHOLARSHIP PROGRAM

Students participating in Air Force ROTC may be eligible to compete for Air Force ROTC College Scholarships. Students selected for this program are placed on grants that pay tuition, book costs, nonrefundable educational fees, and subsistence of $100 per month, tax free. All cadets enrolled in the professional officer course receive $100 per month subsistence during the regular academic year. Students
are also eligible to compete for two-, three-, or four-year scholarships open to both men and women.

AFROTC credit for graduation varies with each college. Students should contact the appropriate college or the Professor of Aerospace Studies for determination of credit.

COURSES

See Department of Military Science in the Course Description section of this bulletin for courses offered.

Senior Citizen Program

The College of Liberal Arts and Sciences through its Academic Advising Office coordinates tuition-free classes for persons 60 years of age or over. Senior citizens may register for any class on a noncredit/audit basis as long as space is available. Senior citizens should register and pick up class registration forms in Room 204, UCD Administration Building, and should take the completed forms to the first session of class for the instructor's approval. The form then should be returned to Room 204, and a student I.D. card will be issued which entitles senior citizens to the same privileges as regular degree students. For further information call 629-2555.

Division of Continuing Education

The Division of Continuing Education at UCD provides lifelong learning experiences for people of all ages seeking to attain career and personal development goals and serves a society trying to cope with the problems and realities of rapidly changing patterns of living. The division offers a large noncredit program ranging from one-day workshops to certificate programs requiring several years to complete. Classes meet throughout the Denver metropolitan area. Off-campus credit classes are offered in the public schools, Lowry Air Force Base, and Fitzsimons Army Medical Center.

Noncredit programs are open to all adults regardless of previous education or training. Some advanced courses require a background in a specific subject matter area. Examples of these courses include licensing and professional designation refresher courses for engineers, accountants, and life insurance agents. Except in some certificate programs, no grade is awarded upon completion of a course.

Off-campus credit classes supplement the regular academic programs offered at UCD. These special purpose programs include recertification classes for public school teachers, vacation college, and certificate programs for government professionals. Admission requirements and refund policies for off-campus instruction are identical with requirements for enrollment in UCD. Individuals who have never been enrolled on any campus of the University of Colorado usually are admitted to off-campus instruction as special students.

Individuals interested in obtaining a copy of the Division of Continuing Education Bulletin or other information may write or call the division office at UCD, 1100 14th Street, 629-2735.

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THE COLLEGE

The College of Business and Administration and the Graduate School of Business Administration at UCD offer programs designed to train competent, responsible administrative and related professional personnel. The College serves students entering this field of study and men and women already in administrative positions—demonstrated by the fact that 80-85 percent of courses are offered in the evening. It promotes research and new thinking about administrative problems.

The major purpose of the College of Business is to provide opportunities both for a liberal education and for professional training. Students are given help in preparing not only for effective careers but also for satisfying living and constructive citizenship.

The Graduate School of Business Administration offers graduate-level education in business to persons with undergraduate degrees in business and other academic fields and prepares them for work in the broad spectrum of business enterprise. All Master of Business Administration (M.B.A.) classes are offered in the evening.

The College was admitted to membership in the American Assembly of Collegiate Schools of Business in 1938.

The College participates on a continuing basis in the Executive Program for the Gas Industry, the Institute for Organization Management, the Colorado School of Banking, the National Installment Banking School, the School of Bank Marketing, the School for International Banking, and many activities of the Center for Management and Technical Programs. The College also assists in the presentation throughout Colorado of a Certificate Program in Real Estate. The faculty also participate in many continuing education, government, and company educational programs.

The UCD Business Advisory Council serves as a direct link with the Denver business community to promote understanding, cooperation, and mutual gain in a variety of education-industry activities.

CAREER OPPORTUNITIES

Graduates occupy positions and perform widely varied functions in:

- Consumer credit and mortgage finance
- Marketing research
- Office management
- Operations research
- Personnel management
- Production management
- Public accounting
- Real estate
- Retailing
- Selling and sales management
- Traffic management
- Transportation
- Wholesaling

Others hold positions of responsibility in fields as diverse as business journalism, public relations, city planning, chamber of commerce and trade association management, college administration, and government.

ORGANIZATION

Within the broad framework of policy established by the Regents of the University of Colorado, policy decisions for the College of Business are made by the Educational Policy Committee of the faculty under the chairmanship of the dean and are subject to review by the faculty as a whole.

The College's activities at UCD are administered by the associate dean, by the heads of its several instructional divisions, and by other faculty directors of particular programs.

RESEARCH ACTIVITIES

The Business Research Division provides facilities and trained personnel for research on business and economic problems. Established in 1915, the unit serves as the research arm of the College. The division serves Colorado and the surrounding region to improve the general economic welfare of the area and to gather and disseminate business and economic information; encourages research by faculty members and graduate students; and develops closer relationships between students, faculty, and businessmen.

Through its monthly publication, The Colorado Business Review, the division provides basic business information concerning Colorado. Other publications include compilations of business and economic data, industry surveys, studies of special problems in business management and regional community studies.
Honors Program

Upon recommendation of the faculty, students who demonstrate superior scholarship are given special recognition at graduation.

Students must achieve an overall grade-point average of 3.3 and a grade-point average of 3.5 in all business courses taken at the University of Colorado to be considered for 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.

Student Organizations

Opportunity for association with other College of Business and Administration students in varied activities intended to stimulate professional interests and to give recognition to scholastic attainment is provided by the following student organizations:

AIESEC—international business association
Beta Alpha Psi—national honorary and professional accounting fraternity
Beta Gamma Sigma—national honorary scholastic fraternity in business
BREC—Buffalo Real Estate Club
CSPA—Colorado Society for Personnel Administration (student chapter) for students interested in personnel or industrial relations
CUAMA—student chapter of the American Marketing Association
Delta Sigma Pi—national professional business fraternity
MBA Association—University of Colorado association of master's students in business
Phi Chi Theta—national professional business and economics fraternity
Rho Epsilon—professional real estate fraternity
Sigma Iota Epsilon—professional and honorary management fraternity
SAML—Student Association of Minerals Landmen

ACADEMIC POLICIES

Academic policies which apply to all UCD students are described in the General Information section of this bulletin. The policies that follow apply specifically to the College of Business and Administration and Graduate School of Business Administration.

Upon admission, the student can be advised on the academic program by the College advisers. The student is responsible for knowing his/her status at all times.

Scholastic Load

The normal scholastic load of an undergraduate student in the College of Business is 15 semester hours, with 19 hours normally the maximum. Hours carried concurrently in the Division of Continuing Education, whether in classes or through correspondence, are included in the student's load.

Credit

To receive credit, all courses must be listed on the student's registration in the Office of Admissions and Records. Credit is then evaluated by the College of Business to determine degree acceptability.

Courses completed at any University of Colorado campus are credited toward degree requirements if appropriate to the degree program.

Registration for Business Courses

Beginning with the Fall Semester 1980, admission to some courses offered by the UCD College of Business will be limited to those students who have been admitted to the College of Business and on a space available basis, and to other students as provided for below.

The course admission criteria are designed to meet a number of objectives:

1. To assure access to business courses for students seeking a business degree.
2. To serve students in other colleges who have business-related educational objectives or requirements.
3. To serve the non-degree seeking special students who have specific career or educational goals.

College of Business Core Courses

In order to serve the needs of non-business students, core courses in the College of Business (Acct. 200, B.Ad. 100, B.Ad. 200, B.Law 300, Fin. 305, Mk. 300, Or.Mg. 330, Pr.Mg. 300, Q.M. 201) will be open to all University of Colorado students in good standing on a space available basis. However, students admitted to the College of Business will be given priority in registering. For all business courses, non-business majors will be able to enroll up to a maximum of 21 semester hours.

Admission to non-core business courses will be limited to the following students:

1. Those admitted to the College of Business who are eligible for all business courses taken in sequential order. (Refer to Model Degree Program in this section.)
2. Non-business degree students who may request admission to business courses outside the core on a petition basis. However, the total number of College of Business courses may not exceed the 21 semester hour limit, and the students must have the signature of the faculty adviser and dean of the students' college and have the statement that the business course will be an elective course for his/her major, or is required by that college.
3. Non-degree seeking students who may enroll for a maximum of 15 semester hours of business courses.

Attendance Regulations

Classroom attendance is at the discretion of the instructor. Students are responsible for determining each instructor's policy on attendance.

Grading and Point System

See the General Information section for University-wide grading system and pass/fail policy. Students in the College may not take required business or nonbusiness
courses, or business elective courses on a pass/fail basis. A maximum of 16 hours pass/fail credit may be applied toward the B.S. degree in business; transfer students may take 1 hour pass/fail for every 8 hours attempted at this institution. Pass/fail determination must be made within the posted deadline, and is irreversible. Failed courses may be repeated, but the $F$ will be included in the grade-point average.

A student who receives an incomplete grade of IF must complete course requirements (exams, papers, etc.) and may not retake the entire course to remove the incomplete.

**Adding and Dropping Courses**

See the General Information section of this bulletin for University-wide drop/add policies.

**Administrative Drop**

Instructors may recommend to the College of Business and Administration office that students who fail to meet expected course attendance standards be dropped without discredit during the first 10 weeks of the semester.

**Withdrawal**

Students may withdraw without discredit at any time prior to the start of the final examination period.

Students who leave the University before the end of the semester should obtain a Withdrawal Form from the associate dean's office and follow the instructions on the form. The completed form must be turned in to the Office of Admissions.

**Appeal Procedure**

Students should contact the associate dean or staff members in the College of Business and Administration office for appeal and petition procedures pertaining to rules and regulations of the College.

**SPECIFIC UNDERGRADUATE ACADEMIC POLICIES**

**Standards of Performance**

Students are held to basic standards of performance established for their classes with respect to attendance, active participation in course work, promptness in completion of assignments, correct English usage both in writing and in speech, accuracy in calculations, and general quality of scholastic workmanship.

In general, examinations are required in all courses and for all students, including graduating seniors.

To be in good standing, students must have an overall grade-point average of not less than 2.0 ($C = 2.0$) for all course work attempted and a 2.0 for all business courses attempted. This applies to work taken at all University campuses. Activity physical education and remedial courses are not included in the overall average.

When semester grades become available, students below standard will be notified of (1) probationary status or (2) suspension.

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. A student shall remain on probation as long as the student maintains normal degree progress each semester as determined by the College, and obtains no grade below a $C$; such probationary status may continue a maximum of four regular semesters, providing these provisions have been met. Failure to meet these provisions will result in indefinite suspension.

3. Indefinitely suspended students may attend the University of Colorado summer session in order to improve their grade averages in the area of deficiency, but may not attend any division of the University for at least two regular (fall and spring) semesters.

4. A student who has been under indefinite suspension for two semesters may apply for readmission to the College of Business and Administration. If readmitted, that readmission will be on a probationary status. After being readmitted under such probationary status, any student who fails to comply with the requirements of his/her 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.

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

7. Official combined degree students are required to maintain the same standards of performance as College of Business students in order to be continued in the combined business program.

**Transfer Credit**

Credits in business and nonbusiness 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. Transfer work is only accepted from institutions accredited by the regional association. In general, 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. All courses in the area of emphasis must be taken at the University of Colorado unless written approval is given by the appropriate division head and associate dean. Transfer students must take 30 hours of business degree requirements (in business courses) in residency after admission to the College of Business.

A maximum of 60 semester hours taken at junior colleges may be applied toward the B.S. degree in business. Remedial or vocational work does not transfer.

Business courses from junior colleges will not be applied toward degree requirements if the course work is offered at the junior-senior level at UCD.

For a detailed explanation of transfer credit, see the General Information section.
Correspondence Credit

Only 30 semester hours of credit, 9 of which may be in business, taken through correspondence study will be counted toward the B.S. degree in business. Required business courses and area of emphasis courses cannot be taken by correspondence. All correspondence courses are evaluated to determine their acceptability.

Credit by Examination

College Level Examination credits (CLEP subject examinations only) are acceptable toward degree requirements to a maximum of 30 hours. Specific information is available in the College of Business and Administration Office, Room 512.

CLEP credit will be applied in the same manner as transfer credits. For credit, students must rank in the 66.7 percentile based on national available norms. Generally, CLEP credit is only appropriate for (a) nonbusiness requirements and (b) nonbusiness 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 subject examinations in business course areas must have prior approval in writing by the College of Business and Administration and by the appropriate division head.

Advanced Placement (CEEB) credit will be given where appropriate to students who make scores of 3, 4, or 5.

Special Sources of Credit

Up to 6 hours of experimental studies or independent study programs can be accepted toward graduation. A maximum of 3 hours of this type of credit may be taken in any one semester.

Junior or senior business students desiring to work beyond regular business course coverage may take variable credit courses (1 to 3 semester hours) under the direction of an instructor who approves the project, but the student must have prior approval. Information and request forms are available in the College of Business and Administration office. The request form must be signed by the instructor, division head of the student's area of emphasis, and associate dean.

To receive credit for nonbusiness independent study courses, students should obtain the associate dean's approval prior to registering for the course. Further information and forms are available in the College office.

There is no credit for work experience or cooperative education programs.

ROTC Credit

Students who are enrolled in and complete the ROTC program may apply a maximum of 12 semester hours of advanced ROTC credit toward nonbusiness elective requirements and toward the 120-semester hour total degree requirement for the B.S. degree in business. No credit toward requirements is granted for basic (freshman and sophomore) ROTC courses. The ROTC adviser can provide more detailed information.

Study Abroad Credit

Transfer credit from study abroad programs is most appropriately applied as nonbusiness elective credit. Required business courses should not be taken during studies abroad. Students are responsible for checking with the College of Business and Administration for prior approval. Information on the various study abroad programs is available at the Office of International Education on the Boulder campus.

UNDERGRADUATE DEGREE PROGRAM

The undergraduate curriculum leading to the Bachelor of Science (Business) degree is intended to help the student achieve the following general objectives:

1. Understanding of the activities that constitute business enterprise and of the principles underlying administration of those activities.
2. Ability to think through logically and analytically the kinds of complex problems encountered by management.
3. Facility in the arts of communication.
4. Comprehension of the human relationships involved in an organization.
5. Awareness of the social and ethical responsibilities of those in administrative positions.
6. Skill in the arts of learning that will help the student continue self-education after leaving the campus.

Admission of Freshman Students

See the General Information section for admission and application procedures.

Prospective students in business are encouraged to pursue a broad college preparatory program in high school, with particular emphasis on English, mathematics, the social sciences, and speech. Candidates for the Bachelor of Science (Business) degree normally enter as freshmen. The College expects entering freshmen to present 15 units of the secondary course work.

Admission of Transfer Students

See the General Information section for admission and application procedures.

Intrauniversity Transfer

Students who wish to transfer to the College of Business and Administration from another college or school of the University must formally apply at the College of Business office (Room 512). A minimum University of Colorado grade-point average (established by the College) is required for consideration.

Students desiring admission to official combined programs must apply to and be accepted by the College of Business. Minimum grade-point averages are also established for these jointly enrolled students.

Second Undergraduate Degree

Students may apply to the College of Business and Administration to earn a second undergraduate degree.
provided the first undergraduate degree is in a field other than business. The student who is accepted for the second undergraduate degree will be required to pursue courses in the sequence normally required for a degree plan. For example, a student registered for the second degree has not had the required mathematics or general education courses, these must be taken before the student will be eligible to register for business courses. Further, the basic business courses (core courses) must be taken before a student begins to pursue the major field. Applications are available through the Office of Admissions and Records.

If a student applying for a second undergraduate degree has an academic record that justifies consideration for the graduate program, that student will be encouraged to consider one of the master's programs.

Academic Advising

Each student in the College of Business is responsible for knowing and complying with the academic requirements and regulations established for the College and for classes. Upon admission to the College of Business and Administration or to the Graduate School of Business Administration, the student has the responsibility for conferring with the student advisers in the College concerning an academic program. Appointments for academic advising can be made by calling 629-2605.

Graduation Requirements

The Bachelor of Science (Business) degree requires:

1. Total Credits. A total of 120 acceptable semester hours of credit, of which at least 51 hours must be in nonbusiness courses (including 9 hours of upper division work) and at least 51 hours in business courses. The remaining 18 hours may be in either, or some combination of both. This credit cannot include remedial work, repetition of courses, courses failed, or activity physical education, recreation and dance courses. However, a maximum 6 hours of theory, physical education, recreation, and/or dance may be used. Advanced ROTC work is acceptable only if the ROTC program is completed. All incomplete grades and correspondence course grades must be completed and recorded at the Office of Admissions and Records no later than four weeks prior to graduation. It is the student's responsibility to contact the instructor concerning the removal of incomplete grades. A maximum of 60 semester hours taken at junior colleges may be applied toward the B.S. degree in business.

2. Residence: Completion of at least 30 semester hours of business, after admission to the College of Business and Administration, including 12 hours in the area of emphasis. Courses completed at any University of Colorado campus after the candidate has been admitted to the College are acceptable toward this requirement.

3. Grade Average: Acceptable toward B.S. (Business) degree—2.0 for all University courses, 2.0 for all business courses and 2.0 for the specific 12 hours required for the student's area of emphasis.

4. Graduation With Honors: Upon recommendation of the faculty of the College of Business, students who demonstrate superior scholarship are given special recognition at graduation. Please refer to the Honors Program under the Information About the College section.

5. Intent to Graduate Form. Students must file an Intent to Graduate Form with the College of Business and Administration office prior to registering for the last semester. Questions concerning graduation should be directed to a student adviser, Room 512.

6. Courses. Completion of all of the following required courses:

<table>
<thead>
<tr>
<th>Semester Hours</th>
<th>Area of emphasis</th>
<th>12</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>College algebra and calculus</td>
<td>6</td>
</tr>
<tr>
<td></td>
<td>Communication and composition</td>
<td>6</td>
</tr>
<tr>
<td></td>
<td>Core requirements (basic courses in accounting, business law, business statistics, business and society, data processing, marketing, finance, organization management, production and operations management and business policy)</td>
<td>30</td>
</tr>
<tr>
<td></td>
<td>Electives</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Business</td>
<td>9</td>
</tr>
<tr>
<td></td>
<td>Nonbusiness (to include 9 hours of upper division work)</td>
<td>15</td>
</tr>
<tr>
<td></td>
<td>Free electives (either business or nonbusiness electives)</td>
<td>18</td>
</tr>
<tr>
<td></td>
<td>General psychology</td>
<td>6</td>
</tr>
<tr>
<td></td>
<td>Introductory sociology or cultural anthropology</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Natural science (astro-geophysics, biology, chemistry, physical geography, geological sciences, and physics; applies as nonbusiness elective)</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Political science</td>
<td>6</td>
</tr>
<tr>
<td></td>
<td>Principles of economics</td>
<td>6</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>120</td>
</tr>
</tbody>
</table>

Model Degree Program

The following sequence of courses is a guide to registration.

**Freshman Year**

<table>
<thead>
<tr>
<th>Semester Hours</th>
<th>Area of emphasis</th>
<th>3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Eng. 102 or 103. English Composition</td>
<td></td>
<td>3</td>
</tr>
<tr>
<td>Comm. 202 or 210. Communication Theory or Public Speaking</td>
<td></td>
<td>3</td>
</tr>
<tr>
<td>Math. 107. College Algebra</td>
<td></td>
<td>3</td>
</tr>
<tr>
<td>Math. 108. College Calculus</td>
<td></td>
<td>3</td>
</tr>
<tr>
<td>Pol. Sci. 100. Introduction to Political Science</td>
<td></td>
<td>3</td>
</tr>
<tr>
<td>Soc. 100. Introduction to Sociology</td>
<td></td>
<td>3</td>
</tr>
<tr>
<td>B. Ad. 100. Introduction to Business or a business elective</td>
<td></td>
<td>3</td>
</tr>
<tr>
<td>Nonbusiness electives</td>
<td></td>
<td>3</td>
</tr>
<tr>
<td>Natural science</td>
<td></td>
<td>3</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>30</td>
</tr>
</tbody>
</table>

**Sophomore Year**

<table>
<thead>
<tr>
<th>Semester Hours</th>
<th>Area of emphasis</th>
<th>6</th>
</tr>
</thead>
<tbody>
<tr>
<td>Econ. 201 and 202. Principles of Economics (macro; micro)</td>
<td></td>
<td>6</td>
</tr>
<tr>
<td>Psych. 203, 204. General Psychology</td>
<td></td>
<td>6</td>
</tr>
<tr>
<td>B. Ad. 200. Business Information and the Computer</td>
<td></td>
<td>3</td>
</tr>
<tr>
<td>Q. M. 201. Business Statistics</td>
<td></td>
<td>3</td>
</tr>
<tr>
<td>Acct. 200. Introduction to Financial Accounting</td>
<td></td>
<td>3</td>
</tr>
<tr>
<td>Nonbusiness electives</td>
<td></td>
<td>9</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>30</td>
</tr>
</tbody>
</table>

**Junior Year**

<table>
<thead>
<tr>
<th>Semester Hours</th>
<th>Area of emphasis</th>
<th>3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mk. 300. Principles of Marketing</td>
<td></td>
<td>3</td>
</tr>
<tr>
<td>Fin. 305. Basic Finance</td>
<td></td>
<td>3</td>
</tr>
<tr>
<td>Or. Mg. 330. Introduction to Management and Organization</td>
<td></td>
<td>3</td>
</tr>
<tr>
<td>Pr. Mg. 300. Production and Operations Management</td>
<td></td>
<td>3</td>
</tr>
<tr>
<td>B. Law 300. Business Law</td>
<td></td>
<td>3</td>
</tr>
<tr>
<td>Business electives</td>
<td></td>
<td>3</td>
</tr>
<tr>
<td>Nonbusiness electives</td>
<td></td>
<td>3</td>
</tr>
<tr>
<td>Free electives</td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>30</td>
</tr>
</tbody>
</table>
Students planning to pursue accounting as a career usually take more than the required 12 hours. Many students take a total of about 30 hours of accounting, often taking two courses each semester in their junior and senior years. Students should work closely with the accounting faculty in planning their accounting programs.

Students planning to take the CPA examination should take about 30 hours of accounting and also be well prepared in statistics, business law, finance, economics.

Graduate study in accounting is receiving increasing emphasis by professional organizations and employers. Students meeting admission requirements should consider continuing their education at the graduate level.

**FINANCE**

The principal areas of study in finance are financial management, monetary policy, banking, investments, and insurance. Finance is intended to give an understanding of fundamental theory pertaining to finance and to develop ability to make practical applications of the principles and techniques of sound financial management in business affairs. Every endeavor is made to train students to think logically about financial problems and to formulate sound financial decisions and policies. Numerous opportunities are to be found with financial institutions and in the field of business finance. Emphasis is placed on financial policy, management, control, analysis and decision making. Act. 202 is a prerequisite for this area.

**ACCOUNTING**

Accounting courses are offered in several fields of professional accountancy at the intermediate, advanced, and graduate levels. They provide preparation for practice in one or more of the following fields:

- Financial accounting
- Auditing
- Managerial accounting
- Tax accounting
- Data processing and control systems
- Teaching and research

In all of these fields, a thorough knowledge of the social, legal, economic, and political environment is needed. A high degree of analytical ability and communication skill is indispensable.

The undergraduate area of emphasis in accounting consists of 12 hours beyond Act. 200 and 202:

**Required Courses**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Semester Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>Act. 332</td>
<td>Cost Accounting</td>
<td>3</td>
</tr>
<tr>
<td>Accounting elective</td>
<td></td>
<td>3</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td></td>
<td><strong>12</strong></td>
</tr>
</tbody>
</table>

---

1. Any of the following four options: (1) Math. 107 and 108; (2) Math. 111 and 140; (3) Math. 111 and 108; or (4) Math. 140 and 241. A maximum of 9 hours of mathematics below the level of Math. 140 can be applied toward the degree.
2. Soc. 100 is recommended to meet the sociology requirement; however, Soc. 104, 119, 300, 301, 302, 303, 305, 306, and Anth. 104 or 200 are acceptable.
3. Any of the following four options: (1) Math. 107 and 108; (2) Math. 111 and 140; (3) Math. 111 and 108; or (4) Math. 140 and 241. A maximum of 9 hours of mathematics below the level of Math. 140 can be applied toward the degree.
4. Soc. 100 is recommended to meet the sociology requirement; however, Soc. 104, 119, 300, 301, 302, 303, 305, 306, and Anth. 104 or 200 are acceptable.
5. Any of the following four options: (1) Math. 107 and 108; (2) Math. 111 and 140; (3) Math. 111 and 108; or (4) Math. 140 and 241. A maximum of 9 hours of mathematics below the level of Math. 140 can be applied toward the degree.
6. Soc. 100 is recommended to meet the sociology requirement; however, Soc. 104, 119, 300, 301, 302, 303, 305, 306, and Anth. 104 or 200 are acceptable.
7. Any of the following four options: (1) Math. 107 and 108; (2) Math. 111 and 140; (3) Math. 111 and 108; or (4) Math. 140 and 241. A maximum of 9 hours of mathematics below the level of Math. 140 can be applied toward the degree.
8. Soc. 100 is recommended to meet the sociology requirement; however, Soc. 104, 119, 300, 301, 302, 303, 305, 306, and Anth. 104 or 200 are acceptable.

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**INFORMATION SCIENCE**

The information science area is designed for those who wish to prepare themselves for careers as professional administrative data processing managers in business and government. The student develops those technical skills and administrative insights required for the analysis of information systems, the design and implementation of systems, and the management of data processing operations. The emphasis is on management information systems—systems for the collection, organization, accessing, and analysis of information for the planning and control of operations. The automation of data processing is also studied extensively.

The undergraduate area of emphasis consists of 12 hours beyond B.A. 200, Q.M. 201, and I.S. 215.

**Required Core (12 Hours)**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Semester Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>I.S. 350</td>
<td>Database Information Systems</td>
<td>3</td>
</tr>
<tr>
<td>I.S. 465</td>
<td>Systems Analysis and Design</td>
<td>3</td>
</tr>
<tr>
<td>I.S. 470</td>
<td>Computerware</td>
<td>3</td>
</tr>
<tr>
<td>Q.M. 330</td>
<td>Operations Research</td>
<td>3</td>
</tr>
</tbody>
</table>

---

**Senior Year**

B.A. 411. Business and Society
or B.A. 410. Business and Government 3
B.A. 450. Cases and Concepts in Business
Policy or B.A. 452. Small Business
Strategy, Policy and Entrepreneurship 3
Area of emphasis 12
Business electives 3
Free electives 9
Total 30

**Area of Emphasis**

Each candidate for the B.S. (Business) degree must complete the prescribed courses in an area of emphasis comprising 12 semester hours taken at the University of Colorado. Typically, students select an area of emphasis from those offered after taking several of the "core" courses. Then they take the hours required for their selected area. Available areas of emphasis are:

- Accounting
- Finance
- Information science
- International business
- Marketing
- Minerals land management
- Organization management
- Personnel management

Although only one area of emphasis will be listed on the student's official records, students so desiring may accomplish the effect of a dual area of emphasis by careful selection of courses.
INTERNATIONAL BUSINESS

In recent years, companies have completely reoriented their thinking, planning, and operations to capitalize on the opportunities offered in the world marketplace. Every phase of business operation is affected by this reorientation, and individuals who offer the appropriate skills, training, and orientation are in great demand.

The program reflects the basic principle that effectiveness in international business is based on a thorough training in business administration. The international business program provides the opportunity to build on these skills. The student electing this area must complete 15 semester hours as follows:

**Required Courses**

<table>
<thead>
<tr>
<th>Course</th>
<th>Semester Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>Econ. 441. International Trade</td>
<td>3</td>
</tr>
<tr>
<td>(applies as a non-business elective)</td>
<td></td>
</tr>
<tr>
<td>B. Ad. 440. International Business Seminar</td>
<td>3</td>
</tr>
<tr>
<td>Fin. 440. International Financial Management</td>
<td>3</td>
</tr>
<tr>
<td>Tr. Mg. 458. International Transportation</td>
<td>3</td>
</tr>
<tr>
<td>Mk. 490. International Marketing</td>
<td>3</td>
</tr>
</tbody>
</table>

Because of the availability of courses on the Denver campus, the requirements for this area may vary from those listed for the Boulder campus. Please see an academic adviser for course scheduling.

A second area of emphasis in business is highly recommended. The course requirements for the second area can be included as part of the business and free elective hours. Foreign language study is also recommended, and foreign language skills are much sought after by business recruiters for this field. Other courses emphasizing international affairs may be elected from the following departments: anthropology, economics, geography, history, political science, psychology, and sociology. Students interested in this area may start their preparation by electing language and other liberal arts and sciences courses in their program.

MARKETING

Marketing is concerned with analyzing the market for a product or service, planning and developing that product, determining the most appropriate distribution channels, pricing the product, and promoting it. Today the administrative policies and practices of any well-managed firm should be marketing-oriented toward the consumer.

The career opportunities in marketing reflect the business person's awareness of the importance of this field. Today many individuals are rising to top executive positions by the marketing route. There are more executive and other job opportunities for women in the marketing field than in any other single area outside teaching or secretarial work. One out of every four people gainfully employed in this country is in a marketing position.

Career opportunities abound in personal selling, advertising, sales management, marketing research, retailing, wholesaling, marketing by manufacturers, international marketing, etc.

**MINERALS LAND MANAGEMENT**

The curriculum in minerals land management is designed to incorporate the primary course patterns of the College of Business and Administration along with certain field area preparation in geology, chemistry, economics, and land management.

With this preparation, the graduate is a candidate for entry into employment as a landman, exploration trainee, lease broker, and other jobs related to the minerals industry. Colorado is presently the headquarters for a wide assortment of resource-based companies operating throughout the western United States and Canada. These companies need qualified employees and have helped in the preparation of the program.

The four-year program will consist of all College of Business requirements and must include the following courses. Except as specifically stated, no 300- or 400-level course (business or nonbusiness) may be taken pass/fail.

1. **Nonbusiness Courses**

<table>
<thead>
<tr>
<th>Course</th>
<th>Semester Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>Geol. 101. Introduction to Geomorphology</td>
<td>4</td>
</tr>
<tr>
<td>Geology/Geography Option</td>
<td>7</td>
</tr>
<tr>
<td>Chem. 101. General Chemistry</td>
<td>4</td>
</tr>
<tr>
<td>Econ. 453. Natural Resource Economics</td>
<td>3</td>
</tr>
<tr>
<td>Econ. 454. Environmental Economics</td>
<td>3</td>
</tr>
</tbody>
</table>

2. **Business Courses**

<table>
<thead>
<tr>
<th>Course</th>
<th>Semester Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acct. 202. Introduction to Managerial Accounting</td>
<td>3</td>
</tr>
<tr>
<td>R. Es. 300. Principles of Real Estate</td>
<td>3</td>
</tr>
</tbody>
</table>

3. A minimum of 12 hours for the major area is required as specified below:

**Required Courses**

<table>
<thead>
<tr>
<th>Course</th>
<th>Semester Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>M.L. Mg. 485. Minerals Landman Administration</td>
<td>3</td>
</tr>
<tr>
<td>M.L.M. 495. Oil-Gas and Mineral Law</td>
<td>3</td>
</tr>
<tr>
<td>Acct. 441. Income Tax Accounting</td>
<td>3</td>
</tr>
<tr>
<td>Fin. 401. Business Finance</td>
<td>3</td>
</tr>
</tbody>
</table>

**Recommended Elective Courses**

<table>
<thead>
<tr>
<th>Course</th>
<th>Semester Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>R. Es. 430. Real Estate Appraisal</td>
<td>3</td>
</tr>
<tr>
<td>R. Es. 473. Legal Aspects of Real Estate Transactions</td>
<td>3</td>
</tr>
<tr>
<td>B. Law 412. Business Law</td>
<td>3</td>
</tr>
<tr>
<td>Econ. 476. Government Regulation of Business</td>
<td>3</td>
</tr>
<tr>
<td>Econ. 477, 478. Economic Development—Theory and Problems 1, II</td>
<td>6</td>
</tr>
</tbody>
</table>

**ORGANIZATION MANAGEMENT**

Organization management offers opportunities to develop understanding and skill in managing human resources in organizations. The curriculum provides the foundation for supervisory and general management careers.

**Required Courses**

<table>
<thead>
<tr>
<th>Course</th>
<th>Semester Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>Or. Mg. 335. Managing Individuals and Work Groups</td>
<td>3</td>
</tr>
<tr>
<td>Or. Mg. 437. Managing Complex Organizations</td>
<td>3</td>
</tr>
</tbody>
</table>

(One of the following:)

<table>
<thead>
<tr>
<th>Course</th>
<th>Semester Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ps. Mg. 434. Labor and Employee Relations</td>
<td>3</td>
</tr>
<tr>
<td>Ps. Mg. 438. Personnel Management: Policy and Practice</td>
<td>3</td>
</tr>
</tbody>
</table>

1Geol. 207-208 (Physical Geology I and II) will also fulfill the requirement.

2A minimum of 7 hours of the following geology or geography courses. These may not be taken pass/fail. Geological Development of Colorado and the West (Geol. 153-4), Environmental Geology (Geol. 370-3), Geohydrology (Geol. 404-3), Principles of Geomorphology (Geol. 463-4), Introduction to Geophysical Prospecting (Geol. 493-4), Mineral Resources and World Affairs (Geol. 494-3), Map Interpretation (Geog. 306-3), Geographic Interpretation of Aerial Photos (Geog. 406-3).
Certification Examinations are given semi-annually by the Inventory Control Society and encouraged to equipment, job design, and labor standards. Quality. Students seriously consider preparing for and taking the five-part examination.

Acct. 332. Cost Accounting
Pr. Mg. 444. Work Design and Measurement
Pr. Mg. 447. Policy Analysis in Production and Operations Management
Pr. Mg. 460. Purchasing and Materials Management
Tr. Mg. 450. Transportation Operation and Management
B. Ad. 470. Small Business—Management and Operations

PERSONNEL MANAGEMENT

Personnel management offers opportunities for students to develop professional competence in the areas of personnel administration and labor relations. Students develop understanding and skill in developing and implementing personnel systems including recruiting, selection, evaluating, training, motivation of employees, and union-management relations.

Required Courses

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Semester Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ps. Mg. 434</td>
<td>Labor and Employee Relations</td>
<td>3</td>
</tr>
<tr>
<td>Ps. Mg. 438</td>
<td>Personnel Management: Policy and Practice</td>
<td>3</td>
</tr>
<tr>
<td>Ps. Mg. 439</td>
<td>Personnel Management: Legal and Social Issues</td>
<td>3</td>
</tr>
<tr>
<td>Elective</td>
<td></td>
<td>3</td>
</tr>
</tbody>
</table>

Recommended Electives

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Semester Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>Or. Mg. 335</td>
<td>Managing Individuals and Work Groups</td>
<td>3</td>
</tr>
<tr>
<td>Or. Mg. 437</td>
<td>Managing Complex Organizations</td>
<td>3</td>
</tr>
<tr>
<td>Pr. Mg. 444</td>
<td>Work Design and Measurement</td>
<td>3</td>
</tr>
<tr>
<td>Acct. 332</td>
<td>Cost Accounting</td>
<td>3</td>
</tr>
<tr>
<td>I. S. 350</td>
<td>Database and Information Systems</td>
<td>3</td>
</tr>
<tr>
<td>Q. M. 300</td>
<td>Intermediate Statistics</td>
<td>3</td>
</tr>
<tr>
<td>Econ. 461</td>
<td>Labor Economics</td>
<td>3</td>
</tr>
<tr>
<td>Psych. 485</td>
<td>Principles of Psychological Testing</td>
<td>3</td>
</tr>
</tbody>
</table>

PRODUCTION AND OPERATIONS MANAGEMENT

Production and operations management studies are designed to prepare for careers as production manager, operations manager, management analyst, or systems analyst in such private sector organizations as manufacturing, banking, insurance, hospitals, and construction, as well as in a variety of municipal, state, and federal organizations.

Production or operations managers may be charged with the design, implementation, operation, and maintenance of the production systems. Managerial activities could include forecasting demand, planning, and implementing projects with local organizations under the direction of their instructor; encouraged to participate in the newly chartered student chapter of the American Production and Inventory Control Society; and encouraged to seriously consider preparing for and taking the five-part Certification Examinations given semi-annually by APICS.

Students whose major areas of emphasis are information science or transportation and traffic management will find the Pr. Mg. 400-level courses to be particularly well related to their courses of study.

Required Courses

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Semester Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pr. Mg. 440</td>
<td>Planning and Control Systems in Production and Operations Management</td>
<td>3</td>
</tr>
<tr>
<td>Pr. Mg. 447</td>
<td>Policy Analysis in Production and Operations Management</td>
<td>3</td>
</tr>
<tr>
<td>Pr. Mg. 460</td>
<td>Purchasing and Materials Management</td>
<td>3</td>
</tr>
</tbody>
</table>

Recommended Electives

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Semester Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>I. S. 350</td>
<td>Database Information Systems</td>
<td>3</td>
</tr>
<tr>
<td>Or. Mg. 335</td>
<td>Managing Individual and Work Groups</td>
<td>3</td>
</tr>
<tr>
<td>Or. Mg. 437</td>
<td>Managing Complex Organizations</td>
<td>3</td>
</tr>
<tr>
<td>Ps. Mg. 434</td>
<td>Labor and Employee Relations</td>
<td>3</td>
</tr>
<tr>
<td>Ps. Mg. 438</td>
<td>Personnel Management: Policy and Practice</td>
<td>3</td>
</tr>
<tr>
<td>Tr. Mg. 450</td>
<td>Transportation Operation and Management</td>
<td>3</td>
</tr>
<tr>
<td>Acct. 332</td>
<td>Cost Accounting</td>
<td>3</td>
</tr>
<tr>
<td>Q. M. 300</td>
<td>Intermediate Statistics</td>
<td>3</td>
</tr>
</tbody>
</table>

PUBLIC AGENCY ADMINISTRATION

Public agency administration is designed to prepare for careers in management of governmental or other nonprofit service organizations. The curriculum in public agency administration provides the student with a foundation of core courses upon which to construct an area of emphasis which will focus on the type of service organization the student desires to enter upon graduation.

Required Courses

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Semester Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acct. 480</td>
<td>Business and Governmental Budgeting and Control</td>
<td>3</td>
</tr>
<tr>
<td>Ps. Mg. 438</td>
<td>Personnel Administration</td>
<td>3</td>
</tr>
<tr>
<td>O. Ad. 440</td>
<td>Principles of Office Management</td>
<td>3</td>
</tr>
<tr>
<td>Q. M. 330</td>
<td>Operations Research</td>
<td>3</td>
</tr>
</tbody>
</table>

REAL ESTATE

Real estate careers require knowledge of real estate investments, urban land economics, real estate law, appraising, finance, taxes, management, sales, and accounting.

Real estate is one segment of the economy in which it is still possible for a person to be his/her own boss whether as a broker, appraiser, developer, syndicator or property manager.

Required Courses

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Semester Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>R. Es. 430</td>
<td>Real Estate Appraising</td>
<td>3</td>
</tr>
<tr>
<td>R. Es. 454</td>
<td>Real Estate Financing</td>
<td>3</td>
</tr>
<tr>
<td>R. Es. 401</td>
<td>Urban Land Analysis</td>
<td>3</td>
</tr>
<tr>
<td>R. Es. 433</td>
<td>Real Estate Investments</td>
<td>3</td>
</tr>
<tr>
<td>R. Es. 473</td>
<td>Legal Aspects of Real Estate</td>
<td>3</td>
</tr>
</tbody>
</table>

Recommended Electives

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Semester Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acct. 441</td>
<td>Income Tax Accounting</td>
<td>3</td>
</tr>
<tr>
<td>Ins. 484</td>
<td>Principles of Insurance</td>
<td>3</td>
</tr>
<tr>
<td>Fin. 455</td>
<td>Monetary and Fiscal Policy</td>
<td>3</td>
</tr>
<tr>
<td>Fin. 433</td>
<td>Investment and Portfolio Management</td>
<td>3</td>
</tr>
<tr>
<td>Mk. 310</td>
<td>Salesmanship</td>
<td>3</td>
</tr>
<tr>
<td>Mk. 320</td>
<td>Consumer Behavior</td>
<td>3</td>
</tr>
</tbody>
</table>
SMALL BUSINESS MANAGEMENT AND ENTREPRENEURSHIP

Small business management studies provide understanding, knowledge, and skills in organizing and managing small business. The emphasis is on the managerial aspects of the wide range of activities required of the entrepreneur.

A second area of emphasis in business is highly recommended. The course requirements of the second area can be included as part of business or free electives. Additional courses in management, finance, accounting, and marketing should be planned in consultation with the adviser to serve individual career needs.

Required Courses

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Semester Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>B.Ad. 470</td>
<td>Small Business—Management and Operation</td>
<td>3</td>
</tr>
<tr>
<td>(Two or three of the following four courses)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fin. 401</td>
<td>Business Finance I</td>
<td>3</td>
</tr>
<tr>
<td>Acct. 332</td>
<td>Cost Accounting</td>
<td>3</td>
</tr>
<tr>
<td>Ps. Mg. 438</td>
<td>Personnel Management: Policy and Practice</td>
<td>3</td>
</tr>
<tr>
<td>Mk. 480</td>
<td>Marketing Policies and Strategies</td>
<td>3</td>
</tr>
</tbody>
</table>

Recommended Electives (at least one of the following)

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Semester Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ps. Mg. 434</td>
<td>Labor and Employee Relations</td>
<td>3</td>
</tr>
<tr>
<td>Pr. Mg. 440</td>
<td>Planning and Control Systems in Production and Operations Management</td>
<td>3</td>
</tr>
<tr>
<td>Pr. Mg. 447</td>
<td>Policy Analysis in Production and Operations Management</td>
<td>3</td>
</tr>
<tr>
<td>Tr. Mg. 450</td>
<td>Transportation Operation and Management</td>
<td>3</td>
</tr>
<tr>
<td>Pr. Mg. 460</td>
<td>Purchasing and Materials Management</td>
<td>3</td>
</tr>
<tr>
<td>Mk. 485</td>
<td>Physical Distribution Management</td>
<td>3</td>
</tr>
<tr>
<td>O. Ad. 440</td>
<td>Principles of Office Management</td>
<td>3</td>
</tr>
<tr>
<td>Fin. 402</td>
<td>Business Finance II</td>
<td>3</td>
</tr>
</tbody>
</table>

TRANSPORTATION AND TRAFFIC MANAGEMENT

The curriculum in transportation management includes the role of transportation in society and the problems of traffic management within specific industries as well as the management of firms in the transportation industry, such as airlines, trucking firms, railroads, and urban transit firms. International transportation management problems and policies are analyzed.

One of the recommended elective courses may be substituted with permission of the adviser for one of the required courses if there is a schedule conflict, if the course is not available, or if a student demonstrates a career need for such a course.

Required Courses

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Semester Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tr. Mg. 450</td>
<td>Transportation Operation and Management</td>
<td>3</td>
</tr>
<tr>
<td>Tr. Mg. 452</td>
<td>Problems in Traffic Management</td>
<td>3</td>
</tr>
<tr>
<td>Tr. Mg. 456</td>
<td>Air Transportation</td>
<td>3</td>
</tr>
<tr>
<td>Tr. Mg. 457</td>
<td>Urban Transportation</td>
<td>3</td>
</tr>
<tr>
<td>Tr. Mg. 458</td>
<td>International Transportation</td>
<td>3</td>
</tr>
<tr>
<td>Mk. 485</td>
<td>Physical Distribution Management</td>
<td>3</td>
</tr>
</tbody>
</table>

Recommended Electives

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Semester Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ps. Mg. 434</td>
<td>Labor and Employee Relations</td>
<td>3</td>
</tr>
<tr>
<td>Ps. Mg. 438</td>
<td>Personnel Management: Policy and Practice</td>
<td>3</td>
</tr>
<tr>
<td>Tr. Mg. 451</td>
<td>Survey of Transportation</td>
<td>3</td>
</tr>
<tr>
<td>Pr. Mg. 460</td>
<td>Purchasing and Materials Management</td>
<td>3</td>
</tr>
<tr>
<td>B. Ad. 470</td>
<td>Small Business—Management and Operation</td>
<td>3</td>
</tr>
<tr>
<td>O. Ad. 440</td>
<td>Principles of Office Management</td>
<td>3</td>
</tr>
</tbody>
</table>

COMBINED PROGRAMS

Numerous career opportunities exist for persons trained in both a specialized field and management. For this reason, students may be interested in combined programs of study leading to completion of degree requirements concurrently in two fields. Such combined programs have been arranged for engineering and business, pharmacy and business, and environmental design and business and may be arranged for other professional combinations as well.

The two programs of study proceed concurrently, terminating together with the award of two degrees. Generally, at least five years will be needed for such combined programs. No substitutions are allowed in this program.

For students in combined programs, the requirements for the degree in business are as follows:

1. An application for admission to the combined program must be filed with the College of Business and approved by the deans of both colleges. Completion of at least 48 semester hours in business and economics, to include Econ. 201 and 202 (6 semester hours), required courses in business (30 semester hours), and a business area of emphasis (12 semester hours).

2. Completion of at least 30 of these semester hours at the University of Colorado while enrolled in the College of Business.

3. Completion of nonbusiness requirements in mathematics, communications, and the social and behavioral sciences in a degree program approved in advance by the College of Business. In addition, for some courses and areas of emphasis, there are prerequisite requirements which must be met.

4. At least a 2.0 grade average must be earned in all courses undertaken in the College of Business. Students in combined degree programs are subject to all policies of the College of Business.

5. Any combined degree student who does not make reasonable progress toward the completion of the business degree requirements, as determined by the College of Business, may be dropped from the program.

6. The number of students accepted in any combined program may be numerically limited and is dependent upon existing demand each semester.

Shown below is the combined engineering-business program. For other combinations, students should consult with the associate dean of the College of Business.

The requirements for all combined business and engineering programs are as follows:

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Semester Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>Econ. 201 and 202</td>
<td>Principles of Economics (Should be completed during the student's sophomore or junior year.)</td>
<td>6</td>
</tr>
<tr>
<td>Acct. 200</td>
<td>Introduction to Financial Accounting</td>
<td>3</td>
</tr>
<tr>
<td>B. Ad. 200</td>
<td>Business Information and the Computer</td>
<td>3</td>
</tr>
<tr>
<td>Q.M. 201</td>
<td>Business Statistics</td>
<td>3</td>
</tr>
<tr>
<td>Mk. 300</td>
<td>Principles of Marketing</td>
<td>3</td>
</tr>
<tr>
<td>Fin. 305</td>
<td>Basic Finance</td>
<td>3</td>
</tr>
<tr>
<td>Pr. Mg. 300</td>
<td>Production and Operations Management</td>
<td>3</td>
</tr>
<tr>
<td>Or. Mg. 330</td>
<td>Introduction to Management and Organization</td>
<td>3</td>
</tr>
<tr>
<td>B. Law 300</td>
<td>Business Law</td>
<td>3</td>
</tr>
<tr>
<td>B. Ad. 410</td>
<td>Business and Government; or B. Ad. 411</td>
<td>3</td>
</tr>
</tbody>
</table>
Graduate Degrees Programs

Requirements for Admission—Master's Programs

Admission to the master's programs will be determined by the following criteria:

1. Applicant's academic record.
2. The applicant's score on the Graduate Management Admission Test (GMAT). (This test is given four times each year at numerous centers throughout the world. For information and to make application for the test, write to the Educational Testing Service, P.O. Box 966, Princeton, New Jersey 08540.)

Because of the large number of applications which must be processed, the deadlines set out below are strictly adhered to, and applicants should be careful to observe them. Personal interviews are not required.

In general, students failing to meet minimum standards are not admitted on a provisional status. 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 requirements for bachelor's degrees may be admitted to the Graduate School of Business Administration by special permission of the director of graduate studies.

Completed applications, including GMAT scores, two official transcripts from each college attended, and a $20 nonrefundable application fee should be in the Office of Graduate Studies, Graduate School of Business Administration, University of Colorado at Boulder, Boulder, Colorado 80309, by March 1 for summer admission, by April 1 for fall admission, and by October 1 for spring admission.

Daytime M.B.A. courses are offered in Boulder. Evening M.B.A. courses are offered in Denver and Colorado Springs.

Background Requirements

Students applying for graduate programs in business do not need to have taken their undergraduate degree in business. For those students the M.B.A. or M.S. degree programs provide a series of 3-semester-hour fundamental background courses. These include B.Ad. 501 (Accounting), B.Ad. 502 (Statistics); B.Ad. 503 (Marketing), B.Ad. 504 (Management and Organization); B.Ad. 505 (Finance); B.Ad. 506 (Business Law), B.Ad. 507 (Management Science); and Econ. 201 and 202 (Macro and Micro Economics) or Econ. 300 (Accelerated Principles of Economics). In addition, all graduate students are required to take either B.Ad. 500 (Sources of Information and Research Methods—1 semester hour) or pass a qualifying examination. These fundamental courses do not carry graduate credit nor may they be used to satisfy requirements for the bachelor's degree in business. They are open only to admitted graduate students.

Graduate students possessing an undergraduate degree in business must be prepared to present the following acceptable course work in order to waive the relevant fundamental course:

<table>
<thead>
<tr>
<th>Course</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>Funamentals ( begun )</td>
<td>6</td>
</tr>
<tr>
<td>Statistics</td>
<td>3</td>
</tr>
<tr>
<td>Principles of Marketing</td>
<td>3</td>
</tr>
<tr>
<td>Organization</td>
<td>3</td>
</tr>
<tr>
<td>Finance</td>
<td>3</td>
</tr>
<tr>
<td>Business Law</td>
<td>3</td>
</tr>
<tr>
<td>Operations Research</td>
<td>3</td>
</tr>
<tr>
<td>Principles of Economics</td>
<td>6</td>
</tr>
<tr>
<td>Macro/Micro</td>
<td>3</td>
</tr>
</tbody>
</table>

Remedial work is required of all applicants accepted for the M.B.A. and M.S. programs who do not have the mathematical and programming skills.

General Information—Master's Programs

The M.B.A. program is a two-year curriculum with the possibility of waiver, for properly prepared students, of all or part of the first year. The student must request course exemption and should be prepared to support the request for waiver. Up to 25 credit hours (First Year Program) of course work may be waived.

Advising. All graduate students should report first to the student adviser in the Graduate School of Business Administration office for the purpose of ascertaining deficiencies and principal field of interest. The division heads of each area serve as faculty advisers.

During the first term of residence, each student should prepare a degree plan. This plan, with appropriate signatures, should be filed in the Office of Graduate Studies.

Qualifying Examination. Satisfactory performance on the Graduate Management Admission Test and admission into a master’s program with the status of a regular degree student will constitute the qualifying examination for graduate study.

Course Load. The normal course load for graduate students is 12-15 semester hours.

Minimum Hours Required. A candidate for a master's degree in business must complete a minimum of 30 semester hours of graduate work plus any deficiencies. A maximum of 6 semester hours of graduate work can be transferred from another AACSB-accredited master's program.

1 Students entering any of the graduate programs are required to take either B.Ad. 502 (Fundamentals of Business Statistics) or to pass satisfactorily a qualifying examination covering this subject matter. In addition, all Master's students are required to take either B.Ad. 500 (Sources of Information and Research Methods) or to pass satisfactorily a qualifying examination.
Comprehensive Examination. A comprehensive examination is not required for students pursuing the Master of Business Administration degree program. Each candidate for a Master of Science or Master of Business Education degree is required to take a comprehensive final examination after the other requirements for the degree have been met. This examination is given near the end of the candidate's last semester of residence. Students must be registered when they take this examination. Comprehensive examinations are given in November, April, and July.

Students must file an Application for Admission to Candidacy with the Office of Graduate Studies during the first month of the final term of their residency.

Minimum Grade-Point Average. A minimum cumulative grade-point average of 3.0 must be achieved in courses taken after the student's admission to the graduate program. If the student's cumulative grade-point average falls below 3.0, he or she will be placed on academic probation and given one regular semester (summer terms excluded) in which to achieve the required 3.0 cumulative average. Failure to achieve the required average within the allotted time period will result in dismissal.

Work receiving the lowest passing grade, D, may not be counted toward a degree, nor may it be accepted for the removal of deficiencies. A graduate student may repeat once a course for which he or she has received a grade of C, D, or F. Both the original grade and the grade for the repeated course count in the computation of the grade-point average.

To earn a grade of W (withdrawal) in a course, a graduate student must be earning a grade of C or better in that course. Students will not be permitted to withdraw from courses after the tenth week of the semester.

An IF (incomplete) will be automatically converted to an F after one academic year.

Time Limit. All 30 semester hours of graduate work, including the comprehensive final examination, should be completed within five years or six successive summers. Candidates for the master's degree are expected to complete their work with reasonable continuity.1

Master of Business Administration

The Master of Business Administration program is devoted to the concepts, analytical tools, and communication skills required for competent and responsible administration. The administration of an enterprise is viewed in its entirety and within its social, political, and economic environment.

In addition to the background requirements for a master's degree listed above, the candidate for the M.B.A. degree must complete the specific requirements of the M.B.A. curriculum (30 semester hours) as follows:

<table>
<thead>
<tr>
<th>Core Requirements</th>
<th>Semester Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. Functional Courses</td>
<td>6</td>
</tr>
</tbody>
</table>

Two of the following four functional courses are required: Fin. 601, Mk. 600, Pr. Mg. 640 (Logistics), and I.S. 645, at least one of which shall be either Fin. 601 or Mk. 600. Candidates with either marketing or finance undergraduate or graduate majors shall not take the corresponding functional course to fulfill this requirement.

b. Business and Its Environment
Business, Government, and Society (B.Ad. 610) ................................3

c. Analysis and Control
Business and Economic Analysis (B.Ad. 615) ................................3
Administrative Controls (B.Ad. 620) ..............................................3

d. Human Factors
Organizational Behavior (B.Ad. 640) ..............................................3

e. Planning and Policy
Administrative Policy (B.Ad. 650) ..............................................9

Total .......................... 30

Areas of emphasis include accounting, finance, management science, marketing, organization management, personnel management, production and operations management, and transportation and traffic management.

For students taking an area of emphasis in accounting, Acct. 322, 323 and 332 or their equivalents are prerequisites for all graduate-level accounting courses. Acct. 533 is substituted for B.Ad. 620. Acct. 628 and two other graduate-level accounting courses are required in the area of emphasis. It is strongly recommended that accounting students take Fin. 601 as one of their functional courses.

Requirements for an area of emphasis in finance are Fin. 601, 602 and either Fin. 633 or 655.

Requirements for an area of emphasis in marketing are Mk. 600, 605 and one additional graduate marketing course.

Candidates pursuing the area of emphasis in management science must elect either a decision science option or an information science option. Those electing the decision science option will be required to take Mg.Sc. 601, 602 and Q.M. 602. Those electing the information science option will be required to take I.S. 645, 650 and 665.

Students taking other areas of emphasis should consult the head of the division concerning the requirements.

No thesis is required in the M.B.A. program. In the total program there must be a minimum of 30 semester hours of graduate course work and a minimum of 24 semester hours of course work at the 600 level. Independent study course 699 is normally not acceptable for credit in the final 30 semester hours of the M.B.A. program.

Master of Science

The Master of Science degree affords opportunity for specialization and depth of training within a particular major field and a related minor field.

MAJOR FIELDS

For detailed information concerning requirements and recommended programs for each of the major fields, students should consult the division heads of the following areas: Accounting, Finance, Management Science, Marketing, and Management and Organization. Call 629-2605 for division head's name and telephone number.

With the approval of the student's adviser and the director of graduate studies, minor fields may be chosen from business subjects or from other graduate departments.
Fields available in the College of Business for selection as a minor are:

- Accounting
- Finance
- Management science
- Marketing
- Organization management
- Personnel management
- Production and operations management
- Real Estate
- Transportation and traffic management

The minimum requirements for the M.S. degree, after all undergraduate background deficiencies have been removed, may be met by Plan I or Plan II. The student's degree program should be approved in advance by the advisory committee and the director of graduate studies.

Plan I. The requirement is 30 semester hours of graduate credit including a thesis (4 to 6 hours credit) based upon original research by the candidate. A minimum of 20 semester hours of credit, including B.Ad. 630 (Business Research), is required of all candidates and, including the thesis, must be earned in a major field. A minimum of three courses, normally 9 semester hours but not fewer than 6, must be completed in a minor field.

Plan II. Minimum of 30 semester hours of course work must be completed in courses numbered at the 500 level or above. Requirements must be met in both a major and a minor field. No thesis is required.

Of the 30 semester hours of graduate-level course work, a minimum of 16 hours must be at the 600 level.

All M.S. students must pass written comprehensive examinations covering major and minor fields. The candidate's committee may require an oral final comprehensive examination subsequent to the written examination.

Minors Without Majors in Fields of Business

Graduate students majoring in other divisions of the University may elect as a minor some field of study within the College of Business and Administration. Acceptable fields are:

- Accounting
- Finance
- Management science
- Marketing
- Organization management
- Personnel management
- Production and operations management
- Real Estate
- Transportation and traffic management

The student must complete two preparatory fundamentals courses, or their equivalents, as background preparation in the particular field. These two courses will be selected in consultation with a College of Business and Administration adviser. Validation of background preparation may be required through examination, either written or oral, or both.

To complete a minor at the graduate level in one of the fields within the college, the student must present not fewer than two graduate courses, and not fewer than 6 semester hours at the 500 or 600 level. Courses taken to apply on a minor must form a logical sequence or unit and should be approved in advance by a representative of the subject field from which the courses are selected.

Doctor of Business Administration

Students should refer to the University of Colorado at Boulder Catalog for information regarding the Doctor of Business Administration (D.B.A.) program.
School of Education
Gerald W. Lundquist, Associate Dean

INFORMATION ABOUT THE SCHOOL
UCD offers undergraduate and graduate programs to prepare teachers and other educational workers. The education of school personnel has long been a recognized responsibility of the University. No program of studies involves the coordination of more scholastic disciplines than does the education of teachers. None is more fundamental, more significant, more far-reaching, or more enduring in its impact on society.

The teacher education program is fully accredited by the North Central Association of Colleges and Secondary Schools and by the National Council for the Accreditation of Teacher Education. Membership also is held in the American Association of Colleges of Teacher Education.

Students interested in pursuing a program of studies leading to teacher certification should consult the School of Education Office. Those desiring to pursue graduate programs or to take courses as graduate students should consult the Graduate School section of this bulletin.

All application forms for School of Education programs are available in the school office, located at 1156 9th Street, 629-2717.

TEACHER CERTIFICATION PROGRAM
The Teacher Certification Program is designed to prepare elementary and secondary teachers for urban school settings through academic work, professional studies, classroom teaching experiences, community field experiences, and urban studies courses.

Graduate and undergraduate teacher certification programs are available at UCD in elementary education and in secondary education in the fields of communication and theatre, English, German, French, Spanish, mathematics, science, and social studies.

Undergraduate students must fulfill all degree requirements of the College of Liberal Arts and Sciences. For students who already have a B.A., B.S., or advanced degree it is possible to obtain teacher certification only or to work toward an advanced degree in education while obtaining Colorado teacher certification.

Student Candidates
1. Juniors and seniors who are working on a B.A. degree.
2. Persons who already have B.A., B.S., or advanced degrees, but who do not have teaching certificates.

The Program

FIRST SEMESTER (FALL)

<table>
<thead>
<tr>
<th>Course</th>
<th>Semester Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>T.Ed. 413 513. General Educational Psychology1</td>
<td>3</td>
</tr>
<tr>
<td>T.Ed. 436 536. Teaching Reading in Urban Schools1</td>
<td>3</td>
</tr>
<tr>
<td>T.Ed. 473 573. The City as a Cultural Laboratory</td>
<td>2</td>
</tr>
<tr>
<td>T.Ed. 420 520. Media in Education</td>
<td>3</td>
</tr>
</tbody>
</table>

Time Commitment for Field Experiences:
- T.Ed. 406 506. Two hours per week in Denver Public Schools
- T.Ed. 413 513. Two hours per week in Denver Public Schools
- T.Ed. 436 536. Two hours per week in Denver Public Schools

If the student elects to take these courses out of sequence, such as T.Ed. 406 506 the first semester and T.Ed. 413 513 and 436 536 the following fall, the time commitment will be a minimum of four hours per week each semester.

City as a Cultural Laboratory: To be offered fall semester in the form of individualized field experiences in the city of Denver. Seminars will be held during the semester to process the experiences.

K-12: T.Ed. 436 536 and T.Ed. 413 513 will be offered with one section designated with an elementary emphasis and one section with an emphasis on secondary aspects. All other courses will maintain the K-12 perspective.

SECOND SEMESTER (SPRING)

<table>
<thead>
<tr>
<th>Course</th>
<th>Semester Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>T.Ed. 436 506. Teaching Reading in Urban Schools</td>
<td>2</td>
</tr>
<tr>
<td>T.Ed. 436 575. School-Based Field Experience (Secondary)</td>
<td>2</td>
</tr>
<tr>
<td>T.Ed. 475 575. School-Based Field Experience (Elementary)</td>
<td>4</td>
</tr>
<tr>
<td>T.Ed. 412 512. Communication: Human Relations and Group Processes</td>
<td>3</td>
</tr>
<tr>
<td>T.Ed. 413 513. General Educational Psychology1</td>
<td>3</td>
</tr>
<tr>
<td>T.Ed. 436 536. Teaching Reading in Urban Schools1</td>
<td>3</td>
</tr>
</tbody>
</table>

Full-time involvement in School of Education for elementary-level students during second semester of program.

SUMMER SESSION (OPTIONAL ENROLLMENT)
This additional semester may be necessary for some students to complete program requirements during a two-year period.
2. Academic work in College of Liberal Arts and Sciences.
3. Elective courses in the School of Education also may be taken during the summer terms.

THIRD SEMESTER (FALL)

<table>
<thead>
<tr>
<th>Course</th>
<th>Semester Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>Elementary certification: (Involves an 8 week full-time student teaching assignment, concurrent seminar.)</td>
<td>3</td>
</tr>
</tbody>
</table>

1 A field experience component is an integral part of each of these courses.
T.Ed. 470/570. Student Teaching-Elementary School .................8
T.Ed. 439/539. Seminar in Elementary Student Teaching..........1
T.Ed. 408/508. Methods and Materials for Teaching the Exceptional Student ........................................3

Secondary certification:
T.Ed. 471/571. Student Teaching-Secondary School
(8 weeks full time or 16 weeks half-time assignment) .............8
T.Ed. 440/540. Seminar in Secondary Student Teaching ...........1
T.Ed. 408/508. Methods and Materials for Teaching the Exceptional Student ........................................3

FOURTH SEMESTER (SPRING)
T.Ed. 414/514. Seminar: Urban Education, Bilingual/Multicultural Education ........................................3

Admission Procedures
A check list which outlines the steps necessary for admission into the Teacher Certification Program is available in the Education office. Students should obtain and follow the procedures as listed. For further information contact the School of Education, 1156 9th Street, 629-2717.

Physical Education Programs
Metropolitan State College is responsible for teaching all undergraduate physical education for the Auraria Higher Education Center. This includes the basic activity program as well as the undergraduate major in health, physical education, and recreation. UCD students may take any activity class MSC offers. Check the appropriate Schedule of Courses for activities offered, class times, and procedures for enrolling in such classes.

Rehabilitation Services Program
The School of Education offers a two-year program in rehabilitation services to juniors and seniors, focusing strongly on the recruitment and training of minorities. Students entering the program must have completed 60 semester hours by September of the year for which application is made and should consult with the School of Education regarding entrance requirements. The program leads to a B.S. degree, but not a teaching certificate.

The program combines didactic and experiential facets of rehabilitation counseling. Trainees spend a minimum of two days per week working in settings such as drug and alcohol treatment centers, juvenile probation, and rehabilitation service agencies. The program requires 30 hours of core curriculum courses during the junior and senior years.

Applications for admission to the Rehabilitation Services Program are accepted each year until July 31.

Graduate Programs
Refer to the Graduate School section of this bulletin for information regarding graduate programs in education.
College of Engineering and Applied Science

Paul E. Bartlett, Associate Dean

INFORMATION ABOUT THE PROFESSION

Through engineering the resources of nature are used for the benefit of humanity and the environment. Engineers today are expected not only to be competent planners and designers of technical systems, but significant contributors to the betterment of their environment in the social and humanistic sense as well. Engineering professional societies have committed themselves to the principle that, as mankind gains the ability to build more powerful machines and more useful devices, there must be a strong and successful effort to protect natural resources and the environment.

An engineering career demands hard work, and so does an engineering education. In return engineers have excellent opportunities to work in various places, meet new challenges, or move upward in management. The engineer is generally well paid and usually in demand; in the rare times when there is a surplus of certain kinds of engineers, individuals usually have little difficulty finding attractive opportunities in other fields. Currently, registration is required in all states for the legal right to practice professional engineering. Although there are variations in the state laws, graduation from an accredited curriculum in engineering, subscription to a code of ethics, and four years of qualifying experience are required. In addition, two days of examinations covering the engineering sciences and the applicant’s practical experience are required in most states. Those who cannot qualify for registration are expected to work under experienced registered engineers.

A listing of the fields in which engineers work would have many hundreds of entries. The following list by departments gives only a brief summary.

The aerospace engineering sciences prepare engineers for an industry that encompasses the design and construction of both commercial and military aircraft and the development and fabrication of space vehicles. Advances in this technology have permitted the industry to enter also the fields of urban mass transit, underwater exploration, bioengineering, nuclear engineering, laser technology, and many other emerging high technology fields. An aerospace engineer often works at the forefront of engineering with scientists in the fields of mathematics, physics, chemistry, biology, etc.

Applied mathematics meets the need of modern research, which is dependent upon advanced mathematical concepts. Almost all concerns that are engaged in industrial and scientific research today need applied mathematicians, as do organizations involved in computational work, statistical analysis, or stochastics.

Architectural engineering prepares students for careers in the building industry and for research at the graduate level on building-related topics. This course of study fulfills the academic requirements for registration as a professional engineer.

The architectural engineering curriculum is recommended for those wishing to specialize within the building industry in engineering design, construction, contracting, or sales engineering. The architectural engineering student may select any of three areas of specialization offered: construction engineering, environmental engineering, or structural engineering.

Chemical engineers convert natural resources into industrial and consumer products in facilities that include refineries and gasification plants. Among their products are many that are often not identified with chemical engineering—in oils, metals, glass, plastics, rubber, paints, soaps and detergents, foods, beverages, synthetic and natural fibers, nuclear and exotic fuels, medicines, and many others.

The department has recently revised and upgraded its bioengineering/premedical engineering program. It is very much interested in research directed toward ecologically sound development of chemical processes. It is also working hard on energy problems and is stressing in its instructional program problems of energy conversion.

Civil engineering offers an interesting and challenging career to the student interested in the design and construction of buildings, bridges, dams, aqueducts, and other structures; in transportation systems including highways, canals, pipelines, airports, rapid transit lines, railroads, and harbor facilities; in the transmission of water and the control of rivers; in the development of water resources for urban use, industry, and land reclamation; in the control of water quality through water purification and proper waste treatment; in the construction and contracting industry; and in the problems concerned with man’s physical environment and the growth of cities.

Electrical engineering offers professional possibilities that include teaching and research in a university; research in development of new electrical or electronic devices, instruments, or products; design of equipment or systems; production and quality-control of electrical
The electrical engineering and computer science program is designed to provide entrance into the profession for students who wish to work in computer engineering. This includes design and construction of efficient software systems as well as an introduction to hardware design. Present interest is in the application of microprocessors.

The engineering physicist works where new kinds of engineering are being born, or where many fields are being used jointly. General knowledge of the diverse fields of physics provides the ability to deal with industrial problems that cannot be solved by a standardized procedure in a specialized field. The training prepares the student for a career in physics where there are many and varied opportunities in development work and industrial research. It is also basic for graduate work in physics and for specialized training in research.

Mechanical engineering is very broad in scope, not identified with or restricted to a particular technology, vehicle, device, or system but instead is concerned with all such subjects, both individually and collectively. The objective of the undergraduate program is to prepare the student to meet and anticipate change, and to work with technologies as yet unknown. Typical starting assignments for the graduating senior include positions with oil, construction, and automotive industries.

INFORMATION ABOUT THE COLLEGE

B.S. Degree

The College of Engineering and Applied Science offers at UCD complete four-year programs leading to the B.S. degree in civil engineering, electrical engineering, electrical engineering and computer science, mechanical engineering, and applied mathematics. A number of the courses leading to the B.S. degree in aerospace engineering sciences, architectural engineering, chemical engineering, and engineering physics also are offered at UCD.

The course requirements during the freshman year are essentially the same throughout the College of Engineering and Applied Science.

About two-thirds of the sophomore year is common to all, and the remainder of the courses begin to point to the various fields of engineering taught; real specialization begins, however, in the junior year and carries on through the senior year. A fifth year of study leading to the master's degree is strongly urged for students of more than usual ability who feel they can profit from additional study. Those in this category are likely to achieve greater ultimate success in the engineering profession.

At UCD it is also possible for a student to obtain a bachelor's degree in engineering and a bachelor's degree in business in five years plus one or two summer terms. Any of the engineering degree programs can be modified for an excellent premedical program. If liberal arts students elect certain courses in science, mathematics, and engineering as undergraduates, they may earn an engineering degree in four semesters after graduation from the College of Liberal Arts and Sciences.

At the graduate level, UCD offers complete master's degree programs in civil engineering, electrical engineering and applied mathematics. Many graduate courses leading to the Ph.D. in civil engineering and electrical engineering are also offered.

For information regarding courses and requirements leading to the Master of Engineering, Master of Science, or to the Ph.D. degree, see the University of Colorado at Boulder Catalog and the Graduate School section of this bulletin.

Summer Courses

Summer term courses are planned for regular students who must clear deficiencies and for transfer students. Courses also are offered for high school graduates who wish to enter as freshmen and for those who need to remove subject deficiencies. For information about courses, students should write to the associate dean of the College of Engineering and Applied Science, UCD, for the Schedule of Summer Courses.

For many students there are several advantages in starting their college careers during the summer term. Some required freshman and sophomore courses are normally offered at UCD during the summer. Generally, the summer classes are smaller than regular academic-year classes, which means that students can get more individual attention. The summer term gives students a head start and enables them to take a lighter load during the fall semester or take additional courses to enrich their program.

Scholarships, Fellowships, and Loan Funds

Money contributed to the University Development Foundation for assistance to engineering students is deposited in appropriate accounts and used according to the restrictions imposed by the donors. Numerous industries match employee contributions. A list of companies contributing to scholarships and fellowships and different loan funds available can be obtained from the associate dean's office.

Student Organizations

The following honorary engineering societies have active student chapters in the College of Engineering and Applied Science:

Chi Epsilon, civil and architectural fraternity
Eta Kappa Nu, electrical engineering society
**Tau Beta Pi**, engineering society  
Student chapters of the following professional societies are well established at UCD:  
American Society of Civil Engineers  
Association for Computing Machinery  
Institute of Electrical and Electronic Engineers  
Society of Women Engineers  
The following societies have chapters on the Boulder Campus; however, UCD students are eligible for membership:  
American Institute of Aeronautics and Astronautics  
American Institute of Chemical Engineers  
American Society of Mechanical Engineers  
Society of Industrial and Applied Mathematics  

These societies meet frequently to present papers, speakers, films, and other programs of technical interest. A general student organization, known as the Associated Engineering Students, of which all students in the College are members, has supervision of matters of interest to the whole group.

**REQUIREMENTS FOR ADMISSION**

The prospective engineering student needs to be able to work hard, should enjoy mathematics, and should have a keen interest in science and its methods. Sound curiosity about the principles governing the behavior of forces and materials and the ability to visualize structures and machines are necessary prerequisites. The ability to express ideas in both written and spoken form is of primary importance.

In order to enroll, the student must meet the admission requirements of the College of Engineering and Applied Science and the admission requirements described in the General Information section of this bulletin. Students who have been out of high school for two or more years may petition the College for admission. Persons of sufficient maturity and experience who do not meet the prescribed requirements for admission may be admitted upon approval of the associate dean.

Beginning students in engineering should 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). Any student who questions the adequacy of his precollege background in mathematics should see the applied mathematics coordinator for suggestions. A diagnostic test covering precalculus mathematics will be available, prior to registration, to assist new freshmen in selecting the appropriate beginning mathematics course.

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, including some solid geometry. It is estimated that it will usually take seven semesters to cover this material adequately in high school.

It is recommended that students take at least two units of a foreign language.

**Freshmen**

<table>
<thead>
<tr>
<th>High School Subjects</th>
<th>Required Units</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>English (literature, composition, grammar)</strong></td>
<td>4</td>
</tr>
<tr>
<td>Mathematics distributed as follows:</td>
<td></td>
</tr>
<tr>
<td>Algebra</td>
<td>2</td>
</tr>
<tr>
<td>Geometry</td>
<td>1</td>
</tr>
<tr>
<td>Additional mathematics</td>
<td>1</td>
</tr>
<tr>
<td>Natural sciences (physics and chemistry recommended)</td>
<td>2</td>
</tr>
<tr>
<td>Social studies and humanities</td>
<td></td>
</tr>
<tr>
<td>(Foreign languages and additional units of English, history, and literature are included)</td>
<td>3</td>
</tr>
<tr>
<td>Electives</td>
<td>3</td>
</tr>
</tbody>
</table>

**Former Students**

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. Students who have withdrawn must obtain permission of the associate dean to reenroll in the College of Engineering and Applied Science.

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.

**Transfer Students**

Students transferring from other accredited collegiate institutions may be considered for admission on an individual basis if they meet the requirements outlined in the General Information section of this bulletin and the freshmen requirements for entering the College of Engineering and Applied Science.

Intrauniversity transfers within the same campus of the
University to the College of Engineering and Applied Science will be considered on an individual basis if both the following conditions are fulfilled:

1. Enrollment limitations permit.
2. The student’s prior academic record fulfills the requirements of the College of Engineering and Applied Science.

Intercampus transfers of students from one campus of the University to another will be considered on an individual basis if the following conditions are fulfilled:

1. Enrollment limitations permit.
2. The student has a minimum of 30 hours in an engineering curriculum at that campus, not counting transfer hours.
3. If an engineering student, the student is in good academic standing with at least a 2.0 cumulative grade-point average for all courses attempted and for all courses that count toward graduation requirements. If not an engineering student, the student’s academic record has all that fulfills the admission requirements of the College of Engineering and Applied Science.

Some course sequences should be completed before transferring to another campus; therefore, it is strongly recommended that students who contemplate transferring campuses see their department adviser prior to initiating the transfer request.

Both intrauniversity and intercampus transfers are subject to review by a faculty committee which evaluates the applicant’s qualifications for academic success in engineering subjects.

TRANSFER CREDIT

After a prospective transfer student has made application and submitted transcripts to the University of Colorado, the Office of Admissions and Records issues a Statement of Advanced Standing (currently Form 382) listing those courses that are acceptable by University standards for transfer. A copy of this statement is received by the associate dean’s office at the time the student is admitted by the Office of Admissions and Records and is made a part of the permanent record. The appropriate engineering faculty departmental representative will use this copy of the form to indicate which of those credits listed may be acceptable toward the 136-hour graduation requirement in the College of Engineering and Applied Science and note the tentative acceptance of these credits by dating and initialing each acceptable course listed on the Statement of Advanced Standing. The student will be notified that the acceptance is tentative and is contingent upon satisfactory completion of a minimum of 30 semester hours at the University of Colorado before the credits may be officially applied toward the degree requirements. It is the responsibility of the transfer student, after having completed the 30 semester credit hours at the University of Colorado, to request final validation of the credits by his department and to have this validation noted on the Statement of Advanced Standing kept in the associate dean’s office.

If at any time a student wishes to have a course not previously accepted considered again for transfer, the student should consult with the departmental transfer adviser and complete a petition to the associate dean through the department chairman. All transfer credit must be validated by satisfactory achievement in subsequent courses.

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.

There are technology courses 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:

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.

Students who have taken technology courses (courses with technology designations) that may be valid equivalents for engineering courses have these options:

1. They may petition faculty advisers to waive the course. The requirement for a course can be waived if students demonstrate that, by previous course work, individual study, or work experience they have acquired the background and training normally provided by the course. No credit is given toward graduation for a waived course, but strong students may benefit from the waiver by being able to include more advanced work later in their curriculum. Other students may profit by taking the course at this College instead and thus establish a fully sound basis for what follows.

2. 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 section on transfer of college-level credit in the General Information section of this bulletin.)

3. Students may seek credit for the course by examination.

ACADEMIC POLICIES

Refer to the General Information section of this bulletin for descriptions of University-wide policies.

The following policies apply specifically to the College of Engineering and Applied Science.

Advanced Placement

Advanced placement credit may be granted by special examination of the department involved or by College
Entrance Examination Board (CEEB) tests. Credit by examination is not given for correspondence courses. If the applicant has scored 4 or 5 on the CEEB Advanced Placement Examination, credit toward graduation may be awarded. Students who have scored 3 may be considered for advanced placement by the department concerned. 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.

Attendance Regulations
Successful work in the College of Engineering and Applied Science is dependent upon regular attendance in all classes. Students who are unavoidably absent should make arrangements with instructors to make up the work missed. Students who, for illness or other good reason, miss a final examination must notify the instructor or the associate dean's office no later than the end of the day on which the examination is given. Failure to do so will result in an F in the course.

Changing Departments
Students who wish to change to another department within the College of Engineering and Applied Science must apply for transfer by submitting a Change of Major For Undergraduate Degree Students form which must have the approval of both departments concerned and the associate dean.

College-Level Examination (CLEP) Credit
Prospective students may earn college-level credit through the College-Level Examination Program (CLEP) examinations, provided that they score at the 67th percentile or above. Departments will advise students of the credits accepted for such courses. The number of credits so earned must be within the limits of the number of elective hours of the individual department. A list of subjects in which CLEP examination credit will be accepted may be obtained from the College of Engineering and Applied Science office. The currently approved list includes 23 subjects in the fields of computing, business, science, mathematics, the humanities, and social sciences. (See also College-Level Examination Program in the General Information section of this bulletin.)

Counseling
Freshman students are counseled by the associate dean's office and by representatives from each academic department. These representatives are readily available to assist students with academic, vocational, or personal concerns. Students are assigned specific departmental advisers for academic planning and should consult with the departmental chairman or designated representative for assignment.

Course Load Policy
Full-time Students. Undergraduate students employed less than 10 hours per week should register for the regular work as outlined in the departmental curricula. Additional courses may be allowed when there is satisfactory evidence that these extra courses can be taken profitably and credibly. Permission to take more than 21 hours or fewer than 12 hours may be granted only after written petition to the associate dean. The petition must carry the approval of the departmental faculty adviser.

Employed Students. Suggested maximum course loads for undergraduate students employed 10 or more hours per week are as follows:
- Employed 40 or more hours per week—two courses (maximum of 9 semester hours)
- Employed 30 to 39 hours per week—three courses (maximum of 12 semester hours)
- Employed 20 to 29 hours per week—four courses (maximum of 15 semester hours)
- Employed 10 to 19 hours per week—five courses (maximum of 18 semester hours)

Freshman Year
Fundamentals taught in the freshman year are of prime importance in the more advanced classes, and every effort is made to register a beginning freshman in the proper courses. (Course requirements for freshmen are detailed within the curriculum given under each department.)

All freshmen are urged to consult their instructors whenever they need help in their assignments.

Repetition of Courses
A student may not register for credit in a course in which he already has received a grade of C or better. When a student takes a course for credit more than once, all grades are used in determining the grade-point average. An F grade in a required course necessitates a subsequent satisfactory completion of the course. Students may not register for credit in any course which they have previously enrolled in and completed for NC (no credit).

Work Experience
It is the policy of the College of Engineering and Applied Science that any credits accrued in the official records of the student that were awarded for work experience (or for Cooperative Education experience) will not apply as part of the 136 semester hours required for an engineering degree.

Policy on Academic Progress
The following is a statement of the Policy on Academic Progress in the College of Engineering and Applied Science.
An overall average of 2.0 or better, in hours taken at the University of Colorado toward graduation requirements, is necessary to remain in good standing in the College of Engineering and Applied Science. Grades earned at another institution are not used in calculating the grade-point average at the University of Colorado. However, grades earned in another school or college within the University of Colorado will be used in determining the student's scholastic standing and progress toward the bachelor of science degree in the College of Engineering and Applied Science.

Students whose overall averages fall below 2.0 will be placed on probation for the next semester in which they are enrolled in the College and will be so notified. If, after that semester the student's average is still below 2.0, the student will be suspended from the College.

The following is additional information and interpretation of the policy:

1. Students who have been suspended are suspended indefinitely and may not enroll at any University of Colorado campus during any regular academic year, September through May, but may enroll in summer sessions or Vacation College and/or may take correspondence courses for credit through the Division of Continuing Education.

2. Students who have been suspended may apply for a readmission if they bring their overall average up to a 2.0 through summer session, Vacation College, and/or correspondence work applying to engineering degree requirements as approved by a member of the Academic Progress Committee.

3. A student, upon satisfactorily completing at another college or university a minimum of 12 semester hours of work appropriate to an engineering curriculum subsequent to suspension, may apply for readmission as a transfer student.

4. Applicants for readmission to the University of Colorado cannot be assured readmission.

5. During a probation semester the student must complete a normal load, i.e., 12 hours or more (for a full-time student) of courses counting toward graduation requirements. Physical education courses do not count; if the student has previously completed 6 hours of ROTC courses, ROTC courses do not count; if 24 hours of social-humanistic subjects have been completed, social-humanistic subjects do not count.

6. Students who have been on probation or suspension at any time in the past will automatically be suspended if their overall average again falls below a 2.0.

Details of the probationary and suspension status and of the conditions for return to good academic standing will be stipulated in the letters of probation and suspension. Information regarding these matters may be obtained in the Office of the Associate Dean, Room 402.

Grading System, Pass/Fail and Drop/Add Procedures

See the General Information section of this bulletin for the University of Colorado uniform grading system and for additional pass/fail information and drop/add procedures. Also see the current Schedule of Courses.

Grading System

It is particularly important to note that in the College of Engineering and Applied Science courses to be counted toward fulfilling the 136-hour graduation requirement cannot be taken no credit (NC). Once a course has been taken for no credit, the course cannot be repeated for credit.

Pass/Fail

The primary purpose for offering courses on a pass/fail grade basis is to encourage students, especially juniors and seniors, to broaden their educational experience by electing challenging courses without serious risk to their academic records. In general pass/fail should be limited to 300- or 400-level elective courses. Below are specific pass/fail regulations for the College of Engineering and Applied Science.

1. A maximum of 16 pass/fail hours may be included in a student's total program. A maximum of 6 hours may be taken in one semester, but it is recommended that not more than one course at a time be taken pass/fail.

2. Courses that a student may elect to take pass/fail shall be designated and approved in advance by the student's major department. If courses not so designated are taken, the earned grade will be recorded in place of the P or F grade. An engineering student who has not designated a major field will not be allowed the pass/fail option without approval through the associate dean's office.

3. A transfer student may count toward graduation 1 credit hour of pass/fail for each 9 credit hours completed in the College; however, the maximum number of pass/fail hours counting toward graduation shall not exceed 16, including courses taken in the Honors Program under that program's pass/fail grading system.

4. Students on academic probation should not enroll for pass/fail courses.

Drop/Add

Only under very extenuating circumstances will petitions for dropping courses be considered after the tenth week of the semester.

Sequence of Courses

Full-time students should complete the courses in the department in which they are registered according to the curriculum shown under their major department in this bulletin. (Part-time students may need to modify the order of courses with adviser approval.) Any course in which there is a failure or an unremoved incomplete should, upon the first recurrence of such course, take precedence over other courses; however, each student must be registered so that departmental requirements will be completed with the least possible delay.

Students who do not earn a grade of C or better in a course that is prerequisite to another may not register for the succeeding course unless they have the permission of both the department and the instructor of the succeeding course.

Students may enroll for as much as 50 percent of their
courses in work that is not a part of the prescribed curricula of the College of Engineering and Applied Science, provided they have at least a 2.0 grade average in all college work attempted. Exceptions to this policy may be made by petition and may be made for students taking the combined engineering-business program.

Graduation With Honors

In recognition of high scholastic and professional attainments, Honors or Special Honors, (at the discretion of the Engineering Honors and Recognition Committee) will be awarded at graduation. These honors will be recorded on the diplomas of the graduates receiving them and indicated in the commencement program.

Social-Humanistic Content of the Engineering Curriculum

The faculty of the College of Engineering and Applied Science requires that 24 semester hours should be considered the minimum of social-humanistic content of the degree-granting departments.

A minimum of 6 hours of literature is required. Six hours of social-humanistic subjects should be taken in the junior year and 6 in the senior year. These subjects should be taken from the following categories, with not fewer than 6 hours from category 2 below.

1. Literature (including foreign literature either in the original or in translation).
2. Economics, sociology, political science, history, and anthropology.
3. Fine arts and music (critical or historical).

Up to a maximum of 6 hours of communication skills (e.g., English composition, technical writing, public speaking, elementary foreign languages) may be substituted for 6 hours of the social-humanistic requirement. Alternatively, such courses may be counted as technical electives. Courses in business subjects such as accounting, contracts, and management should be used as technical electives where applicable. (Elective courses are to be coordinated with the faculty adviser.)

Qualified students will be permitted to take appropriate honors courses as substitutes for social-humanistic courses.

PLANNING AN ENGINEERING PROGRAM

It is the responsibility of students to be sure they have fulfilled all the requirements, to file the intended date of graduation in the departmental office at the close of the third year, to fill out a Diploma Card at registration at the beginning of the last semester, and to keep the departmental adviser and the associate dean's office informed of any changes in the students' plans throughout the last year.

In order to become eligible for one of the bachelor's degrees in the College of Engineering and Applied Science, a student, in addition to being in good standing in the University, must meet the following minimum requirements.

Courses. The satisfactory completion of the prescribed and elective work in any curriculum as determined by the appropriate department.

Hours. A minimum of 136 hours, of which the last 30 shall be earned after matriculation and admission as a degree student in the College of Engineering and Applied Science at CU is required for students in the four-year curricula; however, many students may need to present more than the minimum hours because of certain departmental requirements and because they may have enrolled in courses which do not carry full credit toward a degree. The hours required for students in the business and engineering program vary by departments; as a guide, 166 semester hours are considered a minimum, but most students follow programs that bring the total above this figure.

Grade Average. A minimum grade-point average of 2.0 (C) for all courses attempted and (separately computed) for all required courses. A department may require a minimum grade of C in all major courses.

Faculty Recommendation. The recommendation of the faculty of the department offering the degree and the recommendation of the faculty of the College of Engineering and Applied Science.

Incomplete and Correspondence Courses. It is the student's responsibility to insure that all incompletes and correspondence courses are officially completed before the tenth week of the student's final semester in school.

Simultaneous Conferring of Degrees. For business and engineering students, the degree B.S. in business and the degree B.S. in engineering must be conferred at the same commencement.

Commencement Exercises. Commencement exercises usually are held in May. Students finishing in December and August may attend commencement the following May or receive diplomas by mail.

English for Engineering

Communication skills are essential for every professional person and are particularly so for the engineer. Most engineering departments recommend one of the following series of courses. It is not mandatory but is preferable that the courses be taken sequentially as shown. These courses are intended to develop the student's writing ability and to allow a close analysis of significant works of world literature in translation and in English originals.

The following combinations are recommended: (1) Engl. 258, 259, 260, 261; or (b) Engl. 258, 259, and the following two introductory courses: Engl. 120 (Introduction to Fiction), Engl. 130 (Introduction to Drama and Poetry). Students who achieve a B average in two of the following English courses (120, 130, 258, and 259) may take immediately thereafter any literature courses listed by the Department of English. No social-humanistic credit will be given for courses dealing with English as a foreign language. Students having questions about the English requirement should see their departmental adviser.
UNDERGRADUATE DEGREES

In addition to the standard four-year degree programs previously listed, the College is involved in the following programs.

Business and Engineering Curricula

Undergraduates in the College of Engineering and Applied Science with career interests in administration may complete all of the requirements for a B.S. degree in engineering and a B.S. degree in business by extending their study programs to five years, including one or two summer terms. The 48 semester credits required in the College of Business and Administration may be started in the second, third, or fourth year, depending upon the curricular plan for the particular field of engineering in which the student is enrolled.

It is also possible for qualified graduates (GPA: 3.0 or better) to complete the requirements for a master's degree in business within one year after receiving the baccalaureate degree in engineering. Before deciding upon the business option, a student should carefully consider, in consultation with departmental advisers, the relative advantages of the B.S. business-engineering curricula, the degree program of the Graduate School of Business Administration, and the M.S. degree program in the student’s own engineering discipline.

Combined B.S. business and B.S. engineering programs are available for students in aerospace engineering sciences, applied mathematics, architectural engineering, chemical engineering, civil engineering, electrical engineering, electrical engineering and computer science, engineering physics, and mechanical engineering.

Students taking these undergraduate programs are not required to submit formal application for admission to the College of Business. However, before enrolling in any business courses, the student must see an adviser from the College of Business.

Requirements for the undergraduate business degree and engineering degree must be completed concurrently. At least a 2.0 grade average must be earned in all courses undertaken in the College of Business. Not fewer than 30 semester credits in business courses must be earned to establish residency credit. Courses offered by the College of Business may be used in lieu of electives required for undergraduate engineering degrees, subject to the approval of the individual department.

The business requirements for this program are as follows:

<table>
<thead>
<tr>
<th>Courses</th>
<th>Semester Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>Econ. 201 and 202. Principles of Economics</td>
<td>6</td>
</tr>
<tr>
<td>(Should be completed during the student’s sophomore year or junior year.)</td>
<td></td>
</tr>
<tr>
<td>Acct. 200. Introduction to Financial Accounting</td>
<td>3</td>
</tr>
<tr>
<td>B. Ad. 200. Business Information and the Computer</td>
<td>3</td>
</tr>
<tr>
<td>Q. M. 201. Business Statistics</td>
<td>3</td>
</tr>
<tr>
<td>Mk. 300. Principles of Marketing</td>
<td>3</td>
</tr>
<tr>
<td>Fin. 305. Basic Finance</td>
<td>3</td>
</tr>
<tr>
<td>Pr. Mg. 300. Production and Operations Management</td>
<td>3</td>
</tr>
<tr>
<td>Or. Mg. 330. Introduction to Management and Organization</td>
<td>3</td>
</tr>
<tr>
<td>B. Law 300. Business Law</td>
<td>3</td>
</tr>
<tr>
<td>B. Ad. 410. Business and Government; or B. Ad. 411 Business and Society</td>
<td>3</td>
</tr>
<tr>
<td>B. Ad. 450. Business Policy (Cases and Concepts in Business Policy)</td>
<td>3</td>
</tr>
</tbody>
</table>

Courses in an area of emphasis in one of the following fields: accounting, finance, information science, international business, marketing, minerals land management, organization management, personnel management, production and operations management, public agency administration, real estate, small business management, or transportation and traffic management. All course work in the area of emphasis must be taken in the University of Colorado College of Business and Administration 12

Total 48

The student should note that for some courses, and for some areas of emphasis, there are prerequisites which must be met. Since some of the courses may be taken as engineering electives, it is possible to obtain the two degrees in as few as 166 semester hours; however, most students will require more.

Joint Engineering Degrees

A student may obtain two engineering degrees by meeting the requirements and obtaining the approval of both departments concerned. Thirty hours of elective or required subjects in addition to the largest minimum number required by either of the two departments must be completed.

Premedicine Option

A professional school in a field such as medicine requires a student to have a college education prior to pursuing its professional courses. In practically all cases, medical students are university graduates, although occasionally a student may enter medical school after three years of university training. A student can prepare for medical school either in the College of Liberal Arts and Sciences or in the College of Engineering and Applied Science. The desirability of obtaining an engineering education prior to undertaking a study of medicine is increasing continually, as medicine itself is evolving. A great deal of additional equipment, most of it electronic, is being developed to assist the medical practitioner in treatment of patients. Bioengineering, engineering systems analysis, probability, and communication theory are highly applicable to medical problems. Improved communication techniques also are allowing the storage and retrieval of information not previously available to the medical doctor. An advanced knowledge of basic mathematics and computing techniques, along with increased understanding of physical chemistry, are improving the scientific base upon which medical knowledge rests. It is therefore desirable that the medical practitioner and researcher in the future be well equipped with the tools which engineering can offer.

To provide at least a minimum of the necessary knowledge, the additional courses listed below are prescribed and must be completed with superior grades. General overall requirements for entry into most medical schools are given. Students can meet these requirements by careful substitution of electives in the engineering
curriculum. In some cases where additional hours may be required, interested students should consult with the engineering department chairman.

General chemistry (103-106) ............... 2 sem. (8-10 sem. hrs.)
Organic chemistry (341, 342, 343, 344) ...... 2 sem. (8-10 sem. hrs.)
General biology (205-206) .................. 2 sem. (8 sem. hrs.)
English composition .......................... 1 sem. (3 sem. hrs.)

To prepare for a career in medicine in the College of Engineering and Applied Science, it is strongly recommended that the student follow a full four-year college course (with the equivalent of at least 136 semester hours) and earn a B.S. degree.

The Admissions Committee of the University of Colorado School of Medicine welcomes inquiries and visits from prospective students, particularly at the time of their first interest in medicine as their chosen profession.

Students desiring to enter a premedical program should consult the representative of the department involved. At UCD, premedical advising is available through the Health Careers Advisory Committee, Room 232.

GRADUATE STUDY IN ENGINEERING

The College of Engineering and Applied Science at UCD offers complete M.S. degree programs in civil engineering, electrical engineering, and applied mathematics. Some courses are now being offered toward the M.S. degree in mechanical engineering. Many graduate courses leading to the Ph.D. in civil engineering and electrical engineering also are offered.

For information regarding courses and requirements leading to the degrees Master of Engineering and Master of Science or to the Ph.D. degree, see the University of Colorado at Boulder Catalog and the Graduate School section of this bulletin.

Education for Employed Professional Engineers

Continuing education for employed engineers grows more important each year. Therefore, the College puts great emphasis upon making graduate courses available through night and televised courses. A new degree, the Master of Engineering, permits graduate students more flexibility in defining specialized interdisciplinary fields that meet their professional needs. This degree has standards fully equivalent to those of the Master of Science degree.

In addition to credit course work, the College works jointly with the Division of Continuing Education to offer noncredit courses of interest to practicing engineers.

Concurrent B.S. and M.S. Degree Program in Engineering

Students who plan to continue in the Graduate School after completing the requirements for the B.S. degree may apply for admission to the concurrent degree program through their department early in the second semester of their junior year (after completion of at least 84 semester hours). Requirements are the same as for the two degrees taken separately: 136 credit hours for the B.S. degree and 24 hours plus thesis (Plan I) or 30 credit hours (Plan II) for the M.S. degree. Social-humanistic requirements must be completed within the first 136 credit hours. A 3.0 grade-point average for all work attempted through the first six semesters (at least 96 credit hours) and written recommendations from at least two major-field faculty members are required.

The purpose of the concurrent degree program is to allow the student who qualifies for graduate study and expects to continue for an advanced degree to plan his graduate program from the beginning of the senior year rather than from the first year of graduate study. The student can then reach the degree of proficiency required to begin research at an earlier time, and can make better and fuller use of courses offered in alternate years.

Students will be assigned faculty advisers to help them develop the program best suited to their particular interests. Those in the program will be encouraged to pursue independent study on research problems or in areas of specialization where no formal courses are offered. A liberal substitution policy will be followed for courses normally required in the last year of the undergraduate curriculum. The program selected must be planned so that the student may qualify for the B.S. degree after completing the credit-hour requirements for the degree if the student so elects, or if the student's grade-point average falls below the 3.0 required to remain in the program. In this case, all hours completed with a passing grade while in the program will count toward fulfilling the normal requirements for the B.S. degree. There will be no credit given toward a graduate degree for courses applied to the B.S. degree requirements; however, students are still eligible to apply for admission to the Graduate School under the rules set forth in the Graduate School section of this bulletin. Normally, however, the student will apply for admission to the Graduate School when at least 130 of the 136 credit hours required for the B.S. degree have been completed, and will be awarded the B.S. and M.S. degrees simultaneously upon meeting the requirements set forth for the concurrent degree program.

Graduate Work in Business

Undergraduates in engineering who intend to pursue graduate study in business may complete some of the business background requirements as electives in their undergraduate programs. Seniors in engineering who have such intentions and appear likely to qualify for admission to graduate study in business may be permitted to register for the graduate fundamentals courses which are designed to provide qualified students with needed background preparation in business.

AEROSPACE ENGINEERING SCIENCES

The primary objective of the aerospace engineering sciences curriculum is to provide sound general training in subjects fundamental to the practice of and research in this branch of engineering sciences. The major part of the first three years is devoted to the study of mathematics,
physics, mechanics, chemistry, and the humanities. The fourth year is devoted to the professional courses in the fields of physics of fluids (fluid dynamics); propulsion and energy conversion; flight dynamics, control, and guidance; space system analysis; materials and structural mechanics; space environment; and bioengineering.

Planning of graduate study for students having sufficient ability and interest should begin by the start of the junior year. Such a plan should consider the foreign language requirements of appropriate graduate schools, and an advanced mathematics program included in technical electives consisting of Math. 431-432 and Math. 481 or 443.

The minimum total number of semester hours for the B.S. degree is 136. Students who wish to obtain a B.S. degree in aerospace engineering sciences and a B.S. degree in business are advised to consider obtaining the B.S. degree in aerospace and the M.S. degree in business rather than two B.S. degrees. Business courses may not be substituted for technical electives in the aerospace curriculum.

TRANSFER TO BOULDER

The complete aerospace engineering sciences program is not available at UCD. Therefore, students wishing to complete this program should plan on transferring to the University of Colorado at Boulder at the start of the junior year. Students must complete a minimum of 30 hours including the required freshman and sophomore courses in mathematics and physics before transferring to the Boulder campus. The complete curriculum degree requirements, and descriptions of courses may be found in the University of Colorado at Boulder Catalog.

Curriculum for B.S.
(Aerospace Engineering Sciences)

The minimum total number of hours for the degree is 136. A typical first two years of the program:

<table>
<thead>
<tr>
<th>FRESHMAN YEAR</th>
<th>Semester Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fall Semester</td>
<td>Math. 140. Analytic Geometry and Calculus I .......... 3</td>
</tr>
<tr>
<td></td>
<td>Engr. 101. Engineering Drawing ......................... 2</td>
</tr>
<tr>
<td></td>
<td>Engl. 258. Great Books I (see note 1) ................... 3</td>
</tr>
<tr>
<td></td>
<td>Social-humanistic elective (see note 2) ............... 3</td>
</tr>
<tr>
<td></td>
<td>E.E. 130. Problems and Methods of Modern Engineering (or C.E. 130) .............. 2</td>
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<tr>
<td></td>
<td>Total .............. 16</td>
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<tr>
<td></td>
<td>Phys. 231. General Physics I ............................ 4</td>
</tr>
<tr>
<td></td>
<td>Phys. 232. General Physics Lab. I ....................... 1</td>
</tr>
<tr>
<td></td>
<td>Engl. 259. Great Books II (see note 1) ................. 3</td>
</tr>
<tr>
<td></td>
<td>Ch.E. 210. Physical and Chemical Properties of Matter (see note 3) ................ 4</td>
</tr>
<tr>
<td></td>
<td>Social-humanistic elective (see note 2) ............... 3</td>
</tr>
<tr>
<td></td>
<td>Total .............. 18</td>
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<table>
<thead>
<tr>
<th>SOPHOMORE YEAR</th>
<th>Fall Semester</th>
<th>Semester Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>Math. 242. Analytic Geometry and Calculus III ........... 3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Math. 319. Applied Linear Algebra ................................ 3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>C.E. 212. Analytical Mechanics I .......................... 3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Engl. 260. Great Books III (see note 1) .................. 3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Phys. 233. General Physics II ............................. 4</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Phys. 234. General Physics Lab. II .......................... 1</td>
<td></td>
<td></td>
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<tr>
<td>Total .......... 17</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Spring Semester</td>
<td>Math. 320. Elementary Differential Equations .......... 3</td>
<td></td>
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<tr>
<td></td>
<td>C.E. 311. Analytical Mechanics II ....................... 3</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Engl. 261. Great Books IV (see note 1) .................. 3</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Engr. 301. Thermodynamics ............................... 3</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Social-humanistic elective (see note 2) ............... 3</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Approved physics elective .............................. 3</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Total .......... 18</td>
<td></td>
</tr>
</tbody>
</table>

Notes for B.S.
(Aerospace Engineering)

1. For other options in English, see the English listings in the Course Description section of this bulletin.
2. Students may take electives pass/fail, subject to the regulations of the College of Engineering and Applied Science.
3. Chem. 103 may be substituted.

APPLIED MATHEMATICS

Charles I. Sherrill III, Coordinator

The Division of Natural and Physical Sciences in the College of Liberal Arts and Sciences offers all courses in mathematics, both required and elective, for undergraduate and graduate students in the College of Engineering and Applied Science. Three curricula leading to the degree B.S. (A. Math.) are offered. In Option I, the student takes a minor in a specific engineering department, satisfying an adviser from that department. In Option II, the student takes distributed course work in engineering departments, including a solid grounding in mechanics, electronics, and materials. (This option is intended for the above-average student.) Option III is a joint mathematics-computer science program. Regardless of the option chosen, each student is expected to complete a minimum of 45 semester hours of course work in mathematics beginning with Math. 140.

Modern industrial and scientific research is so dependent on advanced mathematical concepts that applied mathematicians are needed today by almost all concerns which are engaged in such research.

The undergraduate curriculum is designed to give training in mathematics and in engineering and science. The use of numerical methods and electronic computers is included.

Nontechnical electives should be broadening and have cultural value. Courses in the humanities and the social sciences are required. Students interested in research should take a foreign language as early as possible. Some beginning language courses are considered technical electives and may not count toward the social-humanistic electives. Some 300- and 400-level language courses may be counted. Under all circumstances, a student must plan
a complete program and obtain the approval of a departmental adviser at the beginning of the sophomore year.

The B.S. degree in applied mathematics requires the completion of a minimum of 136 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. Course work in the social-humanistic elective area must be approved by the student's adviser.

Curriculum for B.S. (Applied Mathematics)

FRESHMAN YEAR

<table>
<thead>
<tr>
<th>Fall Semester</th>
<th>Semester Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>Math. 140. Analytic Geometry and Calculus I</td>
<td>3</td>
</tr>
<tr>
<td>Chem. 103. General Chemistry</td>
<td>5</td>
</tr>
<tr>
<td>Engl. 258. Great Books I (see note 1)</td>
<td>3</td>
</tr>
<tr>
<td>E. E. 210. Fundamentals of Computing (or E E. 201)</td>
<td>3</td>
</tr>
<tr>
<td>Approved elective (see notes 3 and 5)</td>
<td>2</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>16</strong></td>
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<th>Spring Semester</th>
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<tbody>
<tr>
<td>Math. 241. Analytic Geometry and Calculus II</td>
<td>3</td>
</tr>
<tr>
<td>Engr. 101. Engineering Drawing</td>
<td>2</td>
</tr>
<tr>
<td>Engl. 259. Great Books I (see note 1)</td>
<td>3</td>
</tr>
<tr>
<td>Phys. 231. General Physics I</td>
<td>4</td>
</tr>
<tr>
<td>Phys. 232. General Physics Lab. I</td>
<td>1</td>
</tr>
<tr>
<td>Approved elective (see notes 3 and 5)</td>
<td>3</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>16</strong></td>
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SOHOPMORE YEAR

<table>
<thead>
<tr>
<th>Fall Semester</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Math. 242. Analytic Geometry and Calculus III</td>
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<tr>
<td>Engl. 260. Great Books III (see note 1)</td>
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<td>Phys. 233. General Physics II</td>
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</tr>
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<td>Phys. 234. General Physics Lab. II</td>
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<td><strong>Total</strong></td>
<td><strong>17</strong></td>
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<table>
<thead>
<tr>
<th>Spring Semester</th>
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</thead>
<tbody>
<tr>
<td>Engl. 261. Great Books IV (see note 1)</td>
<td>3</td>
</tr>
<tr>
<td>Math. 300. Introduction to Abstract Mathematics</td>
<td>3</td>
</tr>
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<td>Math. 319. Applied Linear Algebra</td>
<td>3</td>
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<td>8</td>
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<tr>
<td><strong>Total</strong></td>
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JUNIOR YEAR

<table>
<thead>
<tr>
<th>Fall Semester</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Math. 431. Advanced Calculus I</td>
<td>3</td>
</tr>
<tr>
<td>Engr. 301. Thermodynamics</td>
<td>3</td>
</tr>
<tr>
<td>Approved electives (see notes 3 and 5)</td>
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<tr>
<td><strong>Total</strong></td>
<td><strong>18</strong></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Spring Semester</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Math. 320. Elementary Differential Equations</td>
<td>3</td>
</tr>
<tr>
<td>Math. 481. Introduction to Probability Theory</td>
<td>3</td>
</tr>
<tr>
<td>Approved electives (see notes 3 and 5)</td>
<td>12</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>18</strong></td>
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</table>

SENIOR YEAR

<table>
<thead>
<tr>
<th>Fall Semester</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Approved electives (see notes 3 and 5)</td>
<td>17</td>
</tr>
</tbody>
</table>

Spring Semester

Approved electives (see notes 3 and 5) ......................... 17

Requirements under each option are as follows:

**Option I**

<table>
<thead>
<tr>
<th>Semester Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>Specialty in a specific engineering department</td>
</tr>
<tr>
<td>Technical electives</td>
</tr>
<tr>
<td>Other electives</td>
</tr>
<tr>
<td>Required social-humanistic electives (see note 2)</td>
</tr>
<tr>
<td>(Electives should include Math 432.)</td>
</tr>
</tbody>
</table>

**Option II**

Distributed engineering courses in the engineering college .............................. 22-30
(A minimal program would consist of the following courses: C.E. 212, C.E. 311, E.E. 213, E.E. 313, E.E. 314, M.E. 301, M.E. 383 or C.E. 331 or their equivalents.)

<table>
<thead>
<tr>
<th>Technical electives</th>
<th>Other electives</th>
<th>Required social-humanistic electives (see note 2)</th>
<th>(Electives should include Math 432.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>15-22</td>
<td>11-30</td>
<td>12</td>
<td>12</td>
</tr>
</tbody>
</table>

**Option III**

Specific courses required under Option III:

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>3</td>
</tr>
</tbody>
</table>

Other electives ........................................................................ 12

**Notes for B.S. (Applied Mathematics)**

1. For other options in English, see the English listings in the Course Description section of this bulletin.
2. Students may take social-humanistic electives pass/fail, subject to the regulations of the College of Engineering and Applied Science.
3. A minimum of 10 approved courses in mathematics beyond 140, 241, 242, 213, and 230 are required of all students majoring in applied mathematics (or E.E. 201).
5. In addition to E.E. 210, Engr. 101 and Engr. 301, the student must take a minimum of 18 hours of approved elective engineering courses excluding chemistry, mathematics, and physics courses. Furthermore, the student who does not have a strong interest in applications of mathematics to engineering is encouraged to consider a major in mathematics in the College of Liberal Arts and Sciences.

ARCHITECTURAL ENGINEERING

John R. Mays, Coordinator

The architectural engineering curriculum is administered at the Boulder Campus by the Department of Civil, Environmental, and Architectural Engineering of the College of Engineering and Applied Science. Its purpose is to prepare a student for a career in the building industry and for graduate-level research on building-related topics. The building industry is the largest single industry in the United States and includes many diverse skills and fields of knowledge.

This course of study fulfills the academic requirements for registration as a professional engineer.

The architectural engineering curriculum is
recommended for those wishing to specialize (within the building industry) in engineering design, construction and contracting, or sales engineering. The architectural engineering student may select any of three areas of specialization offered: construction engineering, environmental engineering, or structural engineering.

Specialization in construction is for students planning a career in contracting and building construction. This program involves courses in construction management, planning and scheduling techniques, cost accounting, estimating and pricing, building materials, and construction methods.

Students interested in environmental engineering may concentrate their efforts in the fields of illumination and electrical systems design, heating-ventilating-air conditioning systems design, sanitation and water supply, or acoustics.

The third area of specialization is for those interested in the design of structural systems for buildings. Courses available include structural analysis; indeterminate structures; and steel, concrete, and timber design.

The five-year course leading to a B.S. degree in architectural engineering and a B.S. degree in business offers opportunity to complement the architectural engineering background with study in one of the major areas of business administration, such as personnel and business management, marketing, and finance.

TRANSFER TO BOULDER

Approximately one-half of the architectural engineering program is available at UCD under the Department of Civil and Urban Engineering. Students wishing to complete the architectural engineering program must plan to transfer to the Boulder Campus at the start of the junior year, but at that time must have completed at least 30 semester hours at UCD. Students should complete the required freshman and sophomore courses in mathematics and physics before transferring to the Boulder Campus. The complete curriculum and descriptions of courses may be found in the University of Colorado at Boulder Catalog.

Curriculum for B.S. (Architectural Engineering)

The minimum total number of hours for the degree is 136. A typical first two years of the program:

**FRESHMAN YEAR**

<table>
<thead>
<tr>
<th>Fall Semester</th>
<th>Semester Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>Math. 140. Analytic Geometry and Calculus I</td>
<td>3</td>
</tr>
<tr>
<td>Engr. 101. Engineering Drawing</td>
<td>2</td>
</tr>
<tr>
<td>Literature elective (see note 1)</td>
<td>3</td>
</tr>
<tr>
<td>E.E. 201. Introduction to Computing (or E.E. 210)</td>
<td>3</td>
</tr>
<tr>
<td>C.E. 130. Introduction to Civil Engineering</td>
<td>2</td>
</tr>
<tr>
<td>Social-humanistic elective</td>
<td>3</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>16</strong></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Spring Semester</th>
</tr>
</thead>
<tbody>
<tr>
<td>Math. 241. Analytic Geometry and Calculus II</td>
</tr>
<tr>
<td>Literature elective (see note 1)</td>
</tr>
<tr>
<td>Arch. E. 102. Descriptive Geometry (see note 4)</td>
</tr>
<tr>
<td>Phys. 231. General Physics I</td>
</tr>
</tbody>
</table>

**Sophomore Year**

<table>
<thead>
<tr>
<th>Fall Semester</th>
<th>Semester Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>Math. 242. Analytic Geometry and Calculus III</td>
<td>3</td>
</tr>
<tr>
<td>Math. 319. Applied Linear Algebra</td>
<td>3</td>
</tr>
<tr>
<td>Phys. 233. General Physics II</td>
<td>4</td>
</tr>
<tr>
<td>Phys. 234. General Physics Lab. II</td>
<td>1</td>
</tr>
<tr>
<td>C.E. 212. Analytical Mechanics I</td>
<td>3</td>
</tr>
<tr>
<td>Specialty requirement: structures and construction majors take C.E. 221; environmental majors take Arch. E. 362 (see note 4)</td>
<td>3</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>17</strong></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Spring Semester</th>
</tr>
</thead>
<tbody>
<tr>
<td>Math. 320. Elementary Differential Equations</td>
</tr>
<tr>
<td>Arch. E. 240. Building Materials and Construction (see note 4)</td>
</tr>
<tr>
<td>C.E. 312. Mechanics of Materials</td>
</tr>
<tr>
<td>C.E. 314. Materials Testing Lab. (not required of environmental majors)</td>
</tr>
<tr>
<td>Basic science elective (see note 2)</td>
</tr>
<tr>
<td>Social-humanistic elective</td>
</tr>
<tr>
<td><strong>Total</strong></td>
</tr>
</tbody>
</table>

**Notes for B.S. (Architectural Engineering)**

1. Great Books series recommended; see the English listings in the Course Description section of this bulletin.
2. Departmental approval required.
3. Chem. 103-5 may be substituted for Ch.E. 210-4, in which case the technical elective requirement is reduced by one credit hour.
4. Arch. E. 240 and 362 are normally not available at UCD. An adviser-approved junior or senior course may be moved ahead.

**CHEMICAL ENGINEERING**

Meeting the crisis in oil and energy, depolluting the water and air, producing new and better materials to replace those that are limited or scarce—these are jobs in which one will find the chemical engineer.

Chemical plants (including refineries and gasification plants) convert natural resources into industrial and consumer products. Among their products are many that often are not identified with chemical engineering—oils, metals, glass, plastic, rubber, paints, soaps and detergents, foods, beverages, synthetic and natural fibers, nuclear and exotic fuels, medicines, and many others.

The department, located at the Boulder Campus, is very much interested in research directed toward ecologically sound development of chemical processes. It is also working hard on energy problems and is stressing problems of energy conversion in its instructional program.

Many essentials of life originate in chemical engineering. Recycling of wastes and resources is not a new idea in chemical engineering but a long-standing principle. Since the earth now is perceived as a self-renewing system, intelligent generalization of the recycle theory to the entire cycle of natural resources is a challenge and opportunity for chemical engineers. Cleaning up pollution from chemical plants and from other sources is largely a chemical engineering problem. The chemical engineer efficiently uses and conserves
natural resources to create valuable end products and to preserve environmental values.

Thus, chemical engineering continually changes and progresses. The Department of Chemical Engineering at the Boulder Campus therefore helps students to prepare to be immediately valuable to industry and eventually to lead future developments in industry and research. Whether they plan to go into industry or on to graduate work, students are urged to watch, understand, and enjoy the sparkle and interplay of new ideas and new technologies.

TRANSFER TO BOULDER

The complete chemical engineering program is not available at UCD. Therefore, students wishing to complete this program must plan to transfer to the University of Colorado at Boulder at the start of their junior year. UCD students must complete a minimum of 30 semester hours and should complete the required freshman and sophomore courses in mathematics, physics, and organic chemistry at UCD before transferring to the Boulder Campus. The complete curriculum, degree requirements, and descriptions of courses may be found in the University of Colorado at Boulder Catalog.

Curriculum for B.S. (Chemical Engineering)

The minimum total number of hours for the degree is 136. A typical first two years of the program:

FRESHMAN YEAR

<table>
<thead>
<tr>
<th>Semester</th>
<th>Course Title</th>
<th>Semester Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fall Semester</td>
<td>Math. 140. Analytic Geometry and Calculus I</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Chem. 103. General Chemistry</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td>Engl. 258. Great Books (see note I)</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Engr. 101. Engineering Drawing</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>Ch.E. 130. Introduction to Chemical Engineering</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>(see note 2)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>15</td>
</tr>
<tr>
<td>Spring Semester</td>
<td>Math. 241. Analytic Geometry and Calculus II</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Chem. 106. General Chemistry</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td>Engl. 259. Great Books II (see note I)</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>E.E. 201. Introduction to Computing (or E.E. 210)</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Social-humanistic elective</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>17</td>
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SOPHOMORE YEAR

<table>
<thead>
<tr>
<th>Semester</th>
<th>Course Title</th>
<th>Semester Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fall Semester</td>
<td>Math. 242. Analytic Geometry and Calculus III</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Phys. 231. General Physics I</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>Phys. 232. General Physics Lab. I</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>Engl. 260. Great Books III (see note I)</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Chem. 341. Organic Chemistry</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Chem. 343. Organic Chemistry Lab. I</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>Math. 319. Applied Linear Algebra</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>18</td>
</tr>
<tr>
<td>Spring Semester</td>
<td>Math. 320. Elementary Differential Equations</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Phys. 233. General Physics II</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>Engl. 261. Great Books IV (see note I)</td>
<td>3</td>
</tr>
</tbody>
</table>

Chem. 342. Organic Chemistry ........................................ 3
Chem. 344. Organic Chemistry Lab. II ............................. 1
Phys. 234. Experimental Physics II ............................... 1
Ch.E. 212. Chemical Engineering Material and Energy Balances (see note 3) ........................................ 3
Total 18

Notes for B.S. (Chemical Engineering)

1. For other English options, see the English listings in the Course Descriptions section of this bulletin.
2. Or C.E. 130 or E.E. 130.
3. Students must arrange to take Ch.E. 212 concurrently in Boulder during the spring semester of their sophomore year or it may delay graduation by a year.

CIVIL AND URBAN ENGINEERING

Ernest C. Harris, Chairman

Civil engineering is generally the broadest field of engineering studied in American universities today. Civil engineering offers an interesting and highly challenging career to the student interested in the design and construction of buildings, bridges, dams, aqueducts, and other structures; in transportation systems including highways, canals, pipe lines, airports, rapid transit lines, railroads, and harbor facilities; in the transmission of water and control of rivers; in the development of water resources for urban use, industry, and land reclamation; in the control of water quality through water purification and proper waste treatment; in the construction industry; and in general in the rapidly expanding problems concerned with man's physical environment and the growth of cities. Furthermore, students educated in civil engineering frequently find rewarding employment in other fields: for example, in aerospace structures, electric power generation, city planning, the process industries, industrial engineering, business management and law or medicine (after appropriate education in law or medical school). The breadth of the civil and urban engineering undergraduate program provides an excellent educational background for many fields of endeavor.

The curriculum is designed to give the student a broad knowledge of the basic and engineering sciences of chemistry, mathematics (including differential equations), physics, mechanics (including fluid mechanics and soil mechanics), electrical circuits, and thermodynamics. In addition, it includes a minimum of 24 semester hours in social-humanistic studies.

Specialized training is achieved through certain required courses, followed by advanced technical electives. By proper selection of these electives the senior student who wishes to specialize may emphasize any of the four major areas of civil engineering: structures, water resources, transportation, or geotechnical engineering.

A five-year program has been arranged for students who wish to pursue a B.S. degree in civil engineering and a B.S. degree in business.

A student interested in a premedical option should consult with an adviser and the department chairman at the earliest possible time in order to make proper plans for an acceptable program. See Premedical Option.
Curriculum for B.S. (Civil Engineering)

The minimum total number of hours for the degree is 136. A typical program is:

**FRESHMAN YEAR**

**Fall Semester**
- Math. 140. Analytic Geometry and Calculus I ........................................ 3
- Literature elective (see note 1) .................................................. 3
- E.E. 201. Introduction to Computing ........................................ 3
- C.E. 130. Introduction to Civil Engineering .................................. 2
- C.E. 221. Plane Surveying ....................................................... 2
- Engr. 101. Engineering Drawing .................................................. 2

Total: 16

**Spring Semester**
- Math. 241. Analytic Geometry and Calculus II .................................. 3
- Chem. 103. General Chemistry (or Ch.E. 210) .................................. 4-5
- Literature elective (see note 1) .................................................. 3
- Phys. 231. General Physics I ...................................................... 4
- Phys. 232. General Physics Lab. I .................................................. 1

Total: 15-16

**SOPHOMORE YEAR**

**Fall Semester**
- Math. 319. Applied Linear Algebra ............................................. 3
- Phys. 233. General Physics II .................................................... 4
- Phys. 234 General Physics Lab. II .................................................. 1
- Social-humanistic elective ......................................................... 3
- C.E. 212. Analytical Mechanics I .................................................. 3

Total: 17

**Spring Semester**
- Math. 320. Elementary Differential Equations .................................. 3
- Social-humanistic elective ......................................................... 3
- Basic science elective .............................................................. 2-3
- C.E. 312. Mechanics of Materials .................................................. 3
- Technical elective ................................................................. 3
- C.E. 314. Materials testing laboratory ........................................... 2

Total: 16-17

**JUNIOR YEAR**

**Fall Semester**
- C.E. 311. Analytical Mechanics II .................................................. 3
- C.E. 331. Theoretical Fluid Mechanics .......................................... 3
- C.E. 350. Structural Analysis ..................................................... 3
- C.E. 380. Soils and Foundation Engineering .................................... 3
- C.E. 315. Water Quality Laboratory (or C.E. 481) ................................ 2
- Intermediate Soil Mechanics) .................................................... 2
- Social-humanistic elective ......................................................... 3

Total: 17

**Spring Semester**
- C.E. 332. Applied Fluid Mechanics .................................................. 3
- C.E. 360. Transportation Engineering ............................................ 3
- C.E. 457. Design of Steel Structures (see note 4) ................................ 3
- Engr. 301. Thermodynamics ......................................................... 3
- C.E. 481. Intermediate Soil Mechanics (or C.E. 315. Water Quality Laboratory) .................................................. 2
- Social-humanistic elective ......................................................... 3

Total: 17

**SENIOR YEAR**

**Fall Semester**
- Geol. 207. Physical Geology I ..................................................... 4
- C.E. 458. Reinforced Concrete Design (see note 4) ................................ 3

**Electrical and Computer Engineering**

William D. Murray, Chairman

The professional possibilities in electrical engineering include teaching and research in a university; research and development of new electrical or electronic devices, instruments, or products; production and quality-control of electrical products for private industry or government; design or operations in the electrical power industry; and sales or management for a private firm or branch of government.

The electrical engineering course of study at UCD begins with principles of physics, chemistry, and mathematics. An early, intensive training in the theory and laboratory application of electrical circuits is followed by more fundamentals in electronics, electromagnetic and transmission theory, electrical machines and transformers, heat, and mechanics. Many students find an opportunity to put their knowledge to work with jobs in industry or research projects being conducted at the University. Throughout the entire course of study, they reinforce their understanding of the theory in well-equipped laboratories.

Students are encouraged to develop interests outside of their electrical engineering specialty, thus providing themselves with a well-rounded background and a sense of awareness and responsibility for their later role in society. They are urged to attend meetings of their student professional society, where practicing engineers from many engineering specialties speak of their experiences.

The areas of specialization that electrical engineering students may enter upon graduation are so numerous it is impossible for the undergraduate training to cover them in detail. Intense specialization may be left to possible additional training graduates may receive when they assume positions with industrial firms, or acquired by specialization in a research field through graduate work beyond the bachelor's degree. Students who have earned a B average or better in their undergraduate work and
who have elected courses in their senior year that strengthen particularly their mathematical background may decide to take additional graduate work. The curriculum in electrical engineering is designed to make it possible for the graduating senior with high scholarship to finish a master's degree in electrical engineering in about one additional full year of work at any of the nation's major universities.

Electrical Engineering Curriculum

In the electrical engineering curriculum the student has considerable freedom in the senior electives. The student may select these electives to provide a good foundation in several of the seven electrical engineering areas listed: communications, digital, electronics, fields, materials, power, and systems. Some of these electives may be courses in other branches of engineering or in other colleges. Those students primarily interested in taking courses in the digital or computer area may do so in this curriculum or in the joint electrical engineering and computer degree option discussed below.

Business Option

Students wishing to complete a B.S. degree in electrical engineering and a B.S. degree in business should not start the business program until their fourth year, with the exception of electing Econ 201 and 202 for two of their social-humanistic electives. Students with a B average may wish to consider obtaining a master's degree in business administration. For both of these programs, students should refer to the College of Engineering and Applied Science introductory section of this bulletin.

Pre-medical Option

A program has been developed which permits the student to satisfy the entrance requirements for medical school, such as those of the University of Colorado, while earning a B.S. in electrical engineering. Medical schools typically require that applicants have completed two semesters of general chemistry, two semesters of organic chemistry, and two semesters of general biology, all with laboratories. A course in English composition is recommended.

More specific information on medical school requirements may be obtained at the office of the Health Careers Advisory Committee at UCD.

Electrical Engineering and Computer Science

The joint degree in electrical engineering and computer science is a comprehensive program covering both hardware and software aspects of computer system design. The program leads to a B.S. (E.E. and C.S.) and can be a base for further study toward either an M.S. in computer science or an M.S. in electrical engineering. A student need not make a decision to enter this program until the second semester of the sophomore year. The details of the program are listed in the section following the electrical engineering curriculum. The purpose of the changes is to add to the mathematics background in such a way as to provide a basis for graduate work in computer-related fields and to permit inclusion of courses in scientific application of computers, logic structure of computers, and assembly language programming. The student also will obtain actual operating experience with the departmental computers. Should students leave the program in favor of returning to the electrical engineering curriculum, they will need to satisfy the departmental requirements of mechanics and E.E. 354, which have been waived in the electrical engineering computer option curriculum.

Curriculum for B.S. (Electrical Engineering)

The minimum total number of hours for the degree is 136. A typical program is:

<table>
<thead>
<tr>
<th>FRESHMAN YEAR</th>
<th>Semester Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fall Semester</td>
<td></td>
</tr>
<tr>
<td>Math. 140. Analytic Geometry and Calculus I</td>
<td>3</td>
</tr>
<tr>
<td>Chem. 103. General Chemistry (see note 2)</td>
<td>5</td>
</tr>
<tr>
<td>E.E. 130. Problems and Methods of Modern Electrical Engineering</td>
<td>2</td>
</tr>
<tr>
<td>E.E. 257. Logic Circuits</td>
<td>3</td>
</tr>
<tr>
<td>Social-humanistic elective (see note 1)</td>
<td>3</td>
</tr>
<tr>
<td>Total</td>
<td>16</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Spring Semester</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Math. 241. Analytic Geometry and Calculus II</td>
<td>3</td>
</tr>
<tr>
<td>Phys. 231. General Physics I</td>
<td>4</td>
</tr>
<tr>
<td>Phys. 232. General Physics Lab. I</td>
<td>1</td>
</tr>
<tr>
<td>Engr. 101 Engineering Drawing</td>
<td>2</td>
</tr>
<tr>
<td>Social-humanistic elective (see note 1)</td>
<td>3</td>
</tr>
<tr>
<td>Total</td>
<td>16</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>SOPHOMORE YEAR</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Fall Semester</td>
<td></td>
</tr>
<tr>
<td>Math. 242. Analytic Geometry and Calculus III</td>
<td>3</td>
</tr>
<tr>
<td>Phys. 233. General Physics II</td>
<td>4</td>
</tr>
<tr>
<td>General Physics Lab. II</td>
<td>1</td>
</tr>
<tr>
<td>E.E. 213. Circuit Analysis I</td>
<td>4</td>
</tr>
<tr>
<td>E.E. 253. Circuits Lab. I</td>
<td>1</td>
</tr>
<tr>
<td>Social-humanistic elective (see note 1)</td>
<td>3</td>
</tr>
<tr>
<td>Total</td>
<td>16</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Spring Semester</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Math. 319. Applied Linear Algebra</td>
<td>3</td>
</tr>
<tr>
<td>Math. 320. Elementary Differential Equations</td>
<td>3</td>
</tr>
<tr>
<td>C.E. 313. Applied Mechanics (see note 3)</td>
<td>3</td>
</tr>
<tr>
<td>E.E. 214. Circuit Analysis II</td>
<td>4</td>
</tr>
<tr>
<td>E.E. 254. Circuits Lab II</td>
<td>1</td>
</tr>
<tr>
<td>Social-humanistic elective (see note 1)</td>
<td>3</td>
</tr>
<tr>
<td>Total</td>
<td>17</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>JUNIOR YEAR</th>
<th></th>
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<tbody>
<tr>
<td>Fall Semester</td>
<td></td>
</tr>
<tr>
<td>E.E. 313. Electromagnetic Fields I</td>
<td>3</td>
</tr>
<tr>
<td>E.E. 321. Electronics I</td>
<td>3</td>
</tr>
<tr>
<td>E.E. 361. Electronics Lab. I</td>
<td>2</td>
</tr>
<tr>
<td>Engr. 301. Thermodynamics</td>
<td>3</td>
</tr>
<tr>
<td>E.E. 381. Introduction to Probability Theory</td>
<td>3</td>
</tr>
<tr>
<td>Social-humanistic elective (see note 1)</td>
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</tr>
<tr>
<td>Total</td>
<td>17</td>
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</tbody>
</table>
Spring Semester
E.E. 314. Electromagnetic Fields II ........................................ 3  
E.E. 322. Electronics II ................................................. 3  
E.E. 316. Energy Conversion I ............................................... 3  
E.E. 331. Linear System Theory ........................................... 3  
E.E. 362. Electronics Lab. I ............................................... 2  
Electives (see note 4) ...................................................... 4  
Total 18

Senior Year
Fall Semester
E.E. 354. Power Lab. I ..................................................... 2  
Electives (see note 4) ...................................................... 10  
Social-humanistic electives (see note 1) ................................ 6  
Total 18

Spring Semester
Electives (see note 4) ...................................................... 15  
Social-humanistic elective (see note 1) .................................. 3  
Total 18

Notes for B.S. (Electrical Engineering)

Students should refer to the section on Academic Policies of the College of Engineering and Applied Science in this bulletin. In addition to planning for sequences of courses based on prerequisites, students should plan to complete sophomore level courses before taking junior level courses and should have completed their junior level E.E. courses before starting their 400-level electives.

1. Of the 24 hours of required social-humanistic electives, a student must have a minimum of 6 hours in literature and a minimum of 6 hours in social science. The electrical engineering department does not require a sequence of two courses in one area.

2. Or Ch.E. 210.

3. The mechanical engineering requirement may be satisfied by the 3-hour course, C.E. 313, or the 6-hour sequences of either C.E. 212 and C.E. 311, or E. Phys. 221 and E. Phys. 332. Students who first take E.E. 313 may, with permission, take only C.E. 311.

4. The purpose of these electives is to allow the student to develop breadth in electrical engineering as well as to develop some depth in areas in which he is most likely to concentrate after graduation. Usually these courses will be taken in electrical engineering, mathematics, and physics at the 300, 400, or 500 levels. In all cases the student needs the approval of his undergraduate adviser.

Electrical engineering courses at the 400 and 500 levels are separated into the following seven areas: communications (C) digital (D), electronics (E), fields (F), materials (M), power (P), and systems (S). Seniors are free to elect courses from any of these areas but, in order to insure a minimum breadth of studies, every student's program must include 9 semester hours of electrical engineering theory courses in at least three areas and a minimum of three laboratory courses in three areas. These distribution requirements could be met through Independent Study, E.E. 940(1-3) or E.E. 950(1-3), only if the subject matter studied is actually in the appropriate area. Independent study may be used only once to satisfy part of the distribution requirements.

A 3-hour upper division course in physics must be included among the technical electives.

The student who has good grades and is interested in graduate work should take additional mathematics. Some preliminary consulting with a department graduate adviser is desirable.

Curriculum for B.S. in Electrical Engineering and Computer Science

The minimum total number of hours for the degree is 136. A typical program is:

Freshman Year

Fall Semester  
Math. 140. Analytic Geometry and Calculus I .................................. 3  
Chem. 103. General Chemistry (see note 2) .................................. 5

Spring Semester  
E.E. 130. Problems and Methods of Modern Electrical Engineering .......... 2  
E.E. 257. Logic Circuits .................................................. 3  
Social-humanistic electives (see note 1) .................................. 3  
Total 16

Fall Semester  
Math. 241. Analytic Geometry and Calculus II .................................. 3  
Phys. 231. General Physics I ................................................ 4  
Phys. 232. General Physics Lab. II ........................................... 1  
Engr. 101. Engineering Drawing ............................................... 2  
Social-humanistic electives (see note 1) .................................. 3  
Total 16

Sophomore Year

Fall Semester  
Phys. 233. General Physics II ............................................... 4  
Phys. 234. General Physics Lab. II ........................................... 1  
E.E. 213. Circuit Analysis I .................................................. 4  
E.E. 253. Circuits Lab. I ..................................................... 1  
Social-humanistic electives (see note 1) .................................. 3  
Total 17

Junior Year

Fall Semester  
E.E. 313. Electromagnetic Fields I ........................................... 3  
E.E. 321. Electronics I ...................................................... 3  
E.E. 361. Electronics Lab. I .................................................. 2  
E.E. 381. Introduction to Probability ....................................... 3  
Engr. 301. Thermodynamics .................................................. 3  
E.E. 458. Logic Lab. ......................................................... 1  
E.E. 401. Survey of Programming Languages .................................. 3  
Total 18

Spring Semester  
E.E. 314. Electromagnetic Fields II ......................................... 3  
E.E. 322. Electronics II .................................................... 3  
E.E. 362. Electronics Laboratory II ......................................... 2  
E.E. 316. Energy Conversion I ................................................. 3  
E.E. 331. Linear System Theory ............................................. 3  
Social-humanistic elective (see note 1) .................................. 3  
Total 17

Senior Year

Fall Semester  
E.E. 422. Electronics III .................................................... 3  
E.E. 459. Computer Organization ............................................. 3  
Math. 465. Numerical Analysis (see note 5) .................................. 3  
Social-humanistic elective (see note 1) .................................. 3  
Electives (see note 4) ...................................................... 6  
Total 18

Spring Semester  
E.E. 460. Computer Lab. ...................................................... 1  
E.E. 559. Advanced Computer Architecture or  
E.E. 551. Hardware Software Interface  
(recommended, not required) .................................................. 3  
Social-humanistic elective (see note 1) .................................. 6  
Electives (see note 4) ...................................................... 8  
Total 18
Notes for B.S. in Electrical Engineering and Computer Science

Students should refer to the section on Academic Policies of the College of Engineering and Applied Science in this bulletin. In planning their programs, students should consider prerequisite and corequisite requirements of courses and should plan to complete courses at the junior level before taking senior electives.

1. Of the 24 hours of social-humanistic electives a student must have a minimum of 6 hours in literature and a minimum of 6 hours in social sciences. The electrical engineering department does not require a sequence of two courses in one area.
2. Or Ch.E. 210.
3. Or equivalent mathematics substitution with approval of adviser.
4. The purpose of these electives is to allow the student to develop some breadth in electrical engineering as well as to develop some depth in areas in which he is most likely to concentrate after graduation. Usually these courses will be taken in electrical engineering, mathematics, and physics at the 300, 400, or 500 levels. In all cases the student needs the approval of his undergraduate adviser.

Electrical engineering courses at the 400 and 500 levels are separated into the following seven areas: communication (C), digital (D), electronics (E), fields (F), materials (M), power (P), and systems (S). Seniors are free to elect courses from any of these areas, but in order to insure a minimum breadth of studies, every student's program must include at least 9 semester hours of electrical engineering theory courses in at least three areas and a minimum of three laboratory courses in three areas. These distribution requirements could be met through E.E. 400 (1 to 3), and E.E. 500 (1 to 3), shown in each area, only if the subject matter studied is actually in the appropriate area. E.E. 400 (1 to 3) and E.E. 500 (1 to 3) may be used only once to satisfy part of the distribution requirements.

A 3-hour upper division course in physics must be included among the electives.

The student who has good grades and is interested in graduate work should take additional mathematics. Some preliminary consulting with a departmental graduate adviser is desirable.

5. E.E. 455, Computer Techniques in Engineering, may be substituted.

ENGINEERING DESIGN AND ECONOMIC EVALUATION

In the fall of 1978, the Engineering Design and Economic Evaluation program was merged with the Department of Mechanical Engineering. The E.D.E.E. degree will not be offered to new students. However, courses in design and economic evaluation have been retained and are administered through the Department of Mechanical Engineering.

ENGINEERING PHYSICS

William R. Simmons, Coordinator

The engineering physics curriculum gives students a thorough foundation in the physical principles underlying most of engineering. The large number of engineering electives which may be incorporated in the curriculum makes it possible for the student to prepare himself for professional work or graduate school in a wide variety of fields. Because the program is particularly flexible, the student should be aware that proper preparation for his professional field will require careful selection of his engineering electives. The student is urged to prepare, in consultation with the departmental coordinator, a coherent plan of courses to meet his professional objectives.

During the freshman and sophomore years, the student must attain a thorough training in mathematics and a grounding in fundamental methods and principles of the physical sciences.

During the junior and senior years the work in physics is amplified to provide a comprehensive knowledge of the various branches of physics such as nuclear physics, atomic physics, electronics, thermodynamics, mechanics, electricity, and magnetism. Individual initiative and resourcefulness are stressed. For purposes of federal Civil Service requirements this degree is an engineering degree from an accredited College of Engineering. Students who plan to become registered professional engineers should check the requirements for registration in their state before choosing their engineering electives.

It is recommended that students preparing for Graduate School also prepare for its foreign language requirement as part of their undergraduate curriculum.

At present, the Bachelor of Science degree in engineering physics is awarded on the Boulder Campus only; therefore, in order to earn a bachelor's degree in engineering physics from the Department of Physics and Astrophysics a student must, in addition to any other requirements, successfully complete 30 semester hours of courses on the Boulder Campus, including 12 semester hours in upper division physics courses.

Applied Physics Option

It is also possible to earn the degree Bachelor of Science (Engineering Physics) with an applied physics option. This option differs from the regular engineering physics degree primarily in that fewer advanced theoretical physics courses are required and in their place a selection of applied science courses is required. This option should not be selected by students intending to pursue graduate study in physics, but it is appropriate for students intending to pursue graduate work or employment in related fields such as geophysics, environmental science, oceanography, nuclear engineering, medicine, and law. Students intending to pursue this option should consult the coordinator by the beginning of their junior year regarding the electives which they wish to propose. The 24 hours of electives in pure or applied natural science must be approved by the engineering physics advising committee, which is located on the Boulder Campus. The committee will consider the proposed courses relative to the student's stated educational and/or professional objectives. At least 30 semester hours of credit must be earned after the student's proposed program is approved.

Curriculum for B.S. (Engineering Physics)

The minimum total number of hours for the degree is 136. Approved ROTC courses may be substituted for a maximum of 6 hours of electives. A typical program is:

FRESHMAN YEAR

<table>
<thead>
<tr>
<th>Semester Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fall Semester</td>
</tr>
<tr>
<td>Math. 140. Analytic Geometry and Calculus 1</td>
</tr>
<tr>
<td>Engr. 101. Engineering Drawing</td>
</tr>
<tr>
<td>Social-humanistic elective (see note 1)</td>
</tr>
<tr>
<td>E.Phys. 111. General Physics (see note 8)</td>
</tr>
<tr>
<td><strong>Total</strong></td>
</tr>
</tbody>
</table>
**Spring Semester**

Math. 241. Analytic Geometry and Calculus II ........................................... 3  
Social-humanistic elective (see note 1) ............................................. 3  
Phys. 112. General Physics (see note 8) ............................................. 4  
Phys. 114. Experimental Physics (see note 8) ..................................... 1  
C.S. 210. Fundamentals of Computing ............................................... 3  
Elective (see note 2) ........................................................................... 3  

**Total** 17

**Sophomore Year**

**Fall Semester**

Social-humanistic elective (see note 1) ............................................. 3  
Phys. 213. General Physics (see note 8) ............................................. 3  
Phys. 215. Experimental Physics (see note 8) ..................................... 1  
Elective (see note 2) ........................................................................... 3  
Math. 319. Applied Linear Algebra ..................................................... 3  

**Total** 16

**Spring Semester**

Math. 320. Elementary Differential Equations ....................................... 3  
Chem. 202. General Chemistry (see note 3) ......................................... 4  
Social-humanistic elective (see note 1) ............................................. 3  
Phys. 214. Introductory Modern Physics (see note 8) ............................ 3  
Elective (see note 2) ........................................................................... 5  

**Total** 18

**Junior Year**

**Fall Semester**

Upper division mathematics elective ..................................................... 3  
Phys. 317. Junior Lab. ........................................................................ 2  
Phys. 322. Classical Mechanics and Relativity ....................................... 4  
Phys. 331. Principles of Electricity and Magnetism ............................... 3  
Elective (see note 2) ........................................................................... 3  
Social-humanistic elective (see note 1) ............................................. 3  

**Total** 18

**Spring Semester**

Phys. 318. Junior Lab. ........................................................................ 2  
Phys. 322. Classical Mechanics, Relativity, and Quantum Mechanics .......... 3  
Phys. 332. Principles of Electricity and Magnetism ............................... 3  
Phys. 341. Thermodynamics and Statistical Mechanics ....................... 3  
Chem. 453. Physical Chemistry (see note 4) ....................................... 3  
Chem. 454. Physical Chemistry Laboratory (see note 4) ....................... 2  

**Total** 16

**Senior Year**

**Fall Semester**

E. E. 403. Electronics (see note 6) .................................................. 2  
E. E. 443. Electives of Electronics Lab. (see note 6) ............................. 1  
Social-humanistic elective (see note 1) ............................................. 3  
Electives (see note 7) ........................................................................ 12  

**Total** 18

**Spring Semester**

Social-humanistic elective (see note 1) ............................................. 3  
Electives (see note 7) ........................................................................ 15  

**Total** 18

**Notes for B.S.**

(Engineering Physics)

1. A total of 24 hours of social-humanistic electives is required. These must include 6 hours of literature and 6 hours selected from economics, sociology, political science, history, and anthropology. The other 12 hours must be selected from the above subjects and/or fine arts and music (critical or historical only), philosophy, and psychology.

2. Required and elective engineering courses (excluding mathematics and physics) must total 22 semester hours.

3. Chem. 202 is offered only at the Boulder Campus. UCD students may substitute Chem. 103 and 106 for Chem. 202.

4. Chem. 453 and 454 are offered only at the Boulder Campus. One semester of any upper division chemistry course with associated laboratory may be substituted for physical chemistry.

5. Or Phys. 455, or approved 3-hour physics elective.

6. E. E. 403 and 453 are offered only at the Boulder Campus. UCD students may substitute E. E. 321 and 311.

7. The elective courses are divided into three exclusive groups: (1) Electives of physics. These must be five hours from among Phys. 318, 341, 361, 365, 366, 367, 446, 451, 455, 461, 462, 491, 492, 495, 496, 500, 501, 503, 504, and 580. (2) Applied natural science electives (24 semester hours, minimum). These must include 4 hours of upper-division laboratory courses and sufficient engineering courses so that the total of engineering courses (excluding mathematics and physics) is at least 22 semester hours. (3) Other courses.

8. See the E. Phys. coordinator.

**MECHANICAL ENGINEERING**

Ralph C. Koeller, Associate Chairman

Mechanical engineering is perhaps the broadest in scope of all the engineering fields. It is not identified with or restricted to a particular technology, vehicle, device, or system; rather, it is concerned with all such subjects, both individually and collectively.

In an era when technology is changing rapidly, the education of an engineer must provide a base for working in fields which may now not exist. The objective of the undergraduate program in mechanical engineering is to give the student a broad intellectual horizon and such habits and skills of study that learning new science as it
appears and taking the initiative in applying it will be second nature.

There can be only one firm foundation for the student preparing for a career in mechanical engineering: mathematics, physics, and chemistry are the basic ingredients. Also essential is mastery of such engineering sciences as solid and fluid mechanics; thermodynamics, and heat and mass transport; materials, and systems analysis and controls. Along with the study of these fundamentals, the engineer must experience the ways in which scientific knowledge can be put to use in the development and design of useful devices and processes.

The mechanical engineering program may be roughly subdivided into two-year groupings. In the first two years, the program emphasizes the fundamentals of those engineering sciences that are essential for an understanding of most branches of professional engineering. For the final two years, the department, in recognition of the extremely broad and varied demands which the advances of modern technology have imposed on the mechanical engineer, provides two plans, A and B, for the curriculum leading to the degree Bachelor of Science in mechanical engineering. The plans are designed to accommodate the professional objectives of the individual student.

Plan A specifies a typical mechanical engineering curriculum and is intended for those students who wish to obtain a broad, general education in mechanical engineering without an emphasis on any of the specific professional aspects.

Plan B is designed for students who know what they intend to do upon graduation. This option allows the student to pursue any course plan that meets a valid professional objective and has been approved by the advisory committee. Under Plan B, the specific requirements of the program are determined after a detailed conference with an appropriate departmental adviser. In the course of this conference, the professional objectives of the individual student are studied in detail, and a specific plan (with a minimum of 136 credit hours) is designed to meet these objectives. With liberal use of courses throughout the University, the following may be considered typical among the professional concentrations which can be achieved:

| Thermodynamics | Design          |
| Heat transfer   | Power           |
| Fluid mechanics | Dynamics and controls |
| Solid mechanics | Materials science |
| Electromechanical systems | Thermomechanical systems |

All of the required courses for mechanical engineering plan A are offered at UCD. Plans are to expand the number of elective courses for plans A and B in the near future. Students should work closely with their mechanical engineering adviser as they may have to complete some courses in Boulder depending upon their study plan and the phasing in of the complete program at UCD.

Curriculum for B.S. (Mechanical Engineering)

The minimum total number of hours for the degree is 136. A typical program is:

### Fall Semester

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Engl. 258</td>
<td>Great Books (see note 1)</td>
</tr>
<tr>
<td>M.E. 130</td>
<td>Introduction to Mechanical Engineering</td>
</tr>
<tr>
<td>Math. 140</td>
<td>Analytic Geometry and Calculus I</td>
</tr>
<tr>
<td>E.E. 210</td>
<td>Fundamentals of Computing</td>
</tr>
<tr>
<td>Chem. 103</td>
<td>General Chemistry (see note 2)</td>
</tr>
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</table>

**Total** 16

### Spring Semester

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Engl. 259</td>
<td>Great Books II (see note 1)</td>
</tr>
<tr>
<td>Phys. 231</td>
<td>General Physics I</td>
</tr>
<tr>
<td>Phys. 232</td>
<td>General Physics Lab. I</td>
</tr>
<tr>
<td>Math. 241</td>
<td>Analytic Geometry and Calculus II</td>
</tr>
<tr>
<td>Engr. 101</td>
<td>Engineering Drawing</td>
</tr>
<tr>
<td>Social-humanistic elective</td>
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**Total** 16

### Sophomore Year

#### Fall Semester

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Description</th>
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</thead>
<tbody>
<tr>
<td>M.E. 281</td>
<td>Mechanics I (see note 3)</td>
</tr>
<tr>
<td>Engl. 260</td>
<td>Great Books III (see note 1)</td>
</tr>
<tr>
<td>Phys. 233</td>
<td>General Physics II</td>
</tr>
<tr>
<td>Math. 242</td>
<td>Analytic Geometry and Calculus III</td>
</tr>
<tr>
<td>Math. 319</td>
<td>Applied Linear Algebra</td>
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**Total** 17

#### Spring Semester

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>M.E. 282</td>
<td>Mechanics II (see note 3)</td>
</tr>
<tr>
<td>Engl. 261</td>
<td>Great Books IV (see note 1)</td>
</tr>
<tr>
<td>Math. 320</td>
<td>Elementary Differential Equations</td>
</tr>
<tr>
<td>Engr. 301</td>
<td>Thermodynamics</td>
</tr>
<tr>
<td>Social-humanistic elective</td>
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</tr>
</tbody>
</table>

**Total** 18

### Junior Year

#### Fall Semester

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>M.E. 312</td>
<td>Thermodynamics II</td>
</tr>
<tr>
<td>M.E. 314</td>
<td>Measurements I</td>
</tr>
<tr>
<td>M.E. 362</td>
<td>Heat Transfer</td>
</tr>
<tr>
<td>M.E. 371</td>
<td>Systems Analysis I (see note 4)</td>
</tr>
<tr>
<td>M.E. 383</td>
<td>Mechanics III</td>
</tr>
<tr>
<td>Social-humanistic elective</td>
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</table>

**Total** 17

#### Spring Semester

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>M.E. 301</td>
<td>Introduction to Materials Science I</td>
</tr>
<tr>
<td>M.E. 316</td>
<td>Measurements II</td>
</tr>
<tr>
<td>M.E. 372</td>
<td>Systems Analysis II (see note 4)</td>
</tr>
<tr>
<td>M.E. 384</td>
<td>Mechanics IV</td>
</tr>
<tr>
<td>M.E. 385</td>
<td>Mechanics V</td>
</tr>
<tr>
<td>Technical elective</td>
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**Total** 18

### Senior Year

#### Fall Semester

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Description</th>
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</thead>
<tbody>
<tr>
<td>M.E. 442</td>
<td>Mechanical Engineering Lab.</td>
</tr>
<tr>
<td>M.E. 414</td>
<td>Mechanical Engineering Design</td>
</tr>
<tr>
<td>M.E. 401</td>
<td>Introduction to Materials Science II</td>
</tr>
<tr>
<td>Technical elective</td>
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<tr>
<td>Free elective</td>
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**Total** 18

#### Spring Semester

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Social-humanistic elective</td>
<td></td>
</tr>
<tr>
<td>Technical electives</td>
<td></td>
</tr>
</tbody>
</table>

**Total** 15
Notes for B.S.
(Mechanical Engineering)

1. Or other English options; see the English listings in the Course Description section of this bulletin.
2. Or Ch. E. 210.

3. M.E. 281 and M.E. 282 are offered only on the Boulder Campus. UCD students may substitute C.E. 212 and C.E. 311 for M.E. 281 and M.E. 282.
4. M.E. 371 and M.E. 372 are offered only on the Boulder Campus. UCD students may substitute E.E. 213 and E.E. 413 for M.E. 371 and M.E. 372.
INFORMATION ABOUT THE COLLEGE

The College of Environmental Design at UCD offers five graduate programs: the Master of Architecture, Master of Architecture in Urban Design, Master of Interior Design—Interior Architecture and Space Planning, Master of Landscape Architecture, and Master of Planning and Community Development; and one service program, the Center for Community Development and Design. Undergraduate programs in the College are available only through the University of Colorado at Boulder, and students interested in the Bachelor of Environmental Design degree should see the catalog for that campus.

The College offers programs designed both to train men and women who can meet the complex and demanding challenge of developing and shaping the environment and to provide the practicing professional a means of keeping abreast of cultural and technological changes.

In recent years, the roles and responsibilities of the environmental design professions have broadened. The social and physical problems encountered by the architect, urban designer, the landscape architect, the urban and regional planner, the technologist in environmental systems, and the interior designer have minimized the lines of demarcation among these professions and interdependence among them has increased.

The College maintains traditional and essential ties with the professions and practitioners in the community and through the Division of Continuing Education offers workshops for architects in solar architecture, seismic design, and business development and law. The College participates in faculty interchanges with the Boulder campus, participates in the architectural engineering program of the College of Engineering and Applied Science, and relies on local professionals to buttress its teaching program.

The College of Environmental Design is a member of the Association of Collegiate Schools of Architecture and is represented by its students, faculty, and alumni on various professional boards, committees, and societies. In 1978, the National Architectural Accrediting Board renewed the College's accreditation for the regular five-year period. Its program in urban and regional planning was granted recognition by the American Planning Association in 1975 for a five-year period.

Full professional status in most environmental design fields requires a minimum of five or six years of academic experience and two or three years of practical experience followed by state registration or licensing through a professional examination.

Qualifications for success in these careers are not easily measured. Candidates for this profession must have the ability to complete successfully an academic program ranging from fundamental humanistic and scientific courses through applied technical activity to full creative development. They should have a background of secondary education that includes courses in mathematics and physics. Some experience in creative activity may aid them in predetermining their personal satisfaction from the creative process.

Financial Aid

Graduate scholarships and fellowships are available to continuing students only, with the exception of Colorado Grants. A limited number of Colorado Grants are available to new students who are residents of the State of Colorado and who fulfill the University's criteria for financial need. Forms to apply for State of Colorado Graduate Grants, Federal Work-Study Assistance, and Federal National Direct Student Loans (NDSL), are available through the Office of Financial Aid, UCD, 1100 14th Street, Denver 80202.

Grade-Point Average Requirement and Scholastic Suspension

Students must maintain a 3.0 average for a degree. Students who fail to meet the minimum requirements during any semester will be permitted to continue their studies during the second semester, but will be placed on probation. Students who fail to meet the minimum requirement after two semesters will be suspended. After a period of one year, appeal for readmission may be made by petitioning the Scholastic Deficiency Committee of the College or the director.

MASTER OF ARCHITECTURE

The Division of Architecture offers three degree programs, all of which lead to the Master of Architecture. The three programs are named by typical time-in-residence: three-year, two-year, and one-year programs. The three- and two-year programs lead to the first professional degree for architectural practice; the one-
year program leads to a second professional degree.

The one-year program is open only to applicants already holding the first professional degree in architecture (generally the bachelor's, occasionally the master's). Individually organized studies are focused on the student's interests in architecture or in architecture with an urban design specialization.

The two-year program is open to holders of the Bachelor of Environmental Design or Architectural Studies degree and is arranged to receive graduates of the Division of Environmental Design at Boulder or similar undergraduate studies at other schools.

The three-year program is open to holders of the bachelor's degree in all other fields.

Curriculum

The Division of Architecture is a professional school; its role and purpose is the education of men and women who wish to design buildings. The division provides studies in architectural design, graphic communications, history and theory, technology, and professional practice.

Architectural design is the central activity of the several programs and the design studio serves to integrate architectural learning from all course work in the supportive arts and sciences. Most studios are conducted on the case study method; skill in the definition and the solution of design problems is acquired through the analysis and the working of exercises which simulate actual building problems. Advanced studio options are available with projects in the Community Center for Development and Design. The design thesis is the culmination of architectural studies.

Communications courses provide the graphic skills necessary to present design ideas. History and theory courses anchor the student's work in social responsibility, and in an understanding of the forces that give shape to buildings and cities. Technology courses give basics in structures, and in the environmental concerns of utilities, heating, lighting, and acoustics. Professional courses provide exposure to the workings of contemporary practice, and an internship in a practicing professional's office is a course option in the final year.

The goal of all of these studies is competency for the graduates of the division as intelligent, knowledgeable, and creative designers, each at the threshold of entry to architectural careers in private practice, government, or industry.

Admission Requirements

APPLICATION

The complete set of materials for application for the Master of Architecture programs include the application form, college transcripts, three recommendations, statement of purpose, and a portfolio of academic and professional work. To be considered for admission, the complete set of application materials must be received by March 15 preceding the fall semester of entry. The portfolio must be no larger than 14 inches by 17 inches. The application form and addition information may be obtained by writing to the Director of Architecture, University of Colorado at Denver, 1100 14th Street, Denver, Colorado 80202.

Applicants must hold a Bachelor of Arts, Bachelor of Fine Arts, or Bachelor of Science degree from an accredited four-year college or university to be accepted into the three-year Master of Architecture program. A four-year degree in architecture or environmental design from an accredited college or university is required for acceptance into the two-year program. A Bachelor or Master of Architecture degree from an accredited architecture program is required for acceptance into the one-year master's program. A student in the fourth year of the University of Colorado architectural engineering program may enter the first year of the three-year program and qualifications based upon the course work taken previously and upon academic performance. However, a student in this program must still apply and be accepted into the Master of Architecture program and must have completed all requirements for the Bachelor of Science degree in architectural engineering before entry into the second year of the program.

ADMISSION

An Admissions Committee will review the application materials and select students to be admitted to programs. Applicants will be notified that they have been accepted, are on a waiting list, or have not been accepted, prior to May 1.

The recommended minimum grade-point average is 2.75 on a 4-point scale. If the student's grade-point average is below 2.75, the Graduate Record Examination is recommended as part of the application materials. The student, however, will be evaluated for admission on the basis of all the application materials and not the grade-point average alone.

One-Year Program

The one-year program is available only to students already holding the first professional degree, the Bachelor or Master of Architecture. The Master of Architecture or Master of Architecture in Urban Design is awarded upon satisfactory completion of 32 semester hours of courses and special projects arranged for the particular candidate's program. The candidate and the adviser mutually develop the course of study through selection of offerings in the College of Environmental Design and other divisions of the University. The program is primarily research oriented, and students are allowed to pursue independently an area of their choice related to architecture.

Two-Year Program

The two-year program is open to the student with a four-year Bachelor of Environmental Design or Architectural Studies degree who seeks the first professional degree in architecture. The program is a two-year, 64-semester-hour series of studies leading to the Master of Architecture degree.

Students in the third or fourth year of the University of
Colorado Environmental Design degree program who intend to pursue the Master of Architecture should take Structures (Arch. 452 and 453), Environmental Systems (Arch. 450), Materials and Methods of Construction (Arch. 451), Architectural History (Arch. 470 and 471), and Architectural Graphics (Arch. 410 and 411), and a minimum of six semesters of Design (including Arch. 400 and 401). Students who have not completed these courses previous to entry will be asked to complete them while in the program. Students from other four-year design programs must have taken two semesters of architectural history, two semesters of basic structures (statics, strength of materials) and must show, with the portfolio, a graphics ability equivalent to the two-semester course in architectural graphics. Required courses in the two-year program that have been taken by the student in prior studies may be waived if the grade received is B or above. The Master of Architecture is awarded upon satisfactory completion of 64 semester hours and all required courses.

**Two-Year Program**

<table>
<thead>
<tr>
<th>Course Requirements</th>
<th>Semester Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>Architectural design</td>
<td>24</td>
</tr>
<tr>
<td>Technologies</td>
<td>15</td>
</tr>
<tr>
<td>Theory</td>
<td>3</td>
</tr>
<tr>
<td>Professional practice and construction documents</td>
<td>4</td>
</tr>
<tr>
<td>Landscape architecture</td>
<td>3</td>
</tr>
<tr>
<td>Planning</td>
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<tr>
<td>Electives</td>
<td>12</td>
</tr>
<tr>
<td>Total</td>
<td>64</td>
</tr>
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</table>

**Three-Year Program**

The three-year program is open to students with a Bachelor of Arts or Bachelor of Science degree, with a particular program prerequisite of one year of high school or college basic physics and college mathematics through calculus. The mathematics and physics requirement must be completed before entering the program. The Master of Architecture is awarded upon satisfactory completion of 96 semester hours and all required courses.

<table>
<thead>
<tr>
<th>Three-Year Course Requirements</th>
<th>Semester Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>Architectural design</td>
<td>34</td>
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<tr>
<td>Technologies</td>
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<tr>
<td>Theory</td>
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<tr>
<td>Graphic communications</td>
<td>6</td>
</tr>
<tr>
<td>Professional practice and construction documents</td>
<td>4</td>
</tr>
<tr>
<td>Landscape architecture</td>
<td>3</td>
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<tr>
<td>Planning</td>
<td>3</td>
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<tr>
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<td>Total</td>
<td>96</td>
</tr>
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**Recommended Order of Studies**

**Two-Year Program: 600 and 700 levels**

**Three-Year Program: 500, 600, and 700 levels**

**Fall Semester: 500 level**

<table>
<thead>
<tr>
<th>Course</th>
<th>Semester Hours</th>
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</thead>
<tbody>
<tr>
<td>Arch. 500. Design</td>
<td>5</td>
</tr>
<tr>
<td>L.A. 510. Graphics I</td>
<td>3</td>
</tr>
<tr>
<td>Arch. 551. Materials and Construction</td>
<td>3</td>
</tr>
<tr>
<td>Arch. 552. Structures I</td>
<td>3</td>
</tr>
<tr>
<td>U.P.C.D. 570. Development of Environmental Form</td>
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**Spring Semester: 500 level**

<table>
<thead>
<tr>
<th>Course</th>
<th>Semester Hours</th>
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<tbody>
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<td>5</td>
</tr>
<tr>
<td>L.A. 511. Graphics II</td>
<td>3</td>
</tr>
<tr>
<td>Arch. 550. Environmental Systems</td>
<td>3</td>
</tr>
<tr>
<td>Arch. 553. Structures II</td>
<td>3</td>
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<tr>
<td>Arch. 571. History/Philosophy</td>
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**Fall Semester: 600 level**

<table>
<thead>
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<th>Course</th>
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<td>Arch. 600. Design</td>
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<tr>
<td>Arch. 650. Heating and Plumbing</td>
<td>3</td>
</tr>
<tr>
<td>Arch. 660. Structures III</td>
<td>3</td>
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<tr>
<td>L.A. 630. Survey of Landscape Architecture</td>
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</table>

**Spring Semester: 600 level**

<table>
<thead>
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<td>Arch. 601. Design</td>
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<tr>
<td>Arch. 651. Lighting and Acoustics</td>
<td>3</td>
</tr>
<tr>
<td>Arch. 666. Structures IV</td>
<td>3</td>
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<tr>
<td>Arch. 660. Professional Practice and Construction Documents</td>
<td>4</td>
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<tr>
<td>Arch. 680. Theory and Practice or Arch. 670. Designer Philosophies or U.D. 682. Architectural and Urban Design Theory</td>
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**Fall Semester: 700 level**

<table>
<thead>
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<th>Course</th>
<th>Semester Hours</th>
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<tbody>
<tr>
<td>Arch. 700. Design</td>
<td>5</td>
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<tr>
<td>Arch. 712. Thesis Preparation</td>
<td>2</td>
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<tr>
<td>Arch. 750. Systems Synthesis</td>
<td>3</td>
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<td>Arch. 760. Internship (Optional)</td>
<td>3</td>
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**Spring Semester: 700 level**

<table>
<thead>
<tr>
<th>Course</th>
<th>Semester Hours</th>
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</thead>
<tbody>
<tr>
<td>Arch. 701. Design Thesis</td>
<td>7</td>
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<tr>
<td>Arch. 761. Internship (Optional)</td>
<td>3</td>
</tr>
<tr>
<td>Elective</td>
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</tr>
</tbody>
</table>

**Master of Architecture in Urban Design**

**Program Options and Descriptions**

Urban design is one of the graduate environmental design programs taught at facilities which are located within two urban renewal projects in the core of the metropolitan Denver area. The curriculum focuses on the complex problems that are generated by change and growth in a vigorous urban and regional laboratory. Emphasis is given to participatory community and publicly funded design, research, and technology. Special efforts are made to utilize the vast resources of information available from federal, state, and local agencies and institutions which are concentrated in the immediate community. Specific courses and projects attempt to incorporate these allied academic, civic, and citizen inputs into the design processes.

The sequential format, content, and progression of the Architecture in Urban Design program has been developed to provide a broad range of balanced study which combines architecture, landscape, planning, and urban design methodologies. Direct contact and coordination with the activities of the students and faculty in these disciplines is an essential part of the curriculum. Importance is given to the problem-solving processes associated with mixed use complexes, neighborhood, activity center, village, town, and cityscape projects.

Specific courses in urban technologies, urban theories,
environmental impact analysis, and social and economic factors are available. During the final semester students have a wide choice of professional electives which can be closely related to their thesis problem selection.

Two sequences are available in the program. One is a non-prelicensing two-year graduate degree for students who have received a bachelor's degree in environmental design, landscape, architectural studies, planning, or urban studies. The one-year program is for students who have obtained a five-year Bachelor of Architecture degree.

In both sequences the final master's year is a synthesis of the special factors influencing urban design in one of five options: recreational facilities, community development, rehabilitation or renewal, transportation, and health care. In this phase the student is carefully advised throughout the period of his independent research and design studies. Opportunities to do state and city outreach work in association with the Center for Community Development and Design (the College statewide design aid field program for ethnic and economic minorities) are available. Many other real problems and case studies from the community, which require anticipatory and feasibility design and development, also are considered. Whenever possible, individual or team projects in cooperation with allied disciplines and institutions are encouraged.

Admission Requirements

In order for students to be considered for admission into the graduate program, they must submit application forms, college transcripts, three letters of recommendation, statement of purpose, and a portfolio of academic and professional work by March 15 preceding the fall semester they wish to enter. All portfolio material submitted with the application must be in 8½" by 14" format or smaller. If slides are included, they must be in a looseleaf slide holder. It is recommended that students indicate the type and length of all work experience they have had since receiving a degree. Application forms and information may be obtained by writing to the Director of Master of Architecture in Urban Design, College of Environmental Design, University of Colorado at Denver, 1100 14th Street, Denver, Colorado 80202.

Curriculum Outline

In both sequences the studio is the focal point for the specialization selected by the student. The projects chosen are developed on an independent study basis with meetings, seminars, and evaluations scheduled between the student and the faculty advisers. Cognate courses are selected with the guidance of the faculty advisers from related subjects offered by the College or other units of the University.

One-Year Program

A one-year program leading to the Master of Architecture in Urban Design degree is available to students holding a first professional degree in architecture. The degree is awarded upon satisfactory completion of 30 semester credit hours. The program is for students who wish to pursue advanced studies in compound, complex community architecture and urban design problems.

<table>
<thead>
<tr>
<th>Course Sequence</th>
<th>Semester Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>Urban Design Studio</td>
<td>5</td>
</tr>
<tr>
<td>Thesis Preparation</td>
<td>1</td>
</tr>
<tr>
<td>Environmental Analysis</td>
<td>3</td>
</tr>
<tr>
<td>Planning, Landscape Electives</td>
<td>6</td>
</tr>
<tr>
<td>Thesis Studio</td>
<td>6</td>
</tr>
<tr>
<td>Urban Design Seminar</td>
<td>3</td>
</tr>
<tr>
<td>Professional Electives</td>
<td>6</td>
</tr>
</tbody>
</table>

Two-Year Sequence

A two-year non-prelicensing program leading to a Master of Architecture in Urban Design degree is available to students holding a first degree in political science, environmental design, landscape architecture, urban studies, and planning. The degree is awarded upon satisfactory completion of 60 semester credit hours. The program is for students who wish to pursue graduate studies in multidiscipline design problems and processes which are evolving throughout the urban environment.

First Year

<table>
<thead>
<tr>
<th>Course Sequence</th>
<th>Semester Hours</th>
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<tbody>
<tr>
<td>Urban Design and Graphics Workshop</td>
<td>3</td>
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<tr>
<td>Design History Philosophy</td>
<td>3</td>
</tr>
<tr>
<td>Urban Design Systems and Management</td>
<td>3</td>
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<tr>
<td>Professional Electives</td>
<td>6</td>
</tr>
<tr>
<td>Urban Design Studio</td>
<td>5</td>
</tr>
<tr>
<td>Design History Philosophy</td>
<td>3</td>
</tr>
<tr>
<td>Environmental Systems</td>
<td>3</td>
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<tr>
<td>Transportation Systems</td>
<td>4</td>
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<tr>
<td></td>
<td>15</td>
</tr>
</tbody>
</table>

Second Year

See One-Year Sequence | 30 |

MASTER OF INTERIOR DESIGN—INTERIOR ARCHITECTURE AND SPACE PLANNING

The Master of Interior Design program is structured to educate designers who will be qualified to assume responsible leadership roles in the continuing growth of the profession and in the improvement of the quality of man's near environment by constructively relating the design process to man's life process.

There are two programs leading to the Master of Interior Design degree. The two-year program is open to applicants holding Bachelor of Interior Design, Bachelor
of Environmental Design, or Bachelor of Architecture degrees. The three-year program is designed for applicants holding bachelor's degrees in other fields from accredited four-year colleges or universities.

The program is characteristically different from more traditional programs in the following ways:

**Multidisciplinary Approach.** Individualized instruction and guidance are provided in skills and knowledge that are integrated from related disciplines. Accordingly, the student develops personal models and methodologies within a multidisciplinary conceptual framework for the analysis, design, and evaluation of appropriate interior environments.

**Interior Architecture and Space Planning Orientation.** The program relies heavily upon the conviction that the design of an interior space and the building form containing it are inextricably related. The former inwardly responding to the human environment, the latter outwardly responding to the natural environment; both design activities require high degrees of interdependent specializations in generating an adequate integrative environmental form.

**Social and Behavioral Base.** Understanding the social, behavioral, and biological implications of man-environment interactions is emphasized as an integral part of design research/problem-solving methods in all design studio work.

**Coordinated University-Professional Community Learning Experiences.** The program is a direct response to the Rocky Mountain region's general recognition of a need for designers whose professional training is relevant to regional interests. In turn, the professional community serves as an auxiliary source of educational enrichment by providing students with opportunities to combine theoretical and applied learning.

**Admission Requirements**

**APPLICATION**

In order for students to be considered for admission into the graduate program, they must submit application forms, two original transcripts, three recommendations, statement of purpose, and a portfolio of academic and professional work by March 15 preceding the fall semester that they wish to enter. The portfolio format is to be 14 inches by 17 inches or smaller. Application forms and information may be obtained by writing to the Director of Interior Design, College of Environmental Design, University of Colorado at Denver, 1100 14th Street, Denver, Colorado 80202.

**ADMISSION**

A Faculty Admissions Committee will review the application materials and select the students to be admitted to the program. Applicants will be notified that they have been accepted, are on a waiting list, or have not been accepted, prior to May 1.

The recommended minimum grade-point average is 2.75 on a 4-point scale. If the student's grade-point average is below 2.75 the Graduate Record Examination is recommended as part of the application materials. The student, however, will be evaluated for admission on the basis of all the application materials and not the grade point average alone.

**ORDER OF STUDIES**

**(Two and Three-Year Programs)**

<table>
<thead>
<tr>
<th>Semester</th>
<th>Year</th>
<th>Fall Semester</th>
<th>Spring Semester</th>
</tr>
</thead>
<tbody>
<tr>
<td>1st Year</td>
<td>1st</td>
<td>I.D. 500. Design Research/Problem-Solving Methods</td>
<td>I.D. 501. Residential Design</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Arch. 510. Graphic Communications I</td>
<td>Arch. 511. Graphic Communications II</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Arch. 557. Elements of Structures</td>
<td>Arch. 557. Elements of Structures</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Arch. 571. History/Philosophy I</td>
<td>Arch. 571. History/Philosophy II</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Psych. 225. Behavioral Biology</td>
<td>Psych. 320. Human Behavior and Maturation Through the Life Span</td>
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<td>Elective Course</td>
<td>Elective Course</td>
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**Fall Semester, Second Year**

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<thead>
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<th>Semester</th>
<th>Year</th>
<th>Fall Semester</th>
<th>Spring Semester</th>
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</thead>
<tbody>
<tr>
<td>2nd Year</td>
<td>1st</td>
<td>I.D. 600. Transportation Design</td>
<td>I.D. 601. Commercial Design</td>
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<td>I.D. 660. Furniture Design</td>
<td>I.D. 662. Professional Practice</td>
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<td>Arch. 650. Environmental Control Systems I</td>
<td>Arch. 651. Environmental Control Systems II</td>
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**Fall Semester, Third Year**

<table>
<thead>
<tr>
<th>Semester</th>
<th>Year</th>
<th>Fall Semester</th>
<th>Spring Semester</th>
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</thead>
<tbody>
<tr>
<td></td>
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<td>I.D. 624. Environmental Signage and Graphic Design</td>
<td>I.D. 664. Internship II</td>
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<td>I.D. 663. Internship I</td>
<td>B.L. 512. Business Law</td>
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**Spring Semester, Third Year**

<table>
<thead>
<tr>
<th>Semester</th>
<th>Year</th>
<th>Fall Semester</th>
<th>Spring Semester</th>
</tr>
</thead>
<tbody>
<tr>
<td>3rd Year</td>
<td>2nd</td>
<td>I.D. 701. Thesis</td>
<td>I.D. 664. Internship II</td>
</tr>
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<td></td>
<td></td>
<td>B.A.D. 503. Fundamentals of Marketing (Fall or Summer Semesters)</td>
<td>B.A.D. 503. Fundamentals of Marketing (Fall or Summer Semesters)</td>
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<td></td>
<td></td>
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<td>16</td>
</tr>
</tbody>
</table>

**MASTER OF LANDSCAPE ARCHITECTURE**

The academic program leading to a Master of Landscape Architecture degree at the University of Colorado at Denver responds to a perceived need to offer professional training preparing students to meet the complex and demanding challenges of designing and shaping the environment.

Our rapidly growing western regions, both urban and rural, require comprehensive problem-solving skills which address regional climate, geology, soils, hydrology, and vegetation. These related processes provide
a regional basis for planning and designing land areas for public/private use, enjoyment, and preservation.

Programs

UCD offers both two- and three-year graduate-level professional programs leading to the degree Master of Landscape Architecture. The two-year second professional degree program, comprised of a minimum of 64 semester hours, is structured to provide advanced training and exposure in the theoretical, technical, and practical aspects of design for those M.L.A. candidates possessing a Bachelor of Landscape Architecture degree. The three-year first professional degree program, comprised of a minimum of 96 semester hours, is offered to students with undergraduate degrees not specifically related to landscape architecture.

These programs permit the M.L.A. candidate to pursue a wide range of career goals responding to the profession's concerns and expertise in physical planning and design. A major goal of the program is to develop the candidates' knowledge and practical skills of landscape architecture to assume effective roles in professional practice. Emphasis is placed upon emerging problems and frontier areas of the Rocky Mountain Region, and on applying problem-solving tools, theories, and methodologies to environmental concerns covering a broad range of scales and project types.

Curriculum

The curriculum includes those subjects considered as essential to core professional training in the field of landscape architecture, including design, technology, history, and professional practice. Both programs and courses have a design focus upon real problem-solving situations with emphasis on design process.

Opportunities exist to develop complementary knowledge and skills related to interdisciplinary projects involving the graduate programs of architecture, urban design, urban and regional planning, and public administration, within the College of Environmental Design. Additionally, through the Center for Community Development and Design (an outreach program in the College of Environmental Design), the M.L.A. candidate is afforded opportunity for actual project experience and participation for a variety of projects within the Denver metropolitan area and the state of Colorado.

The hierarchy of courses from term to term includes sequences of design, technical, and history core courses required of all entering candidates. The final spring term is reserved for an independent design practicum contributing to the program and the profession of landscape architecture. This project is performed under the guidance of a Comprehensive Thesis Committee comprised of faculty, practicing professionals, and technical specialists in the project topic. Additionally, the M.L.A. candidate is required to complete a minimum 12-week internship with a professional landscape architecture office or under the work supervision of a professionally registered landscape architect.

Admission Requirements

Applicants to the three-year program or those who do not have a first professional degree, Bachelor of Landscape Architecture, should have proficiency in college mathematics, physical science, English, environmental science, and a basic course in art or drawing.

Applicants to the two-year program, having undergraduate degrees in landscape architecture, architecture, environmental design, or other physical design degrees are considered for admission upon individual evaluation of their undergraduate curriculum, scholastic performance, and professional experience.

To be considered for admission into the graduate programs in landscape architecture, applicants must submit application forms, college transcripts, three recommendations, statement of purpose, and a portfolio of academic and professional work by April 15 proceeding the fall semester they wish to enter the program. The portfolio format is to be 14 inches by 17 inches or smaller.

Application forms and further information may be obtained by writing to the Director of Landscape Architecture, College of Environmental Design, University of Colorado at Denver, 1100 14th Street, Denver, Colorado 80202.

ORDER OF STUDY

TWO AND THREE-YEAR PROGRAMS

<table>
<thead>
<tr>
<th>Semester Hours</th>
<th>Fall Semester, First Year</th>
<th>Spring Semester, First Year</th>
<th>Fall Semester, Second Year</th>
<th>Spring Semester, Second Year</th>
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TOTAL

18

17
**Fall Semester, Third Year**

- L.A. 700. Landscape Arch. Design V .......................... 5
- L.A. 760. Landscape Architecture Construction II .......... 3
- B.A. Business Admin. Elective ............................... 3
- L.A. 761. Synthecology Field Research (Retreat III) .... 1
- L.A. 790. Independent Design Practicum Research and Research Methods ........................................ 2
- L.A. 791. Landscape Architecture Issues Seminar ....... 2
- Total Hours ..................................................... 16

**Spring Semester, Third Year**

- L.A. 701. Independent Design Practicum-Design VI ...... 5
- L.A. 721. Professional Practice Seminar .................. 3
- Elective .................................................................. 3
- Total Hours ..................................................... 14
- Total Hours ..................................................... 96

**MASTER OF PLANNING AND COMMUNITY DEVELOPMENT**

The MPCD program prepares planners to research, design, and evaluate the ends and means of social and environmental action. Careers in planning usually center in such growing fields as environmental design, community development, social services, natural resources, ecology, planning consultation, environmental assessment, urban renewal, and regional planning. Because Denver is the Rocky Mountain region’s central location for managing these fields of action, UCD planning students are able to combine easily the general principles of academic learning with practical experience in nearby operating agencies and organizations.

**Curriculum**

The curriculum requires 60 semester hours as a minimum for graduation. Forty-five of these semester hours are required core courses aimed at training the student in basic planning principles, content, research methods, and plan/policymaking skills. Of these required credits, 3 are spent in experiential learning and internships with public agencies and other organizations.

Another 15 credit hours of the curriculum are elective. They are chosen in consultation with the student’s faculty adviser to form a consistent pattern of planning expertise along the lines of the individual’s major interests. The courses may be chosen from the MPCD’s own core electives, from other programs in the College of Environmental Design or from other graduate colleges at UCD. Typical areas of specialization have been ecology, transportation, planning administration, community development, urban design, and health planning.

The final curriculum requirement in the student’s last semester is the satisfactory completion of an in-depth planning study or project. The aim is to illustrate the individual’s ability to integrate and apply the knowledge and experience gained in the program. This is the major thrust of the core requirement entitled Planning Studio 3.

**Admission Requirements**

In order for a student to be considered for admission into the graduate program, application forms must be submitted by April 15 for the fall semester. Entry into the program at other times is not normally permitted. Applications for admission are reviewed by a faculty-student committee. Criteria for admission include academic performance, experience, interest, and motivation for study.

Candidates for admission should note that a 1-semester-hour course in statistics is part of the 60-hour core curriculum. Students who have taken an acceptable course in statistics may have this requirement waived.

Application forms and information may be obtained by writing to Director of Planning and Community Development Program, University of Colorado at Denver, 1100 14th Street, Denver, Colorado 80202.

**CENTER FOR COMMUNITY DEVELOPMENT AND DESIGN**

The Center for Community Development and Design provides educational and technical assistance to solve design, planning, and community development problems upon request to groups, organizations, neighborhoods, communities, and small towns that cannot afford or do not have access to these services. The center provides these services to aid in the development of the community and to encourage local self-reliance. These services are provided by mobilizing the necessary and available resources of the College of Environmental Design and the community and by utilizing the appropriate community development process and participatory techniques.

A central goal of the center is to combine academic and practical experience of students working with community members on problem solving through supervised projects in the field. The faculty and staff of the center coordinate community projects for which students register through classes in the various academic curricula. Students who register for these projects assume an added responsibility of satisfying client needs that goes beyond academic credit.

Students are expected to do two things: Utilize and develop professional expertise which not only enhances their own education but also better prepares them to assist in the community problem-solving process, and to develop an understanding for community participatory processes and be able to integrate these into the technical aspects of their community project.

The types of projects students may select to work on include developing a physical design program for a child care center in an inner-city neighborhood; assisting a neighborhood organization, design, and implement a self-help housing program in a small mountain town; and developing a comprehensive plan in cooperation with a planning commission in a Colorado high plains town.
Graduate School
Robert N. Rogers, Associate Dean

INFORMATION ABOUT THE SCHOOL

The Graduate School is a University-wide body which authorizes programs within its constituent colleges and schools. At UCD, Business and Administration (except the M.B.A. program), Education, Engineering, Liberal Arts and Sciences, and Music are colleges or schools whose graduate programs are offered through the Graduate School. In concept, there is a single Graduate School regardless of campus. In practice, most master's-level programs are specific to the campus where the student is admitted, insofar as particular options and advisers are concerned.

Doctoral-level programs in a discipline are viewed as the responsibility of the entire University community of that discipline. At the present time all Ph.D. programs are coordinated through the corresponding Boulder department. However, in a number of disciplines most or all course work for the Ph.D. can be completed at Denver and the research adviser may be a member of the UCD faculty. Some departments in which this is the case are communication disorders and speech sciences, communication and theatre, electrical engineering, and civil engineering. In other disciplines, a significant portion of the course work required for the Ph.D. degree may be taken at UCD. Persons interested in pursuing doctoral-level work should consult with the appropriate discipline graduate adviser.

Anyone wishing further information not given in this bulletin should contact the Associate Dean of the Graduate School, University of Colorado at Denver, 1100 14th Street, Denver, Colorado 80202.

Degrees Offered

The following graduate programs are authorized for completion through the Graduate School at UCD. In some cases, a specific required course may only be offered through the University of Colorado at Boulder in a given year.

The Master of Arts (M.A.) in:
- Anthropology
- Biology
- Communication and theatre
- Communication disorders and speech science
- Economics
- English
- Geography
- History
- Mathematics
- Political science
- Psychology
- Sociology

The Master of Education (M.Ed.) and the Master of Arts (M.A.) in:
- Administration and supervision
- Early childhood education
- Educational psychology
- Foundations of education
- Guidance and counseling

The Master of Science (M.S.) in:
- Accounting
- Applied mathematics
- Chemistry
- Civil engineering
- Electrical engineering
- Environmental science
- Finance
- Management
- Management science
- Marketing
- Mechanical engineering
- Music

The Master of Basic Science (M.B.S.)
- The Master of Humanities (M.H.)
- The Master of Social Science (M.S.S.)

Facilities for Graduate Study and Research at UCD

Facilities for research in many fields are available at UCD as well as specialized institutes, seminars, and meetings of national standing.

The Graduate Student at UCD

Approximately 1,800 students are enrolled in graduate programs at UCD and an additional 1,400 special students take graduate courses. Of these, approximately 45 percent are part-time students.

Faculty

The faculty operating in these programs is mainly housed at UCD, although resources of other campuses at the University of Colorado are used.

Financial Aid for Graduate Study

SCHOLARSHIPS AND FELLOWSHIPS

The University of Colorado administers various forms of financial aid for graduate students: fellowships, scholarships, and a number of awards from outside agencies.

The Graduate School each year awards to qualified regular degree graduate students approximately 50 doctoral fellowships paying up to $2,500 plus tuition.
Special fellowships and scholarships are also available for study in certain departments. Colorado Graduate Grants are also available to students who can show demonstrated need. For details contact the Graduate School Office.

Applications for fellowships, scholarships, and grants are due in the department before the announced department deadline. Fellowship awards are announced about March 15; Colorado Graduate Grant awards are announced each semester for the following semester.

GRADUATE STUDENT TEACHING APPOINTMENTS

Many departments employ graduate students as part-time instructors for teaching assistants. The instructorship is reserved for those advanced graduate students already possessing an appropriate M.A. degree who may be independently responsible for the conduct of a section or course. Payment for these teaching appointments in 1979-80 was: one-half time instructor; $5,446 for the academic year; one-half time teaching assistant, $4,356 for the academic year.

A half-time appointment for an instructor is considered to be equal to 6 class contact hours; a half-time teaching assistant is appointed for 20 hours per week. Students appointed for one-half time qualify for resident tuition rates regardless of their actual Colorado residency status. Teaching assistants and instructors must be enrolled students in good standing for the full period of their appointment.

RESEARCH ASSISTANTSHIPS

Research activities provide opportunities for graduate students to obtain part-time work as research assistants in many departments. Holders of these positions pay resident tuition. Assistants must be enrolled students.

LOAN FUNDS

Graduate students wishing to apply for long-term loans through the National Direct Student Loan Program and for part-time jobs through the college work-study program should submit an Application for Financial Aid to the Office of Financial Aid by March 1. This office also provides short-term loan assistance to students who have completed one or more semesters in residence. Short-term loans are designed to supplement inadequate personal funds and to provide for emergencies. Applicants should go directly to the Office of Financial Aid.

EMPLOYMENT OPPORTUNITIES

The University maintains an employment service in the Office of Financial Aid to help students obtain part-time work either through conventional employment or through the college work-study program.

Students employed by the University are hired solely on the basis of merit and fitness, a policy which avoids favor or discrimination because of race, color, creed, sex, age, handicap, or national origin. Students are also referred to prospective employers in accordance with this policy.

International Education

The Office of International Education expedites the exchange of students and faculty, entertains foreign visitors, promotes special relationships with foreign universities, and acts as adviser for Fulbright and other scholarships.

The office also arranges study abroad programs. Students remain enrolled at the University of Colorado while taking regular courses in the foreign universities. A B average with the equivalent of two years of college-level work in the appropriate language is required. There are also occasional summer programs offering academic credit.

Peace Corps information may be obtained from the Office of International Education.

For additional information contact the Office for Student Affairs, 629-2861.

Institute for Urban and Public Policy Research

The institute was established at UCD to facilitate organized research on significant public policy issues and urban problems. Its principal objectives are (1) to improve public policy formation and decision making through more effectively relating issues with knowledge and research and (2) to assist faculty, policy makers, and students to work together as research teams on state and local problems that cut across disciplines.

Research in the institute is being done through centers, programs, and ad hoc teams utilizing individual expertise from the several campuses of the University of Colorado and other Colorado institutions of higher education as required to deal with a specific problem.

The institute has been involved in a number of research activities including determining effective methods of using scientific and technological resources in metropolitan, state, and regional government policy formation and decision making; environmental quality studies; energy-related research; health needs assessment; gerontological studies; evaluating community development programs; and attitude surveys. Its members have continuing programmatic research interests in the measurement of quality of life and social indicators, urban transportation policy; urban and regional planning; community and organizational development; and the physical, biological, and social effects of energy development.

Center for Environmental Sciences

The Center for Environmental Sciences is a cluster of federally funded research grants studying various environmental problems of concern to the state and nation. The center is presently made up of four research components: the Environmental Trace Substances Research Program (ETSRP), the Department of Energy Oil Shale Task Force, the Policy Research Program, and the Faculty Review Program. ETSRP consists of several grants studying the behavior of trace elements in the areas of oil shale mining, uranium mining and milling, and reuse of wastewater; the Oil Shale Task Force coordinates oil shale environmental programs funded by
the Department of Energy; the Policy Research Program performs risk assessment and literature search studies in various areas of environmental concern; and the Faculty Review Program coordinates state government and faculty review of permit applications and environmental impact statements for energy development. Current funding agencies are the Department of Energy, Environmental Protection Agency, and the U.S. Bureau of Mines.

REQUIREMENTS FOR ADMISSION

General Requirements

Students may be admitted to the Graduate School in either of the two categories described below.

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.

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 DEGREE STUDENTS

Qualified students are admitted to regular degree status by the appropriate department. In addition to departmental approval, an applicant for admission as a regular degree student must:

1. Hold a baccalaureate degree 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.
2. Show promise of ability to pursue advanced study and research, as judged by his or her previous scholastic record.
3. Have had adequate preparation to enter upon graduate study in the field chosen.
4. Have at least a 3.0 undergraduate grade-point average on all work taken.
5. Meet additional requirements for admission as established by major departments.

Regular degree students must maintain at least a 3.0 grade-point average each semester or summer term on all work taken, whether it is to be applied toward the advanced degree intended or not. Students who fail to maintain this standard of performance will be subject to suspension from the Graduate School.

Pass/Fail Grades. In order to permit a meaningful evaluation of an applicant's scholastic record, not more than 10 percent of those credit hours that are relevant to the intended field of graduate study shall have been earned with pass/fail grades, nor more than 20 percent overall. Applicants whose academic record contain a larger percentage of pass/fail credits must submit suitable additional evidence that they possess the required scholastic ability. If the applicant does not submit satisfactory additional evidence, he or she can be admitted only as a provisional student.

PROVISIONAL DEGREE STUDENTS

Applicants who do not meet the requirements for admission as regular degree students may be admitted as provisional degree students upon the recommendation of the major department. With the concurrence of the dean of the Graduate School, a department may admit provisional students for a probationary period, which may not normally exceed one academic year. At the end of the probationary period, provisional degree students must either be admitted to regular degree status or be dropped from the graduate program.

Credit earned by persons in provisional degree status may count toward a degree at this University.

Provisional degree students are required to maintain a 3.0 grade-point average or higher, as may be required by the terms of their provisional admission, each semester or summer term on all work taken, whether or not it is to be applied toward the advanced degree sought. If students fail to maintain such a standard of performance, they will be subject to suspension from the Graduate School.

Note: All provisional applicants must take the Graduate Record Examination and submit scores as part of the application.

Application Procedures

Graduate students who expect to study at UCD should contact the UCD Office of the Graduate School concerning procedures for forwarding completed applications.

An applicant for admission must present a completed Application Form (Parts I and II), which may be obtained from the UCD Graduate School office, and two official transcripts from each university attended. The application must be accompanied by a nonrefundable application processing fee of $20 (check or money order) when the application is submitted. No application will be processed unless this fee is paid. Many departments require scores from the Graduate Record Examination, and most departments require three or four letters of recommendation.

When a prospective degree student applies for admission, the chairman of each department or a committee named for the purpose shall decide whether the applicant shall be admitted and shall make that decision known to the Office of Admissions and Records, which will inform the student. Persons not wishing to work toward an advanced degree are referred to as special students (below).

A completed application must be in the office of the major department at least 60 days prior to the term for which admission is sought or earlier as may be required by the major department.

Students who wish to apply for a graduate student award for the academic year 1980-81, e.g., fellowship,
scholarship, assistantship, etc., must file a completed application with the department before the announced departmental deadline (see previous section on financial aid).

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

SENIORS IN THE UNIVERSITY OF COLORADO

A senior in this University who has satisfied the undergraduate residence requirements and who needs not more than 6 semester hours of advanced subjects and 12 credit points to meet his requirements for a bachelor's degree, may be admitted to the Graduate School by special permission of the dean.

GRADUATE RECORD EXAMINATIONS

At the option of any department, the Graduate Record Examination may be required of applicants for assistantships, or of any student before his or her status is determined.

Students who are applying for the fall of 1981 take the GRE no later than the December testing date so that their scores will be available to the graduate awards selection committee. Four to six weeks should be allowed for GRE scores to be received by an institution.

Information regarding these examinations may be obtained from the Graduate School Office or the Student Relations Office at UCD, or from the Educational Testing Service, Box 1502, Berkeley, California 94701, or Box 955, Princeton, New Jersey 08540.

SPECIAL STUDENTS

A student not wishing to earn an advanced degree from the University of Colorado should apply to the Office of Admissions and Records, UCD, 1100 Fourteenth Street, Denver, Colorado 80202, or to the Office of the Associate Dean of the Graduate School. Special students will be allowed to register only on the campus to which they have been admitted.

Special students desiring to pursue a graduate degree program at this University are encouraged to submit the complete graduate application and supporting credentials as soon as possible. A department may recommend to the graduate dean the acceptance of as much as 8 hours of credit toward the requirements of a master's degree for courses taken either as a student at another recognized graduate school, as a special student at the University, or any combination thereof. In addition, the department may recommend to the graduate dean the acceptance of credit for courses taken as a special student for the semester, quarter, or summer term for which the student has applied for admission to the Graduate School, provided that the student's application was on file with the department before the beginning of the semester, quarter, or term in question.

REGISTRATION

Course Work and Examinations

On the regular registration days of each semester, students who have been admitted to the Graduate School and who expect to study in the Graduate School are required to complete appropriate registration procedures.

Students should register for classes the semester they are accepted into Graduate School. If unable to attend that semester they must notify the department which has accepted them and submit the necessary forms to the Office of Admissions and Records at UCD in order to attend the following semester.

Changes in Registration

A student who wishes to drop a course or take it for no credit should follow the drop/add standard procedure (see current Schedule of Courses). Note that after the tenth week of classes a graduate student may not drop, add, or change a course to no credit without presenting a letter to the dean of the Graduate School, UCD Administration Building, Room 302, stating the exceptional circumstances which justify the change. This letter, endorsed by the instructor of the course, must accompany the properly signed and completed drop/add card or no credit option form.

Master's Thesis or Report

Graduate students working toward master's degrees, if they expect to present a thesis or M.Ed. report in partial fulfillment of the requirements for the degree, must register for thesis for a minimum of 4 semester hours or a maximum of 6 semester hours, or for M.Ed. report for 2 semester hours. The student may register for any number of hours in any semester of residence, but the total number of hours for all semesters must equal the number of credits the student expects to receive for the thesis or report. The final grade will be withheld until the thesis or report is completed. If the thesis or report is not completed at the end of the term in which the student is registered, an in progress (IP) will be reported. (The student may not register again for any portion of thesis credit on which an IP grade has been submitted.)

Limitation of Registration

FULL LOAD

A graduate student will be considered to be carrying a full load during a regular semester for purposes of determining residence credit if the student is registered for not fewer than 5 semester hours in work numbered 500 or above, or at least 8 semester hours of other graduate work, or thesis.

A full load for purposes of determining residence credit during the summer term is 3 semester hours of work in courses numbered 500 or above, or 6 semester hours of other graduate work, or thesis.

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 term at UCD is 10 hours per 10-week summer term.

TUITION AND FEES

The schedule of tuition and fees is given in the General Information section of this bulletin.

REQUIREMENTS FOR ADVANCED DEGREES

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. Students 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. They should work on their own initiative, reading widely and thoughtfully, reaching their own conclusions, and acquiring a sense of values, perspective, and proportion.

All studies offered for credit toward an advanced degree (except those in deficiencies) must be of graduate status.

A student is expected to maintain at least a B average in all work attempted in Graduate School.

For the Ph.D., a course mark below B is unsatisfactory and will not be counted toward fulfilling the minimum requirements for the degree.

A student who fails to do satisfactory work will be subject to suspension from the Graduate School by the dean with the approval of the major department.

Appeal may be made to the Executive Committee of the Graduate School. The committee's decision shall be final. A suspended student is eligible to apply for readmission after one year. Approval or rejection of this application rests jointly with the student's major department and the dean. In case of lack of agreement between the department and the dean or in case of appeal by the student, the final decision will be made by the Executive Committee.

Grading System

The standing of a student in work intended for an advanced degree is to be indicated by the marks, A, B, and C.

A — Superior, 4 credit points for each credit hour.
B — Good, 3 credit points for each credit hour.
C — Fair, 2 credit points for each credit hour.

Work receiving the lowest passing grade, D, may not be counted toward a degree, nor may it be accepted for the removal of deficiencies. Marks below B are not accepted for the doctoral degree.

An IF or an IW grade may be given for incomplete work at the discretion of the instructor. For details, refer to the discussion of the uniform grading system. The grade of IP (in progress) will be given for continuing thesis work and will be valid until the thesis is completed.

A graduate student may repeat once a course for which he or she obtained a grade of C, D, or F upon written recommendation to the dean by the chairman of the advisory committee and the chairman of the department, provided the course has not previously applied toward a degree.

Graduate students may register for undergraduate courses on a Pass/Fail basis; however, graduate credit will not be awarded, and such courses cannot be applied toward a graduate degree.

Use of English

A student who is noticeably deficient in the use and spelling of the English language may not obtain an advanced degree from the University of Colorado. The satisfaction of this requirement depends not so much upon the ability to pass formal tests, although these may be demanded, as it does upon the habitual use of good English in all oral and written work. Ability to use the language with precision and distinction should be cultivated as an attainment of major importance.

Each department will judge the qualifications of its advanced students in the use of English. Reports, examinations, and speech will be considered in estimating the candidate's proficiency.

MASTER'S DEGREE

A student regularly admitted to the Graduate School and later accepted as a candidate for the degree Master of Arts, Master of Science, or other 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. All studies offered toward the minimum requirement for the degree must be of graduate rank. 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 Requirement

The minimum requirement of graduate work for the degree Master of Arts or Master of Science may be fulfilled by following either Plan I or Plan II below.

Plan I: By presenting 24 semester hours of graduate work, including a thesis. At least 12 semester hours of this work must be at the 500 level or above.

Plan II: By presenting 30 semester hours of graduate work, without a thesis. At least 16 semester hours of this work must be at the 500 level or above.

Plan II does not represent a free option for the student. A candidate for the master's degree may be allowed to select Plan II only on the recommendation of the department concerned.
Graduate Credit

Graduate credit is given for courses which are listed at the 500 level or above and which are offered by those colleges or schools that are members of the Graduate School, or which have otherwise been approved by the dean of the Graduate School. No assurance can be given that work taken by a student will count toward a higher degree unless the student has the approval of the department.

Not all courses listed are available at any one time; some of them are given in alternate years.

Courses taken during the fall semester 1975 and thereafter will have graduate rank if they are taught by members of the Graduate School faculty and are in one of the following two categories:

1. Courses within the major department at the 500 level or above.
2. Courses outside the major department at any level, provided they are approved for graduate rank for a specific degree plan by the faculty of the degree-granting program.

This does not change the minimum number of courses that must be taken at the 500 level or above. However, as a result, most students who include 400-level courses of other departments in their program will not exceed those minimum requirements for graduation.

Field of Study

Studies leading to a master's degree may be divided between major and minor subjects at the discretion of the faculty of the degree-granting program.

Status

After a student has made a satisfactory record in this University for at least one semester or summer term and after he has removed any deficiencies that were determined at the time of admission or by qualifying examinations or otherwise, he should confer with his major department and request that a decision be made on his status. This definite status must be set by his major department before a student may make application for admission to candidacy for an advanced degree.

Students who are inadequately prepared must make up without credit toward a graduate degree all prerequisites required by the department concerned.

Language Requirements

Candidates must have such knowledge of ancient and modern languages as each department requires. See special departmental requirements.

Credit by Transfer

Resident graduate work of high quality done in a recognized graduate school elsewhere and coming within the time limit may be accepted up to a limited amount. Provided it is recommended by the department concerned and approved by the dean of the Graduate School.

All work accepted by transfer must come within the five-year time limit or be validated by special examination.

The maximum amount of work that may be transferred to this University is 8 semester hours.

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. Requests for transfer of credit to be applied toward an advanced degree must be made on the form specified for this purpose and submitted to the Graduate School by the beginning of the semester prior to that in which the student will be graduated.

Work already applied toward a master's degree received from 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.

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 8 semester hours) provided such work:

1. Is completed with distinction in the senior year at this University.
2. Comes within the five-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.

Requests for transfer of credit to be applied toward an advanced degree must be made on the form specified for this purpose and submitted to the Graduate School by the beginning of the semester prior to that in which the student will be graduated. For more information contact the Graduate School office.

Residency

In general, the residency requirements can be met only by residence at this University for at least two semesters or at least three summer terms. For full residence a student must be registered within the time designated at the beginning of a semester and must carry the equivalent of not fewer than 5 semester hours of work in courses numbered 500 or above, or at least 8 semester hours of other graduate work. See Limitation of Registration, Full Load, for requirements for full residence credit during the summer. A student who is noticeably deficient in his general training, or in the specific preparation indicated by each department as prerequisite to graduate work, cannot expect to obtain a degree in the minimum time specified.

Assistants and other employees of the University may fulfill the residence requirements of one year in two semesters, provided their duties do not require more than half time. Full-time employees may not satisfy the residence requirements of one year in fewer than four semesters.
Admission to Candidacy

A student who wishes to become a candidate for a master's degree must file application to the dean's office not later than 10 weeks prior to the completion of the comprehensive-final examination. The number of hours to be presented for the degree must be determined before this application may be filed. See previous section on Status.

This application must be made on forms obtainable at the dean's office and in various departments and must be signed by a representative of both the major and minor, if any, fields of study, certifying that the student's work is satisfactory and that his program outlined in the application meets the requirements set in his particular case.

A student on Graduate School probation is not eligible to be awarded a degree until he or she is removed from probation.

Thesis Requirements

A thesis, which may be of a research, expository, critical, or creative type, is required of every master's degree candidate under Plan I. Every thesis presented in partial fulfillment of the requirements for an advanced degree must:

1. Deal with a definite topic related to the major field.
2. Be based upon independent study and investigation.
3. Represent the equivalent of from 4 to 6 semester hours of work.
4. Receive the approval of the major department not later than 30 days (in some departments, 90 days) before the commencement at which the degree is to be conferred.
5. Be essentially complete at the time the comprehensive-final examination is given.
6. Comply in mechanical features with specifications obtainable from the Graduate School.

Two weeks prior to the date on which the degree is to be conferred, two formally approved, printed or typewritten copies of the thesis must be filed in the Graduate School. The thesis must be complete with abstract.

All theses must be signed by the thesis adviser and the second reader. All approved theses are kept on file in the library. The thesis binding fee must be paid at the Business Office when the thesis is deposited in the Graduate School.

Credit hours earned for the thesis will not be accepted toward the requirements for a degree unless such credit has previously been registered. A student working toward a master's degree must register for thesis for a specific number of hours. The student may register for any specific number of hours in any semester of residence, but the total registered credit for thesis must total a minimum of 4 or a maximum of 6 semester hours, the total number of hours depending upon how much credit is to be given for the thesis.

The final grade will be withheld until the thesis or report is completed. An IP will be reported for terms during which a student is registered for thesis prior to completion of the thesis.

Comprehensive-Final Examinations

Each candidate for a master's degree is required to take a comprehensive-final examination after the other requirements for the degree have been completed. This examination may be given near the end of the candidate's last semester of residence while he is still taking required courses for the degree, provided he is making satisfactory progress in those courses.

The following rules applying to the comprehensive final examination must be observed:

1. A student must be registered when he or she takes the examination.
2. Notice of the examination must be filed by the major department in the dean's office at least three days in advance of the examination.
3. The examination is to be given by a committee of three graduate faculty members appointed by the department concerned in consultation with the dean.
4. The examination, which may be oral or written, or both, must cover the thesis, which should be essentially complete at the time, as well as other work done in the University in formal courses and seminars in the major field.
5. An examination in the minor work taken at this University is optional with the major and minor departments.
6. The examination must include all work presented for the degree not done in residence at the University of Colorado, whether in the major or minor field. The examination on transferred work will be given by representatives of the corresponding fields of study in this University.
7. A student who fails the comprehensive final examination may not attempt the examination again until at least three months have elapsed and until such work as may be prescribed by the examining committee has been completed. The student may retake the examination only once.

Master's Thesis or Report Credit

Every graduate student working toward a master's degree who expects to present a thesis or M.Ed. report in partial fulfillment of the requirements for the degree must register for thesis for a minimum of 4 semester hours or a maximum of 6 semester hours, or for M.Ed. report for 2 semester hours. The student may register for any specific number of hours in any semester of residence, but the total number of hours for all semesters must equal the number of credits the student expects to receive for the thesis or report. The final grade will be withheld until the thesis or report is completed. If the thesis or report is not completed at the end of the term in which the student is so registered, an in progress (IP) will be reported. (The student may not register again for any portion of thesis credit on which an IP grade has been submitted.)

Supplemental Examinations

Supplemental examinations should be simply an extension of the original examination and given immediately. If the student fails the supplemental
examining, three months must elapse before it may be attempted again.

**Course Examinations**

The regular written examinations of each semester except the last must be taken. Course examinations of the last semester, which come after the comprehensive-final examination has been passed, may be omitted with the consent of the instructor.

**Time Limit**

All work, including the comprehensive-final examination, should be completed within five years or six successive summers. Work done earlier will not be accepted for the degree unless validated by a special examination. A candidate for the master's degree is expected to complete his work with reasonable continuity.

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**Deadlines for Master's Degree Candidates Expecting to Graduate During 1980-81**

Deadline dates for the following can be obtained by calling the Graduate School office on the Boulder Campus, 492-7401.

1. Last day for requesting transfer of credit.
2. Applications for admission to candidacy. Applications must be submitted at least 10 weeks before the student expects to take the comprehensive-final examination. Students are urged to submit this form by the beginning of the semester prior to that in which they expect to receive the degree. (The form may be picked up in the department or in the Graduate School office.)
3. Last day for thesis to be approved by department.
4. Last day for scheduling of comprehensive-final examination.
5. Last day for taking comprehensive-final examination.
6. Last day for filing thesis in the Graduate School. At the time of filing, the thesis must be complete in all respects and must meet thesis specifications in order to be accepted by the Graduate School. Candidates whose theses are received after 5 p.m. on the indicated date will be graduated at the commencement following that for which the deadline is indicated.

**Graduate Programs**

**ANTHROPOLOGY**

The master's program in anthropology offers general, flexible training in anthropology along with topical specialization and the opportunity to specialize in interdisciplinary, applied areas: medical anthropology and community and urban anthropology. The medical anthropology track is intended to serve students preparing for careers and those with established careers in the health care professions and related fields. Similarly, the community and urban anthropology track is intended to serve those who seek to employ anthropological concepts and methods of community analysis in public administration, development, planning, and allied fields. Working with an advisory committee, each student will tailor an individual program of studies around courses and seminars in anthropology and allied disciplines. These programs will culminate in either a master's paper or master's thesis. A primary goal of the program is to produce graduates who are capable of understanding and proficient at resolving, in cooperation with others, the many problems of complex societies; consequently, a premium will be placed on interdisciplinary instruction and practical exercises in the design and implementation of research in a variety of settings.

More detailed descriptions of the options available within the M.A. program may be obtained by writing to the Director of Graduate Studies, Anthropology, University of Colorado at Denver, 1100 14th St., Denver, Colorado 80202.

**Admission**

Admission to the master's program in anthropology is open to any holder of a baccalaureate degree, not necessarily in anthropology, provided he or she meets the following requirements: (1) general requirements for admission to the Graduate School (2.75 or better grade-point average for all undergraduate studies); and (2) knowledge of the fundamentals of anthropology. Applicants will be expected to have had a general introductory course in anthropology and secondary courses in ethnology, archaeology, linguistics, and physical anthropology or be able to demonstrate a mastery of materials equivalent to that which might reasonably be expected to result from such formal training. Applicants deficient in background may be admitted on a provisional basis but will be required to make up deficiencies without graduate credit during the first year in residence. A simpler alternative, when practical, would be to remove deficiencies as a special student prior to applying for admission to the graduate program.

In order to be considered for admission into the master's program, an applicant must submit (1) two copies of transcripts from all undergraduate institutions attended; (2) Graduate Record Examination scores for verbal and quantitative aptitude; and (3) at least three letters of recommendation. Evidence of previous nonacademic anthropology-oriented work or other experience will be carefully considered, as will that of special skills relevant to anthropological research. Department deadlines for receipt of applications for admission to the Graduate School, including accompanying materials, is April 15 for fall entrance.

Further information concerning specialization within the program, departmental admission and advising policies, etc., may be obtained by writing the Director of Graduate Studies in Anthropology. For general Graduate School requirements and application information, see beginning of graduate section of this bulletin.

**Residency**

A minimum of two full semesters devoted to advanced
study is required by the Graduate School. Students working toward the master's degree in anthropology will be strongly encouraged to attain that degree within three years following matriculation into the program.

**Course Hours and Distribution**

A minimum of 36 semester hours of credit is required for the M.A. degree in anthropology. Fifteen hours of nonthesis course work must be at the 500 level or above. Course work is to be distributed as follows for students pursuing an interdisciplinary specialty within the general anthropology track, the medical anthropology track, or the community and urban anthropology track:

Courses in anthropology .......... 15 semester hours minimum  
Courses in related fields .......... 15 semester hours minimum

For students pursuing a subdisciplinary specialty within the general anthropology track, course work is to be distributed as follows:

Courses in anthropology .......... 18 semester hours minimum  
Courses in related fields .......... 12 semester hours minimum

The remaining 6 semester hours may be met either by writing a master's thesis, for which 6 hours credit is given, or by taking 6 additional hours of course work if the student prefers to write a master's paper.

**Examination**

Each student must pass a comprehensive M.A. examination demonstrating mastery of the fundamental principles of anthropology. This examination will ordinarily be taken before the conclusion of the fourth semester in residence.

**Thesis or Paper**

The student must either carry out an original research project and report the results in a thesis of professional quality or write a master's paper, more limited in scope, to complete the degree. A thesis provides a valuable opportunity to initiate or pursue important, individual research objectives. The master's paper is intended as a flexible alternative for students who wish to pursue in depth some issue or specialty topic without engaging in the sustained research effort on which a master's thesis depends.

**APPLIED MATHEMATICS**

See Mathematics Program.

**BASIC SCIENCE, MASTER OF**

Collin Hightower, Coordinator for UCD

The program leading to the Master of Basic Science (M.B.S.) degree is interdisciplinary. It provides an opportunity for present and prospective mathematicians and science professionals and others to extend and broaden their training in computer science, mathematics, museology, and the natural and physical sciences at advanced undergraduate and graduate levels. These professionals include public school teachers, industrial scientists, engineers, business persons, and others. The student may elect the mathematics, science, or museology options as described below. Wide latitude is possible in the details of a degree plan so that each student may follow a course of study most pertinent to their interests. The degree plan will be designed in conjunction with the student's adviser and must be approved by the executive committee.

- All courses credited toward the degree must be taken through the University of Colorado at Boulder, Colorado Springs, or Denver, over a period of five years or six successive summers.

The Master of Basic Science degree is supervised by an advisory committee appointed by the dean of the Graduate School, and application should be made to the Master of Basic Science Office, Ketchum 306, University of Colorado, Boulder, regardless of the campus which the student plans to attend.

**Requirements for Admission**

1. General regulations for admission to the Graduate School apply (see Requirements for Admission).

2. A student is expected to have had at least 40 semester hours in the natural sciences and mathematics, including one year of calculus, upon admission. Students may be admitted to the program with a deficiency in calculus, but must remedy the deficiency within two years after admission by completing Math. 140-241 with a grade of C or better (or other courses in mathematical subjects on approval by the advisory committee with a grade of C or better).

**Requirements for the Master of Basic Science Degree**

1. General regulations of the Graduate School governing the award of the master's degree apply (see Master of Arts and Master of Science) except as modified below.

2. The student is required to complete 24 semester hours of University credit for the Plan I (thesis) option and 30 semester hours for the Plan II (no thesis) option. All of these hours shall be numbered 300 and above, and be taught by members of the graduate faculty. At least 12 of these hours shall be numbered 500 or higher, not to include thesis credit. Normally, not more than 3 hours of 500-level credit should be independent study.

3. **Minimum Grade-Point Average.** Courses on the 300 and 400 level 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. The student must have a B average in all courses taken subsequent to his admission to the program, including courses not actually offered for the degree.

**PROGRAM REQUIREMENTS**

Students who are not presenting a thesis for the degree must pass a final examination or prepare a paper describing a research project or other specialized study. The choice of these is at the discretion of the Administrative Committee which also must approve the candidate's performance.
There are three basic options within the program: mathematics, museology, and science. A Plan II (no thesis) option is available in the science option.

Mathematics Option

A reasonable degree of competence is required in the fields of analysis, algebra, and geometry. A minimum of 15 semester hours of upper division courses (300 level or above) in mathematics must be offered for the degree, including at least 3 hours of analysis, 6 hours of algebra, and 3 hours of geometry.

1. One upper division sequence of at least 6 semester hours in any of the physical or biological sciences represented in the program. With permission, two independent one-semester courses in the same area may be substituted for the one-year sequence.

2. Upper division electives in science, mathematics, or computer sciences, to complete an approved 30-semester-hour degree plan. Of these 30, twelve or more hours must be from courses numbered 500 or higher. The 30 hours may also include 3 semester hours of upper division courses or seminars in secondary school mathematics teaching, history of mathematics or science, or philosophy of science or mathematics.

Science Option

1. An upper division sequence (300 level or above) of at least 6 semester hours in each of two of the physical or biological sciences named above. With permission, two independent one-semester courses in the same area may be substituted for one of the one-year sequences.

2. Upper division electives in science, mathematics, or computer sciences, to complete an approved degree plan. Of the total, twelve hours or more must be from courses numbered 500 or higher. The 30 hours may also include 3 semester hours of upper division courses or seminars in secondary school teaching, history of science or mathematics, or philosophy of science or mathematics.

Museology Option (Boulder Campus Only)

1. At least 8 but not more than 12 semester hours of courses offered by the museum. Three to 6 semester hours of courses in the College of Business and Administration of which 3 semester hours must be in the area of small business management. The total museum-business semester hours may not exceed 15.

2. An upper division sequence (300 level or above) of at least 6 semester hours in one of the departments (other than museum) represented in the program.

3. Upper division electives in science, mathematics, or computer science, to complete an approved 30-semester-hour degree plan. Of the 30 hours, at least 12 hours must be numbered 500 or above.

BIOLOGY

Students wishing to pursue graduate work in biology should be familiar with the University of Colorado Requirements for Advanced Degrees. There are no special discipline requirements, although the prospective student must consult with a faculty adviser prior to making application. The general portion of the GRE is required, and the specialty area is recommended. Applications are submitted directly to the biology graduate coordinator at UCD.

The discipline offers either Plan I (with thesis) or Plan II (without thesis) Master of Arts degrees in environmental, organismic, and population biology, and Plan II M.A. degree in biology with education. Upon admission to the program the student in consultation with an adviser will design a study program suited to the student's specific needs. There is no core of required courses structured into the master's degree program. Courses acceptable toward the master's degree in biology include, in addition to biology courses and subject to the approval of the adviser, any appropriate 400-, 500-, and 600-level courses offered in other disciplines or divisions of the University.

It should be noted that the student may have to complete some courses at the Boulder or Health Sciences Center campuses.

In conjunction with the College of Engineering and Applied Science an interdisciplinary program has been developed with a major in environmental science. The program offers several subject concentrations within both basic and applied environmental science. Included within the basic approach are concentrations in ecology, earth science, population studies, and physics-chemistry. Included within the applied approach are concentrations in conservation of natural resources, systems analysis, and environmental quality control.

Students interested in this program should contact the Graduate Representative for Biology at UCD.

CHEMISTRY

The M.S. degree is offered at UCD in any one of the following basic fields: analytical, bio-, inorganic, organic, or physical chemistry. Additionally, problems involving application of chemical knowledge to the problems of our environment are encouraged.

The M.S. program is available to both full- and part-time students. The chemistry faculty at UCD strives to ensure that students receive excellent supervision of work and advising in the graduate program. Students enrolled in the program have a good opportunity to be appointed as teaching assistants. Research activities on the part of the chemistry faculty provide opportunities for graduate students to obtain research assistantships.

Degree Requirements

Two types of degrees are offered:

Plan I requires 24 credit hours including 15 to 20 credit hours of formal course work, 4 to 9 credit hours in research courses, the completion of a research investigation, and the presentation of a thesis.

Plan II requires 24 hours of formal course work and 6 credit hours of research without a thesis.

Prerequisite. An undergraduate major in chemistry is desirable since all students are required to pass
competence not only in urban transportation but also in environmental design, at least two relevant minor areas, such as architecture, dealing with the complex problems of urban transportation in a competent and meaningful manner. Students in these programs are expected to reach significant levels of expertise within the University.

**CIVIL ENGINEERING**

Civil engineering graduate programs at UCD are offered through the combined departments of Civil, Environmental, and Architectural Engineering (Boulder) and Civil and Urban Engineering (Denver). Students wishing to pursue graduate work in civil engineering leading to candidacy for the Master of Science or Doctor of Philosophy degrees should read carefully Requirements for Advanced Degrees in this bulletin. All requirements for the M.S. and a large part of those for the Ph.D. may be completed at UCD. A pamphlet elaborating on the rules as they apply to civil engineering is available from the departmental office at UCD.

No qualifying examination is required for the M.S. degree; however, in competition for all University fellowships, the Graduate Record Examination, consisting of the aptitude tests and the advanced test in engineering, is used in the evaluation of candidates. Therefore, students are advised to take this examination prior to their arrival on campus.

Programs are available in the fields of transportation, water resources, hydraulics, soil mechanics, structural mechanics, and structural design.

In each course, programs are selected by the student (under supervision of the faculty adviser) in such a way as to meet the student's interests and the requirements of the Graduate School.

See also Master of Engineering degree.

The civil engineering program has no Ph.D. foreign language requirement other than those communication requirements established by the Graduate School.

**Center for Urban Transportation Studies**

The Center for Urban Transportation Studies (CUTS), operating under the Department of Civil and Urban Engineering, was established: (1) to assume a leading role in the Rocky Mountain region in developing research, research facilities, and interdisciplinary graduate programs in urban transportation; and (2) to provide a central resource for information concerning urban transportation problems in the Rocky Mountain region, making available to outside organizations the expertise within the University.

Through CUTS, the departments offer interdisciplinary graduate programs and research opportunities designed to develop professionals who will be capable of dealing with the complex problems of urban transportation in a competent and meaningful manner. Students in these programs are expected to reach significant levels of competence not only in urban transportation but also in at least two relevant minor areas, such as architecture, environmental design, urban planning, business management, geography, political science, public administration, sociology, computing science, and systems analysis.

**COMMUNICATION AND THEATRE**

Applicants are admitted to the graduate program in communication and theatre on the basis of their academic records and on recommendations. While there are no specific prerequisites beyond those required by the Graduate School, students admitted who are unable to offer a substantial number of semester hours of work in the area of their intended specialization or allied fields must expect that a significant number of additional courses and semester hours will be required of them in order to make up deficiencies.

Every student must take a diagnostic examination before completing 9 semester hours.

For every student who declares intention to qualify for an advanced degree, an adviser and committee will be selected not later than the beginning of the student's second semester (or second summer term) in residence. It is the duty of this adviser and committee to assume the responsibility for (1) approving the student's graduate program; and (2) evaluating the student's qualifying examination, thesis, and comprehensive-final examination.

All M.A. degree candidates are required to complete C.T. 601 or its equivalent. At least two courses (4 to 8 hours) must be taken outside the department or outside the departmental area(s) of concentration.

Plan I, With Thesis. After any undergraduate deficiencies have been removed, students under Plan I must normally earn 27 semester hours, of which a minimum of 16 must be earned in one major area. Four to 6 thesis hours may be counted toward the 27-hour requirement.

The Plan II Option without thesis is available at UCD only upon application.

Courses at the 500 level or above may be applied toward the graduate degree by graduate students in communication and theatre. Some courses are available only on the Boulder Campus; inquiry should be made.

The graduate courses in communication and theatre are also applicable to the Master of Humanities program at UCD.

**COMMUNICATION DISORDERS AND SPEECH SCIENCE**

The graduate curriculum in communication disorders and speech science leads to the M.A. and Ph.D. degrees. The major area of emphasis at UCD is language and learning disabilities. Requirements for certification in the state of Colorado and by the American Speech and Hearing Association (ASHA) can be met. The program in communication disorders and speech science is accredited by ASHA. At present, students must take courses on both the Denver and Boulder campuses.

Prospective students should read Requirements for Advanced Degrees and request additional information from the Graduate School Office.
Master's Degree

The M.A. degree plan includes course work in speech pathology, language pathology, learning disabilities, audiology, and education. Clinical and educational practicums with the communicatively disordered are required of all students. Students who do not have an undergraduate degree in the field will also be required to take courses in the basic communication processes.

Students may fulfill the Graduate School requirements for the master's degree by following Plan I or Plan II.

Doctor's Degree

The Ph.D. degree plan is developed with the student's advisory committee to meet the individual interests and needs of each student. In addition to the major sequence of courses and practicum offered in language and learning disabilities, the student must select two or three minor areas of emphasis from this or other departments. A sequence of courses in statistics also is required.

Students must meet requirements of the Graduate School for the doctoral degree as well as 8 hours among the following courses:

C.D.S.S. 795-4. Practicum III: Clinical Supervision
C.D.S.S. 796-2. Practicum IV: Clinical Administration
C.D.S.S. 797-2. Practicum V: Research Coordination
C.D.S.S. 798-2. Practicum VI: Classroom Instruction

COMPUTER SCIENCE

Under the auspices of the Computer Science Department at the University of Colorado at Boulder, the Department of Electrical and Computer Engineering and the mathematics department at UCD are offering a program leading to the M.S. in computer science. The program consists of a core of five courses required of all students and the selection of a specialty field (numerical computation, programming languages, computer systems, management science, or signal processing) in which additional courses are taken.

Students may choose the thesis option (Plan I) or the nonthesis option (Plan II). Those selecting Plan I may register for 4 to 6 semester hours of credit for thesis research, working with a faculty adviser from the Boulder or Denver campus. Those selecting Plan II must take C.S. 701, the master's reading option, offered on the Boulder Campus. In both cases the student's advisory committee usually will consist of faculty from both campuses.

Admission to the program is granted by the Computer Science Department (Boulder). Information on the program can be obtained from the department, 492-7514, the Electrical and Computer Engineering Department at UCD, or Professor Roland Sweet, UCD mathematics department.

ECONOMICS

The M.A. degree in economics is offered at both the Denver and Boulder campuses. The requirements are the same and the examinations are offered jointly, but the emphasis and fields offered differ. The Denver program is oriented toward part-time students concerned with urban problems or seeking to teach below university level. Persons interested in the program should contact the graduate adviser, Professor Alan Shelly.

Requirements for Admission

(Students not meeting these requirements may be admitted provisionally.)

1. General requirements of the Graduate School.
2. Three letters of recommendation.
3. Sixteen semester hours of economics.
4. Acceptable GRE scores.

Degree Requirements

1. Economic Theory: Econ. 507.
2. Quantitative Methods: Econ. 580 (or 480), and Econ. 581.
3. Plan I: An M.A. Thesis. Twenty-four semester hours, of which 12 must be at the 500 level (400 level if taken prior to fall 1975); 4 to 6 semester hours of thesis credit. Thesis credit does not count toward the twelve 500-level hours.
4. Plan II: Without Thesis. Thirty semester hours, of which 16 must be at the 500 level (400 level if taken prior to fall 1975). Two fields of concentration. Each field requires 6 credit hours, but the structure is highly flexible, e.g., one field can be an internship.

EDUCATION

Graduate study in education at the University of Colorado is offered on three campuses (Denver, Boulder, and Colorado Springs) and through 14 program areas. All inquiries regarding programs at UCD should be directed to the Associate Dean's Office, School of Education, University of Colorado at Denver, Denver, Colorado 80202, or to the Associate Dean of the Graduate School at UCD.

A wide range of professional and academic interest is served by these programs. Programs of study can be undertaken in the following areas:

Administration and supervision
Early childhood education
Educational psychology
Elementary education
Foundations of education
Guidance and counseling
(Library media
Reading
Secondary education
(Mathematics education
Science education)

Graduate studies in education are offered at the M.A. (thesis and nonthesis) level. In some instances, doctoral work can be taken at UCD, but only with the prior approval of a student's adviser, and the dean's office on both the Boulder and Denver campuses.

Outlines of each of the graduate programs of study are available upon request from the School of Education Office at UCD. Since many of the graduate degree plans are flexible and can be designed around individual student needs, it is highly desirable that the prospective candidate discuss tentative programs of studies with appropriate faculty members prior to submitting applications.
Application for Admission

A prospective candidate should request application forms from the Associate Dean, School of Education, University of Colorado at Denver. The completed form should be returned to the Associate Dean, School of Education, UCD, together with a $20 application fee. The fee should be in the form of a check or money order payable to the University of Colorado. Two copies of official transcripts of all previous college and university study should be ordered by the applicant to be sent to the associate dean. Four recommendations on the forms provided, or by letter, should be furnished. At least two of these should be from college or university professors who can write with assurance about the applicant’s academic and professional achievement promise. One or two recommendations from supervisors or employers are acceptable with reference to an applicant’s ability and contribution to the enterprise with which he was or is associated. Application papers and all supporting documents (including GRE scores or MAT scores, see below) must be in the associate dean’s office on March 1 for summer, July 1 for fall, and October 1 for spring semester admission.

Applicants should request the Educational Testing Service to send their scores on the aptitude test (verbal and quantitative) of the Graduate Record Examination (GRE), or scores from the Miller’s Analogy Test, to the dean’s office. If an applicant has not taken the Graduate Record Examination or the Miller’s Analogy Test, he should arrange to do so. The GRE or MAT is administered at many centers throughout the country. Information about the GRE may be obtained from the Graduate School Office, the Student Relations Office at UCD, the Educational Testing Service, 20 Nassau Street, Princeton, New Jersey 08540, or the graduate office of a university in the applicant’s area.

Master’s Degree

Two Master of Arts degree plans and a Master of Education plan are available, each comprising one academic year or more of graduate work beyond the bachelor’s degree. The minimum residence requirement for any master’s degree is one academic year or the equivalent, and it may be satisfied by two semesters in residence, or three full summer sessions, or any combination equal to two semesters.

DEGREE REQUIREMENTS

1. M.A. — Plan I (With Thesis). The program consists of 36 semester hours or more, including 4 semester hours for the master’s thesis. While the inclusion of a minor field is not required by the Graduate School, a student and adviser may agree on a minor, in which 4 to 8 semester hours can be applied toward degree requirements.

The M.A. thesis is written in accordance with the specifications set by the Graduate School and under the supervision of the student’s adviser. When a complete first draft is ready for final typing, the thesis must be read by a second reader appointed by the Dean’s office. If the second reader approves the thesis, both the reader and the adviser will sign it when it is presented for filing with the Graduate School. If the reader does not approve, he and the student’s adviser will confer and suggest appropriate changes. Two copies are required by the Graduate School.

2. M.A. — Plan II (Without Thesis). The Plan II program includes 36 or more semester hours of graduate credit, and may include 4 to 10 hours for a minor. The minor is highly recommended in some fields of study.

3. Master of Education (M.Ed.). This program requires a minimum of 36 or more semester hours of graduate work, including a professional report for which 2 semester hours credit is granted. The professional report is prepared under the supervision of the student’s adviser, in accordance with thesis specifications issued by the Graduate School. One copy is submitted to the adviser upon completion, but none is filed with the Graduate School.

EDUCATION AS A MINOR FIELD

In M.A. programs for majors outside the School of Education, students may include education as a minor if both their major department and the dean’s office of the School of Education approve. For master’s degrees, a minor in education consists of at least 6 semester hours of study in related courses. Not more than 2 semester hours may be transferred from another institution.

Students who propose to minor in education must have had sufficient undergraduate work in education to prepare them for graduate study in the field. Appraisal of undergraduate preparation will be made by the dean’s office and the coordinator of the program area in which the proposed minor courses will be taken.

ELECTRICAL ENGINEERING

Electrical engineering graduate programs at UCD are offered through the combined Departments of Electrical Engineering (Boulder) and Electrical and Computer Engineering (Denver).

Students can undertake studies toward the M.S. and Ph.D. degrees at UCD in the areas of communication and information systems, computer hardware and software, control systems, electro-optics and holography, circuits and electronics, fields and propagation, and power systems.

A student wishing to pursue work in electrical engineering should read carefully the Requirements for Advanced Degrees section in this bulletin. He should also obtain a copy of the specific electrical engineering requirements by writing to the Director of Graduate Admissions, Electrical Engineering Department, University of Colorado at Boulder, Boulder, Colorado 80309. Special students and those intending to pursue a graduate program at UCD are urged to consult the departmental representative as part of their application procedure.

Master’s degree students are expected to present a thesis unless specifically exempted by the department.

The Ph.D. preliminary examination will include the following areas:
Bioengineering
Circuits (active, passive, models)
Communication theory
Computers
Control systems
Electric and magnetic fields
Energy conversion
Mathematics
Physical and semiconductor electronics

Each student must complete two sections, mathematics and the area in which he plans to specialize, and must present an acceptable master's thesis or the equivalent as an indication of ability to perform independent research.

ENGINEERING, MASTER OF

The Master of Engineering degree program is administered by the Graduate School through the departments of engineering. The requirements for admission and for quality and quantity of academic work are essentially the same as for the Master of Science degree awarded in the College of Engineering and Applied Science. The degree is awarded by the Boulder campus only, although sufficient courses exist at UCD to allow for completion of course requirements here.

The principal difference between the Master of Engineering degree and the Master of Science degree is that the Master of Engineering is intended especially to meet the needs of those practicing engineers who wish to follow an integrated, interdisciplinary program of studies in engineering and allied subjects related to the individual student's professional work. Examples of such interdisciplinary programs include engineering and social sciences, engineering and biological sciences, engineering and behavioral sciences, engineering and public administration, engineering and law, and engineering and business administration.

A successful program to meet these needs requires greater flexibility in operation than is normally possible or intended under the existing Master of Science degree program.

The degree will be especially valuable for continuing education programs for engineers in industry. It will provide a framework for such persons to work toward significant goals fitted to their particular interests. The program will make effective use of the present TV tape program for offering engineering courses from the University (the ACE program). The ACE program, plus extended use of live TV offerings, will make the program available on a comprehensive basis at various areas throughout the state.

The Master of Engineering degree is not intended as a means to permit a random, unguided selection of courses. Each prospective student is required to present a well-defined objective in order to be admitted to the program. In consultation with the faculty advisers, an academic program is developed to meet this objective.

The requirements for the degree are 30 credit hours plus a written report on a creative investigation which may be related to the student's professional work. The report will be of the same general quality as that required for the thesis for the Master of Science degree and must be defended orally, but does not in itself carry credit nor require registration. It may be based upon work done for credit under independent study. At least 15 credit hours must be in engineering at the 500 level or above. As many as 15 credit hours may be taken outside of engineering. Credit in courses below the 400 level will not apply toward degree requirements.

Requirements for the following are the same as for the Master of Science degree awarded by the College of Engineering and Applied Science: admission to Graduate School, application procedures, registration, quality of graduate work, status, credit by transfer, residence, admission to candidacy, and time limit.

The admission of each student to graduate study, the approval of his degree program, admission to candidacy for the degree, and the approval of the awarding of a degree are to originate through a specific department of the College of Engineering and Applied Science, in the same manner as for the established Master of Science program. An advisory committee, including not fewer than three faculty members, will be appointed for each student by his department. The membership of each advisory committee shall be chosen from the various interdisciplinary academic areas represented in the student's program and will be from more than one department. The advisory committee guides the student, and is responsible for approving the individual's degree program and admission to candidacy; and approves the student's written report and the awarding of the degree.

Additional information about the degree may be obtained from the University of Colorado at Boulder Catalog, the Graduate School on the Boulder Campus, or College of Engineering and Applied Science departmental offices on the Boulder and Denver campuses.

ENGLISH

Students admitted to graduate study in English may complete all or substantially all of their course requirements for either the M.A. or Ph.D. at UCD; examinations are administered through the English Department on the Boulder Campus.

Admission requirements for graduate study in English include satisfactory scores on verbal and advanced (literature) parts of the Graduate Record Examination, plus at least 24 semester hours in English (exclusive of composition, creative writing, speech, and literature courses counting as credits in education, but including 6 hours of Survey of English Literature), of which at least 16 semester hours must be in upper division work.

Students wishing to pursue graduate work in English should note Requirements for Advanced Degrees in this bulletin. They also should obtain a copy of the brochure, Graduate Study in English, issued by the English department and should consult the director of graduate English studies at UCD.

All students planning to take any graduate English examination must state their intentions to the director of graduate English studies at UCD at least ten weeks prior to the date of the examination.

The graduate courses in English are also applicable to the Master of Humanities program at UCD.
ENVIRONMENTAL SCIENCE

A Master of Science degree in environmental science is offered through cooperation between the College of Engineering and Applied Science and the College of Liberal Arts and Sciences. For further details contact the associate dean of the Graduate School at UCD.

FINE ARTS

Some course work at the graduate level can be taken at UCD in the discipline, but degree programs must be completed through the University of Colorado at Boulder. Courses at the 400 level also may be used for graduate credit as part of the minor; 500-level courses are open to qualified seniors.

The graduate courses in fine arts are also applicable to the Master of Humanities program at UCD.

FRENCH

At present UCD offers no French courses above 599. The courses at the 500 level are applicable to an M.A. degree through the University of Colorado at Boulder, depending upon degree plan approval by the graduate adviser in Boulder in each case. The graduate courses in French are also applicable to the Master of Humanities program at UCD.

GEOGRAPHY

An M.A. degree program is offered at UCD emphasizing the spatial analysis of a variety of urban phenomena. Areas of specialization include urban economic/social geography, transportation, quantitative methods, urban microclimatolgy, demography, land use, perception, and environmental planning. Graduate training toward the Ph.D. degree is also available at UCD, but applications are presently processed by the departmental office on the Boulder campus. Flexible programs are designed to meet the needs of both full- and part-time students.

All incoming graduate students will be required to complete Geog. 618 (Seminar in Geographic Problems). This orientation and diagnostic seminar emphasizes research methods and their application to selected topics. Each student's performance will be evaluated by the faculty to: (1) determine the general fitness of the student to continue toward the M.A. degree and (2) identify any academic deficiency the student may have.

For admission to the M.A. program, the student must have a bachelor's degree in geography or some allied field. Applicants with little or no training in geography may be required to take additional course work in areas deemed necessary for completing graduate work. The GRE verbal and quantitative examinations, or their equivalent for foreign students, are required of all applicants.

GEOLOGICAL SCIENCES

Course work at the graduate level can be taken at UCD in this discipline, but degree programs must be completed through the University of Colorado at Boulder.

HISTORY

As general preparation for graduate work in history, it is desirable for a student to have had undergraduate courses in government, geography, and economics as well as a major in history. Candidates for graduate degrees may be required to pursue such fundamental courses in history as the department deems necessary to provide sufficient bibliographical background.

The candidate for degree status is required to take the verbal section of the Graduate Record Examination before enrolling in the discipline's graduate program, and demonstrate adequate informational background for candidacy. The advanced history section of the GRE is recommended but not required.

While it is possible to obtain the M.A. degree in two full semesters of residence, it is frequently advisable and at times necessary that more time be spent in graduate work.

Degree Requirements

There are two options for fulfilling M.A. degree requirements. A student may take 30 semester hours of course work or 24 semester hours plus a thesis. The department strongly recommends the latter option. A comprehensive written examination must be passed before the degree is awarded. Before beginning graduate work, the student should seek guidance in course selection from members of the history faculty.

HUMANITIES, MASTER OF

The Master of Humanities is an interdisciplinary degree offered at UCD. Its purpose is to provide an opportunity for students to broaden their understanding of the relationships among the several areas normally subsumed under the heading of humanities, e.g., communication, philosophy, the arts, literature, and the languages. The M.H. program is especially suitable for the many high school, junior high school, and elementary school teachers who find themselves in the position of having to teach in several different areas of the humanities. However the M.H. program is by no means restricted to teachers.

All courses required for the M.H. degree are offered at UCD.

Admission

Each student is required to take the Graduate Record Examination aptitude test as an aid in the planning of his studies for the degree.

Before entering the M.H. program, a student is expected to have had at least 40 semester hours in the humanities. Humanities, as used here, is broadly conceived to include general studies in communication, theatre, philosophy, literature, the arts, the languages, and other areas as agreed upon by the student and the Graduate School.

General requirements of the Graduate School governing the awarding of the master's degree apply.
Degree Requirements

All courses credited toward the M.H. degree must be taken at the University of Colorado over a period not exceeding five years or six successive summers. The M.H. degree program shall be supervised by an advisory committee consisting of three members of the graduate faculty, each from a different area of the humanities.

In addition to the 6 hours for Hum. 500 and 501 (described below), candidates for the M.H. degree are expected to complete a minimum of 24 semester hours at the 500 level or higher in four of the following areas (i.e., 6 hours in each of four areas):

<table>
<thead>
<tr>
<th>Communication</th>
<th>History</th>
</tr>
</thead>
<tbody>
<tr>
<td>English</td>
<td>Music</td>
</tr>
<tr>
<td>Fine arts</td>
<td>Philosophy</td>
</tr>
<tr>
<td>French language and literature</td>
<td>Spanish language and literature</td>
</tr>
<tr>
<td></td>
<td>Theatre</td>
</tr>
</tbody>
</table>

Up to 6 hours in areas other than those listed above may be accepted as humanities as agreed upon by the student and the advisory committee.

The requirement of 6 hours in each of four areas is intended to insure that the student achieves a considerable degree of breadth. On the other hand, this requirement should not be construed as precluding the student from doing additional work in one particular field in order to achieve further depth.

Within one calendar year of entering the M.H. program, the student is required to take Hum. 500 and 501. These are 3-credit seminars which deal with the identity of the humanities, their place in the life of man, the various media through which they manifest themselves, and related matters. Hum. 500 and 501 count as part of the 30 hours required for the M.H. degree. Twenty-four of the required hours will be taken in the disciplines listed above, the remainder to be completed through Hum. 500 and 501.

Before completing 15 hours of course work toward the M.H., the student must meet with an advisory committee to plan the directions and emphases for the remainder of studies for the degree.

After completing the 30 hours required for the degree, the student is required to pass a comprehensive examination covering three of the four areas in which course work has been concentrated. It should be stressed that this examination is not a combination of three different master's degree examinations; rather, it is an opportunity for the student to display, and the faculty to view, the student's expertise in combining significant aspects of three different fields, bringing major trends and ideas of the fields into meaningful relationships with each other. The examination will be composed and administered by the student's advisory committee.

After satisfactory completion of the comprehensive examination, the student must present a final thesis or project. This is a substantial scholarly and/or creative exercise involving three different humanistic areas. It is supervised by the student's advisory committee and must be performed or presented before an open seminar consisting of the committee and any other faculty members who wish to attend. The approved thesis or report of thesis-performance shall be recorded in the Graduate School.

Throughout this work toward the M.H. degree, the student must uphold the high standards of the Graduate School, maintaining at least a B average in all courses taken subsequent to his admission to the M.H. program.

Required Courses

The only courses specifically required for the M.H. degree are the new Hum. 500 and 501 described above.

The 24 hours (in addition to Hum. 500 and 501) required for the degree will normally be drawn from 500-level courses which already exist at UCD.

The language requirement for the M.H. degree is fourth-semester proficiency in a language relevant to the student's particular course of study. Such relevancy will be decided upon by the student's advisory committee.

For further information about the Master of Humanities degree program students should contact the Division of Arts and Humanities.

MATHEMATICS

Two graduate degrees may be earned in mathematics: the M.A. in mathematics and the M.S. in applied mathematics. (Also see Master of Basic Science.) It is the responsibility of each individual student to see that the requirements for these degrees are satisfied at the proper time.

To begin graduate work toward one of the above degrees, a student should have at least the following preparation: 30 semester hours in mathematics including, beyond a full course in calculus, a year's course in advanced calculus, 3 semester hours of linear algebra and either a 3-semester-hour course in higher algebra or a 3-semester-hour course in ordinary differential equations.

Students who do not have all the prerequisites for one of the advanced degrees may still be admitted provisionally if, in the faculty's judgment, their record justifies this (but also see the Graduate School admission requirements).

For a mathematics minor for a graduate degree, a full course in calculus is prerequisite.

Requirements for the M.A. and M.S.

The student must present 30 hours of course work, including a 6-hour minor. All mathematics courses submitted must be numbered 500 or higher. If the minor is taken outside of mathematics, the minor courses must be numbered 400 or higher.

These 30 hours must include at least two of the following two-semester sequences. See the Schedule of Courses for courses offered.

- Math. 511-512. Theory of Numbers
- Math. 513-514. Abstract Algebra
- Math. 515-516. Linear Algebra
- Math. 521-522. Projective Geometry
- Math. 531-532. Real Analysis
- Math. 535-536. Complex Variables
- Math. 537-538. Topics in Applied Mathematics
- Math. 541-542. Calculus of Variations
- Math. 553-554. Mathematical Physics
Candidates should make personal inquiry at UCD about arranging, sound synthesis and recording, and music and concentration unique to UCD include composition and requirements.

Math. 560-561. Numerical Analysis
Math. 571-572. Logic
Math. 573-574. Set Theory
Math. 581-583. Statistics and Probability
Math. 581-587. Statistics
Math. 583-585. Probability

A two-hour written examination will be given on the content of the two sequences and two other one-semester courses that the student offers for the degree.

There is no thesis requirement for either degree.

There is no foreign language requirement for either master's degree. However, students who may want to continue for a Ph.D. should satisfy at least one of the foreign language requirements before obtaining a master's degree.

Mathematics offers a wide assortment of programs leading to a master's degree. All programs must be planned in consultation with and approved by a mathematics graduate adviser.

**Suggested M.A. in Mathematics**

**FIRST YEAR**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Description</th>
<th>Semester Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>Math. 515-516</td>
<td>Linear Algebra I, II</td>
<td>6</td>
</tr>
<tr>
<td>Math. 535-536</td>
<td>Functions of a Complex Variable I, II</td>
<td>6</td>
</tr>
<tr>
<td>Minor</td>
<td></td>
<td>3</td>
</tr>
</tbody>
</table>

**SECOND YEAR**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Description</th>
<th>Semester Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>Math. 513-514</td>
<td>Modern Algebra I, II</td>
<td>6</td>
</tr>
<tr>
<td>Math. 531-532</td>
<td>Introduction to Real Analysis I, II</td>
<td>6</td>
</tr>
<tr>
<td>Minor</td>
<td></td>
<td>3</td>
</tr>
</tbody>
</table>

Total: 30

**Suggested M.S. in Mathematics**

**FIRST YEAR**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Description</th>
<th>Semester Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>Math. 560-561</td>
<td>Numerical Analysis I, II</td>
<td>6</td>
</tr>
<tr>
<td>Math. 543</td>
<td>Ordinary Differential Equations</td>
<td>3</td>
</tr>
<tr>
<td>Math. 549</td>
<td>Introduction to Partial Differential Equations</td>
<td>3</td>
</tr>
<tr>
<td>Minor</td>
<td></td>
<td>3</td>
</tr>
</tbody>
</table>

**SECOND YEAR**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Description</th>
<th>Semester Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>Math. 505</td>
<td>Topics in Combinatorial Analysis</td>
<td>3</td>
</tr>
<tr>
<td>Math. 507</td>
<td>Advanced Calculus III</td>
<td>3</td>
</tr>
<tr>
<td>Math. 537-538</td>
<td>Topics in Applied Mathematics</td>
<td>6</td>
</tr>
<tr>
<td>Minor</td>
<td></td>
<td>3</td>
</tr>
</tbody>
</table>

Total: 30

**MUSIC**

Graduate study in music at UCD is presently offered in several cooperative programs with the University of Colorado at Boulder. Varying amounts of work toward the Master of Music Education and the Master of Music degrees may be taken in Denver. Admission to these programs is achieved by application to the Office of the Associate Dean for Graduate Study, College of Music, in Boulder.

Postbaccalaureate study in the special areas of concentration unique to UCD include composition and arranging, sound synthesis and recording, and music and media. Since these are innovative programs, prospective candidates should make personal inquiry at UCD about requirements.

The music educator intending to undertake graduate work will find the UCD programs attractive, particularly if he or she has special interests in jazz, rock, improvisation, sound synthesis and recording, and the repertory associated with today's youth.

The composer-arranger-performer-producer who seeks graduate training in the fields of recording, television, and music for advertising also will find UCD responsive to his or her needs.

**Applied Music Policy**

All performance standards, requirements, and credits specified for a particular music degree in this college do not necessarily transfer and become acceptable for any other music degree within the college. Additional information on this policy is available from the Office of the Associate Dean, UCD College of Music.

**PHILOSOPHY**

Applicants for admission to the Graduate School for work toward an M.A. or Ph.D. degree in philosophy are expected to have had 18 or more semester hours in undergraduate courses in the subject, including history of philosophy. While some course work at the graduate level may be taken at UCD in this discipline, all degree programs must be arranged through the University of Colorado at Boulder.

Students wishing to pursue graduate work in philosophy should note Requirements for Advanced Degrees in this bulletin and should obtain from the department a copy of the Graduate Program in Philosophy. The Graduate Record Examination is not required.

Certain special programs exist (M.A.'s in comparative East/West philosophy and in history and philosophy of science), details of which may be had on request.

**PHYSICAL EDUCATION**

A variety of graduate-level courses in health, physical education, and recreation can be taken at UCD. At the present time, the degree program must be completed through the University of Colorado at Boulder. Courses at the 500 level are available to qualified students. For further information, contact the School of Education.

**PHYSICS**

While some course work at the graduate level may be taken at UCD in this discipline, all degree programs must be arranged through the University of Colorado at Boulder. Physics courses at the 400 level may be used for graduate credit for students in nonphysics graduate programs.

**POLITICAL SCIENCE**

**Admission to the M.A. Program**

Students applying for admission to the M.A. program in political science normally should present at least 18 hours of undergraduate or previous graduate work in
political science, at least 9 hours of which should be at the upper division or graduate level. Deficiencies may be made up at UCD by enrolling in political science courses as a special student. Deficiencies usually must be made up before the student will be admitted as a regular degree student, and the work involved will be in addition to the minimum hourly requirements for the degree. Graduate Record Examination aptitude scores are required of applicants. The department may make exceptions to these requirements in unusual cases (for instance, where course work in related fields such as psychology, economics, and history, or practical political experience, compensate for course work deficiencies in political science).

**Master of Arts in Political Science**

The degree requirement shall consist of at least 25 semester hours of work at the graduate level, including at least one seminar in each of three broad areas of political science—American, foreign, and theory—and at least one additional graduate seminar in political science. The other 13 hours may be distributed among other political science seminars, the master’s thesis (4 hours), and a maximum of 9 hours combined in independent study and work in cognate disciplines (but not more than 6 hours of either).

Emphasis of the political science discipline at UCD is on critical perspectives, creative teaching and writing, interdisciplinary work, experiential involvement, and cooperative research projects. Close and continuing contact among students and between faculty and students is encouraged.

**SOCIAL SCIENCE, MASTER OF**

The Master of Social Science (M.S.S.) graduate degree program was instituted at UCD in fall 1978 to provide students with an opportunity for urban-oriented, interdisciplinary, liberal education in the social sciences. All courses required for the degree are offered at UCD. Because courses also can be taken at the University of Colorado at Boulder, the range of course work possible is large.

General rules for admission to the Graduate School apply. A student is expected to have completed at least 30 semester hours of undergraduate work in any combination of anthropology, economics, social or economic geography, psychology, history, political science, or sociology.

The M.S.S. degree gives students wide latitude in designing their programs to satisfy their unique educational needs. Candidates must complete 36 semester hours of credit: at least 18 hours of course work at the 500 level and above (9 hours of which must be graduate level seminars usually taught at the 600 level). Up to 6 hours of the 36 may be for thesis credit, or taken as Soc. Sci. 610 to complete a research, an internship, or a work-related project.

For further information contact the UCD Division of Social Sciences, telephone 629-2616.

**PSYCHOLOGY**

The M.A. program offers a specialty in child development, and is appropriate for persons who will have responsibility for implementing and evaluating child care delivery programs, as well as for those with research and/or service functions associated with early psychological development.

Students wishing to pursue graduate work leading to the Master of Arts degree should read Requirements for Advanced Degrees. The GRE (verbal and quantitative) Aptitude Tests and Advanced Test in Psychology are required. The master’s degree program is the only graduate program in psychology offered at UCD. Any questions should be directed to Professor Graham M. Sterritt, director of the graduate program, or to the Graduate School.

**SOCIOLOGY**

The M.A. degree in sociology offered at UCD has an urban focus with an applied emphasis. The urban sociology program is designed to complement professional degree programs in environmental design, medicine, nursing, community health, physical engineering, public and business administration, education, and fine arts by providing advanced seminars, and planning and research opportunities in urban theory and methodology.

**Requirements for Admission**

1. General requirements of the Graduate School.
2. A combined grade-point average of at least 3.0 for all courses taken in sociology as an undergraduate or graduate prior to admission.
3. Three letters of recommendation.
4. A statement specifying the purpose and goal of advanced study.

**Degree Requirements**

1. Completion of a minimum of 30 semester hours of approved graduate work.
2. Completion of a project in the format of an article prepared and submitted for publication in a relevant professional journal.
3. Sociological theory sequence—6 hours (Soc. 515 and 516).
4. Research methods sequence—6 hours (Soc. 507 and 508).
5. Area of concentration—14 to 16 hours.
6. Passing of comprehensive-final examination.

**SPANISH**

At present UCD offers no Spanish courses above 599. The courses at the 500 level are applicable to an M.A. degree through the University of Colorado at Boulder, depending upon degree plan approval by the graduate adviser in Boulder in each case. The graduate courses in Spanish are also applicable to the Master of Humanities program at UCD.
INFORMATION ABOUT THE COLLEGE

Study of the liberal arts and sciences aims to develop human potential in order to bring the best of human intellect and emotion to bear on the experiences and challenges of life. By providing a broad educational foundation, the arts and sciences prepare students to initiate careers, to change careers in midlife, to pursue advanced study in a discipline, to study for a professional career such as law or medicine, and, in general, to lead a rewarding and productive life. The curriculum helps students to increase substantive knowledge, to learn skills such as logical argument and clear expression, to gain new insights about relationships in nature and society, to develop critical thought and interpretive ability, to solve complex problems rationally, and to heighten aesthetic appreciation.

To accomplish these aims, the College of Liberal Arts and Sciences supports a vigorous interaction between faculty and students. A young and dedicated faculty with strong academic credentials is committed to highly motivated urban students who represent a broad range of age and experience. Thus, the curriculum of the College maintains traditionally high university academic standards while providing numerous flexible learning opportunities to meet the varied objectives of university students from the Denver metropolitan area. At the undergraduate level, the College offers a high-quality liberal educational program that also prepares students for subsequent professional and graduate study. At the graduate level, the College offers students disciplinary and broad interdisciplinary master's degree programs which may serve as a means of beginning study towards doctoral degrees.

Because students are consulted and involved in the design of both undergraduate and graduate programs, the curriculum of the College reflects the concerns of Denver area students. There are many opportunities to study urban problems, confront contemporary issues, participate in off-campus working internships, and in general make use of the resources of the city. To accommodate the many students who are employed full time during the day, about half of all courses offered by the College are scheduled after 5 p.m.

Many students enroll in the College of Liberal Arts and Sciences to study the liberal arts and participate in the general education associated with the B.A. or B.F.A. degree as an end in itself. Upon receiving a degree, some students decide to continue study at the graduate level. Others set aside further formal study and initiate careers. Because a liberal education provides a broad foundation in problem-solving skills and substantive knowledge that can be widely applied, graduates of the College have begun careers in a variety of positions in industry, commerce, and government.

Many students also enroll in the College of Liberal Arts and Sciences specifically to prepare themselves for admission to one of the professional schools of the University, which include the School of Dentistry, School of Education, College of Environmental Design, School of Journalism, School of Law, School of Medicine, School of Nursing, School of Pharmacy, and Graduate School of Public Affairs. The specific admission requirements for each of these professional schools can be met in the College of Liberal Arts and Sciences.

The faculty of the College provide instruction at the undergraduate level through three academic divisions: Arts and Humanities, Natural and Physical Sciences, and Social Sciences. Each division offers a wide variety of curricula including traditional undergraduate major programs, interdisciplinary studies, and preprofessional programs.

The degrees offered by the College at the undergraduate level are the Bachelor of Arts (B.A.) and Bachelor of Fine Arts (B.F.A.). A number of degrees are offered at the graduate level.

MAJOR PROGRAMS

Students can earn the Bachelor of Arts (B.A.) degree in the following areas:

<table>
<thead>
<tr>
<th>Anthropology</th>
<th>Biology</th>
<th>Chemistry</th>
</tr>
</thead>
<tbody>
<tr>
<td>Communication and theatre</td>
<td>Economics</td>
<td>English</td>
</tr>
<tr>
<td>English Writing Program</td>
<td>Ethnic studies</td>
<td>Fine arts (students may study for either a B.A. or B.F.A. degree)</td>
</tr>
<tr>
<td>French</td>
<td>Geography</td>
<td>German</td>
</tr>
<tr>
<td>History</td>
<td>Mathematics (students may also choose a special computer science option)</td>
<td>Philosophy</td>
</tr>
<tr>
<td>Physics</td>
<td>Political Science</td>
<td>Psychology</td>
</tr>
<tr>
<td>Sociology</td>
<td>Spanish</td>
<td>Sociology</td>
</tr>
<tr>
<td>Urban studies</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Special options are available for those students who would like to distribute their major program studies among two or more disciplinary majors (distributed studies) or who would like to propose a unique major...
program tailored to meet a specific objective (individually structured major).

The College also provides the necessary course work to prepare students for careers in elementary or secondary teaching, journalism, and law, as well as the following health science fields: child health associate, dental hygiene, dentistry, medical technology, medicine, nursing, optometry, osteopathy, pharmacy, physical therapy, podiatry, and veterinary medicine.

Double Majors

Students may graduate with more than one major (e.g., mathematics and French) by completing all requirements for both majors.

Second Degrees

Students who have been awarded a bachelor's degree (either from the College or elsewhere) may be granted a second bachelor's degree provided that (a) all general requirements for the degree have been met; (b) the major for the second bachelor's degree is different from the major for the first; and (c) at least 30 hours are completed in this College after admission to the second degree program.

Double Degrees

Students may earn two degrees from the University of Colorado simultaneously by fulfilling all requirements for both degrees. The College of Liberal Arts and Sciences requires that a student complete at least 90 liberal arts credits and 150 total credits in order to be granted two bachelor's degrees.

It is recommended that students planning one of these multiple programs consult with the College Advising Office at the earliest possible date.

Note: Graduate degree programs offered by the faculty of the College through the Graduate School are described in the Graduate School section of this bulletin.

ACADEMIC POLICIES

Students are referred to the General Information section of this bulletin for a description of academic policies that apply to all undergraduate students at UCD. The policies which follow apply specifically to the College of Liberal Arts and Sciences.

Academic Ethics

Students are expected to conduct themselves in accordance with the highest standards of honesty and integrity. Therefore, the faculty assumes that term papers, reports, studio work, results of laboratory experiments, and examinations submitted by the student represent the student's own work. Students are referred to the Statement on Academic Honesty of the College of Liberal Arts and Sciences, available from the Office of the Dean, for guidance on generally acceptable limits on cooperation in the preparation of academic work, and for a discussion of what constitutes academic dishonesty.

Academic dishonesty, such as plagiarism or cheating, is a serious charge which, if substantiated, may result in course failure, probation, suspension, or expulsion from the University. The Academic Ethics Committee, composed principally of faculty and students, is charged by the faculty of the College with considering evidence in contested cases, determining guilt or innocence, and assessing penalties. Special rules of the committee, available from the Office of the Dean have been designed to insure due process.

Transfer Students

Students who have attended another college or university are expected to meet the general requirements for admission of transfer students as described in the General Information section of this bulletin. Applicants who have been away from a college environment for more than three years will be considered on the basis of all factors available: high school record, test scores, original college admission qualifications, college performance, and interim experiences that might suggest potential success in the College of Liberal Arts and Sciences. A maximum of 72 semester hours taken at a community college may be applied toward a degree in the College.

MSC Cross-listed Courses

During the 1979-80 academic year the College of Liberal Arts and Sciences cross-listed many undergraduate courses with two schools at Metropolitan State College, the School of Liberal Arts and the School of Science and Mathematics. These cross-listed courses were taught by either UCD or MSC faculty and counted as University of Colorado credit, not as transfer credit. For the academic year 1980-81 and beyond, the College of Liberal Arts and Sciences will continue to work with the two schools at MSC in an effort to make courses easily available to the students of both institutions through a simplified registration process.

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Academic Advice and Information

Students in the College are expected to assume the responsibility for planning their academic programs in accordance with College rules and policies and major requirements. To assist students, the College maintains an advising staff located in the UCD Administration Building, Room 204, telephone 629-2555. Students are urged to consult with the staff of this office concerning individual academic problems and progress toward their degrees.

As soon as the student has determined a major, he or she must declare the major to a department adviser. The department adviser will be responsible not only for the student's advising but also for the certification of the completion of the major program for graduation.

Students planning to earn a degree from one of the professional schools should see an adviser in that school. Each professional school has certain specific requirements. Preprofessional health science students should see a member of the Health Careers Committee during their first year in the College. Appointments should be made through the sciences secretary in Room EC 232, 629-2646.

The College has organized a Pre-Law Advising Committee for the purpose of advising all UCD students who are interested in careers in law. This committee has a library of law school catalogues, pre-law handbooks, and other relevant documents, advises individual students, interviews students who need to secure a dean's letter for application to certain law schools, and sponsors meetings at which information of interest to pre-law students is shared. Students may contact the Committee through the Office of the Dean, telephone 629-3396.

UCD also has a counseling service available through the Office for Student Affairs to which a student may go for assistance with personal problems.

Career counseling is available to all students with majors in the College of Liberal Arts and Sciences. Assistance in skills analysis, resume preparation, and career exploration is available through the Office of the Dean, telephone 629-3396.

Academic Probation and Scholastic Suspension

Good academic standing in the College requires a grade-point average of 2.0 (C) on all University of Colorado course work. Grades earned in another college or school within the University of Colorado are used in determining the student's scholastic standing and progress toward the degree. However, grades earned at other institutions are not used in calculating the grade-point average at the University of Colorado.

ACADEMIC PROBATION

Students whose cumulative grade-point averages fall below a 2.0 (C) at the end of the fall or spring semester will be placed on academic probation for the following semester. Students will be informed in writing concerning the grade-point requirements which must be met by the end of the succeeding semester. The grade-point requirements are listed in the table below. Students must continue to meet the required grade-point average each semester until their cumulative grade-point average is a 2.0. At that time students will be removed from probation.

SCHOLASTIC SUSPENSION

Students on academic probation who do not meet the required grade-point average in the succeeding semester will be suspended from the College for one year. Scholastic records of students are reviewed as soon as grade reports are available at the end of the fall and spring semesters. Students are informed in writing of scholastic suspension.

<table>
<thead>
<tr>
<th>Hours Deficient</th>
<th>Grade-Point Average in the Most Recent Semester</th>
</tr>
</thead>
<tbody>
<tr>
<td>1-10</td>
<td>2.2</td>
</tr>
<tr>
<td>11-20</td>
<td>2.3</td>
</tr>
<tr>
<td>21-30</td>
<td>2.4</td>
</tr>
<tr>
<td>Over 30</td>
<td>2.5</td>
</tr>
</tbody>
</table>

The number of hours deficient is equal to the number of credit hours of B work that the student must earn to raise the cumulative G.P.A. to 2.0 (C). For example, if the student has attempted 24 semester hours and has earned 42 grade points, the G.P.A. is 1.75. The student needs 6 semester hours of B to raise the G.P.A. to 2.0. To calculate the hours of B that are needed, multiply the total hours attempted by 2 and subtract the number of grade points from this figure. Example: 24 semester hours attempted x 2 = 48; 48 - 42 grade points = 6 semester hours of B needed or 6 hours deficiency.

In attempting to raise a grade-point average while suspended, a student may register for courses in the University of Colorado summer term on any campus, for correspondence study through the University, or for credit courses offered through the Division of Continuing Education.

FIRST SUSPENSION

The normal period of suspension is two regular semesters (one academic year, excluding summer term), after which the student will automatically be readmitted on probation to the College of Liberal Arts and Sciences. The student then will be expected to meet the sliding scale (based on the student's University of Colorado record only) until the cumulative G.P.A. reaches 2.0. Failure to do so will result in a second suspension.

A student under a first suspension may be readmitted before the end of the normal suspension period only if the student has demonstrated academic improvement in one of the following ways:

1. By achieving a cumulative 2.5 average on all summer or correspondence work attempted at the University of Colorado since suspension. (A student must register for a minimum of 6 credits in the summer term on any campus, through correspondence work, or through credit courses in the Division of Continuing Education.)
2. By raising the cumulative grade-point average to 2.0 through correspondence or summer work at the University of Colorado.
3. By raising the cumulative grade-point average to 2.0 at another institution. (The cumulative grade-point average is defined in this instance as the grade-point average at the University of Colorado in combination with course work taken at all other institutions.) Upon return to the University, however, the student retains his or her previous grade-point average. The G.P.A. from other institutions does not transfer back to the University of Colorado.

SECOND SUSPENSION

A student suspended for a second time will be readmitted only under unusual circumstances and only by petition to the Academic Standards Committee of the College of Liberal Arts and Sciences. Each petition will be examined individually. The committee will expect the student to show that chances for successful completion of an educational program in the College have been materially improved by factors such as increased maturity or a relief from stressful circumstances. The deadline for petitions to the Academic Standards Committee for reinstatement for any fall semester is August 1; for reinstatement for any spring semester, the deadline is December 1.

A student who completes 12 or more semester hours at another institution must apply for readmission to the University of Colorado as a transfer student, regardless of his or her status in the University of Colorado. He or she also must present a 2.0 cumulative grade-point average on all collegiate work attempted (at the University of Colorado and elsewhere) in order to be considered for readmission.

Petitioning for Special Requests or Exceptions to Standing Academic Policy

The Academic Standards Committee is responsible for the administration of the academic policies of the College as established by the faculty. This faculty-student committee constitutes the bridge between the faculty in its legislative capacity and the students upon whom the legislation comes to bear. The committee alone is empowered to grant waivers of exemptions from and exceptions to the academic policies of the College. Students wishing to submit a petition to the committee should meet with the advising staff first to discuss the petition.

One of the major responsibilities of the committee is the handling of suspension and reinstatement of suspended students. The normal period of suspension is two regular semesters (one academic year, excluding summer term). However, students suspended a second time will be reinstated only under unusual circumstances and only by petition to the committee.

Course Load

The normal course load is 12 to 18 semester hours each semester. Students registered for fewer than 12 hours are regarded as part-time students. Students wishing to register for 19 hours or more must obtain approval from the dean. Designation as a part-time or full-time student depends only upon courses taken for credit in the University and does not include correspondence courses or noncredit courses. 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 should register for course loads they can expect to complete without unusual difficulty. Recommended course loads are given below, but each student must weigh his or her own abilities and assess the demands of each course in determining an appropriate schedule. The College assumes that all courses selected will be completed.

- Employed 20 hours per week — 10 to 13 semester hours, or three to four courses.
- Employed 30 hours per week — 8 to 11 semester hours, or three courses.
- Employed 40 hours per week — 6 to 9 semester hours, or two or three courses.

Summer Term: Since the summer term is only 10 weeks long, the recommended course load is less than in the fall and spring.

- Employed fewer than 15 hours per week — 9 semester hours, or three courses.
- Employed 15 to 30 hours per week — 6-8 semester hours, or two courses.
- Employed over 30 hours per week — 3-5 semester hours, or one course.

Courses taken at the University of Colorado at Boulder and the University of Colorado at Colorado Springs, and interinstitutionally with MSC and CCDA, are included in the total load.

Note: 6 semester hours is considered a full load in the summer term. Maximum course load is 9 semester hours. Students wishing to register for 10 hours or more must obtain approval from the dean.

Earning Academic Credit—Special Options

Students in the College may earn credit toward a degree for knowledge gained prior to enrollment in the College or for knowledge gained outside of College courses. Some specific programs by which credit is awarded include Credit by Examination, Advanced Placement, and the College-Level Examination Program. These are described in the General Information section of this bulletin. In addition, credit may be earned for Cooperative Education, Army ROTC, and the following activities.

CORRESPONDENCE STUDY

Students in the College of Liberal Arts and Sciences, with the approval of the dean, may take work in correspondence study offered by the University's Division of Continuing Education. A maximum of 30 hours of correspondence work may count toward the degree.

CREDIT FOR COURSES IN THE PROFESSIONAL SCHOOLS AND IN PHYSICAL EDUCATION

Students may count toward the Bachelor of Arts and
Bachelor of Fine Arts degrees as many as 24 semester hours of course work from curricula leading to degrees other than the B.A. (business, engineering and applied science, environmental design, journalism, music, nursing, and pharmacy). College of Liberal Arts and Sciences students desiring secondary school certification will be allowed to take up to 37 semester hours in the certification program of the School of Education as part of their total required hours for the Bachelor of Arts degree. Students desiring elementary education certification will be allowed up to 44 hours in the certification program. Vocational and technical courses from a two-year program may not be included. Activity courses in physical education, up to a maximum of 8 semester hours, will count toward the 120 hours required for the degree.

CREDIT FOR INDEPENDENT STUDY

Students may register for independent study with the written approval of the appropriate faculty member and divisional dean. The amount of credit to be given for an independent study project (not to exceed 6 credits per semester) shall be arranged at the time of registration. A maximum of 12 credits taken on an independent study basis may apply toward the bachelor's degree. Independent study credit may not be used to satisfy the College area distribution requirements.

Effective summer 1978, independent study courses are numbered as follows:

910 - 919 Freshman level course
920 - 929 Sophomore level course
930 - 939 Junior level course
940 - 949 Senior level course
950 - Graduate level course
999 - Candidate for degree

COLLEGE LEVEL EXAMINATION PROGRAM (CLEP)

An exciting challenge is available to College of Liberal Arts and Sciences students who want to earn university credit by examination in subject areas in which they have obtained college-level proficiency. Interested students are encouraged to take appropriate subject examinations provided in the College Level Examination Program of the College Entrance Examination Board Testing Service. The College will award credit for the following subjects if a student scores at the 67th percentile:

Arts and Humanities
- American literature
- Analysis and interpretation of literature
- English literature

Natural and Physical Sciences
- Biology
- General chemistry
- Geology
- Introductory calculus
- General psychology

Social Sciences
- American government
- American history
- Introductory economics
- Western civilization

Students should contact the Office for Student Affairs, UCDA Room 207, 629-2861, to arrange for the examinations.

SUMMARY

Following is a listing of the types of credit and the maximum number of hours that may be earned for nonclassroom work.

<table>
<thead>
<tr>
<th>Types of Credit</th>
<th>Maximum Credit Hours Allowed Toward the B.A. Degree</th>
</tr>
</thead>
<tbody>
<tr>
<td>Advanced Placement Credit(AP)</td>
<td>No limit</td>
</tr>
<tr>
<td>College-Level Examination Program(CLEP)</td>
<td>30 semester hours</td>
</tr>
<tr>
<td>Cooperativeeducation</td>
<td>12 semester hours</td>
</tr>
<tr>
<td>Correspondence study</td>
<td>30 semester hours</td>
</tr>
<tr>
<td>Credit by examination</td>
<td>No limit</td>
</tr>
<tr>
<td>Independent study</td>
<td>12 semester hours</td>
</tr>
</tbody>
</table>

Graduation Requirements

STUDENT RESPONSIBILITIES

The student is ultimately responsible for knowing the requirements for his or her degree and for fulfilling these requirements. Upon completion of the requirements (including those of a major), the student will be awarded the appropriate degree.

THE LIBERAL EDUCATION PROGRAM

In order to qualify for a B.A. or B.F.A. degree from the College of Liberal Arts and Sciences, students must complete the liberal education program, which consists of area distribution requirements and a foreign language requirement.

To satisfy the area distribution requirements, students must choose from a list of available courses in each of three areas:

1. Arts and humanities — 12 semester hours.
2. Natural and physical sciences — 12 semester hours.
3. Social sciences — 12 semester hours.

Lists of courses that will satisfy these area requirements are available in the Schedule of Courses published each fall and spring semester and summer term. The Schedule may be obtained in each divisional office and in the Office of the Dean of the College.

To satisfy the foreign language requirement, students must demonstrate proficiency in a foreign language. This requirement may be met prior to admission by completion of a Level III high school course in any classical or modern foreign language. Students who have not satisfied the requirement upon admission may do so by (a) demonstration of a third-semester proficiency by examination, or (b) completion of a third-semester course in the College. Students are strongly urged to begin or continue their college-level language studies immediately upon enrollment in the College. Students who elect to continue a language studied before entering the College will be placed in courses appropriate to their levels of preparation. Students are urged to consult the advising staff of the College or any foreign language faculty member regarding foreign language study and the foreign language requirement.
MAJOR REQUIREMENTS

In addition to completing the above mentioned college requirements, students in the Bachelor of Arts degree program must declare a major. As soon as a major has been determined (no later than the beginning of the junior year), students must declare their intentions to the major departments. Each department stipulates its own requirements for the major. These requirements shall include at least 30 semester hours of work in the major area (as determined by the department) of C grade or higher, at least 16 hours of which shall be at the upper division level. The grade average in the major shall be at least C. Not more than 48 semester hours in one field may be counted in the 120 hours required for the degree. The student is responsible for knowing the requirements' for the major. The department adviser shall be responsible for determining when a student has satisfactorily completed the requirements for the major and for so certifying to the dean of the College.

For requirements of the Bachelor of Fine Arts degree, consult the Fine Arts section in the alphabetical listings under the description of programs.

UPPER DIVISION REQUIREMENT

Students must complete at least 45 semester hours of upper division work (courses numbered 300 or higher) to be eligible for the bachelor's degree. Any student may register for upper division courses providing he or she has satisfied the prerequisites or has the approval of the discipline in which the course is offered. Courses transferred from a community college carry lower division credit. Exceptions to this require approval of the dean of the College and the appropriate discipline representative, who may ask the student to validate upper division credit by taking an advanced standing examination.

TOTAL CREDIT-HOUR AND GRADE-POINT REQUIREMENT

To qualify for the Bachelor of Arts degree in the College of Liberal Arts and Sciences, students must pass at least 120 semester hours with an average of at least 2.0 (C) in all courses attempted at the University of Colorado.

RESIDENCE REQUIREMENT

A candidate for a degree from the College of Liberal Arts and Sciences must earn the last 30 hours while enrolled as a degree student in the College of Liberal Arts and Sciences.

The College will not graduate any student who has not completed at least 30 hours of letter-graded work at the University of Colorado.

SENIOR PROGRESS REPORT AND DIPLOMA CARD

Upon completion of 80 semester hours of course work, each student must make an appointment with the College Advising staff to determine the student's status with respect to degree requirements.

During registration for their last semester, students are required to file Diploma Cards, indicating the date they intend to graduate and Applications for Degree Candidacy. Failure to file a Diploma Card with the College Advising Office will result in delayed graduation. Diploma Cards and Applications for Degree Candidacy are available in the College Advising Office.

SUMMARY CHECKLIST OF GRADUATION REQUIREMENTS

Liberal Education Program
1. Arts and humanities: 12 semester hours.
2. Natural and physical sciences: 12 semester hours.
3. Social sciences: 12 semester hours.
4. Foreign language: third-semester proficiency in any one language or completion of a Level III high school foreign language course.

Major Requirements
1. 30 to 48 semester hours in the major field.
2. A minimum of 30 semester hours of C grade or better in the major field.
3. A 2.0 (C) grade-point average in all major course work.
4. A minimum of 16 semester hours of upper division courses in the major, C grade or higher.
5. Special requirements as stipulated by the major adviser.

General Requirements
1. A total of 120 semester hours passed.
2. A 2.0 (C) cumulative grade-point average on all University of Colorado course work.
3. A minimum of 45 semester hours of upper division course work.
4. The last 30 hours while registered in the College.

Note: Not more than 48 hours in any one field and not more than 24 hours outside the College can be included in the 120 hours required for the degree.

SPECIAL ACADEMIC PROGRAMS

Honors

FORMER POLICY FOR GRADUATION WITH DISTINCTION

A student who performs superlatively in course work in the College will be awarded a bachelor's degree accompanied by the statement, with distinction. To be eligible for graduation with distinction, a student must have completed at least 30 semester hours at the University of Colorado and have obtained a grade-point average of 3.5 or higher by the end of the semester prior to the final semester's work toward the degree. The cumulative grade-point average must be based upon all collegiate work attempted, both at the University of Colorado and elsewhere.
NEW POLICY FOR GRADUATION WITH DISTINCTION

Effective summer 1978, all graduating seniors must have completed a minimum of 45 semester hours at the University of Colorado (on any CU campus), including the final semester, with a grade-point average of at least 3.75. The 45 semester hours must be completed in the student's junior and senior years. The student also must meet the College's residency requirement, i.e., the last 30 hours in the College.

Students who feel they are qualified to graduate with distinction, but who do not meet these standards, may petition to the Academic Standards Committee for a review of their particular cases. Petitions dealing with these standards will rarely be approved, however, and then only with evidence of academic performance equivalent to the standard.

Special Notes

1. Courses that UCD does not offer, but that the faculty encourages students to take at the other Auraria institutions (MSC and/or CCD), may be counted as part of the 45 semester hours.
2. A maximum of 6 semester hours may be completed with a grade of P (on P/F option) and included in the 45 semester hours.
3. All credit courses which are completed through the Division of Continuing Education may be included in the 45 semester hours.
4. In calculating the minimum total of 45 semester hours, part of a semester will not be counted but, instead, all courses in a semester will be included.

The new policy outlined above was approved by the Academic Standards Committee on April 19, 1978. Both the old and the new policies will be administered simultaneously for all students who matriculated prior to summer 1978. For those students who matriculated in summer 1978 or thereafter, only the new policy will be used.

COLLEGE HONORS PROGRAM

Independent of graduation with distinction, which is based on grades alone, the College offers a program through which students can qualify for the following honors awarded by the College: summa cum laude, magna cum laude, or cum laude. The determination of the level of honors to be awarded is made by the College Honors Council. These awards may be earned either in a specific department (Departmental Honors), or in general studies (General Honors), or in both. In either case, special independent creative work is required to qualify. Any junior or senior student with a cumulative grade-point average of 3.0 (B) or higher may participate in the program.

In order to qualify for the award of College honors in a discipline, a student must (a) complete a research project or honors thesis in the discipline, (b) take the Advanced Graduate Record Examination, and (c) take an oral examination administered by an honors committee.

The College-wide General Honors program is designed to encourage and assist academically strong students to achieve a greater degree of breadth in their educational experiences than they ordinarily might obtain in their college careers. The program is intended for students who wish to deal creatively with ideas and who desire to extend education beyond the usual course requirements. Any qualified junior or senior may enroll in honors seminars without becoming a candidate for graduation with honors. Grading in honors courses is based on the designations H (Honors), P (Pass), and F (Fail). All honors courses carry upper division credit. In cross-listed courses, open to honors students upon consent of the instructor, honors students may expect to do additional or independent work as determined in consultation with the professor.

In order to qualify for General Honors, a student must (a) complete at least four honors courses with grades of H, (b) submit an honors paper, and (c) take oral and written honors examinations administered by the College Honors Council.

Detailed information concerning the Honors Program may be obtained from the director of the Honors Program or from the College Advising Office. Students interested in the program ordinarily should begin participation in their junior year.

PHI BETA KAPPA

Students in the College who excel in their undergraduate studies may be invited to join Phi Beta Kappa, the nation's oldest academic honorary society, founded in 1776 at the College of William and Mary. For further information, interested students should contact the College Advising Office.

Cooperative Education

Based on the precept that employment experiences can often contribute to liberal education, the Cooperative Education Program is designed to provide opportunities to supplement academic work with practical experience. Students may be placed as employees with corporations, businesses, and public agencies in ways that complement or enhance their academic course work. Many cooperative education students choose to contract with a professor in their major fields to receive academic credit for their work experiences. An academic cooperative education contract designates a certain number of academic credits for satisfactory performance in a related work experience. The credit is contingent upon satisfactory completion of whatever academic project the faculty member chooses to assign in conjunction with the job.

The College of Liberal Arts and Sciences participates in this program with cooperative education courses offered at the 398 level in each department. These courses are listed under each department heading in the Course Description section of this bulletin. Students placed by the Cooperative Education Office in paid or volunteer assignments, as well as students who have obtained their own jobs, may be eligible, subject to the guidelines below:

1. The participant in the program will be enrolled in the College of Liberal Arts and Sciences and generally have...
attained sophomore standing.

2. The participant must have at least a 2.5 grade-point average.

3. A contract for Cooperative Education credit is required for all projects. It is to be completed by the employer, sponsoring faculty member, and the student before being approved by the divisional dean. The Cooperative Education office will distribute copies of the completed contract to the student, the sponsoring faculty member, and the employer.

4. Job experience approved for credit will be related to the student's undergraduate academic curriculum.

5. Credit will be approved for more than one semester for a job, provided that the learning possibilities and responsibilities of the student allow for additional academic growth.

6. Projects will be granted from 1 to 6 hours of credit per semester. The number of credit hours will be arranged between the student and the sponsoring faculty member with possible consultation with the employer. The number of credit hours must reflect the quality of the academic experience gained from the project, not the hours worked.

7. Twelve hours is the maximum number that a student can earn toward the bachelor's degree in Cooperative Education. Departments may decide whether or not Cooperative Education hours will count toward requirements for the major. Cooperative Education hours may not count toward the Area Distribution Requirement.

8. The Cooperative Education project may not simultaneously be used for academic credit in other programs such as Independent Study.

Students should contact the Cooperative Education Program office for further information and forms for placement and credit, 1047 9th Street, 629-2892.

Study Skills Center

The Study Skills Center is administered by the College on behalf of UCD. The purpose of the center is to help UCD students develop methods of efficient study. Services are available to help specifically with particular subject areas, as well as to strengthen general academic and research skills. Telephone, 629-2802.

Each semester the center offers three courses for which students may receive 1 semester hour of credit graded on a pass/fail basis: developmental composition, developmental reading, and college preparatory mathematics. Detailed course descriptions may be found in the Course Descriptions section of this bulletin. A maximum of 3 semester hours in study skills courses may be included in the 120 required for the degree.

A noncredit modular course, such as rapid reading, also is offered in which students may accelerate reading speed, learn reading flexibility, and build word-grouping ability and comprehension. Study technique workshops (noncredit) are offered in such topics as: reading for maximum effectiveness; writing papers and using the library; improving memory, study techniques, and note taking; tests without panic; and time management. Also, a noncredit spelling and vocabulary workshop is available.

The center has available a collection of books, including a number by minority authors and about minorities which may be utilized for research assignments as well as for improvement of general knowledge.

Special Services Program

The Special Services Program is a federally funded project designed to assist selected students to be successful in their university lives. The goal of the project is to increase the likelihood for students with special needs to graduate from UCD. This is done by providing academic support services to students during their freshman and sophomore years. Services provided include the following: tutorial assistance, classroom instruction in basic skills, classroom instruction in English as a second language, academic advising, personal counseling, academic skill improvement, diagnostic testing, student advocacy, and disabled student services.

Students must meet specific eligibility criteria in order to receive services as the project is designed to provide intensive help to a specific target population. Students eligible for participation include low income students, culturally diverse students, students with limited English speaking ability who are U.S. citizens or who hold a permanent visa, academically deficient students, and physically disabled students. Any student who feels he or she may be eligible for these services should contact a special services adviser in Room 47, East Classroom Building, telephone 629-8345.

PREPARATION FOR PROFESSIONS

Completion of the undergraduate curriculum of the College of Liberal Arts and Sciences can prepare students for a number of careers in the professions. Information on preparation for those professions most frequently asked about by students in the College is presented here. Students seeking information about other professions should contact the College Advising Office.

Law

Students intending to enter a school of law may major in any field while completing their bachelor's degree programs since law schools do not generally specify a particular undergraduate degree major. Successful prelaw students from the College have had majors in many different fields. However, students preparing for law school should place primary emphasis on learning superior methods of study, critical thinking, and communication skills, which are often considered more important by law schools than factual knowledge alone. College courses should be chosen with care to produce a balanced pattern of skills and insights. Sufficient English should be studied to insure good use of language skills in grammar, spelling, composition, and rhetoric, and also to develop a capacity for analysis and criticism. Because the natural sciences provide an appreciation for inductive and deductive approaches, evaluation of evidence, and detailed accuracy of observation, some study in this area is desirable. Mathematics is helpful in developing a
capacity to think analytically, as are certain courses in philosophy.

The Law School Admission Test (LSAT) is required of all applicants for admission to law school and should be taken as early as possible during the senior year. For additional information, students should review the current Prelaw Handbook, published annually in October and prepared by the Law School Admissions Council and the Association of American Law Schools. This book includes material on the law and lawyers, prelaw preparation, applying to law schools, and the study of law, as well as individualized information on most American law schools. It may be ordered from Educational Testing Service, Princeton, New Jersey 08540.

Any student who aspires to a career in law should contact the College pre-law adviser, telephone 629-3396.

Students interested in applying for admission to the School of Law of the University of Colorado should contact the Admissions Office of the School of Law, Room 118, Fleming Law Building, Boulder, Colorado 80309.

Journalism

Students interested in preparing for a career in journalism may decide to obtain a bachelor's degree from the College as a general preparation, or they may choose to complete a B.S. degree in journalism. The B.S. degree in journalism is granted from the School of Journalism at the beginning of the junior year. To be considered for transfer admission, a student must have completed a minimum of 60 semester hours with a grade-point average of at least 2.25. Interested students should consult the University of Colorado at Boulder Catalog for detailed information concerning requirements for the B.S. degree in journalism.

Information is also available in the College Advising Office, Room 204, Administration Building, telephone 629-2555.

Health Careers

Course programs have been developed within the College to prepare students for the following specific careers within the general area of health sciences.

Child health associate  
Dental hygiene  
Dentistry  
Medical technology  
Medicine  
Nursing  
Optometry  
Osteopathy  
Pharmacy  
Physical therapy  
Podiatry  
Veterinary Medicine

Because the prerequisites for these health career programs are continually changing, students interested in pursuing one of these careers should contact the Health Careers secretary, UCD East Classroom Building, Room 232, 629-2646, or the College Advising Office for current requirements and for advising.

Education

Students seeking certification for teaching at the elementary and/or secondary school level must complete a major program in the College of Liberal Arts and Sciences, and approximately 30 to 50 semester hours of professional education work in the School of Education. Students completing all requirements will receive a Bachelor of Arts degree and teacher certification.

Early planning is crucial for students intending to enter the Teacher Education Program. Since the School of Education has initiated a new program at both the elementary and secondary levels, students must consult the School during their first semester on campus concerning new requirements for the Teacher Education Programs, 629-2717.

PRE-EDUCATION PROGRAM

Students pursuing teacher certification should so indicate on all application and registration materials so that they may be advised by the education counselor or faculty members. Application for admission to the Teacher Certification Program should be made during the last semester of the sophomore year. The minimum requirements for acceptance are:

1. Completion of at least 60 semester hours of acceptable college work with a grade-point average of 2.5 for all courses attempted, and 2.5 for all courses attempted at the University of Colorado, and 2.5 in the major teaching field. No student will be recommended for certification to teach in any field in which the grade-point average is less than 2.5.

2. Information on the general education requirements for students planning to student teach at the secondary or elementary school level are available in the College of Liberal Arts and Sciences Advising Office and the School of Education.

COLLEGE-WIDE INTERDISCIPLINARY ACADEMIC PROGRAMS

Most of the individual departments represented in the College have numerous links with other disciplines, and many faculty members consequently encourage students to take courses in related disciplines. In the natural and physical sciences new subject-matter areas are emerging from blends of traditional disciplines; examples include biochemistry, geophysics, biophysics, and psychology. In the social sciences the similarity of method and of subject matter from discipline to discipline tends to promote broad interaction and a sense of common purpose. In the arts and humanities the continual synthesis of useful analytical ideas and concepts gains strength as it it tested against differing perspectives; comparative literature, mixed media fine arts, and philosophical psychology are examples of this kind of interdisciplinary involvement. Therefore, students will often find opportunities to explore relationships among different disciplines while studying within traditional disciplines. In some instances, such as ethnic studies, much or most of the academic work can be characterized as interdisciplinary even though the area is treated as a traditional discipline. The following programs are explicitly interdisciplinary and college-wide in character.
Distributed Studies

The College's distributed studies major has been designed for those students who wish to develop consolidated major programs based upon the study of two or three disciplines together rather than to focus their major programs on single disciplines. In pursuing a distributed studies major, a student works closely with a faculty adviser to develop a specific program. One discipline is designated as primary subject, and then one or two other disciplines are designated as secondary subjects. The total program must consist of at least 60 semester hours in at least two disciplines. The disciplines must be disciplines or areas offered within the College, and the program may not include a first-year course in English (101, 102) or foreign language (101, 102). General requirements for the primary subject are (a) a minimum of 30 semester hours with grades of C or better, and (b) a minimum of 12 semester hours of upper division course work with grades of C or better. General requirements for the secondary subject(s) are (a) a minimum of 30 semester hours from among one or two disciplines, and (b) at least 12 semester hours in any one discipline. The specific requirements in any case depend upon the program worked out with a faculty adviser, who may stipulate specific course requirements. Students interested in a distributed studies major program should contact the College Advising Office for additional information, telephone 629-2555.

Ethnic Studies

For a complete description of the Ethnic Studies program, see the Division of Social Sciences section of this bulletin.

Individually Structured Major

Some students wish to study in depth, as a major program, a coherent topic area that crosses traditional disciplinary lines and/or requires significant independent study to complete. These students are encouraged to propose a design for an individually structured major program. To pursue an individually structured major program, a student must work out the details of the proposed program sometime after his or her first year in the College with a committee of three College faculty members. The major becomes the student's official program upon final approval by the faculty committee. In recent years students in the College have structured majors in such areas as French and cinematography, or oral history and environmental planning. Advising for the individually structured major is available through the Office of the Dean, 629-3396.

Population Dynamics

Melvin Albaum, Director

The Population Dynamics Program is a multidisciplinary major designed to provide a comprehensive and flexible educational experience for persons who are interested in population processes, especially within the urban environment. Emphasis of the major is on the social, economic, and mental health problems complicated by the dynamics of population processes. The principal departments involved are biology, geography, psychology, and sociology. The major is appropriate for students intending careers in the fields of urban and community planning, family planning and counseling, population education, environmental demography, and population-related careers in community action programs, neighborhood health centers, and local, state, and federal agencies. Students completing this major may enter graduate programs in most of the social, behavioral, and natural sciences, demography (population studies), public affairs and administration, urban and regional planning, and in public health, medicine, law, or social services.


4. A minimum of 24 additional hours from the following disciplines with not more than 12 hours from any one discipline: anthropology, biology, communication and theatre, computer science, economics, geography, physical education, political science, population dynamics, psychology, rehabilitation services, social science, and sociology. Students should consult with the program director in selecting these hours to be sure the courses are acceptable in the program.

Note: Those students wishing to receive teacher certification should consult with the academic counselor in the School of Education and should familiarize themselves with the School of Education requirements in this bulletin.

Urban Studies

Faculty: Cedric D. Page

The Urban Studies Program has a fourfold purpose. First, it provides an in-depth understanding of urban problems to permit the student to pursue advanced degrees in one of several traditional academic disciplines in the College of Environmental Design or in the Graduate School of Public Affairs. Second, the program permits graduates to move directly into a variety of
careers with federal, state, and local agencies as well as private companies concerned with urban affairs. It also provides a desirable second major or minor for students preparing for public school teaching, human service, legal, or medical careers. Third, an undergraduate degree in urban studies provides a liberating educational experience for those whose career interests have not been fully decided. Fourth, the major increases an individual’s sensitivity to and awareness of the unique experiences and problems of economic, social, and ethnic groups in cities.

The generalist who is trained in the application of analytical and policy tools of a variety of disciplines will be more immediately employable and will be of significant value to his or her community. Since urban centers are increasing in size and influence, an understanding of the city and its problems is indispensable and essential to the modern urban society. The baccalaureate major in urban studies is designed to prepare and train such citizens.

REQUIREMENTS FOR MAJORS

The urban studies major is designed to provide both flexibility and depth in the relevant academic perspectives, as well as versatility in career selections. The major provides an interdisciplinary view of the city and its environs in a more comprehensive manner than any single traditional academic discipline can provide. The requirements of the major in course units therefore are greater. Whereas most academic disciplines require about 30 semester hours of course work, the urban studies major requires 42. All students who intend to major in urban studies will be expected to meet the following requirements:

1. Urban Studies/Soc. Sci. 210-3. Urbanization in America. This course is the foundation and orientation course for further study for the urban studies major. One objective of the course is to present to the student the most important theories and perspectives of several disciplinary approaches to urban society. Another objective is to encourage the student to recognize areas of overlap among the disciplines, the interrelationships between disciplines, and the value of interdisciplinary knowledge and research.


3. Four of the following six upper division courses for a total of 12 semester hours:
   - Econ. 425. Urban Economics
   - Hist. 470. United States Urban History
   - Pol. Sci. 407. Urban Politics
   - Anthro. 444. Urban Anthropology
   - Soc. 421. Advanced Population Studies

4. One course from the Ethnic Studies offerings (3 semester hours).

5. Soc. 402. Statistics (3 semester hours) or equivalent with consent of program director.

6. In addition, each student will successfully complete not less than 3 semester hours (6 semester hours maximum) of credit in Cooperative Education 398 for the internship placement. This requirement is usually taken toward the conclusion of the academic program. The placement can be determined by the student and/or the program director. The internship should permit the student to gain experience in an area related to his or her academic preparation and career goals and interests.

7. The core program of required courses specifies a minimum of 27 semester hours necessary for graduation with an urban studies major. The program director, in consultation with the student, may authorize changes in the above program to accommodate the specialized interests and objectives of the student. In addition to the minimum (core) 27 semester hours required, the student will be advised to choose electives from the following disciplines (for a total of 15 semester hours):

   - Anthropology
   - Communication and theatre
   - Economics
   - Geography
   - History
   - Philosophy
   - Political science
   - Psychology
   - Sociology
   - Planning and Comm. Dev.

Division of Arts and Humanities

Shirley White Johnston, Assistant Dean

The Division of Arts and Humanities offers programs in the traditional humanistic disciplines as well as interdisciplinary studies on both the undergraduate and graduate level.

Undergraduate. Students seeking bachelor’s degrees may major in communication and theatre, English, fine arts, French, German, philosophy, and Spanish. (See the following individual department sections for details.) Students may also earn B.A.’s in interdisciplinary curricula such as the General Writing Program and the distributed studies major. The General Writing Program, which acquaints students with the rhetoric and methodologies of the sciences, social sciences, and humanities, prepares its graduates for writing careers in a wide variety of fields. (See the section on the English program for details.) The distributed studies major combines two or three fields and is particularly appropriate in the interrelated disciplines that make up arts and humanities; students can enrich their undergraduate education through in-depth study in such areas as literature, theatre, and filmmaking, for example; or the languages and literatures of America, Britain, France, Germany, and Spain; or the languages and literatures of North America and Latin America. (See the section on College-Wide Interdisciplinary Academic Programs.)

Students who earn the B.A. within the Division of Arts and Humanities have excellent preparation for graduate education in their majors and for advanced training in professional fields such as medicine and the other health sciences, law, business, public affairs, and architecture. Arts and humanities majors also provide excellent preparation for jobs in teaching, journalism, personnel administration and management.

Graduate. A complete program leading to the Ph.D. is offered in English; programs leading to the M.A. are also fully available in communication and theatre and English. Graduate curricula leading to the M.A. in
Communication Emphasis

(I) effectively in many contexts. These courses build into the confronting the community; and (2) courses focusing on the development of the students' communication skills support for communication theories, strategies for the skills component of the emphasis seeks to equip students they may react effectively to their analysis of which promote confidence in their abilities to perform which present traditional rhetorical theories, empirical suggested courses in each of the three areas of emphasis: communication, theatre, or communication and extracurricular activities will be best suited to his or her needs, skills, and goals. Lists of required and suggested courses in each of the three areas of emphasis may be obtained from the divisional office.

For information on scheduling of courses, consult the appropriate Schedule of Courses for day, time, and meeting place of classes.

COMMUNICATION AND THEATRE


An undergraduate wishing to major in communication and theatre will choose one of the three basic areas of emphasis: communication, theatre, or communication and theatre education. An emphasis in radio-television is available, but part of the work must be completed at the University of Colorado at Boulder. Each emphasis has its own requirements for graduation, and specific programs will be developed in consultation with the student's major adviser to insure that each student's term-by-term schedule, choice of electives, involvement in cocurricular and extracurricular activities will be best suited to his or her needs, skills, and goals. Lists of required and suggested courses in each of the three areas of emphasis may be obtained from the divisional office.

Communication Emphasis

The primary goal is to equip the student with a wide range of theoretical perspectives and diverse communication skills. The theoretical perspectives generally focus on face-to-face communication in interpersonal, small group, institutional, and community settings. The skills component of the emphasis seeks to equip students with flexibility in their communication repertoires so that they may react effectively to their analysis of communication situations.

The program offers two types of courses to the student: (1) courses in communication and rhetorical theory, which present traditional rhetorical theories, empirical support for communication theories, strategies for the application of communication theory to problems confronting the community; and (2) courses focusing on the development of the students' communication skills which promote confidence in their abilities to perform effectively in many contexts. These courses build into the students' repertoires the tactics and strategies of effective expression.

The communication emphasis requires that students take a total of 45 hours of course work (usually 15 courses) in communication and theatre. Six courses (18 hours) are required. Four courses (12 hours) are chosen from a list of specified alternatives. The remaining 15 hours may be chosen from a wide range of courses available in communication and theatre, allied disciplines, or independent study projects.

Since requirements for the communication emphasis insure that the student knows both communication theory and how to apply it, communication graduates are generally well equipped for employment. Students with an interest in management and administration, training, writing and copy preparation, public relations, information services, and wide variety of occupations focusing on communication will find in the communication emphasis a curriculum relevant to their expected employment needs.

Theatre Emphasis

This program provides a broad range of experiences in courses, laboratory workshops, full productions, and field work in the Denver area. Helping the student to answer questions concerning the significance of what theatre does to us and for us is the primary goal of the program.

Three kinds of courses will be taken by each student in theatre: (1) performance skills—acting, directing, oral interpretation, technical theatre; (2) critical skills—dramatic theory and criticism and theatre history; and (3) communication theory—interpersonal, small group, intercultural, social change, etc. In addition to the 42 hours of required courses within the department of communication and theatre, 12 additional hours from English, fine arts, and music are required.

As an integral part of the program, each student will have the opportunity to participate as performer, technician, or designer in faculty-directed productions which occur each term. The auditions, rehearsals, and performances involved in these productions provide opportunities for close examination of the process of making and performing theatre from practical, theoretical, critical, historical, and social perspectives. After each performance the audience will be invited to share their responses with the production team in order to provide some indication of impact.

In order to increase the range of practical and critical experience, each student will see and evaluate at least six live theatre productions in the Denver area each term. These experiences test the assumptions and beliefs about theatre discussed and worked with in classes and productions. As majors develop their performance and critical skills, special internships for credit in a variety of capacities may be arranged with local theatre operations through independent study or cooperative education.

Depending on the individual's actual program of study (cocurricular and extracurricular activities), a degree in communication and theatre with an emphasis in theatre not only can provide a graduate with useful technical and
practical skills, but also, and more importantly, it can provide critical insight into theatre as a human enterprise wherever it occurs. Through examining and experiencing theatre's potential to achieve human value, students should develop personal, aesthetic, and social principles which will guide them to sound career choices (as performers, technicians, designers, producers, or managers).

Communication and Theatre Education Emphasis

The emphasis in communication and theatre education prepares students to meet Colorado certification requirements in communication or in theatre for grades 7-12. Requirements for these professional programs are complex and demanding. Interested students in their freshman or sophomore years should meet with the department adviser for the education emphasis to discuss the requirements and to plan a long-range schedule to be followed.

COMMUNICATION DISORDERS AND SPEECH SCIENCE

Faculty: Natalie Hedberg Daves, Patricia Killian, Philip M. Prinz; part-time: Thomas Prescott, Jon Hasbrouck.

The B.A. degree in communication disorders and speech science is not available at UCD, but the following courses are open to undergraduates: C.D.S.S. 401 and 435. For information on graduate-level courses see Communication Disorders and Speech Science in the Course Description section of this bulletin. For information on M.A. and Ph.D. degrees see the Graduate School section.

COMPARATIVE LITERATURE

Students wishing to pursue graduate work in comparative literature should consult the University of Colorado at Boulder Catalog.

On the 400 level, students may read all texts in translation; however, reading knowledge in at least one foreign language is highly recommended. On the 500 and 600 levels, students must be able to read in two foreign languages.

ENGLISH


The purpose of the English major is to provide a full exposure to the great tradition that constitutes the Anglo-American literary inheritance. In the process of studying individual works and the periods from which they emerged, students acquire an especially rich sense of the culture of which they are a part. All students, majors and nonmajors alike, may acquire an understanding of how various literatures reflect wide developments and trends in the history of culture and ideas in the Topics in Literature series, Engl. 290 to 294. Students may further widen their perceptions by the study of how literature, in its broadest sense, and ideas are expressed in film through Engl. 225 (Introduction to Film), and 306 and 307 (The History of Film I and II).

Students majoring in English must present a total of 39 hours in English, excluding Engl. 101, 102, and 103, of which 24 hours must be earned in upper division courses. None of the required 39 hours may be taken on a pass/fail basis. Of the 24 hours required at the 300- or 400-level, at least 3 must be earned in a course dealing with English literature before 1800, at least 3 in a course dealing with English literature after 1800, at least 3 in a course on American literature, and at least 3 in a major figure of either English or American literature. Required courses: Engl. 250, 251 (Survey of English Literature — 6 hours); Engl. 300 (Critical Writing — 3 hours); Engl. 497 or 498 (Major Authors or Topics in Literature - 3 hours).

At least 12 hours of the major's upper- or lower-division work in English must be done at UCD in order to qualify for the B.A. in English.

English majors interested in graduating with honors should confer with the honors adviser as soon as possible, but definitely no later than the beginning of the spring term of their junior year.

Students who contemplate teaching should obtain from the School of Education sheets listing curricula required for a teaching certificate and should consult the School of Education, which supervises the teacher-training program. Since fulfilling requirements for education and English involves close scheduling, students should fulfill at least some of the college requirements during their freshman and sophomore years.

English for foreign students and courses for prospective teachers of English as a foreign language are listed in the course description section of this bulletin under communication and theatre.

For additional literature courses see Comparative Literature and Mexican American Studies.

Note: A considerable amount of writing is required in all English courses and is graded on form as well as on content.

In addition to the regular major, the English discipline offers a General Writing Program, an alternative to the traditional baccalaureate in English. Especially designed for future writers, it offers a wide range of intensive writing experience combining such areas as technical reports, fiction, and poetry. The student is trained in the rhetorics of the arts and humanities, the social sciences, and the sciences.

In order to enroll in the program, students must consult with the director of the General Writing Program through the division office at 629-2730.
FINE ARTS


An education in fine arts is based on discipline, absorption, and knowledge. Discipline is the relationship of the student to his material or form. What comes through the form is the self of the student and his relationship to the world. This constant exposure through discipline leads to absorption which can be seen as a fascination with and appreciation of both himself and the world. In fine arts, the record of this process is made visible for the world to see and is called art.

The Fine Arts discipline offers both a B.A. degree and a B.F.A. degree in painting, sculpture, printmaking, or design. The B.A. degree must include 40, but not more than 48, hours in fine arts, 24 of which must be in upper division courses. The B.F.A. degree must include 54, but not more than 72, hours in fine arts, 24 of which must be in upper division courses. Students wishing to apply for the B.F.A. degree must have a 2.0 average in all course work at the time of application, which may not be earlier than the end of the junior year. Application forms are available in the division office.

The core curriculum for fine arts majors includes 12 hours of Studio I (Fine Arts 100, 101, 102), Studio II (Fine Arts 202), Fine Arts 180-181, Fine Arts 496, and 6 hours of upper division art history. The recommended program for the B.F.A. includes at least two years in one creative field (painting, printmaking, design, or sculpture) plus 9 semester hours in drawing. Students who are candidates for the B.F.A. must take a minimum of 27 hours while in residence.

Studio I and II Courses

For an orientation to studio practice, including drawing and an exploration of two- and three-dimensional media, fine arts majors are required to take 12 hours of Studio I and II courses. There are no prerequisites for Studio I and II courses, but all upper division courses require the corresponding basic course as a prerequisite.

FRENCH

Faculty: Simone Christopherson, Blandine M. Rickert, Terrence D. Wright.

A B.A. degree with a French major prepares students for the following careers:

Foreign Service — Positions abroad with government agencies, private business, foundations, and other organizations having interests in French-speaking countries throughout the world.

Teaching — Teaching at all levels: elementary, secondary, and college.

Translation and Interpretation — Exchanges in the fields of science, culture, politics, and economics have become vital to the nations of the world. Effective international communication requires an increasing number of expert translators and interpreters.

International Trade — Administrative and managerial positions with U.S.-based firms involved in foreign trade.

A strong background in French can be very valuable to such programs as English, black studies, business, political science, interdisciplinary, and cross-cultural studies.

Students who have completed a Level III high school French course have automatically satisfied the college graduation requirement in a foreign language. This requirement may also be satisfied by completion of French 201, 211, or 212 or by demonstration of equivalent proficiency by placement test. Students who have studied French in high school and who wish to continue with the language will be placed according to their high school record and verbal SAT score or English ACT score. A student normally may not receive credit for a course at a lower level than that into which he or she is placed. For a complete statement of policy on foreign language placement and credit, see the statement on foreign language available from the College Advising Office.

Students majoring in French must complete a minimum of 35 semester hours beyond first-year proficiency. Students presenting four years of high school French for admission must complete 30 hours beyond the second year. Students majoring in French may choose between the following options:

Option A: Literature. Required courses are: French 211 and 212; 301 and 302; 311 and 312; 401 and 402; and a minimum of 6 hours of French literature courses at the 400 level.

Option B: Culture and Civilization. Required courses are French 211 and 212, 301 and 302, 311 and 312, 401 and 402, 320, 420 and 421.

Students planning to acquire certification for teaching French at the secondary level are required to take French 496. Methods of Teaching Modern Languages (required by the School of Education). For those students Option B is preferable for the major.

UCD students who wish to take nonrequired courses in another institution must obtain permission from the French department chairman at UCD. Students must see the department adviser prior to registration for 300-level courses. Since all courses are not offered every year, it is extremely important for students to plan their schedules in advance to avoid a delay in graduation.

The department strongly recommends that all majors include some study in a French-speaking country in their major programs. Credit earned will normally count toward satisfaction of the major requirements, but the student should see an adviser before enrolling in a foreign program to assure full transfer of credit.

Students majoring in French must satisfy the requirements of the College of Liberal Arts and Sciences. At least 15 hours of upper division work, including all 400-level required courses, must be taken from the UCD French department in order to earn the UCD degree.

Literature courses at the 500 level are applicable to an M.A. degree from the University of Colorado at Boulder and to the M.H. degree at UCD.
GERMAN

Faculty: M. Kent Casper, Carsten Seecamp; Part-time: Friedhelm F. Rickert.

The German program provides a variety of courses for students interested in German language, literature, history, philosophy, music, and art. The curriculum contains essentially three course clusters: basic language skill courses, from beginning through advanced levels; upper division literature courses taught in German; and German area studies courses taught in English with readings in English translation.

Foreign Language Requirement. Students who have completed a Level III high school German course have automatically satisfied the college requirement in a foreign language. This requirement may also be satisfied by completion of German 201, 202, or 221 or by a demonstration of equivalent proficiency by placement test. Students who have studied German in high school and wish to continue with the language will be placed according to their high school record and verbal SAT score or English ACT score. A student may not receive credit for a course at a lower level than that into which he or she is placed.

The German Major. A B.A. degree with a German major can prepare the student for the following career options: teaching positions at the elementary and secondary levels, including the requisite undergraduate training for those wishing to pursue further graduate work; translator and interpreter positions (e.g., with the publishing trade or with various private firms or government agencies); foreign service with the U.S. State Department; or positions in international trade with U.S. firms abroad.

Students majoring in German must complete 35 hours beyond first-year proficiency. Not more than 12 hours may be taken on the second-year level toward the major. Course work successfully completed at other institutions will be evaluated for credit transfer, but a minimum of 12 hours of upper division credits must be taken within the UCD German department. Majors must maintain a B average in German. Required courses for the major are German 301-302, 401-402, plus a minimum of 9 hours in literature and/or culture courses at the 400 level.

German majors are encouraged to take German area studies courses, but these courses may not count toward the major unless some of the readings and written assignments are done in German. Majors should consult with the instructor on this requirement. Students planning to acquire certification for teaching German at the secondary level are required by the School of Education to take German 496 (Methods of Teaching Modern Languages).

It is strongly recommended that all majors attempt to include some study in a German-speaking country in their programs. Credit earned abroad normally counts toward satisfaction of major requirements, but students should see an adviser before enrolling in a foreign program to insure full transfer of credit.

PHILOSOPHY

Faculty: Charles Kenevan, Glenn A. Webster; Adjunct: Manuel Laderman.

The philosophy program is recommended to those students whose goal is a liberal arts or education in the finest sense. Philosophy is concerned with the most sustained and deeply reflected thoughts of human civilization, with the transmission and evaluation of basic beliefs and values. It is not an easy field of study, but for more than 25 centuries philosophy has been judged most rewarding by those who seek self-development, intellectual sophistication, and the happiness of a reflective life.

For career preparation, philosophy should be combined with other fields. It is an excellent undergraduate preparation for such professional fields as law and medicine.

A program for the philosophy major must include a minimum of five courses (15 hours) at the 300 level; a minimum of three courses (9 hours) at the 400 level; and a minimum of one course (3 hours) at the 500 level. The balance of the courses for the major may be taken at the discretion of the student.

The following courses are recommended (not required) for philosophy majors who are planning to do graduate work in philosophy: Symbolic Logic (Phil. 344); History of Philosophy (Phil. 300, 302, 402, 403, 404); Ethics (Phil. 315); Metaphysics (Phil. 335); Epistemology (Phil. 336); several courses concerned with a single philosopher (e.g., Phil. 580, 581, 582, etc.); and one course concerned with the relationship of philosophy to some other discipline (e.g., Philosophy of Science, Philosophy of History, etc.).

General prerequisites (which may vary for some courses) are: 100-level—none; 200-level—3 hours; 300-level—6 hours; 400-level—9 hours; and 500-level—12 hours. The prerequisite may be waived with consent of instructor.

SPANISH

Faculty: James Anthony Black, Phil Jaramillo, Martha Manier, Francisco A. Rios, Edith R. Rogers, Donald L. Schmidt; Attendant: Daniel E. Martinez, Ila M. Warner.

The Spanish programs emphasize all phases of the study of the language, literature, civilization, and culture of Spain, Hispanic America, and the Spanish-speaking Southwest of the United States. The courses are directed toward three distinct groups: lower division students who are acquiring proficiency in a foreign language; upper division students who are either majoring in Spanish or increasing their competence through study in advanced courses in language and literature; and graduate students in the Spanish M.A. degree program offered in conjunction with the Boulder Campus (see the Graduate School section of this bulletin), most of whom are preparing for professional careers in teaching.

Courses prepare students in language, literature, and civilization as part of an enhanced liberal education and as professional training. Study under this department offers an opportunity to be better prepared for industry, commerce, government, public services, or further study at the graduate level. Courses also are functionally
supportive of such programs as those leading to the teaching certificate, comparative literature, the Master of Humanities degree, and the Master of Arts degree in bilingual-multicultural emphasis offered at UCD.

Students who have completed a Level III high school Spanish course have automatically satisfied the college graduation requirement in foreign language. Requirement may also be satisfied by completion of Spanish 211 or by demonstration of equivalent proficiency by placement test. Students who have studied Spanish in high school and wish to continue with the language will be placed according to their high school record and verbal SAT or ACT score. A student may not receive credit for a course lower than that into which he or she is placed. For complete statement of policy on foreign language placement and credits, see the College of Liberal Arts and Sciences general information section of this bulletin.

A major in Spanish consists of the following requirements:

1. Total of 36 credit hours in Spanish courses beyond 102, including the following minimum distribution: (a) at least 9 hours in upper division courses in language theory and practice (301-302, 401-402, 496); (b) at least 9 hours in upper division literature courses, including at least one course in Spanish Peninsular literature and one in Spanish-American literature; (c) at least 12 hours in courses numbered 400 or above. The required 12 hours at or above the 400 level must be completed in residence at UCD. None of the required 35 hours may be taken on a pass/fail basis.

2. Total of 6 hours from one or more of the following areas: (a) Latin American studies (e.g., history, political science, etc.); (b) Mexican American Studies; (c) linguistics; (d) upper division courses in another foreign language or comparative literature.

Students seeking certification for teaching at the secondary level should note that the School of Education requires Span 496 (Methods of Teaching Spanish); the 3 credit hours earned in that course count toward the major and are subject to the 48-hour maximum from one discipline allowed by the College of Liberal Arts and Sciences for the B.A. degree. Hence, students who begin the major program with Spanish 101 and intend to include secondary certification in their B.A. program must include Span 496 in their electives in Spanish.

To be admitted to practice teaching of Spanish, majors must take the language skills tests of the Modern Language Association Proficiency Tests for Teachers and Advanced Students of Spanish and make satisfactory scores.

Students must see the department adviser prior to registration for their final 30 hours of course work. Failure to do so may result in delay of graduation. Students considering entering graduate school, either at UCD or elsewhere, should see an adviser as early as possible since admission depends largely on courses taken in the major.

It is strongly recommended that all majors include some study in a Spanish-speaking country in their programs. Credit earned normally counts toward satisfaction of major requirements, but students should see an adviser before enrolling in a foreign program to insure full transfer of credit. Courses taken abroad and designated as Spanish are subject to the 48-hour-maximum rule of the College of Liberal Arts and Sciences. Students interested in study abroad should consult with the Spanish faculty or the UCD representative for International Education.

For comparative literature courses, see the Course Description section of this bulletin.

Division of Natural and Physical Sciences
Robert D. Elder, Assistant Dean

The Division of Natural and Physical Sciences offers study in traditional undergraduate disciplines, interdisciplinary programs, and preprofessional programs. Undergraduate majors are available in biology, chemistry, geography, geology, mathematics, physics, and psychology. The College-wide interdisciplinary major program in population dynamics is also administered by faculty within the division.

The health-related preprofessional programs include child health associate, medical technology, physical therapy, dentistry, dental hygiene, medicine, optometry, osteopathy, nursing, pharmacy, podiatry, and veterinary medicine. Students interested in these programs should consult with the Health Careers Committee of the division at the beginning of their preprofessional education and at selected intervals thereafter. Program requirements and appointments for advising can be obtained in the division office. East Classroom Bldg., Room 232.

Three sets of course options are available, in any combination, from which a nonscience major may satisfy the natural and physical science area requirement of 12 semester hours.

Set I. Topics in Science, consists of modular courses designed for, but not limited to, nonscience majors. Each module carries 1 semester hour of credit and is offered in a 1.5-semester time block of five weeks, during which the course meets the equivalent time of three lectures per week. There are no prerequisites. Each module is a self-contained unit designed to cover a given problem or topic in science. Normally, a student takes a single module each five-week period with a maximum of three per semester. The topics change from semester to semester and from year to year. The Schedule of Courses for each semester lists the current topics offered.

Set II courses are one or two semesters in length and have no formal prerequisites. They include both introductory survey courses and special topics courses and are usually designed with the nonscience major in mind.

Set III includes all other natural and physical science courses offered in the division. Although these courses are generally intended for the science major, they are open to students with the proper prerequisites.

BIOLOGY

The study of biology offers the student an introduction to the vast array of living systems that make up our world. With an understanding of biology, the student can truly learn to appreciate living by extending that term to other creatures. From the green plant to the fish to the human being, all are biological systems. The study of each system and its interrelationships with other systems can provide fascinating insights into life and the world environment.

A background in biology is vital to a preprofessional or professional career in the health sciences. Furthermore, most professional schools expect applicants to have completed several biology courses. Students planning to teach should consult the School of Education for information on teacher certification.

All biology majors are required to take the complete list of biology core courses (20-21 credit hours) plus the specific ancillary core courses in chemistry, mathematics, physics, and statistics (29 credit hours). At this point a student must declare a particular direction by selecting one of the options listed below (i.e., ecology, genetics, organismic, or general biology). Course selections above the core level should be made in consultation with a biology faculty adviser. Students should contact their biology faculty advisers early in their academic careers.

**Biological Core Courses**

<table>
<thead>
<tr>
<th>Course</th>
<th>Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Biology I and II (Biol. 205 and 206)</td>
<td>8</td>
</tr>
<tr>
<td>Principles of Ecology (Biol. 341)</td>
<td>3</td>
</tr>
<tr>
<td>Cell Biology (Biol. 361)</td>
<td>3</td>
</tr>
<tr>
<td>General Genetics (Biol. 383)</td>
<td>3</td>
</tr>
<tr>
<td>Plus one physiology or morphology course</td>
<td>3-4</td>
</tr>
</tbody>
</table>

**Total biology core 20-21**

**Ancillary Core Courses**

<table>
<thead>
<tr>
<th>Course</th>
<th>Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Chemistry, two semesters (Chem. 103 and 106)</td>
<td>10</td>
</tr>
<tr>
<td>University Mathematics I and II (Math. 111 and 112)</td>
<td>6</td>
</tr>
<tr>
<td>Physics for the Life Sciences (Phys. 251 and 252)</td>
<td>10</td>
</tr>
<tr>
<td>Introductory Statistics (Math. 383 or Psych. 210)</td>
<td>3</td>
</tr>
</tbody>
</table>

**Total ancillary core 29**

In addition to the above core requirements the student must select at least four other courses in biology to complete his or her major requirements and a minimum of 36 biology credit hours for graduation. At least three of these courses must be taken from the list provided by the particular option which the student elects. Note that each option also carries a set of ancillary courses which are either required or recommended. Independent Study can be taken under any of the options with the consent of an appropriate biology faculty adviser.


**Organismic Option** (select a minimum of one physiology and one morphology course): Biol. 225, 310, 322, 407, 413, 425, 427, 438, 439, 461, 467, 470, 541, 542. Ancillary organismic courses: Organic Chemistry I and II (Chem. 341 and 342) required. Also recommended: Calculus I and II (Math. 140 and 241) and General Biochemistry (Chem. 481 and 482).

**General Biology Option**: A student may prefer an undergraduate option which may or may not lead to training for an advanced degree and does not specifically lead the student in one of the three directions shown above. Hence, a student may declare a general biology option and choose from an array of courses under the strict guidance of an adviser. At least one biology course recognized by each of the above options must be included under this particular plan. To receive certification as a biology major at UCD, a student must complete a minimum of 15 hours of upper-division UCD biology courses.

**CHEMISTRY**

Faculty: Robert Damrauer, Sandra S. Eaton, Dennis Gould, Marsha Heinig, John Lanning, John Perry, Donald Soucy, Denis R. Williams; Part-time: Martha B. Barrett, Leonore K. Damrauer; Adjunct: Robert M. Speights; Visiting Faculty: Joseph C. Stickler.

Why study chemistry? A practical reason is that our highly technical society faces many problems which can be solved through a thorough understanding of the science of chemistry and its methods of solving problems. A more intangible reason recognizes that chemistry is central to a variety of other disciplines and that many problems ultimately may have chemical solutions.

At the undergraduate level students can prepare for (1) careers in chemical and medical laboratories, (2) careers in nursing, medical technology, physical therapy, dental hygiene, and other health oriented fields, (3) post-baccalaureate programs in chemistry, biology, biochemistry, medicine, and dentistry. At the graduate level, the chemistry program offered at UCD culminates in the awarding of an M.S. degree. Students awarded M.S. degrees have job opportunities in research and technical laboratory services. In addition, flexible programs can be designed to combine chemical knowledge and skills with other interests of the M.S.-level student (e.g., business and biology).

For graduation at the bachelor's level, students majoring in chemistry must present credits in the following courses or their equivalents: Chem. 103, 106, 311, 341, 342, 348, 349, 412, 413, 451, 452, 455; Phys. 231, 232, 233, 234; Math. 140, 241, 242. Students interested in the chemistry major should consult regularly with a member of the chemistry faculty. A copy of the chemistry major's program may be obtained in EC Room 232.

Qualified majors are strongly urged to participate in the independent study program beginning in their junior year.

A distributed studies program in chemistry requires at least 30 hours of chemistry including the following or their equivalent: Chem. 103, 106, 311, 341, 342, 343 or 348, 344 or 349, and 451.

Students planning chemistry as a career should be familiar with the recommendations of the American Chemical Society for the professional training of chemists. Among these recommendations are a reading knowledge of German or Russian, one semester of inorganic chemistry (Chem. 401) and two semesters of
advanced work (see graduate chemistry offerings and 400-level biochemistry courses). Six hours of Chem. 493 will satisfy the special courses requirement. An option leading to a degree accredited by the American Chemical Society is also offered. UCD maintains an ACS chapter of student affiliates.

Students wishing to graduate with honors in chemistry should plan to do a minimum of two semesters (6 credit hours) of research (Chem. 493), ordinarily starting in the junior year. Additional requirements are listed under Honors in the Special Academic Programs section.

**COMPUTER SCIENCE**

Faculty: Roland A. Sweet, CLAS Adviser. Several computer scientists reside in other colleges: in engineering—Paul F. Hultquist and William D. Murray; in business—Richard Hackathorn.

Computers have an impact on every aspect of modern life. Knowledge of the basic principles and methods of computer operation can be helpful to students in their personal lives as well as useful in developing job skills. Students interested in pursuing the study of computers in depth may designate computer science as a primary subject in the College's distributed studies major program. In this program, a student completes 30 semester hours in computer science (and computer-related courses) and 30 semester hours distributed over one or two secondary subjects. For students pursuing a traditional major program in mathematics, or in electrical engineering within the College of Engineering and Applied Science, a special computer science option is available.

**GEOGRAPHY**

Faculty: Melvin Albaum, Yuk Lee, Charles G. Schmidt, Richard E. Stevens.

Geography is a science that focuses on the spatial analysis of human physical patterns and processes. Geographers attempt to identify the factors affecting the distribution of people and their activities on the surface of the earth and to provide meaningful solutions to problems faced by societies. This discipline is an ideal major for the liberal arts student, providing exposure to the concepts and techniques utilized in investigating environmental issues, socioeconomic problems, and planning policies.

The program is designed to provide the student interested in economic, physical, or social geography with the background necessary for obtaining a rewarding job in government (federal, state, local) and private industry, as well as preparing students for graduate work. Recent graduates have found employment in forest management, surveying mapping, land-use planning, location analysis, transportation planning, and environmental impact analysis.

Students majoring in geography must complete the following basic courses or their equivalents: Geog. 100, 101, 199, 306, and 361. In addition, majors must complete a minimum of 30 hours of course work in geography (at least 16 hours of which must be at the upper division level) and maintain a 2.0 average in all geography course work completed. Distributed studies majors selecting geography as a primary or secondary subject should consult with the department adviser.

**GEOLOGICAL SCIENCES**

Faculty: Wesley E. LeMasurier, William L. Bilodeau

Geology is the study of the earth. The major topics in the field include (1) the origin and distribution of rocks and minerals that make up the planet and serve as raw materials and fuels for technology, (2) the processes that create continents and ocean basins and shape the surface of the earth, and (3) the history and evolution of the planet and its living organisms. Most topics serve as subjects of both basic research and applied technology.

Employment opportunities for well-qualified geologists are generally good for students holding B.A., M.S., or Ph.D. degrees. A graduate degree is strongly recommended for those seeking responsible positions. Major employers are the oil, mining, and engineering industries, federal and state surveys, and various teaching and research institutions, all of which are heavily represented in the Denver metropolitan area. Many persons combine a geology degree with a second degree in law, business, planning, engineering, or education to pursue a variety of other career options.

Students majoring in the geological sciences may choose from among six curriculum options to suit a variety of career or educational objectives. Most options require the following courses within the department: physical geology, mineralogy, structural geology, and field geology. Introductory petrology, stratigraphy, and paleontology are recommended. In addition, most career-oriented students must take the following courses in allied fields: Chem. 103, 106; Math. 140, 241, and 242 or 319 (or the equivalent courses at the University of Colorado at Boulder, Math. 130, 230); Phys. 231-232, 233-234. All courses required for the geology major must be taken for a letter grade (no Pass/Fail).

UCD offers its program entirely in the evening (excepting field geology), with the assistance of honorarium faculty from industry, the U.S. Geological Survey, and the CU Boulder campus.

**MATHEMATICS**

Faculty: Nancy S. Angle, Roxanne M. Byrne, R.T. Clement, Vance Faber, Zenas R. Hartvigson, Collin J. Hightower, Sylvia Chin-Pi Lu, William W. McCormick, Paul A. O'Meara, Charles I. Sherrill, Roland A. Sweet; Part-Time: Beryle M. Barkley.

Mathematics is a body of deductive knowledge dealing with such topics as numbers, algebra, geometry, analysis, and logic. It permeates modern life and is encountered by the student very early, especially with respect to its applications. At UCD, the mathematics faculty continues to present applications, but broadens the study to incude more of the actual mathematical theory itself, as
well as its historical development.

The study of mathematics can prepare the student for careers in business, industry, teaching, and government. Mathematics is especially useful in engineering, science, and computer science, and it provides a good background for any of the professional schools.

A major in mathematics can be completed by students in the College of Liberal Arts and Sciences by satisfying all of the following requirements, completing each with a grade of C or better:

1. At least 30 semester hours of mathematics courses.
2. At least 18 semester hours of mathematics courses numbered above 300, approved by an adviser and excluding Math. 303, 304, 383, 427, 428, 429, 470, 475, 495, 496 and 497.
5. Exceptions to the above can be made only by the designated department adviser.

No student may earn more than 9 hours credit in mathematics courses numbered below 140.

Students who plan to do graduate work in mathematics should take Math. 431-432; students who wish to obtain a secondary teaching certificate are encouraged to complete Math. 321-422; students planning to major in mathematics must see an adviser from that discipline.

Variations in these courses must be approved by a mathematics adviser.

At the graduate level, master's degrees are available in mathematics, applied mathematics, and basic science (mathematics option).

The mathematics department offers a teaching internship program which consists of three phases as follows:

**Phase 1.** A junior-level student who is majoring in mathematics or applied mathematics, and who shows promise as a teacher, is sponsored by a member of the full-time faculty of the department. A freshman-level course is then assigned to the student, on an honorarium basis, with the understanding that the faculty member will attend all sessions of the course. The student will thus be acting as an intern and will be provided with a critique of his performance after each lecture.

It is the interested student's task to convince a faculty member that he or she should sponsor the student. No faculty member is required to perform this function, nor is any compensation afforded to the sponsor for so doing.

**Phase 2.** After completion of one or two semesters of fully supervised classroom exposure, and upon the student's entry into the senior year of study, the faculty sponsor may recommend that the intern be accepted as an undergraduate teaching assistant. With approval of the mathematics faculty, the student will then be assigned broader responsibility for one (or at most, two) freshman courses, with the faculty sponsor exercising such supervision as may appear appropriate under individual circumstances.

**Phase 3.** Upon completion of a baccalaureate program the intern hopefully would be prepared to accept a graduate teaching assistantship in the discipline or in a related interdisciplinary area as the next step in his or her professional career.

### PHYSICS

Faculty: Willard R. Chappell, James P. Crawford, Martin M. Maltempo, Robert N. Rogers, William R. Simmons, Clyde S. Zaidins; Part-time: R. Stuart Saunders; Adjunct: Edward J. Davies, Sidney A. Freudenstein, III. In Kil Hwang, David P. Olsen, Jerry H. Wilson; Adjunct: Paul E. Biagi.

Physics as a discipline is the base on which many other areas of science and engineering rest. There are several variations of a major in physics available to suit career goals ranging from fundamental research to general education. Students interested in basic research or teaching in higher education need to prepare for graduate study in physics (Plan I). Careers in applied physics, primarily in industry, are best served by a Plan II or engineering physics major (see the *University of Colorado at Boulder Catalog* for the latter). Plan II, coupled with appropriate education courses, is also advised for students desiring to teach physical science in primary or secondary schools. A new option (Plan III) which emphasizes conceptual, philosophical, historical, cultural, and social aspects of physics is available for students desiring a technical background for careers in business, law, politics, etc., or for general education. Physics is an important component in many interdisciplinary areas, such as environmental, geophysical, or energy studies. Majors in these areas are arranged individually.

All physics majors, under any option, must consult with an adviser. The basic requirements include Phys. 130 and two semesters of other sciences for all majors. Additional courses are:


**Plan III.** Phys. 105, 106, (201, 202) or (251, 252), 317, and 15 hours of upper division physics electives, such as 307 or 309, 308, 362, 363, 395, 464, or 466, and Philosophy of Science.

### PSYCHOLOGY

Faculty: Janis W. Driscoll, Robert D. Elder, Daniel Fallon, Eben M. Ingram, Linda L. McCabe, Carolyn M. (Currently, it is requested that NPS 490 be taken in place of Phys. 317.)
Simmons, Gary S. Stern, Graham Sterritt; Emeritus: Nell G. Fahrion.

Psychology is the scientific study of behavior, consisting of the following major areas of study: experimental psychology, biopsychology, developmental psychology, social psychology, and clinical psychology. The requirements for the psychology major are designed to expose the student to the spectrum of psychology, including an early exposure to methodology and statistics. Although some specialization is possible, the faculty believes that this is more appropriate at advanced levels and that the undergraduate should have a broad background upon which to base future specialization.

An undergraduate major in psychology provides a good general concentration for a B.A. degree. Job opportunities are developing for interdisciplinary combinations of psychology with other areas of study such as business, computer science, and statistical design. Traditionally, job opportunities within the field of psychology itself require graduate study; however, some students find jobs in the mental health and social service fields with a B.A. degree in psychology. The psychology major also prepares the student for graduate work in psychology. Programs leading to the master's degree in applied areas of psychology appear to be one of the directions in which the field is moving.

Requirements for the psychology major are as follows: majors must complete at least 30 semester hours and not more than 48 semester hours in psychology with at least 16 hours in upper division courses. No grade below C in psychology courses is acceptable toward the major. College algebra and English 102 must be included in lower division curriculum. Specific course requirements are Psych. 203-204, Psych. 211 and 212, and at least one biotrophic course including Psych. 322, 405, 409, 410, 414, 416, 425, 438, 496; at least one sociotropic course including Psych. 364, 430, 431, 440, 441, 445, 449, 464, 466, 467, 471, 485; at least one advanced laboratory course including Psych. 417, 422, 431, 444, 485; and one integrative course, Psych. 451.

Transfer psychology majors will be expected to complete at least 9 semester hours in psychology courses, including an advanced laboratory course, on the UCD campus.

Division of Social Sciences

M. Jay Crowe, Assistant Dean

In the last two decades, the social sciences have included study of some of the most intractable problems of contemporary society: the population explosion, urban concentration, the impact of rapidly changing technology, the strains of race relations, the conflicts arising from competing political ideologies, and the thrust of developing societies. The social science disciplines also provide important bridges between thought and action and between values and problem-solving techniques.

Social science majors provide excellent preparation for further professional training as well as for jobs in public service, secondary school teaching, office administration, journalism, and writing. Students can satisfy all requirements for the Bachelor of Arts degree at UCD in all the departments included in the division. The requirements of each major are explained under the respective departments.

The Division of Social Sciences includes the following departments: anthropology, economics, history, political science, and sociology. The College-wide interdisciplinary major programs in ethnic studies and urban studies are also administered by faculty in the division. The division offers courses in the various disciplines, in interdisciplinary studies, and in preprofessional studies.

Students should be aware of the possibilities for a distributed studies major in the social sciences. The most usual combinations are economics and sociology and history and political science. See the College-wide Interdisciplinary Academic Programs section of this bulletin for details on a distributed studies major.

ANTHROPOLOGY

Faculty: Robert A. Aldrich, Dennis DeSart, JoAnn E. Glittenberg, Janet R. Moore, Lorna Grindlay Moore, Duane Quiatt, Jack E. Smith, Adjunct: Richard G. Conn.

Anthropology provides a broad overview of human beings and their ways of living in the world. It considers humans as biological and social beings and seeks to understand their origins, biological and cultural evolution, present conditions, and future prospects. Anthropology seeks to explain both contemporary biological and cultural diversity, and those features shared by people everywhere. It also seeks to understand the past record of biological and cultural evolution. Anthropological training has an application to many fields. It is especially helpful in the areas of environmental design, city planning, community development and architecture, the medical and nursing professions, and allied health sciences, law, public affairs, and secondary education.

Requirements for Majors. Undergraduate majors must complete a minimum of 30 semester hours in anthropology with grades of C or better. Sixteen of the 30 hours must be upper division. The maximum number of hours in the major is 48. Anthropology majors must take the following courses or demonstrate a competent knowledge of materials and methods covered.

Anth. 103-3. Introduction to Anthropology I
Anth. 104-3. Introduction to Anthropology II
Two of the following:
Anth. 200-3. Cultural Anthropology
Anth. 201-4. Biological Anthropology
Anth. 202-3. Archaeology
Anth. 203-3. Nature of Language
and:
Anth. 453-3. History of Anthropology

ECONOMICS

Faculty: Gary Bickel, Suzanne W. Helburn, Byron L. Johnson, Patricia Malin, John R. Morris Jr., Alan R. Shelly.
Economics is important to the average citizen as well as to the professional. The economy influences daily life, and every person must make economic decisions. The economics student is trained to research, to analyze data, and to make forecasts. This background lends itself to careers in teaching, business, and government.

Economics deals with the production and circulation of the worldly goods of humanity. Specific aspects are macroeconomic (inflation, unemployment, etc.) and microeconomics (theory of behavior or individual producers, consumers, and investors). Analytic scope ranges from precise mathematical modeling to general philosophical speculation on the nature of society and people.

Requirements for Majors. Students majoring in economics must meet the following requirements: at least 33 (including Computer Science), but not more than 48, semester hours in economics, of which 19 must be numbered 300 or higher; Econ. 381, 407, and 408, and Econ. 481 or a data processing course approved by the student's adviser. Recommended: Math. 107, Math. 111, or Math. 140; recommended that prospective graduate students in economics take Math. 140, 241, and Econ. 480 (or Math. 242 and 319 as substitutes for Econ. 480). At least 12 semester hours must be taken for credit on the Denver Campus. Hours outside of economics may be counted for the major at the discretion of the student's adviser.

Students who do not have an adviser should see the department chairperson for assignment to an adviser. Any deficiencies in prerequisites for Econ. 381 should be removed as soon as possible, and the 381 requirement should be fulfilled early in the student's career.

For all courses numbered above 300, the prerequisite, unless otherwise indicated, is Econ. 201 and 202, or Econ. 300.

Distributed Studies

Students majoring in distributed studies may make economics their primary area of concentration by taking 30 semester hours in economics. Required courses for this option are Econ. 407-408 and a course in statistics.

ETHNIC STUDIES

Faculty: Nereya L. Bottoms, Cecil E. Glenn, Fred Anthony Shearer; Part-time: Larry T. Osaki.

Ethnic studies is the academic study of the culture of minority groups in the United States. Although the programs in ethnic studies have been designed to meet academic needs of all university students, many students interested in ethnic studies qualify for support from federal and state educational opportunity programs (EOP). Student organizations provide assistance with recruiting, counseling, personal guidance, and tutoring; financial help is available through grants and the Work/Study Program. The program offers three options for students: (a) the major, (b) the combined major, and (c) the specialization.

The Major. The major leads to the Bachelor of Arts degree in ethnic studies. The major program consists of 42 semester hours, with an average of C or better. 30 of which must be taken from the ethnic studies curriculum. The remaining 12 hours are taken from a list of related courses in other departments prepared annually by the ethnic studies faculty.

The Combined Major. The ethnic studies faculty urges students interested in the program to consider combining ethnic studies with a major in one of the many closely allied disciplines in the University. In this option, a student selects a major in an allied discipline such as communication and theatre, English, Spanish, sociology, history, political science, anthropology, psychology, or education, and pursues it simultaneously with ethnic studies as follows:

1. The student must meet all the requirements for the major in each department.
2. The student's program of study must be approved by the chairpersons of both of the departments involved.
3. Courses that are cross-listed between two departments will apply toward fulfillment of the requirements for either major field but not both.

The Specialization. Rather than majoring in ethnic studies, students pursuing a major in another department in the College of Liberal Arts and Sciences may wish to pursue a specialization in ethnic studies. Students earn the specialization by completing the requirements for their particular academic major and, in addition, 12 semester hours in ethnic studies, 6 of which must be at the 300 level or higher.

HISTORY


History constitutes an intellectual challenge not only because of its special discipline but also because an understanding of history requires one to integrate many branches of knowledge. Individual history courses cut across lines of the social sciences, humanities, even the natural sciences. But more important to the history student than learning facts is understanding the process of change. By comparing the state of humankind over years, decades, or centuries, the student of history isolates important societal changes and analyzes critical causal factors. This is training not only for learning, but for living.

The bachelor's degree in history provides training for immediate postgraduate career entry or advanced training in several social sciences. History majors frequently choose careers in teaching or civil service; in addition, a number enter corporate management training programs or develop careers in sales. History is traditionally a valued background for law school applicants. A key attraction of the major in history is its versatility: an excellent choice for those who are still seeking career goals.

Requirements for Majors. Undergraduate students majoring in history enrolled prior to fall 1980 must complete a minimum of 30 semester hours in history, 16 of which must be upper division. Not more than 48 hours in the student's major area will count toward the 120-
hour graduation requirement. A student must have a cumulative grade-point average of 2.0 or better in the major to graduate. History majors enrolled prior to fall 1980 shall fulfill their lower division requirements by taking 12 hours of history at the 100 and 200 levels. All majors must take Hist. 101 and 102; in addition, they may take Hist. 151 and 152 or any two non-European history courses.

From fall 1980, new major requirements will apply for students enrolling as history majors. Sixteen hours of specific lower division courses and 4 hours of a senior seminar will be required. In the first two academic years all majors shall take two introductory sequences: 9 hours of Western Civilization, the lecture courses Hist. 101 and 102 plus one of two related topics courses, either Hist. 103 in the fall or Hist. 104 in the spring. Also, 9 hours of U.S. history, the lecture courses Hist. 201 and 202 plus one of two related topics courses, either Hist. 203 in the fall or Hist. 204 in the spring. In the senior year, history majors shall be required to take a 4-hour senior seminar with an extended essay component. Electives at the upper division level must account for no less than 12 of the remaining semester hours required for graduation.

POLITICAL SCIENCE

Faculty: Michael S. Cummings, Joel Edelstein, Jana Everett, Harold H. Haak, Larry Mosqueda, Stephen C. Thomas; Adjoint: George W. Pring.

Political science studies people, power, and the public good. Looking at a variety of societies, institutions, and interpersonal situations, the discipline asks who has power, where this power comes from, how it is used, and how it promotes or impairs the public good. It also asks what this public good is; how it differs from China to Rhodesia to Argentina to Colorado; and how the basic human needs for security, love, self-respect, and self-actualization depend upon political conditions, such as freedom and equality. Political science draws on from other fields, such as psychology, philosophy, economics, sociology, and world literature. Finally, it explores the relationship between idealism and realism, between theory and practice, between political thought and personal action.

Opportunities for students with a B.A. in political science include careers in business, teaching, journalism, and government service. A political science degree also serves as good preparation for professional training in law and public administration. In all cases, participation in an internship experience as an undergraduate will increase the student's job opportunities. Students with an M.A. in political science may find careers in such areas as business, government research and administration, and teaching at the community college level.

Requirements for Majors. Undergraduate majors must complete a minimum of 30 semester hours in political science, of which at least 18 must be in upper division courses. Courses are distributed among the primary fields as listed in this bulletin, i.e., American politics, comparative politics, international relations, political theory and public law, and public administration. The major must include the following: Pol. Sci. 100, 110, 200, 440, 441; Econ. 201 and 202; and one upper division course in each of three fields — American politics, comparative politics, international relations. With faculty approval, students may get course credit for political internships through Cooperative Education, Pol. Sci. 398.

SOCIAL SCIENCES

See discussion of this interdisciplinary program in C.L.A.S. Section of this bulletin.

SOCIOLOGY


Sociology is the study of group life in society. It is the investigation of social actions, values, and procedures that are involved in the development, structure, and operation of group life. Sociology attempts to present a perspective which encourages people to develop what has been called the sociological imagination — the use of reason to achieve lucid summaries of what is going on in the world and of what may be happening within themselves.

Training in sociology, especially at the graduate level, can open up almost any professional field. Knowledge of sociology and sociological method is valuable in management, research, government service, public affairs, and the health services.

The department has developed the following rationale for courses offered.

1. Lower division courses (for majors and nonmajors).
   a. One-hundred-level courses are an introduction to the broad sociological perspective as it applies to social life, social systems, and society.
   b. Two-hundred-level courses introduce the student to somewhat more specific content areas: population study, human ecology, social psychology, etc.

2. Upper division courses (300 and 400).
   a. Three-hundred-level courses serve as advanced surveys of some specific area of concentration. They are designed to acquaint the student with the issues, methods, concepts, and theoretical frameworks employed in the content area. Such courses as urban sociology, sociology of the family, and sociology of work are offered at this level. Many of these courses are open courses in that students from other departments and colleges are encouraged to enroll in them.
   b. Four-hundred-level courses are devoted to a more detailed in-depth examination of specific issues, approaches, and concepts within the previously identified content areas. These are advanced courses and are geared more directly to sociology and social science majors.

Requirements for Majors. Majors in sociology are required to complete 30 hours in sociology with a grade
of C or better. Of these hours, 16 must be upper division, of which 12 hours must be 400-level courses. Maximum in the major is 48 hours. The following courses must be completed with a grade of C or better:

Soc. 100: Introduction to Sociology
Soc. 400: Contemporary Sociological Theory
Soc. 402: Statistics

A maximum of 6 hours of social science credit may be counted toward the major in sociology. As no fixed sequence of courses is prescribed, it is recommended and expected that students will select an adviser from the sociology faculty to help them develop their programs. This is particularly important for those intending to do graduate work in sociology.

**URBAN STUDIES**

See discussion of this interdisciplinary program in C.L.A.S. Section of this bulletin.
INFORMATION ABOUT THE COLLEGE

The College of Music is approved by the National Association of Schools of Music to offer music degree programs on both the Denver and Boulder campuses. At UCD the College offers the Bachelor of Science in Music and Media. This degree is designed to prepare students for professional careers in music relating to the recording, broadcasting, business, and entertainment industries.

Requirements for Admission

In addition to the entrance requirements of the University outlined in the General Information section of this bulletin, the entering student must meet the following requirements of the College of Music:

Required High School Units

<table>
<thead>
<tr>
<th>Subject</th>
<th>Semester Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>English</td>
<td>3</td>
</tr>
<tr>
<td>Foreign language</td>
<td></td>
</tr>
<tr>
<td>Mathematics</td>
<td></td>
</tr>
<tr>
<td>Physical science</td>
<td>8</td>
</tr>
<tr>
<td>Social science</td>
<td></td>
</tr>
<tr>
<td>Theoretical music</td>
<td></td>
</tr>
<tr>
<td>Additional high school units</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>15</td>
</tr>
</tbody>
</table>

The prospective music student should be familiar with the established solo and ensemble literature for his or her major instrument, and possess basic sight-reading and technical skills.

It is expected that all students will have had several years of previous experience as performers. Two years of piano study are recommended.

The College of Music requires an audition of all entering freshmen and undergraduate transfer students. In lieu of the personal audition, applicants may substitute tape recordings (about five minutes in length at 7\(\frac{1}{2}\) ips) and a statement of music reading competence from a qualified teacher. Interested students should write to the College of Music, UCD, for audition applications.

Ensembles

Music majors are required to enroll in an ensemble during each of the eight semesters of their enrollment in the College. Nonmusic majors are invited to audition for any of the UCD music ensembles. Each carries 1 semester hour of credit. Some of these have more than one section, depending upon skill level: Electronic Music Ensemble, Jazz Ensemble, The New Singers, Woodwind Ensemble, Chamber Music (various), Percussion Ensemble, Brass Ensemble, and jazz-rock groups.

Visiting Faculty and Artists

Special workshops, clinics, seminars, and symposiums are offered periodically in conjunction with performances by active professionals under the visiting faculty program. These programs are incorporated into the academic program or offered for credit through the UCD Division of Continuing Education.

Applied Music Policy

All performance standards, requirements, and credits specified for a particular music degree in the college do not necessarily transfer and become acceptable for any other music degree within the college. Additional information on this policy is available from the Office of the Associate Dean, UCD College of Music.

Graduate Study

For information on graduate studies in music see the Graduate School section of this bulletin.

BACHELOR OF SCIENCE IN MUSIC AND MEDIA

This degree is unique in Colorado and is intended for students seeking preparation for professional careers in music related to the recording, broadcasting, business, and entertainment industries.

Core Curriculum

Work is to be started in the student's freshman year. A large portion of it can be completed by the end of the sophomore year.

<table>
<thead>
<tr>
<th>Required Courses in Music</th>
<th>Semester Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mus. 100-102. Theory and Musicianship I</td>
<td>4</td>
</tr>
<tr>
<td>Mus. 101-103. Theory and Musicianship I</td>
<td>4</td>
</tr>
<tr>
<td>Mus. 200-202. Theory and Musicianship II</td>
<td>4</td>
</tr>
<tr>
<td>Mus. 207. Instrumentation I</td>
<td>2</td>
</tr>
<tr>
<td>Mus. 180, 181. Introduction to Music</td>
<td>4</td>
</tr>
<tr>
<td>Mus. 380, 381. History and Literature of Music</td>
<td>6</td>
</tr>
<tr>
<td>Mus. 230. Class Piano</td>
<td>1-3</td>
</tr>
<tr>
<td>Applied Music</td>
<td>8</td>
</tr>
<tr>
<td>Ensembles</td>
<td>8</td>
</tr>
<tr>
<td>Music electives</td>
<td>8</td>
</tr>
<tr>
<td>Total</td>
<td>47-49</td>
</tr>
</tbody>
</table>
Areas of Concentration

When students are approaching completion of studies in the core curriculum, they are to select an area of concentration in consultation with an adviser and with the approval of the associate dean. The concentration is to be selected from the following:

Scoring and Arranging

<table>
<thead>
<tr>
<th>Course</th>
<th>Semester hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mus. 406. Analysis I</td>
<td>2</td>
</tr>
<tr>
<td>Mus. 401 or 402. Counterpoint</td>
<td>2</td>
</tr>
<tr>
<td>Mus. 303 and 403. Scoring and Arranging</td>
<td>5</td>
</tr>
<tr>
<td>Mus. 305. Elementary Composition</td>
<td>2</td>
</tr>
<tr>
<td>Mus 420. Advanced Composition</td>
<td>2</td>
</tr>
<tr>
<td>or Mus. 405. Advanced Instrumentation</td>
<td>3</td>
</tr>
<tr>
<td>Applied Music (two semesters)</td>
<td>4</td>
</tr>
<tr>
<td>Music electives</td>
<td>4</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>22</strong></td>
</tr>
</tbody>
</table>

Sound Synthesis and Recording

<table>
<thead>
<tr>
<th>Course</th>
<th>Semester hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mus. 455. Sound Reinforcement and Recording II</td>
<td>3</td>
</tr>
<tr>
<td>Mus. 457. Electronic Music II</td>
<td>3</td>
</tr>
<tr>
<td>Phys. 362 Sound and Music</td>
<td>3</td>
</tr>
<tr>
<td>Mus. 018. Synthesis Proseminar</td>
<td>2</td>
</tr>
<tr>
<td>Applied Synthesizer (two semesters)</td>
<td>4</td>
</tr>
<tr>
<td>Field work (or electives)</td>
<td>7</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>22</strong></td>
</tr>
</tbody>
</table>

The Music Business

<table>
<thead>
<tr>
<th>Course</th>
<th>Semester hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mus. 490, 491. Music and Media</td>
<td>6</td>
</tr>
<tr>
<td>Acct. 200. Introduction to Financial Accounting</td>
<td>3</td>
</tr>
<tr>
<td>Or. Mgr. 330. Introduction to Management and Organization</td>
<td>3</td>
</tr>
<tr>
<td>Mk. 300. Principles of Marketing</td>
<td>3</td>
</tr>
<tr>
<td>Electives/field work in business</td>
<td>7</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>22</strong></td>
</tr>
</tbody>
</table>

Applied Music

<table>
<thead>
<tr>
<th>Course</th>
<th>Semester hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>Applied Music (four semesters)</td>
<td>12</td>
</tr>
<tr>
<td>Recital</td>
<td>0</td>
</tr>
<tr>
<td>Mus. 406. Analysis</td>
<td>2</td>
</tr>
<tr>
<td>Mus. 328. Contemporary Improvisation</td>
<td>2</td>
</tr>
<tr>
<td>Mus. 484. Research Project</td>
<td>2</td>
</tr>
<tr>
<td>Music electives</td>
<td>4</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>22</strong></td>
</tr>
</tbody>
</table>

**Performance Requirement**

Students are required to include applied music study of their principal performing medium (instrument or voice) from the outset of their studies at UCD. Students are required to pass a performance proficiency examination toward the end of their fourth semester of study.

**Ensemble Requirement**

Students are expected to participate in ensembles throughout their residency. They should acquire experience in both large and small ensembles, vocal and instrumental, in accordance with their capabilities and interests.

**Music Facilities Fee**

All music majors and students using University-owned instruments, music practice facilities, and laboratories will be assessed an $18 music facilities fee each semester ($10 for summer term).

**Model Schedule**

A recommended schedule for all freshman music students is the same.

**Freshman Year**

<table>
<thead>
<tr>
<th>Term</th>
<th>Semester Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fall Semester</td>
<td></td>
</tr>
<tr>
<td>Mus. 100 and 102. Theory I</td>
<td>4</td>
</tr>
<tr>
<td>Mus. 180. Introduction to Music</td>
<td>2</td>
</tr>
<tr>
<td>Mus. 230. Class Piano</td>
<td>1</td>
</tr>
<tr>
<td>General Studies</td>
<td>6</td>
</tr>
<tr>
<td>Applied music</td>
<td>2</td>
</tr>
<tr>
<td>Ensemble</td>
<td>1</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>16</strong></td>
</tr>
<tr>
<td>Spring Semester</td>
<td></td>
</tr>
<tr>
<td>Mus. 101 and 103. Theory I</td>
<td>4</td>
</tr>
<tr>
<td>Mus. 181. Introduction to Music</td>
<td>2</td>
</tr>
<tr>
<td>Mus. 230. Class Piano</td>
<td>1</td>
</tr>
<tr>
<td>General Studies</td>
<td>6</td>
</tr>
<tr>
<td>Applied music</td>
<td>2</td>
</tr>
<tr>
<td>Ensemble</td>
<td>1</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>16</strong></td>
</tr>
</tbody>
</table>

The schedules of sophomore, junior, and senior music students vary according to their areas of concentration. Below is the recommended schedule for students concentrating in the area of scoring and arranging. Students concentrating in other areas should consult an adviser in the College of Music to insure that they make the required modifications in their schedule.

**Sophomore Year**

<table>
<thead>
<tr>
<th>Term</th>
<th>Semester Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fall Semester</td>
<td></td>
</tr>
<tr>
<td>Mus. 200 and 202. Theory II</td>
<td>4</td>
</tr>
<tr>
<td>Mus. 290. The Music Business</td>
<td>3</td>
</tr>
<tr>
<td>Mus. 230. Class Piano</td>
<td>1</td>
</tr>
<tr>
<td>General Studies</td>
<td>3</td>
</tr>
<tr>
<td>Applied music</td>
<td>3</td>
</tr>
<tr>
<td>Ensemble</td>
<td>1</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>17</strong></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Term</th>
<th>Semester Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>Spring Semester</td>
<td></td>
</tr>
<tr>
<td>Mus. 406. Analysis</td>
<td>2</td>
</tr>
<tr>
<td>Mus. 328. Contemporary Improvisation</td>
<td>2</td>
</tr>
<tr>
<td>Mus. 484. Research Project</td>
<td>2</td>
</tr>
<tr>
<td>Music electives</td>
<td>4</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>17</strong></td>
</tr>
</tbody>
</table>

1 May not include applied music course.
### Spring Semester
- Mus. 207. Instrumentation ........................................... 2  
- Mus. 291. The Music Business ........................................... 3  
- B.A.D. 100. Introduction to Business ................................... 3  
- General Studies .................................................................. 6  
- Applied music ................................................................... 2  
- Ensemble .................................................................. 1  

Total: 17

### JUNIOR YEAR

**Fall Semester**
- Mus. 380. History of Music ................................................ 3  
- Elective in broadcasting .................................................... 3  
- Mus. 454. Sound Reinforcement and Recording I ....................... 3  
- Mus. 305. Elementary Composition ......................................... 2  
- Mus. 406. Analysis I ....................................................... 2  
- Applied music .................................................................. 2  
- Ensemble .................................................................. 1  

Total: 16

**Spring Semester**
- Mus. 381. History of Music ................................................ 3  
- Music 401 or 402. Counterpoint ........................................... 2  
- Mus. 303. Scoring and Arranging I ........................................... 2  
- Mus. 456. Electronic Music ..................................................... 3  
- Elective ..................................................................... 3  
- Applied music .................................................................. 2  
- Ensemble .................................................................. 1  

Total: 14

### SENIOR YEAR

**Fall Semester**
- Mus. 403. Scoring and Arranging II ......................................... 3  
- Music electives ................................................................ 4  
- General studies .................................................................. 3  
- Electives ..................................................................... 3  
- Ensemble .................................................................. 1  

Total: 16

**Spring Semester**
- Mus. 405 or 420. Advanced Instrumentation or Composition ........ 3  
- Music electives ................................................................ 6  
- Electives ..................................................................... 6  
- Ensemble .................................................................. 1  

Total: 16
Graduate School of Public Affairs

Robert F. Wilcox, Dean

INFORMATION ABOUT THE SCHOOL

The Graduate School of Public Affairs offers the degrees of Master of Public Administration, Master of Urban Affairs, Master of Criminal Justice, and Doctor of Public Administration.

The M.P.A. degree can be earned on the Boulder, Denver, and Colorado Springs campuses of the University. The M.U.A., M.C.J., and D.P.A. degrees are offered at UCD.

The Graduate School of Public Affairs holds membership in the National Association of Schools of Public Affairs and Administration and the Council of University Institutes for Urban Affairs.

Functions of the School

The principal functions of the School are to provide a varied program of professional education, training, and service for the public sector, and to undertake research on issues of concern to the government. Many different kinds of activities are carried out by students and faculty of the School under these two broadly defined missions.

The School provides an opportunity for selected working men and women to enhance their capabilities and potential for executive leadership in the public service through graduate education. It also offers to preservice students educational preparation for careers in the public sector.

Instruction is provided by a multidisciplinary faculty, the members of which are experienced administrators and/or specialists in such fields as organization theory, policy analysis, budgeting, information systems, quantitative analysis, science policy and administration, urban management, and research. Graduate courses from other University schools and departments are available to students desiring specialized study in areas of advanced knowledge beyond the scope of the Graduate School of Public Affairs.

Faculty members of the School maintain close associations with practitioners in all levels of government. Such activities include taking leadership roles in professional associations, conducting executive development programs, and undertaking significant consulting assignments. Special attention is given to assessing and reviewing, in cooperation with the appropriate officials, the needs of governments for professional education for executive leadership. Continuing cooperative effort with responsible public administrators has resulted in a very high rate of placement of the graduates.

Goals of the School

Some of the goals which guide the development of the School are listed here in order to give prospective students an idea of the environment in which they will be studying. The School endeavors to:

1. Work for a synthesis in the University's approach to problems of the public sector, emphasizing multidisciplinary approaches to public issues. The Graduate School of Public Affairs resembles other professional schools in its orientation to decision and action rather than to the accumulation and development of theoretical knowledge.

2. Prepare for public service posts recent college graduates having such diverse majors as anthropology, psychology, economics, sociology, biological sciences, business administration, engineering, political science, etc., and also midcareer specialists (including retired military personnel or veterans) desiring executive development or retraining.

3. Afford students the opportunity to study in crossdisciplinary programs designed to link expertise in such areas as engineering, science, and public health with such factors as policy analysis skills, administrative knowledge and skills, and understanding of the phenomena of urbanism.

4. Devote special effort to enrollment of full- and part-time students from the ranks of those now severely underrepresented in responsible policy and management positions in public service: women, blacks, Chicanos, and native Americans.

5. Expose students to a faculty drawn from the small and uniquely qualified group of scholars who are involved in the domain of the practitioners and who move readily and regularly to and from the practice of public affairs.

6. Maintain close relationships with federal, state, and local governments and associations of governmental executives.

Career Expectations of Graduates

While it would be difficult to predict all of the kinds of careers graduates of this School will pursue, several major categories can be defined. In the past, those who
have earned graduate degrees have filled a variety of administrative positions in federal, state, and local governments. With the initiation of new programs and the addition of new faculty, some of the principal categories of career opportunities are:

1. Generalist public executives, represented by such positions as city manager, assistant city manager, director of administration, department head, assistant administrator, and administrative assistant.

2. Specialists in such fields as urban affairs, policy analysis, administrative planning, financial management, manpower planning and management, and administrative analysis.

3. Mission-oriented careerists, a category which includes persons who are involved in the management of functional programs in which some basic substantive knowledge is necessary or desirable. Examples would include research into, analysis of, planning and direction of such human services as welfare, health, housing and recreation; those involved in all aspects of the direction of programs in such areas as environmental protection, urban planning, research and development, development and management of natural resources and utilization in technology; public works administrators; criminal justice planners and administrators; administrators of cultural and artistic programs; and those who administer American foreign policy and foreign aid programs.

**MASTER'S DEGREE PROGRAMS**

The M.P.A., M.U.A., and M.C.J. degree programs are interdisciplinary. They combine some required core courses to provide background and elective courses to serve each student's professional interests. An internship is required for students without prior governmental experience. A student may develop, in consultation with a faculty adviser, an individualized degree plan meeting the basic requirements for core courses as well as for electives.

The objectives and requirements of the Graduate School of Public Affairs should be read carefully by all applicants to the School.

**Master of Public Administration**

The degree Master of Public Administration (M.P.A.) is multidisciplinary and is designed to provide graduate professional education for men and women who wish to prepare themselves for administrative careers in government service—local, state, and national—or in organizations which are concerned with government affairs. The program also offers to those already in the public service an opportunity to pursue additional education as a means of furthering their careers. In addition to the courses offered by the Graduate School of Public Affairs, cooperating departments and schools of the University offer courses and seminars which may be included in the degree plans of graduate students who major in public administration.

**FINANCIAL ASSISTANCE**

Students in the M.P.A. program are eligible for several types of financial assistance. Work-study positions and educational loans require application to the Office of Financial Aid. A number of students secure internships or other part-time positions with local, state, and federal agencies in the Denver metropolitan area.

The School has received a small number of fellowships from the U.S. Office of Education. Since this act is funded on a year-to-year basis, anyone interested in applying should inquire at the School about current availability. Minority students may apply for the Minorities in Urban Administration Program Traineeships (supported by the Denver Regional Council of Governments and the U.S. Department of Housing and Urban Development). A small number of tuition scholarships also will be available on the three campuses. The Graduate School of Public Affairs is actively seeking additional funding for student support in the form of fellowships and additional internship positions.

**PROFESSIONAL ORGANIZATIONS**

Students in public administration are encouraged to become members of the American Society for Public Administration and to utilize the publications and other services of that professional organization. The monthly meetings in Denver of the Colorado Chapter of the Society provide students with the opportunity of associating regularly with professional administrators from all levels of government.

**ADMISSION REQUIREMENTS**

1. A baccalaureate 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 baccalaureate degree, but he or she will be required to have, or to acquire, an acquaintance with the political environment in which public administrators work. Students who have not had college or university course work which included the basic elements of American government are required to take, before or during their first semester of enrollment, the College Level Examination in American Government (CLEP) test, which is administered by the Testing Office of the University of Colorado or P.Sc. 110, which is an introductory course offered by the College of Liberal Arts and Sciences.

2. Applicants for admission should present evidence that they possess the necessary personal qualifications for administrative or other professional positions in public service. Recommendations by qualified references are to be submitted on forms which the applicant will receive when he requests an application form. (Recommendations may be by professors and/or others who are acquainted with the prospective student's professional work.)

3. A satisfactory score on the aptitude test of the Graduate Record Examination (GRE) or the graduate part of the Schools and Colleges Achievement Test (SCAT). Information about the examinations and the registration forms may be obtained from the Office for Student Affairs, University of Colorado at Denver, 1100 14th Street, Denver, Colorado 80202. To insure proper
reporting of test scores, examinees should specify that their graduate major at the University of Colorado will be Public Administration (Graduate School Department Code No. 94 for Item 10). Applicants should request that their test scores be sent to the Assistant Dean, Graduate School of Public Affairs, University of Colorado at Denver, 1100 Fourteenth Street, Denver, Colorado 80202.

4. Completed credentials should be received by June 1 for the fall semester, by November 1 for the spring semester, and by April 1 for the summer term.

5. Under special circumstances a student may be admitted on provisional status for a specified probationary period. At the end of this period, the student's faculty adviser, in consultation with other faculty members, will review the student's performance and recommend whether the student should be admitted to regular degree status or dropped from the program.

TRANSFER OF CREDIT

Up to 9 semester hours of appropriate graduate work from an accredited college or university and/or from a Department of Defense-sponsored school (e.g., Industrial College of the Armed Forces, Command and General Staff School, Army War College, Naval War College) may be credited toward the Master of Public Administration degree. D.O.D. courses must have been recommended by the American Council on Education as deserving graduate credit.

In addition, 12 hours of appropriate course work taken as a special student at the University of Colorado may be applied to the M.P.A. degree.

MINIMUM REQUIREMENTS FOR THE MASTER OF PUBLIC ADMINISTRATION DEGREE

The minimum requirements for the M.P.A. are outlined below. They are changed from time to time; however students may graduate under the requirements which were in effect when they were admitted.

Present minimum requirements for the M.P.A. include:

1. The completion of a minimum of 39 semester hours of graduate work with a grade-point average of B or better. (No grade lower than C will be accepted for graduate credit.) At least 33 semester hours of work must be at the 500 level or above. Pre-service students are required to take an additional 6 semester hours of field study, bringing their minimum to 45 semester hours.

2. The completion of the following core courses or acceptable equivalents: P.Ad. 500, Public Administration: Fundamentals and Environment I; P.Ad. 501, Public Administration: Fundamentals and Environment II; P.Ad. 502, Quantitative Analysis I (this particular requirement can be waived for students who pass a competency examination in statistics, but completion of the minimum 39 semester hours is still required); P.Ad. 503, Applied Analytic Methods in Public Administration; P.Ad. 504, Organization Theory and Administrative Behavior; P.Ad. 505, Financial Administration and Policy Formulation; and P.Ad. 507, Human Resources Management. (U.A. 500, Research Methods, is required for those students choosing to write a Master's Thesis/Special Project.)

3. P.Ad. 600, Field Study in Public Administration. Students who have not had government experience are required to complete P.Ad. 600. Enrollment in the field study may be during the summer months on a full-time basis, or during the academic year while they have part-time internships. Interns must meet their on-job requirements and also the requirements of the Graduate School of Public Affairs. A minimum of 480 hours of supervised work-and-study is required to earn 6 hours of credit. Students with administrative experience are not required to take P.Ad. 600, and may not apply their full-time position toward field study credits.

4. The completion of an option, examples of which are set forth below. Selection of an option should be made in consultation with an adviser during the first semester of full-time enrollment or before completion of 9 semester hours by part-time students.

In addition to the options listed, a student may develop, with the assistance of an adviser, a degree plan which reflects his or her principal focus of interest and professional objectives. Individual degree plans may be developed, for example, with emphasis in areas such as urban planning, transportation, and comparative and developmental administration. In addition to courses offered by the Graduate School of Public Affairs, the student is encouraged to include in his degree plan appropriate specialized courses offered by other departments and schools of the University. Every course and seminar included in each degree plan is part of the student's major, i.e., public administration. There is no minor. The examples of options follow:

General Public Administration Option

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Semester Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>Core courses (P.Ad. 500, 501, 502, 503, 504, 505, 507)</td>
<td>21</td>
</tr>
<tr>
<td>Required course for this option</td>
<td>3</td>
</tr>
<tr>
<td>P.Ad. 601-3. Administrative Analysis</td>
<td>3</td>
</tr>
<tr>
<td>Elective courses for this option</td>
<td>15</td>
</tr>
<tr>
<td>(a) Three courses selected from the following:</td>
<td></td>
</tr>
<tr>
<td>P.Ad. 510-3. Urban Administration</td>
<td></td>
</tr>
<tr>
<td>P.Ad. 550-3. Governmental Accounting</td>
<td></td>
</tr>
<tr>
<td>P.Ad. 608-3. Organization Development</td>
<td></td>
</tr>
<tr>
<td>P.Ad. 609-3. Group Dynamics</td>
<td></td>
</tr>
<tr>
<td>P.Ad. 624-3. Governmental Budgeting</td>
<td></td>
</tr>
<tr>
<td>P.Ad. 653-3. Public Policy Analysis and Evaluation</td>
<td></td>
</tr>
<tr>
<td>(b) Additional courses selected under advisement</td>
<td></td>
</tr>
<tr>
<td>Field study</td>
<td>6</td>
</tr>
<tr>
<td>P.Ad. 600. Field Study in Public Administration. (Required only of students who have not had appropriate experience.)</td>
<td></td>
</tr>
</tbody>
</table>

Urban Administration Option

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Semester Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>Core courses (P.Ad. 500, 501, 502, 503, 504, 505, 507)</td>
<td>21</td>
</tr>
<tr>
<td>Required courses for this option</td>
<td>9</td>
</tr>
<tr>
<td>U.A. 501-3. Dynamics of the Contemporary Urban Polity</td>
<td></td>
</tr>
<tr>
<td>P.Ad. U.A. 510-3. Urban Administration</td>
<td></td>
</tr>
<tr>
<td>Elective courses for this option</td>
<td>9</td>
</tr>
<tr>
<td>An additional course is to be selected under advisement</td>
<td></td>
</tr>
<tr>
<td>Field study</td>
<td>6</td>
</tr>
<tr>
<td>P.Ad. 600. Field Study in Public Administration. (Required only of students who have not had appropriate experience.)</td>
<td></td>
</tr>
</tbody>
</table>

Environmental Management Option

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Semester Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>Core courses (P.Ad. 500, 501, 502, 503, 504, 505, 507)</td>
<td>21</td>
</tr>
</tbody>
</table>
Required courses for this option ........................................ 9
P.Ad. 630-3. Seminar in Environmental Management
P.Ad. 631-3. Analysis of Environmental Policy
(Note: P.Ad. 653, Policy Analysis and Evaluation, may be substituted when P.Ad. 631 is not offered.)
P.Ad. 545-3. Administration of Public Works
Elective courses for this option ........................................ 9
Additional courses to be selected under advisement. If students wish to take more than the required units, they can follow the disciplinary option described below.
Field study .................................................. 6
P.Ad. 600. Field Study in Public Administration. (Required only if students who have not had appropriate experience.)

DISCIPLINARY CONCENTRATION

Students are encouraged to develop a disciplinary expertise directly related to environmental issues or problems. The departments cooperating in the environmental management option include economics, civil and environmental engineering, etc. Courses taken by the student would be determined by the cooperating department and the student's adviser.

Suggested courses from cooperating departments include:

Civil and Environmental Engineering
C.E. 449. Introduction to Environmental Pollution
C.E. 539. Water Resources Development and Management

Economics
Econ. 454. Environmental Economics
Econ. 553. Resources Economics

Geography
Geog. 441. Environmental Conservation
Geog. 462. Urban Geography, Social
Geog. 562. Urban Geography, Social

Political Science
Pol. Sci. 535. Seminar in Natural Resources Policy and Administration

Public Affairs
P.Ad. 510. Urban Administration
P.Ad. 696. Seminar in Science Policy and Administration
Urban and Regional Planning-Community Development
U.P.C.D. 592. Environmental Science
U.P.C.D. 672. Environmental Policies Planning
U.P.C.D. 710. Legal Aspects of Planning

Human Resources Management Option  

Core courses (P.Ad. 500, 501, 502, 503, 504, 505, 507) .......... 21
Required courses for this option ........................................ 9
P.Ad. 608-3. Organization Development
P.Ad. 609-3. Group Dynamics
P.Ad. 690-3. Labor Relations and Public Employment
Elective courses selected under advisement ................................ 9
The student may wish to take additional courses which would provide a concentration in such areas as human resource management, labor-management relations, or organization development.
Field study .................................................. 6
P.Ad. 600. Field Study in Public Administration. (Required only of students who have not had appropriate experience.)

Policy Analysis Option  

Core courses (P.Ad. 500, 501, 502, 503, 504, 505, 507) .......... 21
Required courses for this option ........................................ 12
U.A. 500-3. Research Methods
P.Ad. 513-3. Quantitative Decision Models
P.Ad. 653-3. Policy Analysis and Evaluation
One of the following:
P.Ad. 623-3. Intergovernmental Fiscal Relations
(Note: P.Ad. 536, Intergovernmental Relations, should be substituted when P.Ad. 623 is not offered.)
P.Ad. 631-3. Analysis of Environmental Policy
Elective courses for this option ........................................ 6
Additional courses are to be selected under advisement. Examples of such courses include statistics, computer science, mathematics for economists, economic theory, management science.
Field study .................................................. 6
P.Ad. 600. Field Study in Public Administration. (Required only of students who have not had appropriate experience.)

Financial Administration Option  

Core courses (P.Ad. 500, 501, 502, 503, 504, 505, 507) .......... 21
Required courses for this option ........................................ 12
P.Ad. 60-3. Administrative Analysis
P.Ad. 623-3. Intergovernmental Fiscal Relations
P.Ad. 624-3. Governmental Budgeting
P.Ad. 653-3. Public Policy Analysis and Evaluation
Elective courses for this option ........................................ 6
Additional courses are to be selected under advisement. Examples of such courses include government accounting, public finance, economic theory, and management science.
Field study .................................................. 6
P.Ad. 600. Field Study in Public Administration. (Required only of students who have not had appropriate experience.)

Health Care Management Option  

Core courses (P.Ad. 500, 501, 502, 503, 504, 505, 507) .......... 21
Required courses for this option (Parts a and b)  
(a) Public Administration Sequence ................................ 9
P.Ad. 536-3. Intergovernmental Relations
P.Ad. 553-3. Public Policy Analysis and Evaluation
P.Ad. 601-3. Administrative Analysis
(b) Health Care Management Sequence .............................. 10
H.A. 601-3. Medical Care Organization
H.A. 602-3. Health Economics
H.A. 620-2. Health Sciences
H.A. 622-2. Health Planning II
Field study .................................................. 6
P.Ad. 600. Field Study in Public Administration. (Required only of students who have not had appropriate experience.)

Note: The following courses are available to students who wish to take an option in health care financial management. These courses are open only to students admitted to the Certificate Program in Health Care Financial Management.
P.Ad. 680-2. Health Care Environment
P.Ad. 681-4. Accounting and Management Reporting
P.Ad. 682-5. Seminar in Health Care Financial Systems
P.Ad. 683-3. Health Systems Development and Analysis
P.Ad. 684-2. Organization and Management of Health Systems

5. Completion of either a thesis/special project or a comprehensive written examination taken during the last semester of enrollment is required. An oral examination based on material covered in the written examination may be required at the option of the student's examination/thesis committee.

Students electing to take the written comprehensive examination may retake it only one time. If the student fails a second time he/she may not elect to do a thesis after failing the comprehensive.

1This option is available only to a limited number of students. Students must contact the Assistant Dean, UCD Graduate School of Public Affairs, for information and approval of this area of specialization.
LIMITATION OF COURSE LOAD

The normal course load for a full-time graduate student is 12 semester hours. A student who is employed full time may not carry more than 6 hours unless an excess load has been approved in advance by the dean. A student employed half time is limited to a course load of 9 hours unless special authorization for an overload has been granted.

Master of Urban Affairs

The Master of Urban Affairs degree (M.U.A.) is a graduate professional degree offered at the Denver Campus through the Graduate School of Public Affairs. The M.U.A. degree program since its inception in 1973 has enabled students to acquire a broad, interdisciplinary understanding of contemporary urban society and, more importantly, to participate effectively in urban affairs. The complexity of even small town urban affairs requires the student to be a generalist in perspective but equipped with appropriate professional skills and the ability to update those skills to deal with the ever changing urban reality. Consequently, the M.U.A. program is not just an academic degree program, but by its very nature is deeply involved in and concerned with the urban community. This critical joining of academic skills and knowledge with participation in urban affairs is achieved through the research and public service activities of the faculty and the research and internship efforts of the students. In addition, the program is guided by a National Policy Board on Urban Affairs composed of leading scholars and practitioners in the field.

Contemporary urban affairs involves public, private, and quasi-public or what some have called third sector organizations (typically nongovernment agencies receiving some funding from government and focusing on public issues). The missions of these organizations are as diverse as the urban scene is complex, ranging from research units to urban service delivery departments. They range from small, often totally volunteer, groups to large, complex super departments of local or regional agencies. Agencies vary in mission and size and usually are involved in complex patterns of interaction. For the student of urban affairs to be an effective participant in one of these organizations, he or she must have the skills and competence required for a particular organizational position, tempered with an understanding of the interaction patterns among urban organizations and organizations at other levels of government.

The core curriculum of the M.U.A. degree provides the student with the ability to handle a professional position in the larger urban scene. This ability requires both appropriate academic knowledge and behavioral competence. Thus, the core curriculum is structured to develop these abilities with electives available in other units and campuses of the University of Colorado.

FINANCIAL ASSISTANCE

Students in the M.U.A. degree program are eligible for financial assistance from several sources. There are work-study positions and educational loans which require application to the Office of Financial Aid. In addition, there are a number of internships or other part-time positions with local, state, and federal agencies in the Denver metropolitan area.

Minority students may apply for the Minorities in Urban Administration Program Traineeships (supported by the Denver Regional Council of Governments, U.S. Department of Housing and Urban Development, and the International City Management Association). Several M.U.A. students have held these traineeships during the operation of the program.

The Graduate School of Public Affairs is actively seeking additional funding for student support in the form of fellowships, internship positions, and research assistantships for research grants obtained by the faculty.

ADMISSION REQUIREMENTS

In considering applicants for admission to the graduate program in urban affairs, the Graduate School of Public Affairs is guided by the following criteria:

1. Baccalaureate or advanced degree from an accredited institution of higher education.
2. Letters of recommendation submitted from former teachers and employers.
3. Applicant's undergraduate academic record.
4. Record of any postbaccalaureate academic work which the applicant might have.
5. Appropriate experience in the urban field.
6. Test scores on the aptitude test of the Graduate Record Examination (GRE) or the graduate part of the Schools and Colleges Achievement Test (SCAT).
7. Evidence of the applicant's commitment to the study of urban affairs.

In general, a well-balanced undergraduate program with background in the social sciences is recommended. This would include courses in public and business administration, political science, economics, sociology, anthropology, history, and psychology.

However, these recommendations do not preclude admission based on specialized undergraduate or graduate degree programs, since the Master of Urban Affairs curriculum recognizes the diversity in student backgrounds and career goals and seeks to reconcile these differences with common core courses and individually attuned electives.

This academic background can be enhanced with appropriate experience in urban affairs. Such experience will be considered in the admission decision and the design of the student's program.

Under special circumstances a student may be admitted on provisional status for a specified probationary period. At the end of this period, the student's faculty adviser, in consultation with the Director of the Urban Affairs Program, will review the student's performance and recommend to the Graduate School of Public Affairs whether the student should be admitted to regular degree status or dropped from the program.

Application materials for the Master of Urban Affairs program may be obtained from the Director, Master of Urban Affairs Program, Graduate School of Public Affairs, University of Colorado at Denver, 1100 14th Street, Denver, Colorado 80202. Completed credentials
should be received in the Office of the Graduate School of Public Affairs by June 1 for the fall semester, by November 1 for the spring semester, and by April 1 for the summer term.

REQUIREMENTS FOR THE MASTER OF URBAN AFFAIRS DEGREE

1. The basic minimum requirement for the M.U.A. degree is the successful completion of 48 semester hours of graduate work with not less than a B average. No grade lower than C will be accepted for graduate credit. Prior approval by an adviser should be obtained for any course at the 400 level to be credited toward the degree. Normally not more than two such courses may be counted. Each student develops a proposed degree plan with assistance of the assigned adviser; the plan must be approved before the end of the first semester (for full-time students) or before completion of 12 semester hours (for part-time students).

2. The core courses for the M.U.A. degree are required for all students in the program. They impart three competences necessary for effective participation in urban affairs: 1) an understanding of the dynamics of urban affairs and the role of government in those dynamics; 2) an understanding of the research methodologies, both empirical and qualitative, typically utilized in research on urban affairs; and 3) the ability to integrate academic theory with practical work experience. The appropriate specialized knowledge is acquired through selection of relevant electives and the focusing of student research, both in the regular courses and in the required research project.

The core curriculum for the M.U.A. degree is set forth below:

Core Curriculum

Core courses required of all M.U.A. students include:

U.A. 500-3. Research Methods
U.A. 501-3. Dynamics of the Contemporary Urban Polity
P.Ad. 502-3. Quantitative Analysis I
U.A. 510-3. Urban Administration
U.A. 700-3. Urban Research Project
Total: 21 Hours

For all pre-service students:
U.A. 656-12. Urban Policies and Services Internship
Total: 12 hours
U.A. 656-12. Urban Policies and Services Internship Electives appropriate for career objectives: 15 hours
Total: 48 semester hours
U.A. 500-3. Research Methods
U.A. 501-3. Dynamics of the Contemporary Urban Polity
P.Ad. 502-3. Quantitative Analysis I
U.A. 510-3. Urban Administration
Total — 15 semester hours

The courses U.A. 500 (Research Methods), U.A. 501 (Dynamics of the Contemporary Urban Polity), and P.Ad. 502 (Quantitative Analysis I) should be the first three courses in the student’s program. Knowledge from U.A. 501 and practice in the research approaches and techniques from U.A. 500 and P.Ad. 502 will be indispensable for the student in later research and writing and in the required research project.

3. An extensive internship is required for all pre-service students. It may be waived in whole or in part for students with appropriate experience in urban affairs. However, students are advised to take as much of the internship as possible, as it is the vehicle for learning how to wedge academic theory to practical problem definition and solution. The required research project will reflect the extent to which the student has learned this most difficult yet critical skill.

The internship will be for 12 semester hours of credit, normally over a two-semester period of time. The student must complete 24 semester hours of course work before being eligible for an internship. The particular internship selected by the student, in consultation with his/her adviser, should reflect particular career objectives, both in terms of the requisite skills needed for a particular career path and the type of organization preferred for employment. For example, a student interested in being a management analyst should choose an internship in a public staff agency, such as the Office of the Mayor or City Manager, and perform an analytical/administrative project typical of the work in such a career position. In contrast, a student interested in being a manager of an urban/public affairs division in a private organization should choose an internship in a corporation and work closely with a line manager in an appropriate office/division.

The title of the internship, U.A. 656, Urban Policies and Services Internship illustrates its function.

4. All students are required to take the capstone seminar for the program, U.A. 690 (Seminars: Urban Philosophy). This should be taken in conjunction with U.A. 700 (Urban Research Project) described below. The seminar provides the student with an opportunity to construct and articulate a coherent and comprehensive philosophy out of their academic knowledge and actual work experience.

5. All students must undertake an urban research project. Students are required to register for U.A. 700 (Urban Research Project). The specifics for the content and format of the research project are contained in a formal document published by the program.

Ideally, the research project should reflect the student’s internship experience and academic knowledge. It is a more practical experience than a thesis, building important abilities to utilize academic knowledge for practical problem identification and amelioration, and to express this professionally in a clear and succinct manner.

6. Each student must complete 15 semester hours of electives. These electives are to be selected to fulfill the student’s career objectives and must be approved by the student’s adviser.

For more information about the M.U.A. Program contact Director, Master of Urban Affairs Program, Graduate School of Public Affairs, University of Colorado at Denver, 1100 14th Street, Denver, Colorado 80202.
Master of Criminal Justice

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 rational and responsive criminal justice systems.

The M.C.J. program defines the criminal justice system to include police and other law enforcement agencies, offices of prosecutors and defenders, and courts having jurisdiction over criminal cases, probation staffs, correctional institutions, and parole. It also covers such specialized agencies as those dealing with children and youth who violate the law, with narcotic addiction, and with gathering information about crime. Attention is also paid, of necessity, to the legislative processes by which substantive and procedural codes are established.

To deal with this system effectively, capability for design of research must be developed along with the skills required in 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.

FINANCIAL ASSISTANCE

Students in the M.C.J. program are eligible for several types of financial aid. Work-study positions and educational loans require application to the Office of Financial Aid. A number of students secure internships or part-time positions with federal, state, and local agencies. Law Enforcement Assistance Program Funds are available for reimbursement of tuition and books for persons employed in criminal justice.

Students enrolled in the full-time program in the field of Criminal Justice Administration are eligible for fellowships under the Law Enforcement Graduate Research Fellowship Program (LEAA). Through awards granted in this competition young men and women are encouraged to apply the skills they are developing to problems in the field of criminal justice administration. Veterans’ benefits are available consistent with the applicant’s status and federal legislation.

Additional funding for student support is being sought by the Graduate School of Public Affairs.

ADMISSION REQUIREMENTS

1. Each person admitted to the M.C.J. program must hold a bachelor’s degree from an accredited college or university. An undergraduate major in the social sciences is desirable but students with superior undergraduate records in other fields are encouraged to apply.

2. Applicants for admission should present evidence that they possess the necessary personal qualifications for professional positions in public service within the criminal justice system. Recommendations by qualified references are to be submitted on forms which the applicant will receive upon requesting an application form.

3. A satisfactory score on the aptitude test of the Graduate Record Examination (GRE) or the graduate portion of the Schools and Colleges Achievement Test (SCAT) or an equivalent test is necessary. Information about the examinations may be obtained from the Office of Student Affairs at the University of Colorado at Denver (UCD). Applicants should request their test scores to be sent to the Graduate School of Public Affairs, Assistant Dean, University of Colorado at Denver, 1100 14th Street, Denver, Colorado 80202.

DEGREE REQUIREMENTS

1. Each program leading to the M.C.J. degree requires a minimum of 36 semester credit hours of appropriate graduate study with a grade average of B or better. No grade below C will be accepted for graduate credit.

2. The completion of the following core courses or acceptable equivalents is necessary:

C.J. 500-3. Law and Social Control
P.Ad. 502-3. Quantitative Analysis I
C.J. 510-3. Criminal Justice Administration
C.J. 520-3. Criminal Justice Planning and Evaluation

3. Students who have not had criminal justice experience are required to complete either C.J. 600-3 (field experience) or C.J. 631-3 (clinical program). A minimum of 240 hours of supervised work and study is required to earn 3 hours of credit for either course.

4. The completion of an option, such as law enforcement, corrections, or juvenile justice (examples of which are outlined below). Selection of an option should be made in consultation with an adviser during the first semester of enrollment.

Suggested Options

Law Enforcement

a. General core required (P.Ad. 500, 502, 510, 520, 550)

b. Required courses
C.J. 630-3. Seminar in Police Administration
P.Ad. 504-3. Organization Theory and Administrative Behavior
C.J. 680-3. Advanced Seminar

c. Recommended electives
U.A. 570-3. Introduction to Systems
P.Ad. 690-3. Labor Relations and Public Employment
Soc. 519-3. Deviant Behavior
Psyc. 496-3. Performance Under Stress
P.Sc. 547-3. Seminar: American Constitutional Law
El.St. 459-3. The Mexican American in the Southwest

Corrections

a. General core required (P.Ad. 500, 502, 510, 520, 550)

b. Required courses
C.J. 640-3. Seminar in Corrections
C.J. 641-3. Seminar in Community Corrections

c. Recommended electives
C.J. 670-3. Seminar in Comparative Criminal Justice
P.Ad. 608-3. Organization Development
G.C. 510-3. Theories and Techniques of Counseling
R.S. 420-3. Treatment Approaches to Drug Addiction and Alcoholism
Research and Planning

- General core required (P. Ad. 500, 502, 510, 520, 550)
- Required courses
  - C.J. 632-3. Research in the Criminal Justice Process
  - P. Ad. 603-3. Research and Statistical Analysis
  - C.J. 700-3. Thesis
- Recommended electives
  - U.A. 500-3. Research Methods
  - U.A. 570-3. Introduction to Systems
  - P. Ad. 603-3. Research and Statistical Analysis
  - U.P.C.D. 500-3. Introduction to Planning
  - U.P.C.D. 502-3. Introduction to Community Development

Policy Analysis

- General core required (P. Ad. 500, 502, 510, 520, 550)
- Required courses
  - P. Ad. 505-3. Financial Administration
  - U.A. 653-3. Public Policy Analysis
  - C.J. 645-3. Seminar in Criminal Justice Policy-Analysis
- Recommended electives
  - C.J. 670-3. Seminar in Comparative Criminal Justice
  - U.A. 570-3. Introduction to Systems

5. Completion of either a thesis/project or a comprehensive written examination taken during the last semester of enrollment is required. An oral examination based on the material covered in the thesis may be required at the option of the student’s thesis committee.

Students must develop specific degree programs expressing their principal focus of interest and profession objectives. In doing so, their degree plans may include courses within other academic or professional disciplines.

Elective Courses

The courses listed below may be utilized as electives for the M.C.J. degree:

- C.J. 630-3. Seminar in Police Administration
- C.J. 631-3. Clinical Program
- C.J. 632-3. Research in Criminal Justice
- C.J. 640-3. Seminar in Corrections
- C.J. 641-3. Seminar in Community Corrections
- C.J. 642-3. Juvenile Justice Administration
- C.J. 645-3. Seminar in Criminal Justice Policy Analysis
- C.J. 660-3. Seminar in Judicial Administration
- C.J. 670-3. Seminar in Comparative Criminal Justice
- C.J. 680-3. Advanced Seminar
- C.J. 700-3. Seminar in Minorities and the Criminal System
- C.J. 700-3. Area Paper or Thesis

For further information about the M.C.J. program, contact Director, Master of Criminal Justice Program, Graduate School of Public Affairs, University of Colorado at Denver, 1100 14th Street, Denver, Colorado 80202.

DOCTOR OF PUBLIC ADMINISTRATION

A program of professional graduate study leading to the Doctor of Public Administration (D.P.A.) degree is offered by the Graduate School of Public Affairs (GSPA). The program, based on the Denver Campus, permits work to be taken on any campus of the University if it is part of an approved program of study or degree plan. In addition, some off-campus and modular, self-paced courses are offered.

The D.P.A. program was developed to meet the strong demand for the services of people who exhibit competence in the theory, concepts, and skills of public administration, and who are able to use them in a variety of applications, such as policy management (including policy planning and evaluation, intergovernmental relations, citizen participation, inter-agency and inter-institutional relations, private sector interfaces, and others), resource management (including budgeting, information systems, human resources management, labor relations, and others), and program management in a variety of areas—including criminal justice, courts administration, regional community development, urban affairs, health services administration, transportation, natural resources and environmental management (including energy resources), and other functional areas.

The D.P.A. is a professional terminal degree. As such, it is designed to prepare mid-career professionals for expanded executive leadership responsibilities or for redirecting public management, consulting, or academic careers. Accordingly, the D.P.A. integrates theory and practice and stresses skill development along with theoretical, conceptual, methodological, and contextual knowledge development in order to strengthen the performance of public managers and public institutions. Approximately one-half of the curriculum is concerned with the theoretical and conceptual aspects of the social, behavioral, and management sciences. The other half deals with problem solving and application in the practice of public administration and management.

Participants

The D.P.A. program is designed to enhance the knowledge and expand the skills of mid-career public administrators as they are called upon to deal with the increasing complexity and multidisciplinary nature of today’s problems. The program serves:

1. People working in government or organizations concerned with government, who wish to improve their performance in or to move into positions that are concerned with broad policy issues.
2. Professional and technical people (attorneys, public health professionals, court administrators, and others) who desire additional training that will enable them to participate more effectively in the process of administration, management, and policymaking at the highest levels.

Among students are city managers, hospital administrators, public safety officials, court administrators, program directors and administrators of federal, regional, state, and local government programs. Also included are individuals in responsible positions in the quasi-public and voluntary sectors. Most students are over 35 years old.

Admission Requirements

1. A baccalaureate degree and a postgraduate degree. Most students have a Master of Public Administration (M.P.A.) or Master of Business Administration (M.B.A.) degree.
2. An overall undergraduate grade-point average of at least 2.75.
3. A combined grade-point average of at least 3.0 for all

All required and elective courses are currently offered except C.J. 645, 680, 690, and 696.
courses taken in public administration as a graduate student prior to admission.

4. Four letters of reference from colleagues and superiors commenting on the applicant's potential for benefitting from the doctoral program.

5. A 1,000-word essay stating the purpose, goals, and objectives of advanced study in public administration.

6. Official transcripts of all undergraduate and graduate credit hours.

7. A detailed resume indicating educational and employment experience, significant awards and achievements, including publications, and a detailed description of current professional and management responsibilities.

8. Graduate Record Examination (GRE) results or approved equivalent, including LSAT, GMAT, and SCAT.

Eligibility

Admission to the D.P.A. program reflects the personal and professional qualifications of the applicant and the objectives of the Admission Committee to achieve a productive and stimulating balance among backgrounds, levels of government represented, interests, and experience in each entering class. At the personal level, however, eligibility for admission is based on four principal considerations:

1. A minimum of three years of significant management experience in the public or private sector.

2. Evidence of ability to do work of high quality at the graduate level.

3. Evaluation by peers and others indicating potential for increased leadership and management responsibility which would be advanced by doctoral study.

4. Evidence of the relevance of the D.P.A. program to the objectives of the applicant as evidenced by the essay.

Requirements for the Degree

1. The program of study leading to the D.P.A. degree will include at least 72 hours of acceptable postgraduate work, including a minimum of 36 hours in the D.P.A. program at the University of Colorado. In practice, most approved Programs of Study have required more than 90 postgraduate hours, including 42-48 hours in the D.P.A. program. A typical program of study includes 6 hours for the dissertation (out of a maximum of 12) and may include up to 12 hours of transfer credit.

2. Students must also demonstrate competence in the subject matter of the core courses in the University of Colorado M.P.A. program. Most applicants with postgraduate degrees outside public administration will need to take courses in one or more of these core areas to remove any deficiency. Core course deficiencies may be made up after admission to the program. Credit for the core courses may be counted toward the 72-hour requirement but not as a part of the 36-hour minimum.

3. All students must successfully complete the required core courses in public administration:
   - P.Ad. 701-3. Seminar in Public Administration I
   - P.Ad. 702-3. Seminar in Public Administration II
   - P.Ad. 705-3. Advanced Seminar in Research Methods
   - P.Ad. 701-702 are normally taken during the first year. P.Ad. 705 is normally taken during the third year as the student is beginning his or her dissertation research.

4. All students must pass a qualifying examination in the field of public administration and field examinations that cover work performed in major and minor fields. Because most students take one major and one minor, the typical student must take three examinations. The qualifying examination, normally taken at the beginning of the student's second year in the program, is designed by the faculty to test the student's knowledge and competence in general public administration and public policy. Field examinations, also scheduled according to the pace of work of each student as reflected in his or her program of study, are designed by the student's advisory committee to test knowledge and competence in the major and minor fields selected by the student. In some cases, a project may be substituted for a written examination to satisfy the field examination requirement.

5. Each student must successfully complete a dissertation, including a public dissertation colloquium held at the outset and dealing with the design of proposed dissertation research and a public defense of the dissertation once it has been provisionally approved by the student's Dissertation Committee. Students are encouraged to link their dissertation research to on-the-job research or analysis responsibilities.

Program of Study

Working with a principal adviser and a D.P.A. advisory committee, each student develops a program of study outlining the substance and schedule of his or her degree plan, including the course work making up the major and minor fields of study.

The major and minor fields of study may be selected from among the following: public management/general public administration; financial policy and administration; human resources management/personnel administration; organization theory/behavior/development; intergovernmental management and administration; policy analysis and program evaluation; management science and quantitative analysis; urban administration; criminal justice administration. Other fields of study, such as health care administration or environmental management, may be approved, depending on faculty and other resources available at the time.

Both the student's advisory committee (which oversees the development and progress of the program of study) and the Dissertation Committee (which supervises the design, conduct, and reporting of the dissertation research) includes at least two faculty members (most have three) and one outside practitioner member. A student is advanced to candidacy for the D.P.A. once he or she has completed all required course work and examinations and has been certified for candidacy by the program director. When a student is formally advanced to candidacy, he or she may register for dissertation research and may take advantage of reduced tuition costs available to all candidates.
Time Required for D.P.A. Degree

The D.P.A. does not require full-time study since it is designed to link advanced education, research, and training with the practice of public management in a context of life-long learning and career development. Accordingly, most courses and seminars are offered during evening hours, or weekends, or on an intensive basis. Candidates also will have the opportunity to take specially designed courses which will be offered in four- or five-day seminar style.

Completion of the master's degree in public administration, urban affairs, or a related field is expected, but not required. If the master's degree has been completed, the requirements for the D.P.A. degree can be expected to take at least three years. Anyone planning to take all work on a part-time basis must recognize that a commitment to an extended period of intense academic effort is being undertaken. Approval of transfer credit will be based on assessment of the relevance and recency of the applicant's prior work.

Financial Aid for Graduate Study

The University of Colorado Graduate School administers various forms of financial aid for graduate students, including fellowships, scholarships, and awards from outside agencies. The University participates in a number of government-sponsored fellowship programs including those of the National Science Foundation, National Institute of Health, and other governmental bodies. A limited number of awards to support dissertation research has been available from such federal agencies as the Office of Personnel Management and the Law Enforcement Assistance Administration.

Further Information

For further information or application materials, write to:

Dr. Philip M. Burgess, Director
Doctor of Public Administration Program
Graduate School of Public Affairs
University of Colorado at Denver
1100 Fourteenth Street
Denver, Colorado 80202
Telephone: (303) 629-3439 or 629-2825
Course Descriptions

COURSE SCHEDULING AND ABBREVIATIONS

For information on scheduling courses, students are encouraged to contact an adviser through their college or school dean's office. In general, the abbreviation preceding the course number identifies the department offering the course. The first digit in the course number indicates the recommended class level of the course:

<table>
<thead>
<tr>
<th>Level of Courses</th>
<th>Student Classification</th>
</tr>
</thead>
<tbody>
<tr>
<td>100</td>
<td>Freshman</td>
</tr>
<tr>
<td>200</td>
<td>Sophomore</td>
</tr>
<tr>
<td>300</td>
<td>Junior</td>
</tr>
<tr>
<td>400</td>
<td>Senior</td>
</tr>
<tr>
<td>500</td>
<td>Graduate students or qualified seniors who have the instructor's or dean's permission</td>
</tr>
<tr>
<td>600</td>
<td>Master and Ph.D. graduate students</td>
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<tr>
<td>700</td>
<td>Master's thesis</td>
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<tr>
<td>800</td>
<td>Doctor's thesis</td>
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<tr>
<td>900</td>
<td>Independent Study</td>
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</tbody>
</table>

Graduate School policy permits specifically approved courses to be offered concurrently at the 400 and 500 levels. However, the evaluation and requirements for students enrolled at the graduate (500) level will be different than for those enrolled at the undergraduate (400) level. It should be expected that work at the graduate level would involve demonstration of greater maturity and critical skills than at the undergraduate level.

The digit after the dash in the course number denotes the credit-hour value of the course. The 1-credit lecture/recitation period is 50 minutes long. Hence a student enrolled in a 3-credit hour course will attend class for 150 minutes per week. A laboratory credit includes from two to four hours per week in the laboratory, drafting room, or field. Unless the course descriptions specify laboratory work, it is understood that the classes consist of lectures and discussions.

Abbreviations used in the course descriptions are:

- Coreq. - corequisite
- Hrs. - Hours
- Lab. - Laboratory
- Lect. - Lecture
- Prer. - Prerequisite
- Rec. - Recitation
- Wk. - Week

Thus, the description of Chem. 106-5 signifies that the course is offered by the chemistry department at the freshman level, and that it carries 5 semester hours of credit which is divided into 3 hours of lecture credit, 1 hour of recitation credit, and 1 hour of laboratory credit. Further, the student must have completed Chem. 103 (the prerequisite) before enrolling.

COURSE MODIFICATIONS

The courses listed in the following pages are intended as a general indication of the range and type of University of Colorado at Denver curricula. Courses and programs are subject to modification at any time. Not all courses are offered every semester, and the faculty teaching a particular course or program may vary from time to time. The instructor may alter the content of a course or program to meet particular class needs.

Courses are listed by college or school.

College of Business and Administration and Graduate School of Business Administration

ACCOUNTING


Acct. 442-3. Advanced Income Tax Accounting. Continuation of Acct. 441, with special emphasis on the income tax problems of partnerships, corporations, and estates and trusts. Consideration is also
given to federal estate and gift taxes. Prer., Acct. 441.


Acct. 542-3. Advanced Income Tax Accounting. Continuation of Acct. 541, with special emphasis on the income tax problems of partnerships, corporations, and estates and trusts. Consideration is also given to federal estate and gift taxes. Prer., Acct. 441 or 541.


Acct. 562-3. Auditing. Generally accepted auditing standards and the philosophy supporting them; auditing techniques available to the independent public accountant. Pertinent publications of the AICPA reviewed. Prer., Acct. 323.


Acct. 626-3. Seminar: Managerial Accounting. 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 analyzed. Prer., Acct. 332, 628, or consent of instructor.


Acct. 642-3. Research Problems in Income Tax Accounting. A study of the methodology used in tax research and in tax planning, together with a study of some aspects of tax administration and tax practice, and of some aspects of the current law and proposals for its reform. Prer., Acct. 441 or 541 or consent of instructor.


BUSINESS ADMINISTRATION

B.Ad. 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 years. Open only to freshmen and sophomores and music majors at all levels.


B.Ad. 410-3. Business and Government. The study of government regulation of the business system. Topics include regulation of business concentration, markets for labor, money, other resources, and final products. Prer., Econ. 201 and 202. Completion of Pol. Sci. 110 is recommended before taking this course.


B.Ad. 450-3. Cases and Concepts in Business Policy. Emphasis is on integrating the economic, market, social-political, technological, and competition components of the external environment with the internal characteristics of the firm, and deriving through analysis the appropriate interaction between the firm and its environment to facilitate accomplishment of the firm's objectives. Priority for enrollment will be given to business seniors in their final semester prior to graduation. Prer., Acct. 200, Fin. 305, Mk. 300, Or. Mg. 330, Pr. Mg. 300, and Q.M. 201.

B.Ad. 452-3. Small Business Strategy, Policy and Entrepreneurship. Emphasis is on planning, organizing, and operating small business firms. The role of the entrepreneur is examined in the conception, organization, and development of firms. Extensive use is made of small business cases. Priority for enrollment will be given to business seniors in their final semester prior to graduation. Prer., Fin. 305, Mk. 300, Pr. Mg. 300, Or. Mg. 300, and Q.M. 201.

The following graduate fundamentals courses (B.Ad. 500 to 507) do not carry graduate business degree credit, nor may they be used to satisfy requirements for the bachelor's degree in business. They are open only to graduate students.

B.Ad. 500-1. Sources of Information and Research Methods. The objective of this course is to provide the M.B.A. student with the basic research techniques needed to locate, use, and evaluate secondary resource materials. The approach will be to emphasize techniques rather than actual titles.


B.Ad. 503-3. Fundamentals of Marketing. Provides basic understanding of marketing essential for graduate study of business.

B.Ad. 504-3. Fundamentals of Management and Organization. Provides basic understanding of organization theory, personnel management, labor relations, and organizational behavior essential for graduate study in business.


B.Ad. 506-3. Legal Environment of Business. Provides a basic understanding of the private and public law essential for graduate study of business.

B.Ad. 541-3. Fundamentals of Management Science. A survey of the analytical methods of management science operations research as applied to decision problems in business. A major objective of the course is to develop an understanding of the power and the limitations of mathematical-statistical models and to develop skills in problem formulation. Prer., B.Ad. 502 or equivalent.

* Students enrolled at the 500 level may expect additional work and evaluation commensurate with graduate standards.
The following graduate courses are open only to admitted graduate students. Students should have completed at least half (12 hours) of the B.Ad. 500 series of fundamentals before enrolling in any of the 600-level graduate courses.

B.Ad. 610-3. Business, Government, and Society. The interaction and interdependence of business and its executives with societal, governmental, and economic environments, including analytic elements such as the forecasting and analysis of business conditions. Explores the firm's and its executives' social and ethical responsibilities to various internal and external publics. Considers the relationship between business and government, and the control and regulation of business. Considers the problems and opportunities of operating in the international environment. Prer., by course work or waiver, completion of at least half (12 hours) of the B.Ad. 500 series of fundamentals.

B.Ad. 615-3. Business and Economic Analysis. A presentation of the concepts, tools, and methods of economical analysis relevant to a broad cross-section of decisions within the business firm. Particular attention will be given to market demands and the interrelationships between price policy, costs, and production. Prer., B.Ad. 502 and Introduction to Microeconomics.


B.Ad. 650-3. Business Policy. Emphasizes problem analysis and decision-making at integrative-management level. Devoted to internal policy making. Emphasis on integrated use of research, analysis, and control in making policy decisions. This course must be taken in the candidate's final term of the M.B.A. program. B.Ad. 500-level fundamentals, by course completion or waiver, are firm prerequisites.

BUSINESS LAW

B.Law 300-3. Business Law. To understand the legal significance of business transactions as part of the decision-making process in business. Coverage of text and statutes include 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., junior standing.


FINANCE

Fin. 305-3. Basic Finance. Includes a study of the monetary system and other institutions comprising the money and capital markets. Also includes a study of the financial manager's role in business, the investment of capital in assets, and financing the asset requirements of business firms. Prer., Econ. 201 and 202; Acct. 200.


Fin. 402-3. Business Finance II. Develops analytical and decision-making skills of students in relation to problems that confront financial management. Areas include planning, control, and financing of current operations and longer term capital commitments; management of income; evaluation of income-producing property; and expansion. Case method of instruction. Prer., Fin. 401.

Fin. 433-3. Investment and Portfolio Management. Discusses investment problems and policies and the methodology for implementing them. Includes portfolio analysis, selection of investment media, and measurement of performance. Prer., Fin. 401 and 455; coreq., Fin. 402. Students may not receive credit for both Fin. 333 and 433.


Fin. 455-3. Monetary and Fiscal Policy. Analyzes the theoretical and practical problems concerning the use of monetary and fiscal devices for controlling national and international economic relationships. Emphasizes the major theories and analytical models for current monetary and fiscal policies. Prer., Fin. 305. Students may not receive credit for both Fin. 355 and 455.

Fin. 534-3. Security Analysis.1 An application of the theories and methodology for the selection of investment media for implementing an investment portfolio. Prer., Fin. 402 and 433 or 602 and 603.

Fin. 540-3. International Financial Management.1 Considers international capital movements and balance of payments problems. Problems of international operations as they affect the financial functions. Reviews foreign and international institutions and the foreign exchange process. Considers financial requirements, problems, sources, and policies of firms doing business internationally. Prer., Fin. 305 or B.Ad. 505.


Fin. 639-3. Investment Management and Analysis. The theory of investment management and security values; portfolio management, including the analysis of investment risks and constraints on investment policies and objectives; the analysis and use of investment information; and the development and application of the tools for determining security values. Prer., Fin. 601 and/or coreq., Fin. 602.

Fin. 655-3. Business Fluctuations and Monetary Policy. Theoretical and empirical study of forces governing business fluctuations in the U.S., and the effectiveness of monetary and fiscal policies. Develops the analytical tools essential for understanding business indicators and the various policy alternatives to attain stated economic goals and objectives. Prer., B.Ad. 505.

INFORMATION SYSTEMS


I.S. 350-3. Database and Information Systems. (Formerly I.S. 345.) Advanced concepts in file processing; management control systems, on-line query systems, data base management systems, and further study in the file processing languages. Prer., I.S. 215.

1Students enrolled at the 500 level may expect additional work and evaluation commensurate with graduate standards.
I.S. 465-3. Systems Analysis and Design. Basic system analysis tools; defining logical system requirements; steps in analysis: preliminary investigation, general feasibility study, general system proposal; detailed analysis: specification of input/output methods and formats; physical design (of files, programs and procedures); system life cycle management. Prer., I.S. 215 or equivalent.


I.S. 565-3. Systems Analysis and Design. Basic system analysis tools; defining logical system requirements; steps in analysis: preliminary investigation, general feasibility study, general system proposal; detailed analysis: specification of input/output methods and formats; physical design (of files, programs and procedures); system life cycle management. Prer., I.S. 645.

I.S. 570-3. Computerware. Contrasting systems for data processing applications; equipment selection and systems configuration with emphasis on economic consideration in an uncertain economic and technological environment. Prer., I.S. 650.

I.S. 645-3. Information Systems and Management. Information processing, the analysis and design of information systems, management query systems, and data base design and management. Prer., familiarity with FORTRAN or some other computer programming language.

I.S. 650-3. Database Management Systems. Theory of data structures; implementations of database models. Comparative analysis of available systems and in-depth applications in conventional and innovative circumstances. especially in development of information for operations and control of administrative functions. Prer., I.S. 645 or equivalent.

I.S. 680-3. Selected Topics in Information Science. This course will vary from semester to semester, treating topics such as advanced concepts and research in information sciences, digital simulation and simulation languages, and other topics. May be repeated when topic changes. Prer., specified each semester.

INSURANCE

Ins. 484-3. Principles of Insurance. Fundamental principles of insurance and their application to life, disability, property, and liability insurance. Provides the basic knowledge for intelligent solution of personal and business insurance problems as well as for further specialized study of insurance. Prer., Fin. 305.

Ins. 584-3. Principles of Insurance. Fundamental principles of insurance and their application to life disability, property, and liability insurance. Provides the basic knowledge for intelligent solution of personal and business insurance problems as well as for further specialized study of insurance. Prer., Fin. 305 or B.Ad. 505.

MANAGEMENT SCIENCE


MARKETING

Note: Mk. 300 or B.Ad. 503 or an equivalent course in basic marketing is a prerequisite for all marketing courses except Mk. 310.


Emphasizes the role of the consumer and the social responsibility of the marketer.

Mk. 310-3. Salesmanship. Principles and methods of personal salesmanship with attention to development and demonstration of effective sales presentation techniques.


Mk. 350-3. Principles of Advertising. Analysis of principles and practices in advertising from executive’s viewpoint. Considers whether a firm should advertise; product and market analysis as planning phase of advertising program; media; survey of creation and production of advertisements; advertising budgets, copy testing, and organization. Prer., Mk. 300.


Mk. 460-3. Industrial Marketing. Activities involved in marketing of industrial goods. Analysis of market structures, habits and motives of purchasers, types of industrial products, pricing problems, and distribution channels. Problems in selling to agencies of government. Oriented to engineers and others entering the fields of industrial selling or marketing. Prer., Mk. 300.

Mk. 470-3. Sales Management. Problems involved in managing a sales force. Includes sales organization, operating a sales force (recruiting, selection, training, compensation, supervision, stimulation, sales planning (forecasting, budgeting, territories), and sales analysis and control. Prer., Mk. 300.

Mk. 480-3. Marketing Policies and Strategies. Detailed consideration of process of formulating and implementing marketing policies. Major emphasis on markets, distribution channels, and product analysis. Problem approach utilized to develop student’s analytical ability and to integrate all major areas of marketing. Prer., Mk. 300 and three additional hours in marketing.

Mk. 485-3. Physical Distribution Management. Investigation and analysis of logistics of distribution systems for firms engaged in manufacturing and marketing. Component parts of each system are studied and analytical tools are presented for selecting alternatives which will attain distribution goals of the firm. Prer., Mk. 300.

Mk. 490-3. International Marketing. Studies managerial marketing policies and practices of firms marketing products and services in foreign countries. Analytical survey of institutions, functions, policies, and practices in international marketing. Relates marketing activities to market structure and environment. Prer., Mk. 300, or consent of instructor.


Mk. 560-3. Industrial Marketing. Activities involved in marketing of industrial goods. Analysis of market structures, habits and motives of purchasers, types of industrial products, pricing problems, and distribution channels. Problems in selling to agencies of government. Oriented to engineers and others entering the fields of industrial selling or marketing. Prer., Mk. 300 or B.Ad. 503.

1 Students enrolled at the 300 level may expect additional work and evaluation commensurate with graduate standards.
Mk. 570-3. Sales Management. Problems involved in managing a sales force. Includes sales organization, operating a sales force (recruiting, selection, training, compensation, supervision, stimulation), sales planning (forecasting, budgeting, territories), and sales analysis and control. Prereq., Mk. 300 or B. Ad. 503.


Mk. 585-3. Physical Distribution Management. Investigation and analysis of logistics distribution systems for firms engaged in manufacturing and marketing. Component parts of each system are studied and analytical tools are presented for selecting alternatives which will attain distribution goals of the firm. Prereq., Mk. 300 or B. Ad. 503.

Mk. 590-3. International Marketing. Studies managerial marketing policies and practices of firms marketing products and services in foreign countries. Analytical survey of institutions, functions, policies, and practices in international marketing. Relates marketing activities to market structure and environment. Prereq., Mk. 300 or B. Ad. 503.

Mk. 600-3. Marketing Management. An in-depth inquiry into marketing decision making. Emphasis is placed on strategic planning and analytical procedures for marketing decisions. The course integrates all areas of marketing management and relates marketing activities to the other functional areas of the firm. Prereq., Mk. 300, or B. Ad. 503.

Mk. 630-3. M.B.A. Seminar: Marketing. Comprehensive survey of current problems and issues in marketing from the perspective of the firm. Analysis of firm’s process of adjustments to market changes. (Required of all M.B.A. students with an area of emphasis in marketing.) Prereq., Mk. 600. Any student not having the prerequisite of Mk. 600 will be administratively dropped from Mk. 605.

MINERALS LAND MANAGEMENT

M.L.Mgt. 485-3. Minerals Landman Administration. A thorough and detailed examination of the wide range of administrative duties performed by the minerals landman. Leasing, property rights, easements, participating interests, taxation, and pay-out schedules are included. Emphasis is on the various governmental agencies and private interests that are dealt with in acquiring land for exploration and development. Prereq., completion of 75 semester hours of work toward the M.L.M area of emphasis, including all lower division requirements. M.L.Mgt. 495-3. Oil, Gas, and Mineral Law. A review and examination of the legal relationships associated with mineral rights and properties. Topics include mineral rights, regulations governing federal, state, and private lands and the rights and duties of owners and developers. Procedural requirements, instruments, title examinations, and environmental statements. Prereq., completion of 75 semester hours of work toward the M.L.M area of emphasis, including all lower division requirements.

M.L.Mgt. 585-3. Minerals Landman Administration. A thorough and detailed examination of the wide range of administrative duties performed by the minerals landman. Leasing, property rights, easements, participating interests, taxation, and pay-out schedules are included. Emphasis is on the various governmental agencies and private interests that are dealt with in acquiring land for exploration and development. Prereq., consent of instructor.

M.L.Mgt. 595-3. Oil, Gas, and Mineral Law. A review and examination of the legal relationships associated with mineral rights and properties. Topics include mineral rights, regulations governing federal, state and private lands and the rights and duties of owners and developers. Procedural requirements, instruments, title examinations, and environmental statements. Prereq., consent of instructor.

OFFICE ADMINISTRATION


PERSONNEL MANAGEMENT

Ps. Mg. 434-3. Labor and Employee Relations. Analysis of legal, political, social, and managerial aspects of collective bargaining and employee relations. Prereq., Or. Mg. 330.


Ps. Mg. 439-3. Personnel Management: Legal and Social Issues. Study of legal issues related to equal employment opportunity, affirmative action, occupational safety and health, and compensation, with emphasis on program implementation and evaluation. Reviews legal questions, guidelines and procedures, and regulatory agencies. It is recommended that students take Ps. Mg. 434 and 438 before this course. Prereq., Or. Mg. 330.

Ps. Mg. 534-3. Labor and Employee Relations. Analysis of legal, political, social, and managerial aspects of collective bargaining and employee relations. Prereq., Or. Mg. 330 or B. Ad. 504.

Ps. Mg. 538-3. Personnel Management: Policy and Practice. Study of development and implementation of personnel systems, including selection, training, motivation, and performance appraisal. Prereq., Or. Mg. 330 or B. Ad. 504.

Ps. Mg. 634-3. Seminar: Labor and Employee Relations. Issues in all areas of industrial labor, and employee relations through applied problems. Study of the NLRB and court decisions, arbitration cases, and conflict management models. Prereq., Ps. Mg. 534 or B. Ad. 640.

Ps. Mg. 638-3. Seminar: Personnel Administration. Issues in all areas of personnel administration. Emphasis on research findings on human resources applications through applied models, survey methods, and other applied behavioral concepts. Prereq., Ps. Mg. 538 or B. Ad. 640.

1 Students enrolled at the 500 level may expect additional work and evaluation commensurate with graduate standards.

ORGANIZATION MANAGEMENT

Or. Mg. 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 Psych. 203 and 204 and Soc. 100 before taking this course.

Or. Mg. 335-3. Managing Individuals and Work Groups. Examines leadership and supervision in small work groups in organizations. Focuses on how and why individuals act as they do in interpersonal relationships and in small groups. Develops interpersonal and small group skills. Prereq., Or. Mg. 330.

Or. Mg. 437-3. Managing Complex Organizations. From the perspective of a general manager, the course explores organizational design and management processes for effective organizational performance. Prereq., Or. Mg. 330.

Or. Mg. 602-3. Individual Behavior in Work Organizations. Explores the impact of key management and behavioral science theories, concepts, and practices on individual productivity, satisfaction, growth, and development. Prereq., B. Ad. 640 or equivalent.

Or. Mg. 622-3. Managing Behavior in Task Groups. A study of interpersonal relationships in organizations. Topics include group formation and development, leadership, power, conflict, conformity, cohesiveness, and task effectiveness. Prereq., B. Ad. 640 or equivalent.

PRODUCTION AND OPERATIONS MANAGEMENT

Pr.Mg. 300-3. Production and Operations Management. An introduction to the design and analysis of production systems in manufacturing, service, and public organizations. Topics include facility location and layout; job design, safety, and work standards; production and inventory planning and control; quality control; simulation; waiting line analysis; and linear programming. Prereq., Acct. 200 and Q.M. 201. It is important to take this course in the junior year. Pr.Mg. 440-3. Planning and Control Systems in Production and Operations Management. Study of the design, implementation, and control of production, inventory, and service delivery systems. Topics include computer-based scheduling and control systems, analytic models for design of operating systems, and material requirements planning (MRP). Organization studies include manufacturing services (including urban services), and government. Prereq., Pr.Mg. 300.

Pr.Mg. 444-3. Work Design and Measurement. Study of design of jobs in manufacturing, service, and public organizations. Topics include job specialization vs. job enlargement, work measurement, determining job standards, job health and safety, and the impact of automation on job design. Prereq., Pr.Mg. 300 or Or.Mg. 330.


Pr.Mg. 460-3. Purchasing and Materials Management. Study of the purchasing function in manufacturing, service, and public organizations. Topics include source selection, make-buy analysis, inventory control, warehousing, material quality standards and specifications; transportation alternatives, bid systems, and legal aspects.

Pr.Mg. 540-3. Planning and Control Systems in Production and Operations Management. Study of the design, implementation, and control of production, inventory, and service delivery systems. Topics include computer-based scheduling and control systems, analytic models for design of operating systems, and material requirements planning (MRP). Organization studies include manufacturing services (including urban services), and government. It is recommended that graduate students take Pr.Mg. 640 in lieu of this course. Prereq., B.Ad. 502 and 507.

Pr.Mg. 544-3. Work Design and Measurement. Study of the design of jobs in manufacturing, service, and public organizations. Topics include job specialization vs. job enlargement, work measurement, determining job standards, job health and safety, and the impact of automation on job design. Prereq., Pr.Mg. 300 or Or.Mg. 330 or B.Ad. 504.

Pr.Mg. 547-3. Policy Analysis in Production and Operations Management. Study in production and operations management policy formulation and analysis. Emphasis is on developing decision-making skills through the use of case analysis, field study in local organizations, and product-oriented simulation games. It is recommended that the graduate students take Pr.Mg. 647 in lieu of this course. Prereq., Pr.Mg. 540.

Pr.Mg. 560-3. Purchasing and Materials Management. Study of the purchasing function in manufacturing, service, and public organizations. Topics include source selection, make-buy analysis, inventory control, warehousing, material quality standards and specifications, transportation alternatives, bid systems, and legal aspects.

Pr.Mg. 640-3. Logistics, Production, and Inventory Management. Study of the total flow of resources to and through the production process to the ultimate consumer. Topics include integrated production, inventory, and logistics systems in manufacturing, service, and public organizations; demand forecasting; capacity planning; inventory management; material requirements planning (MRP); facility scheduling and control; and physical distribution management. Prereq., B.Ad 502 and 507 or equivalents.

Pr.Mg. 647-3. Policy Analysis in Production and Operating Systems. Advanced study of policy formulation and analysis in manufacturing, service and public organizations. Emphasis is placed on developing decision-making skills through the use of case analysis, field study in local private and public organizations, and production/operations-oriented simulation exercises. Prereq., B.Ad. 502 and B.Ad. 507, or equivalent.

PUBLIC AGENCY ADMINISTRATION

The program will encompass the subject areas of budgeting, personnel management, administration, and quantitative methods. For additional information refer to the Public Agency Administration area of emphasis.

QUANTITATIVE METHODS


Q.M. 420-3. Multivariate Analysis. Topics in multivariate data analysis of particular interest to those engaged in business research. Includes techniques such as multivariate discriminant analysis, factor analysis, and multiple regression, and the use of standard multivariate statistical packages such as the SPSS package. Prereq., B.Ad. 200 and Q.M. 201.

Q.M. 520-3. Multivariate Analysis. Topics in multivariate data analysis of particular interest to those engaged in business research. Includes techniques such as multivariate discriminate analysis, factor analysis, and multiple regression, and the use of standard multivariate statistical packages such as the SPSS package. Prereq., B.Ad. 502.

REAL ESTATE


R.Es. 401-3. Urban Land Analysis. The nature of urban real estate and the market forces affecting its utilization. Prereq., R.Es. 300.

R.Es. 430-3. Residential and Income Property Appraising. (Formerly Real Estate Appraising) Principles and techniques of estimating the value of land, residence, and income property are studied. Principles and techniques are applied by a field problem in appraising. Prereq., R.Es. 300.

R.Es. 433-3. Real Estate Investments. Emphasizes problems and methodology for making the real estate investment decision. Includes real estate versus other investments; real estate user and investor requirements, decision models; local, state and federal regulations; tax factors and syndication. Prereq., R.Es. 300 or Fin. 401.

R.Es. 454-3. Real Estate Finance. Functions and practices of various real estate financing institutions. Embraces mortgage lending, servicing, and mortgage banking relative to all types and uses of real estate. Prereq., R.Es. 300 and Fin. 305.


R.Es. 530-3. Residential and Income Property Appraising. (Formerly Real Estate Appraising) Principles and techniques of estimating the value of land, residences, and income property are

*Students enrolled at the 500 level may expect additional work and evaluation commensurate with graduate standards.*
studied. Principles and techniques are applied by a field problem in
appraising. Prer., R.Es. 300.
R.Es. 533-3. Real Estate Investments. Emphasizes problems and
methodology for making the real estate investment decision. Includes
real estate versus other investments; real estate user and investor
requirements, decision models; local, state, and federal regulation; tax
factors; and syndication. Prer., R.Es. 300 or Fin. 401 or 601.
R.Es. 554-3. Real Estate Finance. Functions and practices of
various real estate financing institutions. Embraces mortgage lending,
servicing, and mortgage banking relative to all types of uses of real
estate. Prer., R.Es. 300, Fin. 305, or B.Ad. 505.
R.Es. 577-3. Legal Aspects of Real Estate Transactions. Business
and legal aspects. Estates in land, purchase and sales contracts,
conveyances, mortgage and trust deed transactions, property taxes,
landlord and tenant, wills and inheritance. Prer., B.Ad. 506 or B.Law
300 and R.Es. 300.

TRANSPORTATION AND
TRAFFIC MANAGEMENT
Tr.Mg. 450-3. Transportation Operation and Management.
Economics of transportation service and rates. History and patterns of
regulation. Examination of various forms in common use in freight and
passenger transportation. Introduction to tariffs and their use. Service
and management problems of industrial traffic managers. Prer., Econ.
201 and 202 or consent of instructor.
Tr.Mg. 451-3. Survey of Transportation Operation and
Procedure. Brief analysis of the function of transportation in the
economic system. Issues in administration of transportation policy with
respect to public regulation. Not open to students who have taken
Tr.Mg. 450. Students may take Tr.Mg. 450 after this course but will
receive only 2 semester hours of credit for Tr. Mg. 450.
Tr.Mg. 452-3. Problems in Traffic Management. Class and
commodity rates, demurrage, car mileage, fabrication-in-transit,
diversion and reconsignment privileges, tariff interpretation, and rate
construction.
Tr.Mg. 456-3. Air Transportation. Particular reference to operating
costs and methods, passenger and cargo rates, air routes, schedules,
safety, regulation, and airport management. Prer., Senior standing.
Tr.Mg. 457-3. Urban Transportation. Analysis of the two aspects of
urban transportation — freight and people. Issues in policy, modes,
governmental actions and structure, investment and costs, and effect
upon urban environment.
Tr.Mg. 458-3. International Transportation. Analysis of
international transportation (primarily sea and air) in the world
economy. Detailed study of cargo documentation and freight rate
patterns. Included are liability patterns, logistics, economics, and
national policies of transportation.

School of Education

ADMINISTRATION AND SUPERVISION
Ad.S. 500-2. Problems and Trends in Education. A broad overview
of current problems in schools and school systems and consideration of
practices and policies in U.S. schools for solution of such problems.
Evaluates procedures for solving educational problems.
Ad.S. 502-3. Introduction to Educational Administration.
Responsibilities of boards of education and administrators; nature of
administrative leadership and introductory consideration of finance
and public relations. State, local, and federal relationships in education.
Ad.S. 505-3. The Community College. Origins, functions,
organization, and current trends in the junior or community college.
For present and prospective teachers and administrators in two-year
colleges.
Ad.S. 510-3. School Law. Recent developments including
administrative implications of significant court decisions pertaining to
school operations generally. For superintendents, principals, school
board members, and prospective administrators.
Ad.S. 511-2. School and Community Relations. Principles,
practices, materials, and techniques used in public relations in sections
of the country. Students may develop materials for own use.
Ad.S. 512-2. Personnel Administration. Personnel problems in the
administration of public and private school systems. Policies affecting
personnel, rights and responsibilities of teachers, salary schedules,
retirement, sick leave, collective negotiations, etc.
Ad.S. 513-3. School Finance. For advanced students and school
superintendents. Problems of educational finance; theory, practice,
and control; equalization funds, federal-state-local relations in finance,
budgeting, salary schedules, retirement, and school bonds.
Ad.S. 514-3. Educational Facilities Planning. Structure and
determination of school plant needs; relation of educational and
architectural services; criteria of adequate school plants, site
development, building operation and management; financial problems.
Ad.S. 517-3. Administration and Supervision of the Elementary
School. For administrators and teachers. Purposes, practices, and
trends in administration and educational leadership.
Ad.S. 518-3. Administration and Supervision of Secondary
Schools: Senior and Junior/Middle Schools. Current administra-
tive principles and practices essential to effective organization
and management, with emphasis on the educational leadership of
the principal.
Ad.S. 520-2. Educational Supervision. Stimulating and guiding the
in-service professional growth of teachers. Evaluation of teacher
activities in relation to pupil growth. Supervisory procedures and
techniques.
theory and practice for school leadership personnel with emphasis on
group development, group problem identification and solutions, and
conflict management skills and processes.
Ad.S. 530-2. Elementary Principals Intensive. Offered even
summers only. Two-week in-depth examination of the elementary
school principalship. Required for Type D administrative certification,
elementary school. Consent of instructor required.
Ad.S. 560-2. Seminar: Supervision. Students work on individual
topics and report orally and in writing.
Ad.S. 560-2. Seminar: School Administration. Students develop and
analyze case studies using organizational behavior concepts.
Ad.S. 581-1 to 3. Workshop in Educational Administration and
Supervision. Designed to meet the unique needs and interests of
educational leaders by drawing upon relevant concepts and ideas from
educational administration and supervision and testing their
application in field-based settings. Not to be applied toward a degree.
Ad.S. 590-1 to 4. Independent Study in Administration and
Supervision.
with processes and patterns of educational leadership in the schools.
Graduate students from various specialties interact with faculty

Students enrolled at the 500 level may expect additional work and evaluation commensurate
with graduate standards.
members in preparing for leadership roles. May be taken more than one semester for credit with adviser’s approval.

Ad.S. 610-2. Theory of Educational Administration. Study of organizational models, theories, and communication patterns; leadership roles and behavior; and organizational change. Attention to recent research and administrative theory.


Ad.S. 624-3. Planning and Administration in Community College. Principles and practices in the application of modern management concepts and administrative tools including data base, student flow information, output measurement, and PPBES. Lectures, discussion, simulations, and student projects. Prer., instructor consent.

Ad.S. 630-3. Advanced Seminar: School Law. An in-depth examination of the American legal process as it pertains to administration, planning, and delivery of educational programs. Involves self-selected research followed by individual or group presentations.


Ad.S. 670-1. Internship in Administration and Supervision. Supervised on-the-job experience with related reading and study.

Ad.S. 700-4 Master’s Thesis.


Ad.S. 960-1 to 4. Independent Study: Elementary School Administration.

Ad.S. 961-1 to 4. Independent Study, Middle Level School Administration.

Ad.S. 962-1 to 4. Independent Study: Senior High School Administration.

Ad.S. 963-1 to 4. Independent Study: Central Office Administration.


Ad.S. 965-1 to 4. Independent Study: Supervision.

CURRICULUM

Curr. 501-3. Curriculum Development. Enables students to utilize the knowledge and competencies achieved regarding culture, community life styles, and language in order to develop specific strategies for diagnosing each pupil’s performance and developing curriculum.

Curr. 503-3. Bilingual-Bicultural Education. A survey course; students acquire an understanding of the foundational issues of bilingualism and bilingual education. Topics to be covered include historical survey of bilingual education, bilingualism and the individual, social psychology of bilingualism, models of bilingual education, and the bilingual classroom.

Curr. 504-3. Multicultural Education. Assists teachers in their development of competencies specifically related to multicultural education and provides relevant information which relates to the educational needs of Mexican Americans, Black Americans, Asian Americans, and Native Americans.

Curr. 505-3. Testing Methods and Methodology in Bilingual-Multicultural Education. Provides a general orientation to psychological testing of American minorities and an opportunity to review research relative to psychological and linguistic assessment of language minority students. Students are introduced to fundamental goals and techniques of classroom testing minority students (Seldom offered).

Curr. 506-3. Seminar: Bilingual-Multicultural Education. Provides students with the opportunity to do comprehensive evaluation of current research, issues, and trends relevant to bilingual-multicultural education.

Curr. 507-3. Linguistic Analysis of English: Implications for Teaching. Provides students with a basic understanding of the structure of English and gives them an opportunity to use that understanding to diagnose language problems. Topics to be covered include the structure of English (principally morphology and syntax) and the use of contrastive and error analysis in the classroom. Emphasis is placed on students’ use of linguistic skills to solve learning problems.

Curr. 508-3. The Community as a Resource for Bilingual-Multicultural Education Teachers. Provides an opportunity for students to participate in and observe community life in selected ethnic cultures and assists students in developing the ability to use the community as a classroom resource.

Curr. 509-3. Introduction to Linguistics and Language Learning. Provides students with a basic understanding of language, and introduces linguistics as an effective tool for analyzing and solving the language problems of second language dialect learners. Topics to be covered include nature and origins of language, the structure of English, language variation, and language acquisition.


Curr. 580-3. Techniques of Using Spanish in the Bilingual Classroom. Provides an opportunity for students to increase their ability to effectively use the Spanish language as a tool in the bilingual classroom.

Curr. 582-3. Techniques in Teaching English as a Second Language. Develops skills in using a variety of classroom techniques to teach English as a second language. The course is a practical, cookbook presentation of ESL methods and techniques. Examples of classroom practices will be taken from the full educational spectrum from public schools to preuniversity intensive courses to adult education.

Curr. 583-4. Workshop in Multicultural Education. Provides students with experiences in training in multicultural methodology. How to utilize community members, paraprofessionals, and peers to facilitate learning in a multicultural environment.

Curr. 593-2 to 4. Readings in Multicultural Education. Provides students with an opportunity to examine the current literature as it relates to trends in contemporary issues in the area of multicultural education.

Curr. 950-1 to 4. Independent Study in Bilingual-Multicultural Education. Provides an opportunity for students who have a major in elementary education or secondary education to do an in-depth study of topics not covered in the regular curriculum offerings.

EARLY CHILDHOOD EDUCATION

E.C.E. 501-3. Context and Curriculum Content of Early Childhood Education. Emphasis on contextual concerns such as procedures for organizing physical space, environments, materials, and methods articulated with the present developmental and learning level of the child. Content areas will include language arts, reading, speech development, mathematics, creativity, science, and other subjects common to the preschool. Included are a review of strategies for changes or modifications in programming for the handicapped child.

E.C.E. 502-3. Approaches to Young Children’s Learning. Review of approaches for facilitating the learning and development of young children. Examined are programs for children (infancy through age 8), including those developed under federal auspices, such as Home Start, Head Start. Follow Through, and First Chance programs funded by B.E.H. Approaches are considered in terms of (I) their differing views of the intellectual, social, and physical development of young children; (2) their operation as program activities and procedures; and (3) their effects on children’s learning.

E.C.E. 503-3. Directing Programs for Young Children. Analysis of organizational factors and instructional events in the classroom. Facilitation of teacher effectiveness through supervisory feedback and inservice development. Special attention is given to supervisor-teacher relationships, parent-school-community relationships, and processes for program back-up.

E.C.E. 504-3. Administrative Seminar: Selected Topics in Early Childhood Education. Emphasis on those topics required of administrators of E.C.E. programs in day-to-day operations (philosophy, finance, programming, management, community/parent relations, etc.). Special attention given to unique administrative concerns in programs for special categories of children such as toddlers, developmentally delayed children, etc. Prer. E.C.E. 501 and 502.

E.C.E. 505-3. Program Development for Young Children. Analysis of principles of early childhood program development in the areas of curriculum, staff development, and parent involvement. Special
attention given to the processes of conceptualizing, designing, implementing, and evaluating materials developed for children, staff, and/or parents. Prer., E.C.E. 501 and 502.

E.C.E. 506-3. Parent Involvement in Education. Review of historical factors and research related to current trends in working with parents in the regular classroom and with parents of exceptional children. Presentation of major roles that can be assumed by parents in school settings, i.e., policy maker, teacher of own child, better informed parent or classroom volunteer. Special attention is given to the teacher role in working effectively with parents.

E.C.E. 507-3. Teaching Strategies for Young Handicapped Children. Individual developmental characteristics of young exceptional children will be used to discuss attributes of effective teaching approaches, curriculum activities, procedures, materials, management techniques, and model program which provide the least restrictive alternative will be examined. Prer., E.C.E. 501, Ed. Psy. 510.

E.C.E. 514-3. Measurement and Assessment in Early Childhood Education. Includes cognitive, affective, and psychomotor areas, traditional techniques as well as obtrusive measures, human- and video-observational schemes. Attention is given to important specialized topics such as screening handicapped children, utilizing assessment information on children wisely, assessing bilingual children, etc.

E.C.E. 569-3. Proseminar: Research in Early Childhood Education. Selected topics with emphasis on research findings in the area of education, supervision, learning, and use of evaluation in such programs. Proseminar will concentrate on child development and education research findings essential to provide a firm understanding of the child as he evolves from infancy to elementary school age. Prer., R.F.M. 510, E.C.E. 501, 502, and 514.

E.C.E. 570-3. Clinical and Educational Practicum in Early Childhood Education. Includes planned experiences built around the clinical and E.C.E. classroom in operation. Students observe in public schools, Head Start, day care, and private preschool programs. The practicum will require 30 to 40 clock hours of field placement experience with concurrent classroom meetings. Opportunities for observation in special education classes are provided. Prer., 15 credits in E.C.E. program.

E.C.E. 578-4. Practicum in Early Childhood Education. Includes planned experiences in either administration, supervision, teaching, or research in area E.C.E. centers and programs. The practicum will require a minimum of 180 clock hours under supervision. Provides the opportunity to make decisions about young children and to examine simultaneously the decision-making process and its results. Prer., E.C.E. 570.


EDUCATIONAL PSYCHOLOGY

Ed.Psy. 500-3. Advanced Psychological Foundations of Education. A survey of results of psychological inquiry with emphasis on applications to educational practices. Major topics are motivation, behavior, learning, development, and characteristics of teachers and students.

Ed.Psy. 505-3. Children's Thinking. A review of the psychology of thinking with emphasis on developmental changes in modes of thought. Topics include conceptual behavior, problem solving, creativity, humor, play, and others.


Ed.Psy. 516-3. Behavior Disorders in Exceptional Children. An in-depth study of the psychological, social, and behavioral problems of exceptional learners. Topics to be discussed include identification, etiology, educational assessment and strategies, noneducational intervention, parent programming, and evaluation. Special attention is given to current research and its application in the classroom.

Ed.Psy. 520-3. Social Psychology of Learning. Analysis of social-psychological concepts, such as self-concept and its development, social learning theory, group processes, attitude learning, and related phenomena. Applications to learning and education will be considered.

Ed.Psy. 580-1 to 4. Workshop: School Applications of Educational Psychology. Research, development, and other scholarly activities in educational psychology are studied and reviewed; applications are then made to school settings with student practice and utilization of techniques emphasized.

Ed.Psy. 591-1 to 4. Readings in Educational Psychology.

Ed.Psy. 600-3. Proseminar in Educational Psychology. Examination of current and classic research in educational psychology. Consideration of personalities in the field, likely trends, and related topics. Prer., consent of instructor.


Ed.Psy. 950-1 to 4. Independent Study in Educational Psychology.

ELEMENTARY EDUCATION


El.Ed. 532-3. Advanced Language Arts in Elementary School. Current thought as determined by research and practice in the various areas of language arts, listening, speaking, reading, and writing. Issues, trends, and innovative practices are examined.

El.Ed. 532-2 or 3. Current Literature for Children. Current books, trends, and media material in children's literature. This course is for people who have not had a course in this area within the past five years. Prer., El.Ed. 531 or survey course in children's literature.

El.Ed. 534-3. Language Arts for Urban Schools. Attention will be directed toward listening, speaking, reading, and writing. Diagnosis for weaknesses in listening, speaking, and coordination and application of dramatic play, oracy procedures, sensory imagery, and creative expression. Also includes preparation of cases, records, and application of different instructional activities effective at the undergraduate level.


El.Ed. 540-2. Contemporary Mathematics for Elementary Schools. Deals with contemporary mathematical content and teaching techniques. Emphasis is placed on mathematical background for the teacher and experimental projects.

El.Ed. 541-2. Elementary Mathematics Curriculum. An in-depth study of curriculum building in mathematics at the elementary school level (K-6). Particular attention will be given to selection of instructional materials; establishment of content, and evaluation of programs.

El.Ed. 543-3. Topics in Mathematics Education. An in-depth study of topics such as mathematics and learning, geometry, testing, mathematics labs, calculators. May be repeated as topics vary.

El.Ed. 544-2. Elementary Social Studies Curriculum Evaluation. Course examines existing social studies curricula from selected locations within the United States in light of latest materials and programs. Aims at students updating their own programs and revising them in accordance with current thought and materials available.


El.Ed. 548-3. Museums in Education. For elementary and secondary teachers, this course acquaints teachers with the educational resources available in public institutions such as museums, zoos, historical societies, etc.

planning. Testing and evaluation and parent-teacher cooperation.

**E.L.Ed. 573-3. Creative Experience in Literature.** Will include selection of materials and development and presentation of storytelling, puppetry, flannel board storytelling, choral reading, slide/tape programs, movie making, creative dramatic music, movement, and art. Prer., any two of the following courses: E.L.Ed. 531, 532, 533 or consent of instructor.

**E.L.Ed. 580-1 to 4. Curriculum Workshop for Elementary School Teachers.** Opportunity to work on projects and problems in the school in which the student is employed; conferences, study groups, discussion, and work in curriculum construction. Prer., 18 semester hours in education and teaching experience or consent of instructor.

**E.L.Ed. 581-2. Supervision of Science Curriculum.** Workshop for supervision of science in city school systems; basic content in science fields.

**E.L.Ed. 591-1 to 4. Readings in Elementary Education.**

**E.L.Ed. 610-2. Seminar: Elementary Education.** Students work on individual topics and report orally and in writing. Prer., consent of instructor.

**E.L.Ed. 631-2. Seminar: Children's Literature.** In-depth study of topics such as development of a literature program, banning books, bibliotherapy, appropriateness of award-winning books, books relating to minority groups, and trends in children's literature. Prer., course in children's literature.

**E.L.Ed. 700-4. Master's Thesis.**

**E.L.Ed. 701-2. Master of Education Report.**

**E.L.Ed. 950-1 to 4. Independent Study in Elementary Education.**

### FOUNDATIONS OF EDUCATION

**Fnd. 500-3. Current Issues in American Education.** (Formerly Advanced Social Foundations of Education.) An examination of the social values and forces in American society which shape or influence the aims, philosophies, methods, content, and problems of the American educational enterprise.

**Fnd. 510-3. Education in Other Countries.** A comparative examination of the political, historical, philosophical, sociological, economic, religious, and other foundational aspects of education in several selected countries.

**Fnd. 520-3. Economics of Education.** An examination of sources of economic support for education and the impact of education on the national economy.

**Fnd. 530-3. Sociology of Education.** A sociological appraisal of the school in American society with reference to the status, role, activities, and relationships within the school and of the school to other social institutions.

**Fnd. 540-3. History and Philosophy of Early Education.** An examination of Western intellectual heritage as it was shaped during the ancient and medieval periods; traces corresponding development of educational theory and practice and its continuing impact on modern society.

**Fnd. 541-3. History and Philosophy of Modern Education.** An examination of Western intellectual heritage from the 16th to the 20th century; traces corresponding development of educational theory and practice and its continuing impact on modern society.

**Fnd. 542-3. History and Philosophy of Education: 20th-Century America.** An examination of educational theory and practice against the backdrop of selected themes from 20th-century American life and history.

**Fnd. 550-3. Contemporary Philosophies of Education.** An examination of selected contemporary philosophies and their impact on educational thought and practice.

**Fnd. 560-3. Politics and Education.** An examination of the political forces affecting American education; includes a study of the interaction of the political and educational areas.

**Fnd. 570-3. Religion and Education.** An in-depth study of the constitutional and legislative provisions and judicial decisions regarding religion and the American public school.

**Fnd. 580-3. Seminar: Foundations of Education.** An in-depth exploration of topics, issues, and ideas largely generated by students through their other course experiences in foundations of education. Prer., at least one graduate level course in foundations of education and consent of instructor.

**Fnd. 590-3. Readings in Foundations of Education.** A critical examination of very recent publications in the field of foundations of education: books and professional journal publications. Prer., at least one graduate level course in foundations of education and consent of instructor.

**Fnd. 635-3. Seminar: Foundations of Education.**

**Fnd. 636-3. Research Methodology in Foundations of Education.**

**Fnd. 637-1. Dissertation Seminar.**

**Fnd. 670-3. Teaching Internship in Foundations of Education.**

**Fnd. 693-3. Readings in Foundations of Education.**

**Fnd. 700-4. Master's Thesis in Foundations of Education.**

**Fnd. 800-0 to 8. Doctor of Philosophy Dissertation.**

**Fnd. 801-0 to 8. Doctor of Education Dissertation.**

**Fnd. 950-1 to 4. Independent Study in Foundations of Education.**

**Fnd. 960-1 to 12. Independent Study in Foundations of Education.**

### GUIDANCE AND COUNSELING

**Note:** During the regular academic year the following courses are open to graduate degree students only and to those admitted for the purpose of pursuing professional counselor certification.


**G.C. 502-3. Laboratory in Personal Appraisal.** Laboratory in self-appraisal taken concurrently with G.C. 501, overview of the field. Emphasizes small group laboratory method and experiential learning designed to foster self exploration and interpersonal skill development relevant to personal and professional goals. Because of the experiential nature of the course the grading is undifferentiated with pass/fail with B as the expected maximum grade.


**G.C. 512-3. The Student in Higher Education.** Overview of college student personnel work. Special problems in college counseling. Group facilitation and values clarification skills. Consulting in higher education.

**G.C. 515-3. Marital and Family Counseling.** Marital and family conflicts and counseling intervention strategies.

**G.C. 533-3. Professional Seminar in Counseling.** An in-depth examination of special problems and topics in the field with emphasis upon individual project investigation and reporting. Professional status of the field standards differential client population groups. Because of the experiential nature of the course the grading is undifferentiated with pass/fail with B as the expected maximum grade.


**G.C. 542-3. Organizational Development in Schools.** Organizational development in theory and practice with special attention to educational institutions. The implementation of guidance objectives through organizational structures. Individual projects required for course completion.

**G.C. 570-6. Practicum in Counseling.** Supervised practice counseling in elementary and secondary schools, college student personnel, and agency setting. By advance application and arrangements.


**G.C. 584-3. Readings in Guidance Development.** Focus on special
problems in the development and delivery of guidance services. Directed readings and small group activities.


G.C. 586-589-3. Special Topics in Guidance and Counseling. Specific topics vary from semester to semester.


G.C. 990-1 to 3. Independent Study. Individually directed research activity on special topics not covered by course offerings. Degree students only, with advance approval by major professor and department.

LIBRARY MEDIA

L.M. 501-3. Introduction to the Library Media Center. Consideration of various aspects of the media profession including the media specialist as instructional designer and integral member of the school's instructional team. Includes several field trips to area media centers.


L.M. 505-3. Photography in Education. Basic photographic techniques for media specialists and teachers with little or no prior knowledge. Includes information on 35mm cameras and equipment, simple developing techniques, enlarging and printing, 8mm production, and visual literacy.

L.M. 507-3. Television in Education. (Same as C.T. 465.) Examines the application of television to problems and goals in education. Stresses ways and means by which television can become a significant part of the educational process at all levels. Provides students an opportunity to produce and evaluate instructional TV programs.

L.M. 509-3. Programmed Learning. Designed to give students experience in constructing linear and branching programs plus creation of self-instructional materials based on a systematic approach to instructional design. A field trip to visit computer-assisted instruction facilities is included.


L.M. 513-3. Materials and Services for Children and Young Adults. Extensive and in-depth examination and evaluation of a broad range of material and their utilization in instructional development and curriculum design.


L.M. 516-3. Cataloging Library Media. Terminology, philosophy, and practice in the application of cataloging, classification, and filing pertaining to various types of media.

L.M. 518-3. Administration of Library Media Programs. Problems in the organization and administration of library media programs that are an integral part of the teaching and learning process in the public schools.

L.M. 520-3. Methodology in Library Media Research. Analysis, evaluation, and interpretation of published library media research with examples of studies using the analytical, historical, descriptive, or experimental method and application of appropriate research methodology to a problem in the library media field.

L.M. 529-3. Gaming and Simulation. The design, evaluation, selection and use of games and simulations. Numerous examples of games and simulations from various levels and subject areas are utilized in the course.

L.M. 535-3. Information Storage and Retrieval. Examination of the various types of retrieval systems for use in a school media program. Several approaches to information retrieval include (1) manual information retrieval systems, (2) whole document retrieval systems, and (3) computer-based retrieval systems.


L.M. 570-1 to 4. Internship in Elementary Educational Media. Provides practical experience in the duties, services, and administration of an elementary library media center. The intern will work cooperatively under the direction of the educational media supervisor of the participating library and a faculty adviser.

L.M. 570-1 to 4. Internship in Secondary Educational Media. Provides practical experience in the duties, services, and administration of a secondary library media center. The intern will work cooperatively under the direction of the educational media supervisor of the participating library and a faculty adviser.

L.M. 580-3. Educational Media-Theory and Practice for Teachers. The nature, scope, and use of educational media are covered through practical hands-on experiences with audiovisual equipment and materials.

L.M. 9501-1 to 4. Independent Study in Library Media.

PHYSICAL EDUCATION


P.E. 501, 502, 503-1 to 3. Seminar: Physical Education. Presentation of special aspects of current practices, materials, and trends in physical education. The functions of these topics in contemporary physical education are analyzed or experienced.

P.E. 510-2. Movement Education. The teaching of development and the learning of motor skills applicable mainly to the elementary school, utilizing a guided discovery-problem solving approach.

P.E. 512-3. Curriculum Development in Physical Education. Analysis of trends and problems in physical education curriculum content and organization at the elementary, secondary, and college levels; application of basic concepts of curriculum development in the determination of the physical education curriculum.


P.E. 530-2. Problems in Recreation Administration. Lecture, field work, and lab. experience in recreation administration; problems in management, finance, evaluation, and maintenance of recreation facilities.


P.E. 534-2. Financial Management for Recreation. Specific techniques of management currently being utilized in the profession. Bids, grants, tax expenditure justifications, and specific program accounting will be accentuated.

P.E. 538-2. Recreation Leadership at the Administrative Level. Concepts of play and recreation; recreational needs, characteristics of various age groups.


P.E. 540-2. School Health Program in Secondary School. Organization of programs in junior and senior high schools, personnel health services, health teaching programs, relationships with other health agencies.

P.E. 543-2. Curriculum Problems in Health Education. The primary objective of this course is to study, evaluate, and apply curriculum principles and basic procedures to building units of instruction.


P.E. 620-3. Administration of Physical Education. This class offers insight into the problems of present-day educational administration in
physical education. Learning procedures essential for the effective preparation of teachers, coaches, and administrators.


P.E. 635-2. Seminar: Recreation. Assigned readings, discussions, analysis, and presentation of problems selected by class members for individual involvement.

P.E. 950-1 to 3. Independent Study. Consult advisor on topic; subject field arranged to meet needs of individual student.

READING


Rdg. 502-3. Reading in the Content Area. Materials and techniques for integrating the teaching of reading in content area classrooms.

Rdg. 503-3. Reading Workshop. Special topics in reading geared to the needs of participants in workshop.

Rdg. 509-3. Diagnostic and Prescriptive Techniques of Reading (Elementary). Diagnostic, prescriptive, and evaluative techniques in reading appropriate to elementary and middle schools.

Rdg. 510-3. Diagnostic and Prescriptive Techniques of Reading (Secondary). Diagnostic, prescriptive, and evaluative techniques in reading appropriate to junior high, senior high, and adults.


Rdg. 532-2. Advanced Language Arts in Elementary School. Current thought, as determined by research findings and practice in the various areas of the language arts: listening, speaking, reading, and writing. Issues, trends, and innovative practices will be examined.

Rdg. 533-2 or 3. Current Literature for Children. Current books, trends, and media material in children's literature. This course is for people who have not had a course in this area within the past five years. Prer., Ed. 531 or survey course in children's literature.

Rdg. 534-3. Reading Clinic Practicum I (Elementary). Supervised practicum in reading and writing at the elementary and middle school levels. Includes diagnostic and remedial techniques, methods, and materials. Prer., Rgd. 500 and 509, or consent of instructor.

Rdg. 571-4. Reading Clinic Practicum II (Secondary). Supervised practicum in reading and writing at the junior, senior high or adult level. Includes diagnostic and remedial techniques, methods, and materials. Prer., Rgd. 501 and 510, or consent of instructor.

Rdg. 575-3. Research in Reading. A review of current research in reading-related topics with special emphasis given to methodological and measurement issues in research reading.

Rdg. 591-1 to 3. Selected Readings. Selected readings for advanced study in a specific area of reading instruction or research in reading. Prer., written consent of instructor.

Rdg. 950-1 to 4. Independent Study: Reading. Intended only for those who wish to study along lines not followed by courses. Prer., written consent of instructor.

REHABILITATION SERVICES

R.S. 312-3. Introduction to Rehabilitation Services and Community Resources. Introductory course to prepare students for careers in vocational rehabilitation, social work, employment counseling, probation and parole, and other helping professions. Also included will be a review of community services and their uses and effectiveness.

R.S. 330-3. Rehabilitation Counseling and Interviewing Techniques. Introduction to the theory and practice of rehabilitation counseling and to interviewing techniques. Verbal and nonverbal communication skills will be presented and several theories and systems of counseling will be examined.

R.S. 331-2. Theories of Personality. An introduction to the major theories of personality. An overview of the nature of the theories and their scope, utility, and limitations will be presented.

R.S. 333-3. Appraisal and Evaluation in Rehabilitation Services. Designed to acquaint students with the basic concepts of appraisal and evaluation as applied to the rehabilitation client. Students will be exposed to tests and evaluation procedures in the areas of aptitude, intelligence, vocational interest, personality, etc. Prer., R.S. 312.

R.S. 374-4. Seminar and Field Experience in Rehabilitation I. Experience is designed to provide practical training with social and rehabilitation services agencies. The agencies and the University provide on-the-job instruction and supervision to the student. Class time will be devoted to discussion of field experiences and professional role expectations.

R.S. 374-4. Seminar and Field Experience in Rehabilitation II. Experience is designed to provide practical training with social and rehabilitation service agencies. The agencies and the University provide on-the-job instruction and supervision to the student. Class time will be devoted to casework write-ups, presentations, and decision-making processes and procedures and to discussion of the field experiences and professional role expectations.

R.S. 402-3. Treatment Approaches to Drug Addiction and Alcoholism. This course is designed to acquaint the student with the problems of drug and alcohol addiction and treatment approaches. Experiences will include lectures, reading materials, and field experiences in various treatment centers.

R.S. 437-3. Psychological Aspects of Physical and Mental Disabilities. This course is designed to assist the student in becoming more aware of the sociological and physical aspects of disability. Specific disability areas and adjustment to these conditions will be presented. Special emphasis will be placed on acquiring basic medical terminology. The effect of disabilities on individual occupational possibilities will be explored.

R.S. 477-5. Seminar and Field Experience in Rehabilitation III. Experience is designed to provide practical training with social and rehabilitation service agencies. The agencies and the University provide on-the-job instruction and supervision to the student. The field experience will be 16 hours per week. Class time will be devoted to discussion of the field experience and professional role expectations.

R.S. 478-5. Practicum in Rehabilitation. This course is viewed as a pre-professional experience prior to securing a position in the rehabilitation services field. Students may spend two or more days at the agency of their choice. Supervision will be provided by the University and the agency.

RESEARCH AND EVALUATION METHODOLOGY

R.E.M. 500-3. Orientation to Research and Evaluation Methodology. A survey-type course that examines the fundamental concepts in the areas of statistics, research, measurement, and evaluation. This course satisfies one of the core requirements for master's degree students in the School of Education.

R.E.M. 510-3. Data Analysis I. A first-level course that is oriented to the use and interpretation of descriptive and inferential statistics. Topics covered include frequency distributions, measures of central tendency, measures of variability; contingency tables, chi square, scattergrams, correlation and regression; t-test and analysis of variance. For each topic there is discussion of the appropriate descriptive and inferential statistics. Use of the packaged statistical program (SPSS) is covered. No prer.

R.E.M. 511-3. Data Analysis II. A continuation of R.E.M. 510 to more advanced methods of analyzing data but still with an emphasis on the use and interpretation of descriptive and inferential techniques. Topics covered are one-way and two-way analysis of variance, power, post-hoc comparisons, partial correlation, and multiple correlation and regression. Use of packaged statistical programs (SPSS) is emphasized. Prer., R.E.M. 510 or equivalent, is presented.

R.E.M. 520-3. Introduction to Research Methods. A first-level course that examines the purpose of research, the methods and designs of empirical research, and the processes involved in any research study. The methods of research examined will include experimental designs, quasi-experimental designs, surveys, and production of a research
project will be part of the course activities. Prer., R.E.M. 500 or 510.

R.E.M. 530-3. Introduction to Measurement. A first-level course that examines the nature and purpose of measurement. Particular attention is paid to the concepts of reliability, validity, and norms, and how they relate to the interpretation of scores. The variety of instruments that are used to measure human attributes will be studied. Prer., R.E.M. 500 or 510.

R.E.M. 540-3. Introduction to Program Evaluation. A first-level course that examines the models and methods of evaluating programs in education and other social sciences. Particular emphasis is given to the topics of formative and summative evaluation and the measurement and design problems associated with them. Evaluation reports are studied in detail. Prer., R.E.M. 500, 510, 520, or 530.

R.E.M. 570-1 to 3. Practicum in Research and Evaluation Methodology. Supervised work in projects that would provide for experienced data analysis, research, measurement or evaluation. R.E.M. 950-1 to 4. Independent Study in Research and Evaluation Methodology.

SECONDARY EDUCATION


Sec.Ed. 511-2. Supervision of Student Teachers. Designed to develop competency in the supervision of student teachers, including attention to various modern and new approaches. For cooperating teachers as well as supervisors.


Sec.Ed. 521-3. Models of Teaching and Observation. Designed for elementary and secondary teachers. Teachers are given oral and descriptive introduction to social, academic, and personal models of teaching. Peer teaching is designed to give practice in one of the models. Information on analysis of teaching behavior for each model is presented.

Sec.Ed. 535-3. Issues and Problems in Science Education. Recent developments in theory, curriculum, methods, and materials in secondary science examined for their contribution to the objectives of science education. Prer., High school science teaching experience or consent of instructor.

Sec.Ed. 536-3. Supervision of Science Curriculum. Workshop for supervisors of science in city school systems; basic content in science fields.


Sec.Ed. 541-3. Advanced Methods and Strategies in Secondary Mathematics. In-depth investigation of specific methods and strategies suitable for teaching mathematics in middle and senior high schools. Participants are actively involved in modeling methods and strategies.


Sec.Ed. 544-3. Topics in Mathematics Education. An in-depth study of topics such as computers, testing, learning theory, mathematics laboratories. May be repeated as topics vary.

Sec.Ed. 545-2. Simulation Games in Social Science. Alternate years. An introduction to the use of simulation games as they pertain to social studies instruction in the public schools. Introduction to available simulation and attention to various types of game design for particular social studies courses.

Sec.Ed. 546-3. Theory and Practice of Social Science. Designed to meet the needs of experienced teachers and of those who will teach in public schools. Recent developments in theory and materials in the social studies examined and presented practices analyzed for their contribution to general goals of social studies education. Appropriate for teachers in grades 7-12, but also profitable for elementary teachers with a specialization in social studies.

Sec.Ed. 548-3. Museums in Education. For elementary and secondary teachers, this course acquaints teachers with the educational resources extant in public institutions such as museums, zoos, historical societies, etc.

Sec.Ed. 559-3. Design and Analysis of Instructional Systems. The course covers the theoretical rationale underlying recent advances in instructional design. The student is also expected to develop and assess materials in his own area of specialization.

Sec.Ed. 563-3. Seminar: Experiential Education. Students identify, plan, implement, and evaluate an intensive experiential education experience. They serve as assistants to leaders directing experiential education programs and report their experiences orally and in writing.


Sec.Ed. 570-1 to 4. Advanced Practicum in Teaching. This course is not to be used as independent study but is to be used for groups approved in advance by the dean of the School of Education. Prer., consent of instructor.

Sec.Ed. 571-3. Internship in Mathematics Education.

Sec.Ed. 591-1 to 4. Readings in Secondary Education.


Sec.Ed. 950-1 to 4. Independent Study in Secondary Education.

SPECIAL EDUCATION

Sp.Ed. 500-3. Education of Exceptional Children. The course provides an introduction to exceptional learning from a noncategorical perspective. Topics include historical aspects, legislation, financing, definitions, descriptions and contributing factors of different handicaps, service delivery, and working with families.


TEACHER EDUCATION

These courses may not be applied toward a graduate degree.


T.Ed. 412/512-3. Development Communication and Group Process. Examines the principles of underlying effective interpersonal and intra-personal communication. The class will examine the cognitive, affective, and psychomotor aspects of human interaction.

T. Ed. 413/513-3. General Educational Psychology. An introduction to the application of psychology to education. Designed for prospective teachers. Emphasis is on selected topics (objectives, motivation, retention, transfer and cognitive, affective, and psychomotor outcomes, etc.). Includes school-based field experiences.


T.Ed. 420/520-3. Media in Education. Designed to acquaint students with basic procedures for selecting, producing, utilizing and
evaluating media in the instructional process. Includes experiences in operating audiovisual equipment.

T.Ed. 436/536-3. Teaching Reading in Urban Schools. Designed to describe the reading process as it is related to and affects inner-city children. General topics include foundations of reading instruction K-12, current approaches for teaching reading, and materials for reading instruction. Includes school-based field experience.

T.Ed. 439/539-1. Seminar: Elementary Education. Accompanies the student teaching assignment and yields undergraduate credit only.

T.Ed. 440/540-1. Seminar: Secondary Student Teaching. Accompanies the student teaching assignment and yields undergraduate credit only.


T.Ed. 470/570-8. Student Teaching-Elementary School. Kindergarten and grades one through six. Student teacher attends an elementary school in a Denver metropolitan area.

T.Ed. 471/571-8. Student Teaching - Secondary School. Student teacher attends a senior or junior high school in Denver metropolitan area.

T.Ed. 473/573-2. The City as a Cultural Laboratory. Develops first-hand awareness and understanding of the nature and culture of a city and builds a better appreciation of the possibilities for human and environmental design. Acquaints students with the educational resources, opportunities and further exploration and utilization of a city as a cultural laboratory for education. Field experiences combine with a seminar.

T.Ed. 475/575-4. (Elementary). School-Based Field Experience. Teaching experience in small groups in a school setting.

T.Ed. 475/575-2. (Secondary). School-Based Field Experience. Teaching experience in small groups in a school setting.

T.Ed. 480/580-1 to 4. Workshop in Education. Content varies to meet specific topical needs. A workshop format is utilized.

T.Ed. 940-1 to 4. Independent Study. Elective at the undergraduate level.

College of Engineering and Applied Science

ARCHITECTURAL ENGINEERING


CHEMICAL ENGINEERING

Ch.E. 210-4. Physical and Chemical Properties of Matter. Emphasis is on the principles of chemistry as they relate to engineering materials and systems. Prer., high school chemistry. (Not for Ch.E. majors.)

CIVIL AND URBAN ENGINEERING

C.E. 130-2. Introduction to Civil Engineering. Application of engineering approaches to the solution of a variety of problems from engineering related fields. Translation of engineering problems into mathematical models and the engineering interrelation of the mathematical results. Prer., Math. 112 or equivalent.

C.E. 212-3. Analytical Mechanics I. A vector treatment of force systems and their resultants; equilibrium of frames and machines, including internal forces and three-dimensional configurations; static friction; properties of surfaces, including first and second moments; hydrostatics; minimum potential energy and stability. Prer. or coreq., Math. 242.

C.E. 221-3. Plane Surveying. Observation, analysis, and presentations of basic linear, angular, area, and volume field measurements common to civil engineering endeavor. Prer. or coreq., Math. 140.


C.E. 311-3. Analytical Mechanics II. A vector treatment of dynamics of particles and rigid bodies including rectilinear translation, centripetal-force, free and forced vibration, and general motion of particles, kinematics of rigid bodies; the inertia tensor; Euler's equations of motion; energy and momentum methods for particles, systems of particles, and rigid bodies. Prer., C.E. 212.

C.E. 312-3. Mechanics of Materials. Mechanical properties of materials; stresses and strains in members subjected to tension, compression, and shear; flexural and shearing stresses in beams; deflections of beams, column analysis, principal stresses, static equivalent load, fatigue. Prer., C.E. 212.

C.E. 314-2. Materials Testing Laboratory. One hr. of lect. and one 3-hr. lab. per wk. emphasizing mechanical properties of commonly used structural materials, such as steel, aluminum, timber, and concrete, and the testing and research techniques necessary to obtain these properties. Prer., C.E. 210. Prer. or coreq., C.E. 312.


C.E. 340-2. City Planning. Essential principles of city planning, with particular emphasis on the contribution that can be made by civil engineers. Includes detailed discussion of land use, land use boundaries, transportation, street systems, public buildings, parks and recreation, utility design, and zoning. Prer., junior standing.

C.E. 341-3. Water Quality Engineering. Elements of public water supplies and sewerage. Public water supplies include the study of rates of consumption, quality, source of supplies, methods of treatment and disinfection. Sewerage includes collection, treatment, and disposal of wastes; study of characteristics of sewage. Prer. or coreq., C.E. 331; C.E. 315, or consent of instructor.


C.E. 360-3. Transportation Engineering. Introduction to the technology, operating characteristics and relative merits of highway, airway, waterway, railroad, pipeline, and conveyor transportation systems. Evaluation of urban transportation systems. Recent transportation system innovations. Prer., junior standing or consent of instructor.

C.E. 380-3. Soils and Foundations Engineering. Introduction to physical and mechanical properties of soils; seepage, consolidation, shear strength, bearing capacity, lateral earth pressures, stability, and pile behavior, with preliminary analysis of structures affected by soil properties. Prer., C.E. 312 and 331. The latter may be taken concurrently.

C.E. 442-4. Municipal Design Projects. Analysis and design of municipal public works, including street systems; drainage and flood control systems; water collection, treatment, and distribution systems; sewage collection and treatment systems. The interplay between these systems and their correlation with land characteristics and use. Prer., C.E. 360; prer. or coreq., C.E. 341.

C.E. 449-3. Introduction to Environmental Pollution. A multidisciplinary examination of the problems of environmental pollution. The course focuses particularly on the chemical, social, biological, economic, and engineering aspects of environmental
pollution: composition and sources; health and social costs; methods of reduction and control. Open to any nonengineering or engineering student having at least junior standing. Prer., upper division standing.


C.E. 498-3. Engineering Contracts. Laws met by the practicing engineer, types of contracts, specification writing, laws on contracts, agency, partnership, sales, and property, with primary emphasis on rights and duties of the engineer. Prer., senior standing.

Note: Courses at the 500 level are open to qualified seniors subject to departmental approval. Not all graduate are offered each year.

C.E. 511-3. Introduction to Structural Dynamics. Introduction to the dynamic response of structural systems, both linear and nonlinear. Prer., C.E. 350, Math. 320 or consent of instructor.


C.E. 543-3. Advanced Waste Water Treatment. Advanced studies on theory and operation of waste water treatment works. Prer., C.E. 341, graduate standing, or consent of instructor.

C.E. 545-3. Administration of Public Works. (P.Ad. 545.) A descriptive course concerned with the administration of engineering and planning aspects of urban public works and with listing and comparing modern methodologies. Prer., graduate standing in civil engineering or public administration, or consent of instructor.


C.E. 558-3. Advanced Topics in Reinforced Concrete. Advanced topics relating to design and analysis of reinforced concrete structures including a review of the American Concrete Institute code. (slabs prestressed concrete.) seismic design, folded plates and shells, finite element analysis and other topics determined by class interest. Prer., C.E. 458.


C.E. 561-3. Applications of Statistical Analysis in Civil Engineering. Probability — events, sets, independence, distributions. Measures of dispersion — means, standard deviation, variance, confidence intervals. Statistical decision making — statistical hypothesis, level of significance (a), second type error (β), tests of statistical hypotheses. Simple and multiple regression — scatter diagrams, least squares estimates, simple and multiple regression forecasting models. Queue theory — arrivals and service distributions; queue lengths, and waiting times for single and multiple channel facilities. Prer., C.E. 360 or consent of instructor.

C.E. 562-3. Urban Transportation Planning. Definition of the urban transportation problem. Sociology of urban regions, history of urban growth, models of urban growth, population forecasts, land use surveys and planning, trip generation, characteristics, distribution and assignment, modal split, system evaluation, C.D.B. transportation planning. Prer., consent of instructor.


C.E. 564-3. Urban Traffic—Characteristics. Human and vehicular characteristics, speed and volume studies, origin and destination studies, traffic flow theory, stream characteristics, intersection characteristics, signalized intersections, accident characteristics, parking characteristics, highway lighting, and miscellaneous topics. Prer., C.E. 360 or consent of instructor.


C.E. 568-3. Pavement Design. Design of flexible and rigid pavements for highways and airports; stress analysis in flexible and rigid pavements; design of joints and reinforcing steel for rigid pavements; principles of subgrade stabilization. Prer., C.E. 360 and 481.


C.E. 580-3. Advanced Soils Engineering. An advanced course in the
principles of soil mechanics and foundations engineering. Coverage includes consolidation, shear strength, lateral pressures, and slope stability. Prer., C.E. 380.

C.E. 581-3. Engineering Properties of Soils. Study of the interrelations of soil mechanical properties such as density, moisture, applied stresses, pore pressures, permeability, strength, and shear strength of soils. Determination of these interrelations is done in the laboratory. Prer. or coreq., C.E. 580 or consent of instructor.


C.E. 585-3. Mechanics of Multiphase Media. Development of the geotechnical relationships governing load-deformation-time response of multiphase media. Three-dimensional consolidation theory including thermal, electrical, and chemical effects. Interrelationships between molecular mixtures and theory of consolidation. Applications to geotechnical problems; the analysis of loaded clay layers; the influence of pore pressure diffusion on laboratory and field test results; the application of three-dimensional consolidation theory to laboratory and field tests and to predictions of magnitudes and progress of deformation. Prer., C.E. 580 or consent of instructor.


C.E. 588-3. Selected Advanced Topics in Geotechnical Engineering. Selected, advanced topics in soil mechanics, rock mechanics and geotechnical engineering. Coverage depends on the curriculum needs of that year. Such topics as seepage, clay mineralogy, finite elements, analysis of geotechnical problems, rheology of soils, plasticity applied to soil mechanics, soil dynamics: computational methods in geotechnical engineering, etc. are possible choices. This course can be taken more than once. Prer., C.E. 580 or consent of instructor.

C.E. 589-3. Dynamics, Soils, and Foundations. Principles of vibrations, and wave propagation in elastic, homogeneous, isotropic media; in-situ and laboratory determination of engineering properties of soils; applications of these principles and properties in design of foundations subject to dynamic load generated by machinery, earthquake, or blast. Prer., C.E. 581 or consent of instructor.


C.E. 592/599-1 to 3. Selected Topics. Credit and subject matter to be arranged. Prer., variable.


C.E. 651-3. Advanced Theory of Structures. Generalized approaches to the analysis of civil engineering and continuous elastic structures (such as plates and plane stress bodies) by force and displacement methods. Emphasis is on formulation by finite elements and solution by matrix methods. Prer., C.E. 551 and basic knowledge of computer programming.


C.E. 695/699-0 to 3. Selected Topics. Credit and subject matter to be arranged. Prer., variable.


C.E. 800-variable credit. Doctor's Thesis.

C.E. 940-1 to 6. Independent Study (Undergraduate). This category is intended for upper division level special topics which students may wish to pursue on their own initiative, with guidance from a professor who agrees to limited consultation, on the work and to award credit when the project is completed. Departmental approval is required.

C.E. 950-1 to 6. Independent Study. (Master's level). Available only through approval of the graduate adviser. Subjects arranged to fit needs of particular student.

C.E. 980-1 to 6. Independent Study. (Doctoral level). Available only through approval of the graduate adviser. Subjects arranged to fit needs of particular student.

COMPUTER SCIENCE

C.S. 201-3. Introduction to Computer Science. (E.E. 201.) An elementary course in computer science covering computer programming methods. Fortran programming, numerical applications, and nonnumerical applications. Prer., high school trigonometry (Credit toward a degree not allowed for both E.E./C.S. 201 and E.E./C.S. 210.)

C.S. 210-3. Fundamentals of Computing I. (E.E. 210.) A first course in computing for those who will take additional computer courses. Covers the capabilities of a computer, the elements of a programming language, and the basic techniques for designing algorithms to solve practical problems. The programming language PASCAL is used as a vehicle for expressing these concepts. Prer., Math. 112. (Credit toward a degree not allowed for both E.E./C.S. 201 and E.E./C.S. 210.)


C.S. 311-3. Computer Applications in Mathematical Sciences. (Math. 311.) An advanced Fortran course for scientists and engineers. Aspects of optimal programming with respect to various goals and examination of goals that are appropriate to given contexts. Prer., C.S. 201 and Math. 140.


C.S. 413-3. Advanced Finite Mathematics I. (Math. 413.) Basic methods and results in combinatorial theory. Enumeration methods, elementary properties of functions and relations, graph theory. Considerable emphasis is placed on applications. The department recommends that students take this course followed by C.S. 514 (Math. 509). Prer., Math. 140.

C.S. 453-3. Assembly Language Programming. (E.E. 453.) A laboratory course in programming at the machine code level. Lectures deal with the organization of the machine, its effect on the order code, and techniques for programming in Assembly Language. Primary emphasis is on preparing and running programs. Prer., C.S. 310 or E.E. 451.

C.S. 459-3. Computer Organization. (E.E. 459.) This course is concerned with computer arithmetic units, memory systems, control systems, and input-output systems. The emphasis is on logic structure rather than electronic circuitry. Prer., C.S. 257 or equivalent.


C.S. 540-3. Computer Decision Modeling. (Mg. Sci. 625.) Application of the methods of computer science to problems in management decision making. Emphasis is placed on simulation as a method for studying the behavior of dynamic systems and the use of optimization models for their control. Prere., B. Ad. 502 and 507 or consent of instructor.


C.S. 546-3. Theory of Automata. (Math. 546.) Finite-state machines, regular expressions, paths on graphs, and the relations among these. Turing machines, some equivalent machines, and the idea of computability. Machines between the preceding ones on computational power and the elements of their relation to formal languages. Prere., C.S. 401 or 453.

C.S. 553-3. Fundamental Concepts in Programming Languages. (E.E. 553.) A study of the concepts which underlie the design of a programming language. Basic operators, operand modes, and formation rules. Examples are drawn from contemporary languages such as FORTRAN, COBOL, ALGOL, LISP, SNOBOL, and PASCAL. The relationship among languages, hardware, and applications is studied in the light of the underlying concepts. Prere., C.S. 401 and 453.

C.S. 554-3. Seminumerical Methods for Digital Computers. (E.E. 554.) Survey of topics in the borderline area between numerical analysis and computer systems programming and design. Some topics covered are computer round-off error, floating point arithmetic, the generation of random numbers and parallelism in numerical calculations. Prere., C.S. 453 or 401 and numerical analysis.


C.S. 940-1 to 3. Independent Study in Computer Science (Undergraduate). This course provides opportunities for independent study, work on a small research problem, or tutoring to lower division computer science students. Prere., c.S. 201 or 210.

ELECTRICAL AND COMPUTER ENGINEERING

E.E. 130-2. Problems and Methods of Modern Electrical Engineering. Application of engineering approaches to the solution of a variety of problems from electrical engineering and related fields. Translation of engineering problems into mathematical models and the engineering interrelation of the mathematical results. Prere., Math. 112 or equivalent.

E.E. 210-3. Introduction to Computing. (C.S. 201.) An elementary course in computing, covering computer programming methods, FORTRAN programming, numerical applications, and non-numerical applications. Prere., high school trigonometry. (Credit toward a degree not allowed for both E.E./C.S. 201 and E.E./C.S. 210.)

E.E. 210-3. Fundamentals of Computing I. (C.S. 210.) A first course in computing for those who will take additional computer courses. Covers the capabilities of a computer, the elements of a programming language, and the basic techniques for designing algorithms to solve practical problems. The programming language PASCAL is used as a vehicle for expressing these concepts. Prere., Math. 112. (Credit toward a degree not allowed for both E.E./C.S. 201 and E.E./C.S. 210.)


E.E. 253-1. Circuits Laboratory I. Electrical circuits and measurements; cathode-ray oscilloscope; electrical instruments, transients in circuits involving resistance, inductance, and capacitance; and resistance measurements. Prere., or coreq., E.E. 213 and 257.


E.E. 521-3. Electronics I. Fundamentals of semiconductor devices and their application in electronic circuits. Topics include semiconductor
E.E. 322-3. Electronics II. Transistor model at high frequencies, multisite amplifiers; frequency response of amplifiers; feedback; operational amplifiers; large signal amplifiers and distortion. Prereq., E.E. 321.


E.E. 354-2. Power Laboratory I. Basic electro-mechanical energy conversion concepts as applied to the synchronous machine, induction machine, power transformer; armature windings; the transformer. Prereq., E.E. 254 and E.E. 316.


E.E. 424-3. (C) Communication Theory. Introduction to principles of modern communication theory and signal processing. Random processes will be introduced and used to compare the noise performance of AM, FM and various digital modulation systems. Definition of information and channel capacity. Introduction to error correcting codes and further topics in modern communication theory. Prereq., E.E. 331 (or 421) and 381 (or Math. 481).


E.E. 451-2. (P) Power Laboratory II. Experimental investigations of the design and operating characteristics of synchronous machines, induction machines, transformers, power rectifiers; and single-phase machines. Prereq., E.E. 316 and 354.

E.E. 453-3. (D) Assembly Language Programming. (C.S. 453.) A laboratory course in programming at the machine language level. Lectures will deal with the organization of the machine, its effect on the order code, and techniques for programming in assembly language. Primary emphasis will be on preparing and running programs. Prereq., C.S. 310 or E.E. 351.

E.E. 454-2. (S) Controls Laboratory. Introductory experiments on response of control components; open- and closed-loop response of servosystems; simulation of systems on analog computers; design of compensating networks. Prereq., E.E. 362 and 413.


E.E. 459-1. (D) Logic Circuits Laboratory. Wiring of electronic logic circuits and investigation of the properties and characteristics of those circuits. Circuits will be built from solid state gates and memory elements. Circuits of the type used in digital computers, data processing systems, control systems, and communication systems will be studied. Prereq., E.E. 254 and 257.

E.E. 459-3. (D) Computer Organization. (C.S. 459.) This course is concerned with computer arithmetic units, memory systems, control systems, and input-output systems. The emphasis is on logic structure rather than electronic circuitry. Prereq., E.E. 257 and assembly language background.

E.E. 460-2. (D) Computer Laboratory. This course will provide laboratory experience both with digital computer subsystems and with complete computer subsystems. The student will construct small subsystems and work with actual subsystems of a full digital computer. Prereq., E.E. 458 and 459.

E.E. 461-2. (E) Electronics Laboratory III. Experimental work with oscillators, counters, switching circuits, r-f amplifiers, AM and FM modulators and demodulators, the superheterodyne receiver. Prereq., E.E. 362 and E.E. 422.

E.E. 464-3. (F) Electro-Optics Laboratory. Lasers, light emitters, detectors, polarization effects upon reflection and refraction. Diffraction, antenna simulation, interference, imaging, spatial filtering. Optical modulation, detection. Longer projects are selected from holography, pattern recognition, optical communications, acousto-optical effects. Prereq., E.E. 314, 331 and 362. (Can be used as a theory or lab. course.)

E.E. 465-2. (C) Communications Laboratory. Laboratory experiments demonstrating and verifying material taught in E.E. 424. Extensive use is made of spectrum analysis to study signals and signal processing in filters, samplers, modulators, converters, and detectors. Topics include AM, FM, PM, and noise. Prereq., E.E. 362. Prereq., or coreq., E.E. 424.

E.E. 467-2. (S) Discrete-Time Controls Laboratory. Discrete-time control systems will be developed and tested using microprocessors, compensators, A/D and D/A converters. Experiments in the control of discrete and analog systems will be performed. Prereq., E.E. 331, 362, and 413.


E.E. 940-1 to 3. Independent Study. (Undergraduate.) An opportunity for students to do independent, creative work. Prereq., consent of instructor.

Graduate Courses

The department offers between 8 and 12 graduate courses each fall and each spring. Check the department office for a tentative listing of offerings for future semesters.

Note: Most 500-level graduate courses are open to qualified undergraduates who meet the requirements for technical or professional electives.

To register for 500-level courses, a student must have a B average or consent of the department.

E.E. 501-3. Quantum Mechanics for Electrical Engineers. Basic

*Not offered every year.*


E.E. 513-3. (F) Electromagnetic Fields and Waves III. Mathematical theories and physical concepts related to Maxwell's equations. The static field theory, the boundary-value problems, Green's functions and eigenfunction expansions, momentum and energy for plane waves, reflection and refraction, propagation in anisotropic media, concept of potential and energy functions, gauge transformations, radiation of moving charges, and special relativity. Prer., E.E. 314.

E.E. 514-3. (F) Electromagnetic Fields and Waves IV. Application of Maxwell's equations to microwave passive network analysis. Topics include transmission lines; general mode theory of waveguides; discontinuities, excitations and bends in waveguides; nonreciprocal, inhomogeneously filled and surface-wave waveguides; reflection and transmission resonant cavities; excitation and input admittance of a resonant cavity; scattering and impedance matrices of microwave junctions. Prer., E.E. 312.


E.E. 544-3. (S) Introduction to Modern Control Theory. State space concepts; vector spaces, eigenfunctions; transformations, Jordan canonical form; state space representation and analysis of control systems; controllability and observability; application to discrete systems. Stability of linear systems. Prer., E.E. 413.

E.E. 545-3. (S) Sampled-data and Digital Control Systems I. A study of the analysis and synthesis of control systems characterized by the transmission of control signals by means of period pulses, Z-transform theory and pulse transfer functions are introduced with applications to digital computers. Prer., E.E. 413.

E.E. 546-3. (S) Engineering System Analysis and Design. Procedures of mathematical engineering analysis and design. The formulation and solution of system problems of an interdisciplinary nature are stressed. Analog and digital computer methods of solution are used. Prer., E.E. 413 or equivalent.


E.E. 551-3. (D) Hardware-Software Interface. Computer engineering methods in hardware and software design applied to problems drawn from the minicomputer systems field. Hardware and software techniques will be compared and related, and general techniques for the design of a combined hardware-software system will be developed. Interface between a computer system will be developed. Interface between a computer system and external digital devices. Prer., E.E. 257 and 453.


E.E. 553-3. (D) Fundamental Concepts in Programming Languages. A study of the concepts which underlie the design of a programming language. Basic operations, formation rules, mode and type, scope and extent, procedures. Examples from FORTRAN, ALGOL (60 and 68), COBOL, SNOBOL, LISP. Relationship among languages, hardware, and applications. Prer., E.E./C.S. 401 and 453.

E.E. 554-3. (D) Semi-Numerical Methods for Digital Computers. (C.S. 544.) Surveys of topics in the borderline area between numerical analysis and computer systems programming and design. Some topics covered are computer round-off error, floating point arithmetic, the generation of random numbers, and parallelism in numerical calculations. Prer., E.E. 453 or 401 and numerical analysis.


E.E. 559-3. (D) Advanced Computer Architecture. A broad-scope treatment of the important concepts in the structural design of computer systems. A large number of actual computer will be studied in depth. Prer., E.E. 453.


E.E. 562-3. (C) Information Theory. Information and entropy, Markov chains, combinatorial problems, coding theory, channel capacity, modulation, applications to communication engineering. Prer., E.E. 381 or Math. 481.


E.E. 565-3. (C) Detection and Extraction of Signals From Noise. This course is an introduction into detection and extraction methods used in signal processing and includes such subjects as decision theory, detection of known and random signals, optimum received design and evaluation, estimation theory, estimation of parameters, Wiener filtering, Kalman-Bucy filtering, applications to problems in communication theory. Prer., E.E. 561.

E.E. 566-3. (C) Stochastic Systems and Optimization. An introduction and survey of methods for optimizing stochastic systems. Included are concepts from game theory, decision theory, the use of entropy in optimization. Euler Lagrange equations, Hamilton-Jacobi equations, Markov processes, and sequential decision theory with applications to information transfer and control theory. Prer., E.E. 561.


E.E. 576-3. (P) Industrial Power Systems. Use of per-unit methods to find transient voltage behavior of industrial power systems resulting from motor starting, spot welders, and similar stimuli. System and device failures; protection of generators and substations; subharmonics and over-excitation on induction motors. Prereq. E.E. 316 and 331 or 421.


E.E. 591-599-0 to 3. Special Topics. Intermediate courses of variable title and variable credit, usually offered once by guest lecturers. See current departmental notices for details.


E.E. 606-3. Advanced Topics in Physical Electronics. Semiformal lecture/discussion of topics of current interest. Most lectures are presented by the participants. Each student registered for credit will present at least one lecture per semester. Prereq. E.E. 505.


E.E. 641-3. Advanced Theory of Control I. Optimal control theory; Pontryagin's maximum principle; discrete maximum principle; stochastic optimal control; computational methods. Prereq. or coreq., E.E. 544.

E.E. 642-3. Advanced Theory of Control II. Nonlinear adaptive systems subject to deterministic and random inputs and disturbances; phase-locked loop; time-varying systems; identification theory; learning systems. Prereq., E.E. 544.


E.E. 673-3. Advanced Synchronous Machines. Study of transient characteristics of synchronous machines such as short-circuit currents and torques, out-of-phase synchronizing, and starting torque. Prereq., E.E. 416 or equivalent.


E.E. 691 to 699-0 to 3. Selected Topics. Courses of variable title and variable credit, usually offered once by guest lecturers. See current departmental notices for details.


E.E. 950-1 to 6. Independent Study. (Master's level.) Affords an opportunity for students to do independent, creative work. Prereq., consent of adviser.

E.E. 960-1 to 6. Independent Study. (Doctoral level.) Affords an opportunity for students to do independent, creative work. Prereq., consent of adviser.

ENGINEERING—NONDEPARTMENTAL COURSES


MECHANICAL ENGINEERING


M.E. 195-1 to 3. Special Topics in Mechanical Engineering and Mechanics. Subject matter to be selected from topics of current technological interest. Credit to be arranged.


M.E. 295-1 to 3. Special Topics in Mechanical Engineering and Mechanics. Subject matter to be selected from topics of current technological interest. Credit to be arranged. Prereq., consent of instructor.

M.E. 301-3. Introduction to Materials Science I. The development of the physical principles relating the structural features of materials to their observed properties. Prereq., Phys. 213 or 233.

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M.E. 316-2. Measurements II. Two lab. periods per wk. Application of the theory of measurement to a wide variety of instruments and measurement systems. Prer., M.E. 314.


M.E. 395-1 to 3. Special Topics in Mechanical Engineering and Mechanics. Subject matter to be selected from topics of current technological interest. Credit to be arranged. Prer., consent of instructor.

M.E. 401-3. Introduction to Materials Science II. Application of the physical principles controlling the structure-property relationships in ceramics, metals, polymers, and composite materials. Specific properties considered to include mechanical, electrical, and magnetic behavior. Prer., M.E. 301.

M.E. 414-3. Mechanical Engineering Design. Review of mechanics of materials and stress analysis; detailed design of various machine elements such as screws, springs, brakes, and gears. Prer., M.E. 383.

M.E. 415-3. Material Engineering Design II. Individual device or development and product development cycles. Topics are presented so that the creative, the quantitative, or a blend may be achieved. The supporting disciplines of analysis, organization, computation, and communication are brought out as they become relevant. The difficulty of initial creation, organization, decision, and compromise is not minimized. The subject material is organized chronologically so that a project can be started immediately. Prer., M.E. 414.

M.E. 421-3. Air Conditioning. Physical and thermodynamic laws of water vapor and air mixtures; basic principles of heating and ventilating; determination of heating and cooling loads; examination of heating and cooling systems. Prer., M.E. 362.


M.E. 442-3. Mechanical Engineering Laboratory. Three lab. periods per wk. Approximately 20 percent of semester spent on experience project assignments on conventional equipment; remaining 80 percent spent on live, on-going project on which a design or instrumentation change is made. The student carries out all the planning, testing, and reporting necessary to evaluate the change. Prer., M.E. 312 and 316.


M.E. 458-3. Computer Aided Thermal Design. Computer programming of thermodynamic cycles; compressor, expander, and heat exchanger component design; team design project in solar power, heating, or cooling system; oral and written reporting. Prer., M.E. 312 and 383.

M.E. 457-4. Combustion Phenomena. The multicomponent fluid equations of motion and chemical thermodynamics are used to study a variety of combustion problems. These include droplet and particle combustion, boundary layer combustion, detonation and deflagration wave theory, topics related to internal combustion engines, liquid and solid rockets. Prer., M.E. 312 and 383.

M.E. 461-4. Analytical Methods of Engineering I. Solutions of linear algebraic equations and applications to theory. Topics include matrix analysis, eigenvalue problems, bilinear and quadrature forms, boundary and initial value problems of physics, solution of wave equations by the method of characteristics and applications to elastic wave propagation and supersonic flows. Prer., A. Math. 236, or Math. 319 and 320, or consent of instructor.

M.E. 462-4. Analytical Methods of Engineering II. Boundary and initial value problems of physics. Topics include solutions of partial differential equations of physics by the methods of separation of variables; Sturm-Liouville theory; variational principles and applications; Green's functions and applications. Prer., A. Math. 236 or Math. 319 and 320, or consent of instructor.

M.E. 471-4. Fluid Mechanics. Viscous incompressible and compressible fluid flows. Topics include derivation of equation systems for viscous compressible fluid motion, potential and irrotational flows; boundary-layer theory; nozzles and diffusers; transition. Prer., M.E. 384 or consent of instructor.


M.E. 487-4. Rigid-Body Dynamics. Kinematics of a rigid body, principal axes, and moments of inertia, angular momentum of a rigid body. Euler equations. Applications include topics such as motion of a rigid body having a fixed point under forces, simple vibrations, topics such as of a sleeping top, the gyrocompass, motion of a billiard ball, rotating machinery, etc. Prer., M.E. 282 or equivalent.

M.E. 490-1. Senior Seminar. Presentation of broad range of professional opportunities available to graduating seniors. The manner of instruction is by discussions with practicing engineers. Prer., senior standing.


M.E. 495-1 to 3. Special Topics in Mechanical Engineering and Mechanics. Subject matter to be selected from topics of current technological interest. Credit to be arranged. Prer., consent of instructor.

M.E. 503-3. Plasticity and Creep. Inelastic deformation of materials such as metals, alloys, glasses, composites, polymers, etc., from the phenomenological and structural point of view. Case studies of plastic and creep deformations in engineering materials. Prer., M.E. 401 or equivalent.

ARCHITECTURE

Architectural Communication

Arch. 510-3, 511-3. Graphic Communications. Two lecture-studio periods per wk. Techniques of graphic communication and architectural presentation for design.

Architectural Design

Arch. 500-5. Architectural Design. Three studio-seminar periods per wk. Basic design theory and application; exploration of design fundamentals and vocabulary. Basic understanding of the tools of the designer and their application to the design of man-made environments. Simple, abstract, and real design problems to enable environmental awareness and to introduce the design process.

Arch. 501-5. Architectural Design. Three studio-seminar periods per wk. Continuing exploration of design fundamentals. Scope of study expands in scale from a small social unit to a subcommunity. Design parameters investigated are human needs and activities, climate, pedestrian and vehicular circulation, site planning and development, zoning ordinances and building codes, structure, materials and utilities.

Arch. 600-5. Architectural Design. Three studio-seminar periods per wk. The investigation and design of large building complexes within the context of nearby buildings, site, climate, codes and ordinances, utilities, and circulation. Emphasis is given to the integration of architectural form and space with structure and environmental controls.

Arch. 601-5. Architectural Design. Three studio-seminar periods per wk. Four independent studios are offered for student selection with an attempt at diversity of project scale, building type, theoretical emphasis and design process. This selection is intended to allow some degree of student initiative in exploration of personal interests. The studio option procedure is based on the educational theory that design is learned through repetitive exercise and challenge, and that beyond introduction from earlier semesters to the variable and processes of design, the program base can later be varied.

Arch. 700-5. Architectural Design. Three studio-seminar periods per wk. Four studio selections organized as in Arch. 601 above. In Arch. 601 and 700, attempt is made to include four selection projects emphasizing urban design, urban context problems, major building complex problems, and building type problems (e.g., performing arts, high rise commercial, institutional, housing).

Arch. 701-7. Architectural Design Thesis. Three studio-seminar periods per wk. The thesis is the final design product of the program. It serves to integrate all prior architectural learning in a single project to demonstrate the student's capacity for self-discipline and self-direction in the execution of a complete process of problem definition and solution, and to contribute to the solution of particular architectural and urban problems. Though projects of a major design challenge are expected, emphasis may be given to any of the several areas of architectural interest such as type problems (e.g., housing, health care facilities, recreational facilities), urban infrastructures, historic preservation and contexts, and architectural technology.

Arch. 702-2. Thesis Preparation. One seminar period per wk. Independent study leading to the development of a finished project program with site selection and analysis ready for the final design thesis semester. Though topic selection and problem definition are an individual responsibility of the student, the thesis preparation will be pursued as an adjunct to the Arch. 700 studio to enable broad-based criticism for the work. Projects may be developed for thesis work with the Community Center for Development and Design.

Arch. 710-7, 711-7. Research/Design. Advanced study and research in an area of major professional interest to the student.

Technologies

Arch. 550-3. Environmental Systems. Two lect. and one lab. per wk. Systems considerations of management and treatment of water supply, waste water-treatment and reuse, power supply and consumption, transportation, land use and measurement.

Arch. 551-3. Materials and Methods of Construction. Two lect. and one lab. or field trip per wk. Study of materials and components for construction and construction methods and techniques for residential and commercial buildings.

Arch. 552-3, 553-3. Basic Structures I and II. Two lect. per wk. Analysis of basic structures. Applications of structural systems.

Arch. 557-3. Elements of Structure. Two lect. per wk plus three Saturdays. The course is organized to provide students in areas of specialization other than architecture with an understanding of the effects of natural and man-made loads imposed on the structures of buildings. Analysis of elements range from building systems through the final foundation structure. Prer., lab course in physics, mathematics to and including an introduction to integral calculus and Arch. 551.


Arch. 651-3. Lighting and Acoustics. Two lect. per wk. Illumination quantity and quality, daylighting and electric/lighting, lighting design and application, principles of sound transmission and absorption, room acoustics, architectural acoustics problems.


Arch. 657-1. Elevators and Escalators. Introduction to vertical transportation.

Arch. 658-2. Alternative Energy Technologies. One lect. per wk. Available and proposed energy resources, distribution applications, and technologies with emphasis on solar energy utilization. Studies of new energy solutions include commercially available hardware for the design of energy efficient and passive energy systems.

Arch. 664-2. Life Safety Systems. Two lect. per wk. An architect's guide to the disaster movies. The course is designed to acquaint the student with building and fire codes, loads from seismic, wind blast and fire forces, flood protection, and building safety features.

Arch. 750-3. Systems Synthesis. A synthesis of the preceding environmental systems and structures courses. The student will perform the structural frame design and select and detail the mechanical and electrical systems of a specific building carried forward from Arch. 600 design studio.
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Professional Practice
Arch. 760-3, 761-3. Internship. Eight hrs. per wk. Work in a practicing professional's office during the regular semester. The student is placed in an office by the College and receives academic credit instead of pay. Students must have completed Professional Practice and Construction Documents and be in the last year of the program.

Theory
Arch. 570-3, 571-3. History / Philosophy I and II. Two lect.-rec. per wk. A survey of architectural and related design responses to changing attitudes, technologies, and natural settings from primitive through contemporary cultures.
Arch. 960-variable credit. Independent Study. Studies initiated by students or faculty and sponsored by a faculty member to investigate a special topic or problem related to architecture.

URBAN DESIGN
U.D. 600-5. U.D. Design and Graphics Workshop I. Combines studios, lectures, and field trips to introduce basic urban design principles and graphic communication skills. Analysis of materials, infrastructures, scales, ways and places are used in the studio to develop written, oral, and visual techniques. Workshops focus on drawing, mapping, and multi-media presentation means.
U.D. 601-5. Design II. Broad scale studio design course that focuses on problems of new and rehabilitation project developments in rural and urban locations. Particular emphasis is given to environmental, cultural, regional, and social aspects of the project and related alternative environments. The sites include locations in the city core, edge of core, general city, edge of city, suburbs, and rural areas.
U.D. 700-5. Design III. A studio course to synthesize the studies of advanced architectural, urban design, landscape, and planning design problems that consider large scale organization and communication concepts of society. The program includes design studio and/or community action center study options. Studies cover particular aspects of the urban design, with emphasis on economic, social and political factors and design process determinants. Topics include the design, implementation, and evaluation of urban residential districts, urban cores, institutional centers and circulation systems.
U.D. 701-6. Design IV. Studio and field trips. Focuses all of the student's graduate professional studies on completing a compound, complex thesis. The problem centers on an urban design project, but the work includes architecture and planning aspects with significant attention given to either one. The areas of concentration are in recreation, transportation, health, community action and development, preservation and renewal design.
U.D. 784-3. Urban Design Seminar. A case study course with classroom and field presentations. Emphasis is on particular human needs and responses to provide places for housing (individual and mass) industries, commerce, education, culture, recreation, health, defense, religion, transportation, politics, business, and necropolis, as well as combined activities. Consideration is given to the effect of each function on physical characteristics of domestic and foreign architecture, landscape, urban design, and planning complexes.
U.D. 795-3. Experiencing the Cityscape. Seeing the scope of the city form, as well as exploring individual examples to interpret urban architecture in its context. Special emphasis is placed on urban needs and quality of spaces for public and private uses. Relationships within architecture, circulation, climate, and landscape are analyzed from an aesthetic approach.

INTERIOR DESIGN
I.D. 500-5. Design Research/Problem-Solving Methods. A general project-oriented introduction to interior architecture and space planning. An exploration of methodologies involved in the organization of physical settings correlated with specific human social, biological functioning.
I.D. 501-5. Residential Design. Dynamics of near-environment systems studied with emphasis on the analysis and optimization of these systems via design as they support habitational activities. Major projects include designing for adaptive uses of existing structures and designing the interior spaces of a structure utilizing solar energy systems.
I.D. 557-3. Elements of Structure. Organized to provide students in areas of specialization other than architecture with an understanding of the effects of natural and manmade loads imposed on the structures of buildings. Analysis of elements range from building systems through the final foundation structure. Prer., laboratory course in physics, mathematics to and including an introduction to integral calculus, and Arch. 551.
I.D. 600-5. Transportation Design. Design of interiors for air, sea, and ground transportation systems and related facilities. Fundamental concern is an investigation of the physiological, psychological, and technological factors in designing for transportation experiences.
I.D. 601-5. Commercial Design. Development of comprehensive solutions to facility space planning and design problems. Special emphasis is given to feasibility studies, identification of sources of dissonance within the social-physical environment interface, problems of space modules, land use, and organization, definition of priority systems, integration of interior space components and space enclosure systems with environmental control systems, preparation of construction documents, and cost estimating.
I.D. 624-3. Environmental Signage and Graphic Design. Programming and design development of sign systems and graphics as integral parts of total environments, with respect to information transfer, and symbolic communication. (To be taken concurrently with I.D. 700.)
I.D. 660-3. Furniture Design. An exploration of materials and manufacturing processes with efforts directed toward their applications in the design of furnishings. Delineation of performance criteria and the preparation of specifications and working drawings are stressed.
I.D. 682-2. Professional Practice. An examination of the key characteristics of the professional market milieu, the construction industry, current and projected professional practice, the legal environment, and code of ethics.
I.D. 680-3. Physical Environmental Factors. An analytical inquiry into the effects of various aspects of the designed environment on human development and well-being at the individual, group, and institutional scale. Seminar materials are drawn from related recent literature and case studies are used as backgrounds for discussions.
I.D. 681-3. Human Environmental Factors. A seminar programmed to focus on social processes and patterns as parameters for the physical arrangement of the environment. Concepts considered in the contexts of various classes of micro and macro space include personal space, privacy, territoriality, and crowding. Variables affecting spatial behavior are also explored.
I.D. 700-7. Institutional Design. Development of design and planning strategies based on static models organized around decision theory, and
dynamic models with mechanistic characteristics. Design and planning problem-solving activities within this framework focus on collection and analysis of data, implementation of social change, the consonance between the organizational structure of the function to be accommodate and the physical fabric of the environment, cost control and the relating of cost to performance, semantic aspects of environmental form, communication patterns, and projected change and growth in the physical and social environment.

I.D. 663-3. Internship I. Supervised field applications of theoretical learning in approved professional office. Eight hrs. per wk.

I.D. 664-3. Internship II. A continuation of professional activities specified in Internship I, with emphasis on developing the students' maturity in their motivations and in their understanding and managing assigned area of project responsibilities. Monetary compensation for work performance is to be negotiated with the client, and the students are expected to select his/her independent design practicum project and packaging the results.

I.D. 701·7. Thesis. Approved professional research or design project undertaken by students as concentrations in one or several areas of interior architecture and space planning. Each candidate for the graduate degree is required to submit and defend a thesis project to demonstrate a high level of competence in solving complex social-environmental problems through research, design, and planning.

LANDSCAPE ARCHITECTURE

L.A. 500-5. Landscape Architecture Design I. This initial studio in design focuses on the application of aesthetic principles which form the basis for landscape architectural design. Space, form, color, and texture are explored in their application to design. Problem solving is introduced as a fundamental design tool.

L.A. 501-5. Landscape Architecture Design II. The second design studio attempts to apply the principles and experiences explored in the previous design studio to the site planning process. In a studio/lecture situation several problems are analyzed from site analysis through site design. The intent is to build design competence through application of design principles to solve site problems in an increasing level of complexity.


L.A. 511-3. Graphic Communication II. Two studio lect. periods per wk. Detailed studies in freehand sketching; rendering of all types of plans, sections, and elevations; and photographic reproduction processes.

L.A. 550-3. Environmental Systems—Engineering. Two lect. and one studio per wk. Systems considerations of management and transportation of water supply, waste water treatment and re-use, power supply and consumption, transportation, land use and measurement, and grading and storm drainage.


L.A. 561-1. Synthecology Field Research I. A three-day intensive short course exploring on field location various aspects of the Rocky Mountain region ecological tolerances to development.

L.A. 580-3. Rocky Mountain Plant Materials. Two lect. per wk. Deciduous trees and shrubs of the Rocky Mountain region; identification, horticultural concerns, and design potential are stressed.


L.A. 600-5. Landscape Architecture Design III. The third design studio expands design process even further by expanding the complexity and diversity of the type of case studies explored. There is an attempt at the second-year level to select real site design problems for studio projects. This introduces the constraints of clients, politics, and economics to the site design problem solving method of design.

L.A. 601-5. Landscape Architecture Design IV. The fourth design studio is also an expansion of the "increasing complexity" concept of exploring case studies in the studio environment. Team projects are part of this process and these projects in the Colorado environment are used as case studies. The results are packaged in brochure form in an attempt to explore this form of graphic communication.

L.A. 630-3. Survey of Landscape Architecture. Two lect. and one studio period per wk. Plant materials and basic principles of landscape design related to city planning and development.

L.A. 650-3. Landscape Architecture Engineering II. Two studio/lect. periods per wk. Topics include topography and grading design, earthwork and drainage design.


L.A. 661-1. Synthecology Field Research II. A three-day intensive short course on field location exploring various aspects of Rocky Mountain region ecological tolerances to development.

L.A. 670-3. Landscape Architecture History and Theory Seminar II. Two lect. per wk. Landscape architecture history is explored from the cradles of civilization to the present. Emphasis is placed on contemporary landscape architecture theory and design expression in seminar form.

L.A. 681-3. Rocky Mountain Planting Design Technology. Two lect. per wk. Topics include proper planting, staking, guyin, watering, soils, fertilizers, lawn seed mixtures, sodding, mulches, guarantees, types of planting stock, costs, etc.

L.A. 700-5. Landscape Architecture Design IV. This is the final design studio before the independent design practicum. The student by this course is expected to explore and refine his ability at the full integration of all design principles and related tools and techniques. The case study projects used at this level are complex and require the integration of aesthetic, political, and economic principles. Cost analysis and construction principles also are important elements of this level of design synthesis.

L.A. 701·5. Independent Design Practicum. The final semester in design is spent in the development of an independent design project of the student's choice. This is an opportunity for the student to bring together in one comprehensive project all of the relevant design tools learned by expanding the research base of a particular landscape architecture subject and demonstrating his/her hypothesis through a case study of a real problem and packaging the results.

L.A. 721-3. Professional Practice. Two lecture periods per wk. Business and professional relations, landscape architecture and its relations with government, the ASLA and other professional organizations, professional ethics, general business practices, and contracts and specifications will be covered.

L.A. 750-3. Landscape Architecture Construction II. Two studio/lect. per wk. This course is a continuation of L.A. 560. The course concentrates on methods of landscape architecture construction and the professional documents of construction-working drawings.


L.A. 790-2. Independent Design Practicum Research and Research Methods. One lect./sch. studio per wk. This class concentrates on research methods and technical writing. The student is expected to select his/her independent design practicum project and document the research during this course.

L.A. 792-1. Landscape Architecture Issues Seminar. This course meets one period a week and provides the program an opportunity to explore relevant issues of all descriptions which effect the practice of landscape architecture.

L.A. 791-3. Natural Resource Issues Seminar. Two lect. periods per wk. Renewable and non-renewable natural resource issues are explored as they pertain to man's competition for space and natural resources. The focus of real issues will be on the Rocky Mountain frontier.

URBAN AND REGIONAL PLANNING—COMMUNITY DEVELOPMENT

U.P.C.D. 500-3. Fundamentals of Planning/Community Development. A basic course in the principles of urban and regional planning and community development. Theories of planning, community organization, basic techniques, changing philosophies in modern society, and the process of shaping community form.

U.P.C.D. 510-5. Planning Communication Skills. Fundamentals of communication of the planning process in graphic, written, and spoken form. In addition to basic graphics, students are exposed to media representatives for instruction in preparing reports, press releases, television material, and public presentation in general.
U.P.C.D. 518-1. Statistics for Planners. A short course to provide an understanding of statistical theory as used in planning analysis. Students who have taken an acceptable college-level course in statistics may have this course waived.

U.P.C.D. 520-3. Planning/Community Development Methodology and Techniques I. Spring only. Teaches the basic analyses that are used in the comprehensive planning process and community development. General theoretical understandings, specific analytical methods and techniques, and available data sources are discussed in regard to economics, demography, urban activities, community and neighborhood organization, physical structures, land form, and natural features.


U.P.C.D. 530-3. Planning/Community Development Theory. Spring only. Describes and critically evaluates contemporary theories and ideologies of the planning process and planned change. Aids the student in developing individual powers of critical theoretical analysis and positions on what planning and community development is and should be.


U.P.C.D. 560-3. Housing and the Social System. Fall only. Designed to explore and define housing problems, to identify the actors and institutions that have an impact on the supply and availability of housing, to review the past and present role of the federal government in housing programs, and to acquaint the student with housing design, residential development requirements, and the role of housing in urban development.

U.P.C.D. 570-3. Development of Environmental Form. Describes and develops the basics of Principle and the history and present developments of the man-made environment. Western culture's town-planning traditions. American planning history, and selected schools of modern environmental design thought. Special attention is given to linking major traditions and trends with environmental design in the development of the Denver metropolitan area.

U.P.C.D. 580-3. Ethnicity and the City. Fall only. The purpose is to examine where minorities are spatially, culturally, socially, economically, and politically in American cities and to determine the effect these factors have on the minorities as well as on the future of society and cities.

U.P.C.D. 590-3. The Modern Metropolis. Spring only. Provides a basic background in the structure and dynamics of the modern metropolis. Includes a review of the historical background of the metropolis, analysis of its economic, social, and political components, and consideration of various interpretations of its role in modern society.

U.P.C.D. 592-3. Environmental Science. A special course devoted to reading and research in problems of the environment and the development of environmental science. Offered to students with specific interests in the environment, after arrangement with the instructor.

U.P.C.D. 600-3. Social Policy Analysis and Application. Spring only. A critical review of the evolution of national, state, and local social policies with an emphasis on current social issues and programs. Special attention is given to the application of techniques and procedures of policy analysis to community and regional systems.


U.P.C.D. 620-3. Rural and Small Town Planning. Spring only. Provides knowledge and perspective on global changes in rural areas, with particular reference to the United States. Evaluates the issues of agricultural, rural, and small town development and interrelationships with the industrialization and urbanization processes. Develops knowledge and skills in program planning for rural and small town development.

U.P.C.D. 630-3. Regional Analysis and Planning. Acquaints the student with the concept of the planning region as well as with techniques for analyzing the region. Demographic, economic, social, and historical methods are used.

U.P.C.D. 640-3. State and Regional Planning. Summer only. A seminar devoted to discussion of planning activity at the state and regional level. Focuses on the interrelationship, the effect upon local planning activity, the systems for coordination of activity, and the funneling of aid monies.

U.P.C.D. 650-3. Comparative World Planning. Fall only. Designed to expand the student's knowledge and perspective of urban and regional planning and community development situations beyond those in this country. The purpose is to provide a sense of different planning situations throughout the world, including an analysis of cultures, social and political organizations, types of urbanization, physical settings, and resource availability.

U.P.C.D. 660-3. Social Factors in Urban Design. Spring only. A review and evaluation of major theories and empirical studies dealing with the impact of social forces on the design of the physical environment. Methods of studying and defining user needs. Projects aimed at improving the harmony between social life and its physical containers.

U.P.C.D. 670-3. Humanistic Environmental Planning. Spring only. Intended to review recent literature in planning with a human scale including socio-economic, land use, building, landscape, transport, and utility systems, and to design prototype low energy-high community habitats for the 21st century. Consists of research, analysis, and the design of a community congruent with the conclusions of the research. Prereq., U.P.C.D. 570.

U.P.C.D. 672-3. Environmental Policies Planning. Fall only. A review of the basic principles of air, water, and energy systems and their planning with the purposes the environmental protection and future development of states and regions. Includes the design of an integrated policy for a major problem area in present environmental management.

U.P.C.D. 690-6. Planning Problem Solving Studio I. Spring only. Site and master plan projects aimed at expressing the student's ability to apply the knowledge and experience gained in the program to specific problems and areas of interest. Realistic planning situations. Planning research, community relations, problem identification, program development, planning, and plan evaluation.

U.P.C.D. 700-6. Planning Problem Solving Studio II. Fall only. A continuation and expansion of Studio I, dealing with more complex problems in a team format. Projects are selected to provide options to relate to individual student interest and are usually practical in that they deal with an actual community or citizen organization.

U.P.C.D. 710-3. Legal Aspects of Planning. Fall only. A review of the legal framework within which planning operates and the current trends in the courts toward land-use regulations and housing law.

U.P.C.D. 720-3. Practical Growth Management. Spring only. An examination of zoning, subdivision, growth management systems, and environmental regulations in the context of the society in which they function, and the need for planning. Students learn to read and to challenge intelligently statutes and ordinances and to help design better regulatory systems.

U.P.C.D. 730-3. Planning and Politics. Summer only. A seminar designed to expose students to the realistic political facts ever present in the planning process and to prepare individuals to deal effectively with governmental operation at all levels of their professional careers.


U.P.C.D. 740-3. Communities and the Federal System. Spring only. This seminar is directed toward exploring the expanding role played by the federal government and its programs and the effect which it has upon the local community. Federal grants-in-aid programs will be studied as well as the process for dealing with the federal bureaucracy.

U.P.C.D. 750-3. Planners and the Real World. In seminar format, the opportunity is provided for the student to come in contact with persons from the business world who are affected by planning requirements and restrictions. These include bankers, real estate brokers, developers, land subdividers, and local officials who must interpret land control provisions.

U.P.C.D. 760-3. Experiential Learning. Laboratory and internship A series of designed and programmed experiences dealing with the particular aspects of urban planning and community development with emphasis on the interpersonal, group process, and organizational dimensions, together with real life experiences in the professional arena.
College of Liberal Arts and Sciences

Division of Arts and Humanities

COMMUNICATION AND THEATRE

C.T. 140-3. Structure and Pronunciation of Standard English for Speakers of Other Languages. Practice in speaking and understanding spoken English, with attention to grammar, pronunciation, and vocabulary as well as meaning and appropriateness.

C.T. 141-3. Reading and Written Composition for Speakers of Other Languages I. Reading and beginning course in written English composition for people for whom English is a second language. Oral and written work.

C.T. 142-3. Written Composition for Speakers of Other Languages II. Second semester course. Continued work on grammar, syntax, spelling, and the mechanics of writing, but with greater focus on selection, development, and organization of material for longer connected discourse.


C.T. 202-3. Principles of Communication I. A lecture-discussion-recitation approach to communication theory and its application. Specific topics such as communication models, interpersonal communication and the concept of self, nonverbal communication, message preparation and analysis, problem solving, and decision making.

C.T. 203-3. Principles of Communication II. Further development of the principles of communication. Specific topics such as argumentation, source credibility, attitude, organization, language style, and mass communication will be expanded by both theoretical refinement and analysis of specific research studies. Prereq. C.T. 202.


C.T. 250-3. Introduction to Oral Interpretation. Examination of different theories of oral performance of literature through experimentation, discussion and performance of myth, short story, drama, the essay, biography, letters, and diaries. Each performance is designed to challenge the student's current level of competence. Suggested prereq. Engl. 120 or equivalent.

C.T. 270-3. Introduction to Theatre. Discussions, workshops, and lectures designed to discover, analyze, and evaluate all aspects of the theatre experience: scripts, acting, directing, staging, history, criticism, and theory. Playgoing and field trips to several Denver area theatres, demonstrations, and participation in live productions.

C.T. 273-2. Stage Movement. Analysis and practice of stage movement, including basic techniques in gesture and mime as related to prosenium, thrust, and arena staging.


C.T. 315-3. Group Dynamics. Analysis of the impact of small groups on individual behavior in social and task settings. Lecture, discussion, and guided experiences focus on the dynamics of small groups, including leadership, communication, roles, norms, goals, cohesion, etc.


C.T. 350-3. Oral Interpretation of Poetry. Performance and criticism of primitive poetry, concrete poetry, the ballad, the sonnet, and various modern forms. Each performance is designed to solve a particular problem.


C.T. 362-3. Television Production. Introduction to basic television production practices, techniques, facilities, and equipment, including cameras, audio equipment, lighting, films, videotape, graphics, sets, etc. Prereq. C.T. 360.

C.T. 371-3. The Film Industry (AM 371). A seminar and practicum in basic service announcement and film production. Emphasizes the opportunities in the media to get film ideas aired on TV and radio. The class will produce public service announcements and one short film in cooperation with KOA-TV and KBTV. Prereq. junior or senior standing.

C.T. 373-3. Beginning Acting. Study and workshop experience in basic techniques of stage movement and role portrayal including improvisations, psychological gesture, body and mind concentration, and vocal gesturing. Several short monologues and duets are designed to solve particular characterization problems.

C.T. 374-3. Directing. A study of the director's function in the live theatre with particular emphasis on play analysis and the relationship of creative communication existing between the director and the production team. Workshop experiences include experimental scene work for prosenium, thrust, and arena staging. Prereq. C.T. 373 or equivalent.


C.T. 390-1 to 4. Topics in Communication and Theatre. Various topics such as principles in creativity, communication and counseling, and theatre for adolescents will be offered at regular intervals.

C.T. 398-variable credit. Cooperative Education. Designed experiences involving application of specific, relevant concepts and skills in supervised employment situations. Prereq. sophomore standing and 2.5 grade-point average.


C.T. 411-3. Theories of Leadership. Examination of traditional and modern theories of leadership emergence, maintenance, and role specification. Particular attention is given to the literature on leadership in organizations and on leadership in group contexts. Covers trait theory, humanistic theories, contingency theories, and others.

C.T. 415-3. Group Communication Theory. Observation and analysis of group processes and leadership roles and functions from the viewpoint of modern communication theory. Emphasizes both humanistic and human growth oriented theories of group communication and strict empiricist interpretations of group process. Prereq. C.T. 315 or consent of instructor.


C.T. 420-3. Persuasion. Examination of influence and communication at individual, group, organizational, and societal levels. A theoretical and applied analysis of persuasion includes examination of
public opinion, individual attitudes, beliefs, values, credibility, and certain message and audience variables. Attention is directed at the ethics and effects of persuasive appeals. Prer., C.T. 202.

C.T. 421-3. Psychology of Communication. Examination of psychological factors affecting communication exchange, including perception, formation of meaning, languages, linguistic patterns, social influence, socialization, attitude formation, and others. Attention is also directed at animal-human language behavior and other areas. Prer., C.T. 202.

C.T. 422-3. Information Analysis. Analysis of complex systems such as organizations, with theoretic and applied information exchange and decision-making tools. Study of the applications and misapplications of the mathematical theory of communication. Prer., consent of instructor.


C.T. 428-3. Communication of Directed Change. Examination of the communication process underlying the diffusion of new ideas, processes, or things, A theoretic and applied analysis of social, ecological, and environmental changes.


C.T. 433-3. Teaching With Group Methods. The study of group forces, potentials, and the teacher's role in creating effective learning groups.

C.T. 435-3. Creative Dramatics. The study of creativity, its role and application in dramatics, and the manner in which creative dramatics assist in the growth and development of children and youth.


C.T. 441-3. Teaching Standard English to Speakers of Other Languages or Dialects. Comprehensive overview of the principles and techniques necessary to a broad-based audiolingual-cognitive approach to language teaching. Prer., C.T. 440 or consent of instructor.


C.T. 461-3. Theatre for Children. A study of the processes involved in creating substantial theatre for children, including an examination of various sources for dramatizing children's stories, fairy tales, poems, and existing scripts. This course includes a full production of a child's play to be performed by members of the class before audiences of children. Prer., C.T. 270 or consent of instructor.

C.T. 465-3 to 4. Television in Education. (L.M. 507) Utilization of television at all levels of education. Theory and practice in defining needs, identifying alternative solutions, producing materials, and evaluating results. Fourth credit hour requires comprehensive project design. Prer., C.T. 360 or consent of instructor.

C.T. 470-3. American Theatre History. An investigation of American theatres, methods of presentation, audiences, acting, and economics from 1700 to the present, emphasizing contemporary practices and values as a way of understanding and appreciating the place of theatre in this country as it has evolved and developed. Prer., C.T. 270 or C.T. 478 or consent of instructor.

C.T. 473-3. Advanced Acting. Structured improvisations and fully prepared scene studies leading to advanced work in characterization. Methods of discovering and utilizing the range of creative potential in play scripts will receive particular emphasis. Prer., C.T. 373.

C.T. 475-3. Playwriting: The Short Form. Writing workshop in one-act plays with special emphasis on the demands of production: space, acting, staging conventions and techniques. Prer., consent of instructor.

C.T. 478-3. Drama Theory. Examination of critical and theoretical ideas from Aristotle to the present with special emphasis on the development of each student's own evaluative criteria.

C.T. 479-0 to 4. Theatre Practice. Participation in any one of a variety of capacities in the discipline's production program; acting, directing, technical theatre, publicity, management, etc. Prer., consent of instructor.


C.T. 527-3. Intercultural Communication. An examination of the philosophy, process, problems, and potentials unique to communication across cultural boundaries. Implications for personal and social innovation. Comparative study of communication customs in selected cultures. Not open to students who have had C.T. 427.

C.T. 528-3. Communication of Directed Change. Examination of the communication process underlying the diffusion of innovations. The course provides a bridge between theory and application in the study of directed change. Not open to students who have had C.T. 428.

C.T. 530-2. Perspective in Communication Education. A study of the history and philosophy of communication and theatre education with an emphasis on contemporary trends.

C.T. 539-Variable credit. Problems in Communication Education. Opportunity for students to explore, upon consultation with the instructor, areas in communication and theatre education with undergraduate standards.

1 Students enrolled at the 500 level may expect additional work and evaluation commensurate with graduate standards.

C.T. 541-3. Teaching Standard English to Speakers of Other Languages and Dialects I. An in-depth consideration of the teaching of reading and writing in English as a second language or dialect. Concern will be given to the development of "coordinate" bilingualism/biculturalism as a desirable goal in second-language acquisition. Prer., C.T. 441 or consent of instructor.

C.T. 546-3. Languages in Contrast. A general examination of the theories and theorists concerned with universals in human language leading to a detailed inquiry into certain phonological and morphosyntactic differences among language varieties.


C.T. 549-variable credit. Problems in English as a Second Language.


C.T. 561-3. Theatre for Children. A study of the processes involved in creating substantial theatre for children, including an examination of various sources for dramatizing children's stories, fairy tales, poems, and other material. Includes a full production of a children's play to be performed by members of the class before audiences of children. Prer., C.T. 270 or consent of instructor.

C.T. 565-3 to 4. Television in Education. Utilization of television at all levels of education. Theory and practice in defining needs, identifying alternative solutions, producing materials, and evaluating results. Fourth credit hour requires comprehensive project design. Prer., C.T. 360 or consent of instructor.

C.T. 569-variable credit. Problems in 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 offerings will not allow. Prer., consent of instructor.

C.T. 570-3. American Theatre History. An investigation of American theatres, methods of presentation, audiences, actors, acting, and economics from 1700 to the present, emphasizing perception of contemporary practice and values as a way of understanding and appreciating the place of theatre in this country as it has evolved and developed. Prer., C.T. 270 or C.T. 478 or consent of instructor.


C.T. 576-3. Drama Theory. Examination of critical and theoretical ideas from Aristotle to the present with special emphasis on the development of each student's own evaluative criteria.

C.T. 580-3. Theatre: Historical Perspectives. An investigation of theatres, methods of presentation, audiences, actors, and acting from primitive times to the present, emphasizing perception of contemporary practice and values as a way of understanding and appreciating the place of theatre in historical contexts. Prer., C.T. 270 or C.T. 478 or consent of instructor.

C.T. 601-3. Introduction to Graduate Work in Communication. Intended to familiarize students with the philosophical, ideological, and methodological bases of study in communication. Required of all departmental graduate students.

C.T. 604-3. Departmental Research Seminar. Devoted to the study, analysis, and actual instrumentation and experimentation in contemporary, on-going research projects undertaken by various faculty members. Students will actually participate in hypothesis formation, testing, and interpretation.

C.T. 606-3. Management Communication Systems. (P. Ad. 606.) The responsibilities of complex public agencies in maintaining effective communication systems both internal and external; the nature of the systems and problem areas.

C.T. 609-1 to 4. Field Problems in Communication. Analysis, observation, and field experience involving communication problems in organizations such as service, labor, industry, military, and the like. Prer., consent of instructor.

C.T. 615-3. Seminar: Group Methods. Critical examination of contemporary theory and research in small group behavior. Selected topics may include structure, leadership, power, conflict, decision making, and various applications. Prer., C.T. 315 or equivalent or consent of instructor.

C.T. 619-variable credit. Problems in Communication. Opportunity for students to explore, upon consultation with the instructor, areas in communication which normal sequence of offerings will not allow. Prer., consent of instructor.


C.T. 628-3. Seminar: Argumentation. A study of philosophical and rhetorical perspective on argument plus various applications of argumentative strategies—e.g., legal, political, scientific, etc.


C.T. 631-3. Teaching Communication in College. The application of communication concepts and principles to the teaching-learning process at the college level. Current educational literature on curriculum development, course construction, use of objectives, tests and measurements, nonprint media utilization, teaching styles, and course and teacher evaluation techniques will be examined.

C.T. 650-2. Background Studies for Oral Interpretation. Study of the history and development of different forms and methods of oral presentation of materials from the time of the Greek rhapsode to the present. Prer., consent of instructor.

C.T. 651-1. Recital. Open only to students completing graduate degrees in communication and theatre at the University of Colorado. Open for the fall term only.


C.T. 702-3. Critical Research Methods. To define and explore a variety of approaches to criticism, to explore their suitability for particular research problems, and to study problems in doing critical research. Required of all departmental graduate students working toward the doctorate. Prer., C.T. 601, or consent of instructor.

C.T. 703-3. Critical Research Methods. Fundamentals of scientific philosophy, research design, and statistical analysis. Required of all departmental graduate students working toward the doctorate. Prer., C.T. 601 or consent of instructor.


C.T. 730-3. Scholarship in Communication. Intensive criticism and review of a scholarly essay or a research report with the aim of publishing the paper. Discussion of selected topics related to the publication of scholarly work. Prer., C.T. 702 and 703 or consent of instructor.

C.T. 800-0 to 8. Doctor's Thesis.

C.T. 940-variable credit. Independent Study (Undergraduate). Prer., written consent of supervising instructor.
C.T. 950-variable credit. Independent Study (Graduate). Prer., written consent of supervising instructor.
C.T. 960-variable credit. Independent Study (Graduate). Prer., written consent of supervising instructor.

COMMUNICATION DISORDERS AND SPEECH SCIENCE


C.D.S.S. 435-2. Introduction to Language and Learning Disabilities. An orientation to the field of language and learning disorders as found in preschool, elementary, and secondary children. Diagnostic and remedial techniques and treatment programs will be surveyed.
Films, case studies, guest speakers, and field trips will provide a comprehensive view of the field.

C.D.S.S. 520-3. Psycholinguistics and Language Behavior. An introduction to psycholinguistic theories and their relationship to both linguistic production and comprehension strategies. Psycholinguistic issues relevant to child language acquisition and adult language models will be discussed.


C.D.S.S. 530-3. Communication and Learning Problems in Exceptional Children. The interrelationships among cognitive, social, and linguistic development in normal children and children with communication problems are presented. Both spoken and written language are considered. Prer., C.D.S.S. 301/401 or consent of instructor.

C.D.S.S. 531-3. Language Disorders in the Very Young Child. Psycholinguistic, neurophysiologic, genetic, and sociolinguistic aspects of language disorders in children from birth through five years. Diagnostic and remedial approaches employed in language disorders associated with neurologic dysfunction, congenital structural and genetic anomalies, hearing impairment, and emotional disturbance will be discussed. Prer., C.D.S.S. 301/401 or consent of instructor.

C.D.S.S. 532-3. Language Disorders in the School-Age Child. Advanced study of the methods and procedures used in the appraisal and remediation of disorders of language in the school-age child. Prer., C.D.S.S. 301/401 or consent of instructor.


C.D.S.S. 605-1-4. Problems in Communication Disorders and Speech Science. Opportunity for students to explore, upon consultation with instructor, areas in speech, hearing, or phonetics which the normal sequence of offerings will not allow.


C.D.S.S. 658-1 to 3. Practicum I: Speech Pathology Remediation. Supervised clinical practice in the management of speech and language disorders after training at the observational level. Prer., C.D.S.S. 657 or consent of instructor.


C.D.S.S. 689-1 to 4. Departmental Research Seminar. Participation in ongoing research projects of faculty members.


C.D.S.S. 795-2-4. Practicum III: Clinical Supervision. The doctoral student obtains supervised experience in the supervision of personnel providing services within a clinical setting.


C.D.S.S. 797-1-2. Practicum V: Research Coordination. The

1Prerequisites to some C.D.S.S. courses are offered through the University of Colorado at Boulder and at MSC (Denver). Consult the Boulder and MSC catalogs for course descriptions.
doctoral student assists in the coordination of departmental research.

C.D.S.S. 798-1-2. Practicum VI: Classroom Instruction. This internship provides doctoral students the supervised experience of teaching at the college level. Students are assigned specific units of courses within the curriculum of the department under the direction of the faculty member in charge of the course.


C.D.S.S. 940-1 to 3. Independent Study. (Advanced Undergraduate.)

C.D.S.S. 950-1 to 4. Independent Study. (Graduate.)

C.D.S.S. 960-1 to 4. Independent Study. (Advanced Graduate.)

COMPARATIVE LITERATURE


C.L. 448-3. Contemporary Literature.

C.L. 466-3. Themes, Motifs, and Characters.

C.L. 473-3. Philosophy and Literature. (Phil. 473.)


ENGLISH

Engl. 101/102-3. Beginning Composition. Students are placed in 101 or 102 after diagnostic testing during the first week of classes to determine their writing needs.


Engl. 120-3. Introduction to Fiction. Reading and analysis of short stories and novels.

Engl. 130-3. Introduction to Drama and Poetry. Reading and analysis of plays and poems.


Engl. 200-3. Advanced Composition. Prereq. Engl. 102 or 103 or consent of instructor.


Engl. 225-3. Introduction to Film. Demonstrating the grammar of film and the means by which films create effect: camera work, editing, acting, sound, and theme in the films of Chaplin, Griffith, Murnau, Hitchcock, Ford, Riefenstahl, Godard, and others.


Engl. 259-3. Great Books II. From Plato through the 17th century; selected dialogues of Plato, the Aeneid, the Inferno, and a few works by other writers.


Engl. 265-3. American Literature I. Survey of the literature from its beginnings until the Civil War.

Engl. 266-3. American Literature II. Survey of the literature from the Civil War to the present. Continuation of Engl. 265.

Engl. 274-3. The American Writer and the Black Man. Reading and analysis of significant literary works by black or white American writers treating black Americans.


Engl. 290-294/390-394-3. Topics in Literature. Topics such as the following will be offered at regular intervals: modern writer in a godless world, the Romantic hero, American wit and humor, classical mythology, science fiction, women in literature, opera as drama.

Note: Before taking any 300-level course in English, a student must have earned 24 semester hours of college credit.

Engl. 300-3. Critical Writing. Criticism of novels, poems, and plays; emphasis on written work.


Engl. 315-3. History of Film I. Survey of film from the beginnings until 1941, examining how the essential techniques of film were mastered: script, editing, acting; laboratory work, introduction of sound; films of merit and interest by makers like Melies, Griffith, Chaplin, Keaton, Eisenstein, Pudovkin, Murnau, Lang, Dreyer, Pudovkin, Welles.

Engl. 317-3. History of Film II. Survey of film from 1941 to the present. Examination of films as personal reflections of the interest of creators; trends in Welles, Reed, Ford, Hawks, Rossellini, Kurosawa, Bergman.


Engl. 318-3. Writing Topics. Individual papers based on upper division courses from the arts and humanities, natural and physical sciences, and social sciences. For writing program majors only. May be repeated for up to 9 hours credit.

Engl. 366. Shakespeare I (Up to 1601). A survey of Shakespeare's major works. Covers the period up to 1601 and deals primarily with histories and comedies. Some attention will be paid to historical context.

Engl. 367. Shakespeare II (From 1601 to 1613). A survey of Shakespeare's major works. Covers the period from 1601-1613 and deals primarily with tragedies and romances.


Engl. 398-variable credit. Cooperative Education. Designed experiences involving application of specific, relevant concepts and skills in supervised employment situations. Prereq. Sophomore standing and 2.5 grade-point average.


Note: Before taking any 400-level course in English a student must have earned 36 semester hours of college credit.


Engl. 430-3. Development of British Drama I. From the beginnings through the Restoration.

Engl. 431-3. Development of British Drama II. From 1700 to the

1Prerequisites to some C.D.S.S. courses are offered through the University of Colorado at Boulder and at MSC (Denver). Consult the Boulder and MSC catalogs for course descriptions.
present. Continuation of Engl. 430.


Engl. 446-3. Recent World Literature. Survey of important works and trends in poetry, drama, and fiction since World War II.

Engl. 450-3. Medieval Literature. Selections read in modern English representative of the left and thought of the Middle Ages (up to 1500).

Engl. 452-3. The English Renaissance. Selected works from the 16th and 17th centuries.


Engl. 458-3. The Victorian Age. Main currents of Victorian thought in prose and poetry, 1830-1890.

Engl. 460-3. Modern British and Irish Literature. Chronological survey of the period 1890 to World War II.

Engl. 465-3. Readings in American Literature. Offers a variety of limited special topics which fall outside the other American literature offerings for example, experimental forms in American literature. Offered on an irregular basis.

Engl. 476-3. Contemporary Chicano Literature. (M.Am. 476.)


Engl. 481-3. Literature for Adolescents. (T.Ed. 444.) Reading and evaluating books for junior and senior high school pupils. Attention is given to sources of information about books and criteria for selection, as well as to the writers.


Engl. 497-3. Topics in American and British Literature. Courses such as the following will be offered at regular intervals: Regional Literature—the Frontier; Satire; Comedy; Tragedy. Open to English majors only, except with consent of the instructor.

Engl. 498-3. Major American and British Authors. Intensive study of works of one major British or American author. Open to English majors only, except with consent of instructor.


Engl. 552-3. Continental Renaissance and 17th-Century Literature.1

Engl. 556-3. Readings in American Literature. Extensive reading in the history of American literature as basis for graduate major or minor in the field. Emphasis on bibliographies and critical works. Independent study and research, paper or papers required.


Engl. 581-3. History of Rhetoric in Literature. A study of the art of rhetoric from the theorists: Greeks, Romans, Medieval, Renaissance, 18th century; and the analyses of practice in English from Chaucer through Thomas Jefferson and John F. Kennedy.

Engl. 585-3. History of the English Language. Additional class meetings to be arranged for graduate students.


Engl. 589-3. Semantics. Additional class meetings to be arranged for graduate students.

Engl. 600 to 609-3. Studies in Major Authors. Intensive study of works of one major British or American author for a given semester to be specified in Schedule of Courses.

Engl. 610-619-3. Special Topics. Intensive study of specialized topics in English and American literature. Specific topics will be announced each year in Schedule of Courses.


Engl. 652-3. The 16th Century. Selected prose and nondramatic poetry from Skelton and More through Shakespeare and his contemporaries.


Engl. 682-3. Middle English. Reading of literary selections from Middle English with much detail of English words and sounds to account for present usages.


Engl. 800-4 to 9 (16 to 24 maximum). Doctor's Thesis.

Engl. 940-variable credit. Independent Study (Undergraduate).

Engl. 950-variable credit. Independent Study (Graduate). Independent investigation of topics of specific interest to individual students. Students wishing to enroll must petition the director of graduate studies prior to the beginning of the semester.

Engl. 960-variable credit. Independent Study. Independent investigation of topics of specific interest to individual students. Students wishing to enroll must petition the director of graduate studies prior to the beginning of the semester.

FINE ARTS

Fine Arts 100-3. Basic Drawing. Exploration of drawing approaches and media.


1Students enrolled at the 500 level may expect additional work and evaluation commensurate with graduate standards.

Fine Arts 202·3. Visual Studies. Studio course designed to introduce to the student the realm of visual thinking while solving the problem of making a visual statement.

Life Drawing

Fine Arts 300·3. First-Year Life Drawing and Composition. Problems in drawing from life; exploring the possibilities in pictorial design and composition. May be repeated.

Fine Arts 400·3. Advanced Drawing. Problems in drawing with emphasis on individual development. Prer., 6 hours Fine Arts 300. May be repeated.


Fine Arts 520/521·3. Graduate Painting. Expressive pictorial problems involving varied subject matter and painting media with an emphasis on individual development.

Printmaking

Fine Arts 340·3. First-Year Printmaking. Introduction to intaglio and relief printing, including metal engraving and etching, and woodcut. May be repeated.


Fine Arts 342·3. Silk Screen (Serigraphy). Silk screen techniques as they relate to fine art prints. May be repeated.

Painting

Fine Arts 320·3. First-Year Painting. Basic investigation of the materials of the painter and their use in expressing ideas. May be repeated.

Fine Arts 420·3. Second-Year Painting. Expressive pictorial problems involving varied subject matter and painting media, with emphasis on individual development. Prer., Fine Arts 320 or equivalent. May be repeated.

Sculpture


Design

Fine Arts 315·3. First-Year Photography I. Using lecture as an introduction to history, technique, and concepts of photography as it relates to the fine arts. Emphasis on photography as a means to a formal and expressive end. Students must have access to a camera.

Fine Arts 316·2. Graphic Design. Problems in advertising illustration and design.


Fine Arts 363·3. Film Making. Studio course designed to acquaint students with the basic visual and aesthetic elements of film through actual shooting, editing, and discussion. All work is in 8 or super 8mm. with student's own or rented camera.

Fine Arts 402·3. Movement-Performance in Fine Art. Studio course designed to present the possibility of movement-performance to the fine arts/humanities student as a form for self-exploration and expression. May be repeated.


Fine Arts 418·3. Creativity and Problem Solving. Exploration of the process of problem solving through the means fundamental to all artistic endeavors, i.e., making and doing. May be repeated.

Fine Arts 419·3. Second-Year Photography II. Continuation of Fine Arts 415.

Art History

Note: Not all art history courses are offered every year. Check current Schedule of Courses.

Fine Arts 180·3. History of Art I (Survey). History of art of all ages, reflecting the various cultures of mankind from cave paintings to the Renaissance.

Fine Arts 181·3. History of Art II (Survey). History of art of all ages, reflecting the various cultures of mankind from the Renaissance to the present.

Fine Arts 470·3. Primitive Art. (African and Pacific areas.) Native arts of various African peoples as well as those of the major island groups of the Pacific area.

Fine Arts 471·3. Pre-Columbian Art. Architecture, sculpture, painting of the high cultures of Meso-America and the Andean area before the Spanish conquest.


Fine Arts 476·3. Pre-Classical Art and Archaeology. Greece and Crete from the neolithic period to the end of the Mycenaean world.

Fine Arts 477·3. Classical Art and Archaeology. Greek art and archaeology from the end of the Mycenaean world through the Hellenistic era.


Fine Arts 488·3. American Art II. Study of American art and architecture from the 19th century to the present.


Fine Arts 490·3. Origins of Modern Art II. History of European movements of the late 19th century from Realism through Post-Impressionism.


Fine Arts 493·3. Modern Art II. A survey of major trends in painting and sculpture from Surrealism to the present (1924-).

Fine Arts 498·3. Topics in Art. Designed to accommodate a variety of subjects in the area of art history which are not normally covered in art history courses. Check current Schedule of Courses for specific topic descriptions.

Fine Arts 570·3. Primitive Art I. (African and Pacific areas.) Native arts of various African peoples as well as those of the major island groups of the Pacific area.

Fine Arts 571·3. Pre-Columbian Art. Architecture, sculpture, painting of the high cultures of Meso-America and the Andean area before the Spanish conquest.


Fine Arts 576·3. Pre-Classical Art and Archaeology. Greece and Crete from the neolithic period to the end of the Mycenaean world.

Fine Arts 577·3. Classical Art and Archaeology. Greek art and archaeology from the end of the Mycenaean world through the Hellenistic era.


Fine Arts 588·3. American Art II. Study of American art and architecture from the 19th century to the present.


Fine Arts 590·3. Origins of Modern Art II. History of European movements of the late 19th century from Realism through Post-Impressionism.


Fine Arts 593·3. Modern Art II. A survey of major trends in painting and sculpture from Surrealism to the present (1924-).

Independent Study and Seminar

Fine Arts 398·variable credit. Cooperative Education. Designed experiences involving application of specific, relevant concepts and skills in supervised employment situations. Prer., sophomore standing and 2.5 grade-point average.
FRENCH


French 496-3. Art Seminar. For fine arts majors, undergraduate and graduate. Course based on an exchange of ideas basic to the student's own creative work, and to contemporary philosophies and tendencies in the field. Prer., 12 hours of basic art courses or equivalent. Fine Arts 180-181, or consent of instructor. May be repeated once with consent of instructor.


French 596-3. Art Seminar. Presented concurrently with Fine Arts 496, this course is for advanced fine arts majors and other graduate students who wish to explore the contemporary philosophies and tendencies in the field of fine arts. Prer., consent of instructor.

French 930, 940-variable credit. (Undergraduate). Individual projects or studies assigned by the major professor. To be arranged.

GERMAN

Intensive German (German 101-5, Sect. 1; German 102-5, Sect. 1). These two sections together comprise a 10-hour, one-semester course enabling the student to complete the foreign language requirement in one year. Offered fall semesters only.

German 101-5. Beginning German I. Introduction to basic grammar, sentence structure, and speech patterns. German 102-5. Beginning German II. Continuation of German 101. Prer., German 101 or one year of high school German.

German 201-3. Intermediate German. Expansion of grammar and vocabulary, reading and written work. Prer., German 102 or two years of high school German.

Prer., German 101 or two years of high school German.

German 202-3. Conversation and Culture. Prer., German 102 or two years of high school German.

German 221-3. Reading and Translation. Emphasis on techniques of reading. Conducted in German.

German 301-3. Advanced Conversation and Grammar. Emphasis on developing conversational ability with more complicated idiomatic and structural elements. Reading normally from contemporary periodicals, newspapers, and literature. Prer., German 202 or consent of instructor.

Prer., German 201 or two years of high school German.

Prer., German 102 or two years of high school German.

German 302-3. Advanced Conversation and Composition. Continuation of German 301. Prer., consent of instructor.

German 305-3. French Composition I. Prer., French 201 and 202, or 211 and 212, or consent of instructor.

Prer., French 201 and 202, or 211 and 212, or consent of instructor.

Prer., French 201 and 202, or 211 and 212, or consent of instructor.

French 355-2. Main Currents of French Literature I. Prer., French 211 and 212 or consent of instructor.

Prer., French 211 and 212 or consent of instructor.

Prer., French 211 and 212 or consent of instructor.

French 320-3. La France d'aujourd'hui. Readings and discussion in French of 20th-century French culture. Prer., French 211 and 212 or consent of instructor.

Prer., French 211 and 212 or consent of instructor.

Prer., French 211 and 212 or consent of instructor.

French 390-3. Topics in French Literature in English. See French 290.


French 496-3. Methods of Teaching Modern Languages. Methodology of teaching French, German, and Spanish in an urban setting; required for secondary language teachers wishing to be certified through the Initial Certification Program of the School of Education. Prer., language proficiency interview and upper-division standing.


German 411-3. Issues and Currents in Modern German Literature. The topic focus will vary concentrating on a given theme or problem area in the 20th century (e.g., Modern Transformations of the Faust Figure, the Modern Drama of Revolution, the "New Man" of Expressionism, etc.). Conducted in German. Prer., at least one third-level literature course in German.

German 412-3. Issues and Currents in 18th- and 19th-Century German Literature. Format similar to German 411. Topical focus varies with each offering (e.g., the Symbolism of Goethe's Poetry, the Fairy-Tale Pattern, the Romantic Tale, Schiller's Aesthetics in Theory and Drama, etc.). Conducted in German. Prer., at least one third-level literature course in German.

German Area Studies in English Translation

German 381-3. German Literature in Translation I. Course will focus on in-depth reading of two or three German authors, primarily from the 18th and 19th centuries, such as Goethe, Schiller, Klopstock, and Kleist. Conducted in English with texts in English translation. German major credit may be obtained if some of the work (to be specified by the instructor) is done in German.

German 382-3. German Literature in Translation II. In-depth study of two or three authors from the late 19th and 20th centuries, such as Hauptmann, Mann, Hesse, Grass, Brecht, and Kafka. Conducted in English with texts in English translation. German major credit may be obtained if some of the work (to be specified by the instructor) is done in German.

German 423-3. German Civilization I: From Medieval Through Age of Idealism. Selected highlights of major cultural aspects of the high Middle Ages, the Reformation, the Enlightenment, and the Age of Idealism. Conducted in English with texts in English translation. German major credit may be obtained if some of the work (to be specified by the instructor) is done in German.

German 424-3. German Civilization II: The Modern Age. Selected highlights of major cultural aspects of the later 19th century, the Wilhelminian period, the Weimar Republic, the Third Reich, and the period since 1945. Conducted in English with texts in English translation. German major credit may be obtained if some of the work (to be specified by the instructor) is done in German.

German 494-3. Seminar: Literature and the Visual Arts. Interdisciplinary, team-taught course with fine arts department. Topical focus varies with each offering. Investigation of literature and painting, sculpture, architecture within a given period or movement (e.g., romanticism, symbolism, surrealism, etc.).

German 496-3. Methods of Teaching German. Team-taught course with Spanish and French. Required of all those wishing certification for secondary-level teaching in German. Covers methods, techniques, aids in language teaching. Separate sessions for each language area.

PHILOSOPHY

Phil. 100-3. Introduction to Philosophy. Phil. 115-3. Ethics. Introductory study of major philosophies on the nature of the good of man, principles of evaluation, and moral choice. Phil. 128-3. Philosophy and Society. Systematic discussion and analysis of the philosophic ideas of community, freedom, political power, the nature and role of violence, etc., together with the challenge of war, poverty, and racism to contemporary culture.

Phil. 130-3. Philosophy and the Physical World. An introduction to philosophy through the consideration of topics and problems related to the physical and biological sciences such as freedom and determinism; mind-body problem; social intelligence; current theories of the universe, space, time, matter, energy, causality, etc.


Phil. 160-3. Philosophy and Religion. An introduction to philosophy through problems of religion, such as the existence of God, faith and reason, religious language, etc.

Phil. 170-3. Philosophy and the Arts. Consideration of philosophic questions involved in the analysis and assessment of artistic experiences and of the objects with which the arts, including the literary arts, are concerned.

Phil. 220-3. Classical Social Theories. Introductory study of major philosophies of the past in relation to political, economic, and social issues.

Phil. 221-3. Modern Social Theories. Present social issues, together with theoretical analyses by communist, fascist, and democratic thinkers.


Phil. 315-3. Ethical Theory. Selected problems in classical and contemporary ethical theory.

Phil. 316-3. Medical Ethics. The application of ethical theory to problems in the health sciences.

Phil. 320-3. Social and Political Philosophy. A nonhistorical, systematic treatment of basic issues in social and political philosophy, with reference to theories of being, knowledge, and human nature.


Phil. 370-3. Aesthetic Theory. Introduction to major theories of aesthetics and contemporary discussion of problems in aesthetics; i.e., the nature of art, the problem of evaluations in art.


Phil. 398-variable credit. Cooperative Education. Designed experiences involving application of specific, relevant concepts and skills in supervised employment situations. Prer., sophomore standing and 2.5 grade-point average.


Phil. 426-3. Philosophy of Law. Consideration of various views of the nature of law, its role in society, and its relation to other disciplines. Investigation of philosophic commitments which underlie and affect legal conceptions and procedures. No prer.

Phil. 427-3. Philosophy of History. Contemporary issues in critical and speculative theory of history, including the problems of methodology, explanation, values, and the relationship between history and social philosophy.

Phil. 430-3. Philosophy of Mind. Consideration of the problems in the philosophy of mind, including the mind-body problem, the problem of our knowledge of other minds, the compatibility of free will and determinism, etc., and discussion of such concepts as action, intention, motive, desire, enjoyment, memory, imagination, dreaming, self-knowledge, etc.

Phil. 443-3. Logical Theory. Prer., Phil. 144 or 344, or consent of instructor.

Phil. 444-3. Intermediate Symbolic (Mathematical) Logic. Prer., Phil. 344 or consent of instructor.
Phil. 446-3. Theories of Human Nature.
Phil. 473-3. Philosophy and Literature.
Phil. 493-3. Existentialist Philosophies.
Phil. 496-3. Senior Major Colloquium.
Phil. 498-3. Special Topics in Philosophy.

Note: All courses at the 500 level carry the following prerequisites unless otherwise indicated: 12 hours of philosophy or consent of instructor.

Phil. 500-3. Medieval Philosophy.
Phil. 501-3. Renaissance Philosophy.
Phil. 508-3. Ethics. Representative positions in normative ethics and meta-ethics.
Phil. 510-2. Topics in the History of Philosophy.
Phil. 524-3. Philosophical Problems and Contemporary Culture. Issues and controversies in contemporary culture, their relation to modern theories of society, and their manifestations in the arts, science and technology, education religion, and ethics. No prer.
Phil. 530-3. Philosophy of Mind. Consideration of the problems in the philosophy of mind, including the mind-body problem, the problem of our knowledge of other minds, the compatibility of free will and determinism, etc., and discussion of such concepts as action, intention, motive, desire, enjoyment, memory, imagination, dreaming, self-knowledge, etc.
Phil. 534-3. Epistemology.
Phil. 538-3. Metaphysics.
Phil. 542-3. Philosophy of Science. Topics connected with development and nature of science; structure of scientific theories, testing of hypotheses. Theory of decisions in science and ethics. Basic conceptions and models of abstraction in history of science.
Phil. 570-3. Aesthetics. An analysis of the principal topics of aesthetics, including such issues as formal structure of aesthetics, the nature of critical judgments, and the status of the work of art.
Phil. 575-3. Introduction to Phenomenology. An examination of the contribution of phenomenology to selected topics in the theory of meaning, philosophy of mind, ontology, epistemology, through a study of such philosophers as Husserl, Heidegger, Sartre, and Merleau-Ponty.
Phil. 580-3. Philosophy of Plato.
Phil. 581-3. Philosophy of Aristotle.
Phil. 582-3. Philosophy of Hume.
Phil. 583-3. Philosophy of Kant.
Phil. 584-3. Philosophy of Spinoza.
Phil. 585-3. Philosophy of Dewey.
Phil. 586-3. Philosophy of Wittgenstein.
Phil. 587-3. Philosophy of Russell-Moore.
Phil. 589-3. Philosophy of Hegel.
Phil. 590-3. Philosophy of Whitehead.
Phil. 591-3. Philosophy of St. Thomas.
Phil. 592-3. Philosophy of Husserl.
Phil. 594-3. Topics in Recent Philosophy.
Phil. 597-3. Seminar: Comparative Philosophy. A seminar in the problems and literature of relating non-Western philosophical methods, traditions, and results to Western equivalents or para-equivalents. Required of master’s degree candidates in comparative philosophy.
Phil. 598-3. Special Topics in Philosophy. Seminars not listed as courses in which the instructor meets regularly with three or more students to discuss special topics in philosophy.
Phil. 600-3. Seminar: Ethics.
Phil. 646-3. Seminar: Phenomenology. Intensive study of one or more topics or philosophers in the 20th-century phenomenological movement.
Phil. 662-3. Studies in Political Philosophy. A study of selected texts in political philosophy as guides to formulating the principal problems in the area and to establishing the distinctive features of political realities.

Phil. 700-4 to 6. Master’s Thesis.
Phil. 940-3. Independent Study (Undergraduate).
Phil. 950-variable credit. Independent Study (Graduate).

SPANISH

Intensive Spanish (Spanish 101-5, Sect. 1, Spanish 102-5, Sect. 1). These two sections together comprise a 10-hour, one-semester course. Offered during the summer term only.

Spanish 101-5. Beginning Spanish I.
Spanish 102-5. Beginning Spanish II. Prer., Spanish 101 or placement.
Spanish 301-3. Pronunciation, Diction, and Conversation. Prer., Spanish 212 or consent of instructor.
Spanish 302-3. Conversation and Oral Composition. Prer., Spanish 301 or consent of instructor.
Spanish 304-2. Workshop in Southwest Spanish. Prer., Spanish 303 or consent of instructor.
Spanish 311-3. Latin America: A Tradition of Conflict. Spanish 311 is an equivalent in English or Spanish 321, for non-major credit, requiring no knowledge of Spanish. Both courses are based on an interdisciplinary approach to Latin America. No prer., may be applied to the humanities requirement in the College of Liberal Arts and Sciences.
Spanish 314-3. Introduction to the Study of Literature. Prer., Spanish 212 or consent of instructor.
Spanish 332-3. Nineteenth-Century Spanish Literature. Prer., Spanish 314 previously or concurrently or consent of instructor.
Spanish 333-3. Spanish Literature: Middle Ages Through Golden Ages. Prer., Spanish 314 and 6 hours of literature at the 300 level or consent of instructor.
Spanish 335-3. Spanish American Literature to the 20th Century. Prer., Spanish 314 previously or concurrently, or consent of instructor.
Spanish 355-3. Spanish American Short Story. Prer., Spanish 314 previously or concurrently, or consent of instructor.
Spanish 357-3. Spanish American Poetry. Prer., Spanish 314 previously or concurrently, or consent of instructor.
Spanish 362-3. Don Quixote in English. Spanish 362 is for non-major credit and does not require a knowledge of Spanish. It may be applied to the humanities requirement in the College of Liberal Arts and Sciences. No prer.
Spanish 391-3. Topics in Spanish Literature. Prer., Spanish 314 or consent of instructor.
Spanish 398-variable credit. Cooperative Education. Designed experiences involving application of specific, relevant concepts and skills in supervised employment situations. Prer., sophomore standing and 2.5 grade-point average.
Spanish 401-3. Advanced Rhetoric and Composition I. Prer., Spanish 401 or consent of instructor.
Spanish 402-3. Advanced Rhetoric and Composition II. Prer., Spanish 401 or consent of instructor.

1 Students enrolled at the 500 level may expect additional work and evaluation commensurate with graduate standards.
Spanish 432-3. Spanish Literature Since the Spanish Civil War.
Spanish 452-3. Golden Age Drama.
Spanish 462-Don Quijote.

Note: At present UCD offers no Spanish courses above 599. The courses at the 500 level are applicable to an M.A. degree in Spanish from the University of Colorado at Boulder and to a Master of Humanities degree from the Denver Campus, depending upon degree plan approval by the appropriate graduate adviser. The following graduate-level courses are offered:

Spanish 532-3. Spanish Literature Since the Spanish Civil War. 
Spanish 552-3. Golden Age Drama. 
Spanish 562-3. Don Quijote. 
Spanish 940-1 to 3. Independent Study (Undergraduate). 
Spanish 950-1 to 3. Independent Study (Graduate).

Division of Natural and Physical Sciences

BIOLOGY

Biol. 133-1. Topics in Biology. Five-week courses dealing with topics in biology. See Schedule of Courses for current topics. For nonscience majors to fulfill the natural science requirements.

Biol. 204-4. General Biology I. Lec., lab. Study of structure and function of living systems-macromolecules, cells, energetics, inheritance, and development.


Biol. 310-3. Plant Science. In-depth study of the angiosperms (flowering plants) including embryology, structure, function, ecology, and evolution of the group. Emphasis is placed upon morphology and anatomy of all stages of plant development. The reproductive process and embryogenesis are studied in detail. Lec., lab, and some field trips. A semester project is part of required lab work. Prer., one year of general biology.


Biol. 331-3. Field Botany. A study of the native Colorado mountain and plains vascular flora. Students learn identification procedure using frozen fresh plant specimens. The principles of taxonomy, methods of collection and preservation, and herbarium procedures are covered in theory and practice. Some collecting and observation of mountain habitats are provided through field trips. Finished herbarium specimen sheets are produced by students. Lec., lab, some field trips. Prer., one year of general biology.

Biol. 331-4. Summer Field Botany. A five-week traveling field course spent entirely in the mountains, utilizing three base camps (Elk, Uncompahgre, and San Juan Mountains) for access to subalpine and alpine zones. Vascular flora is stressed primarily; however, lower forms are also studied. The student learns both florals through extensive practice with identification procedures and studies species in their natural environments. An original floristic study is done by each student during final weeks of course. Plant collections are required throughout course. All lectures/exams are given in the field. Enrollment limited to 10. Tentative departure date: last week of June. Fee. 681. In addition to tuition, student pays food charge. Prer., consent of instructor.


Biol. 398-variable credit. Cooperative Education. Designed experience involving application of specific, relevant concepts and skills in supervised employment situations. Prer., sophomore standing and 2.5 grade-point average.


Biol. 411-4. Nonvascular Plants. An evolutionary survey of lower plant forms: algae, fungi, lichens, and bryophytes. Structure, morphology, ecology, modes of reproduction, and evolutionary trends within each group are emphasized. The taxonomy of representative Colorado forms is treated in the lab and field. Lec., lab, some field trips. An experimental lab. project is included in the course. Prer., one year of general biology, and Biol. 310 or equivalent course in introductory botany.


Biol. 427-4. Environmental Physiology. Lec., lab. Adaptations of plants and animals to such environmental parameters as temperature, light, and water. Prer., one year of chemistry and a course in physiology.


Biol. 469-2. Laboratory in Animal Behavior. (Psych. 439.) Laboratory projects and field observations of the behavior of animals. Prer. or coreq., Biol./Psych. 225 or Biol./Psych. 252.


Biol. 505-variable credit. Advanced Biology. This course is reserved for formal courses for which seniors as well as graduate students can enroll without resorting to Independent Study.


Biol. 511-3. Bryophytes. In-depth study of the nonvascular cryptogams, the bryophytes (mosses, liverworts, hornworts). Basic taxonomy, morphological, cytological, physiological, and reproductive characteristics of the group are augmented by an additional consideration of the unique genetic and ecological characteristics. All of the preceding are used to build an evolutionary picture of the group.


Biol. 519-4. Mountain Ecology. Graduate level option for Biol. 441, Mountain Ecology. See description. Requires additional work in current literature survey and weekly field studies. An independent field project also is required. Not open to students who have had Biol. 441. Prer. one year of biology and minimum of 15 semester hours in biology.

Biol. 522-3. Biological Speciation. In-depth study of one basic biological concept, speciation. The process and mechanisms of speciation are contrasted with the process and mechanisms of evolution. In exploring plant and animal species and speciation, information provided by studies in genetics, morphology, ecology, and taxonomy is used. A student should have a reasonable background in all or most of these areas of biology. Surveying the current literature and abstracting papers relating to lecture topics along with an annotated bibliography are required. Lect. Prer. 15 semester hours in biology (not including general biology) and at least one course in genetics.

Biol. 524-3. Identification of Nonseed Plants. Advanced work in taxonomy of nonseed, nonvascular, and vascular plants including algae, lichens, bryophytes, ferns, and fern allies. Topics include methods of collection and preservation, review of structure and life histories, methods of identification, distribution, and ecology of each group. Special emphasis is placed on Colorado species. Some collecting and habitat study are provided through field trips. A collection of finished herbarium specimens is required. Lect. lab., some field trips.


Biol. 531-3. Pteridology. In-depth study of the vascular cryptogams including the Psilotophyta, Lycopsidophyta, Equisetophyta, and Polyophidophyta. Basic taxonomic, morphological, cytological, physiological, and reproductive characteristics of the groups are augmented by additional consideration of unique genetic and ecological characteristics. All of the preceding are used to build an evolutionary picture for the vascular cryptogams. Lect. lab., some field trips. A semester lab project is required. Prer. minimum of one year of general biology and Biol. 310 or equivalent course in general botany.


Biol. 567-5. Vertebrate Embryology. Lect. lab. Development stressing vertebrate animals from fertilized egg through organ systems, with introduction to experimental analysis. Not open to students who have had Biol. 461. Prer. a year of general biology or zoology.

Biol. 570-4. Biometry. Lect. lab. and intensive course in intermediate statistics with emphasis on experimental design and analysis. Includes statistical design of repeated measures, analysis of variance, correlation, regression, and nonparametric tests. Use of computer processing is introduced. Prer. one year of general biology, statistics, and two other biology courses. Not open to students who have had Biol. 470.


Biol. 681-4. Advanced Botany: Field Botany (Summer) Graduate-level modification of Biol. 331 (see description). Additional work includes a detailed field study in each base camp area, more work with lower plant forms, habitant analyses, correlation of environmental...
factors with specific plant associations, and study of plant distribution. Enrollment limited. Tentative departure date: last week of June. Open to students who have had Biol. 331 (Field Botany) during regular school term. In addition to tuition, student pays food charge. Prer., consent of instructor only.


Infrequently Offered Courses


CHEMISTRY

Chem. 100-2. General Chemistry. Summer only. Lect. For students with no previous chemistry or with inadequate background. This course is in preparation for Chem. 103. Prer., working knowledge of high school algebra.

Chem. 101-5. General Chemistry. Fall only. Lect., rec., and lab. A beginning course intended primarily for prenursing, physical education, physical therapy, and other students wanting to fulfill curriculum or area distribution requirements. No previous knowledge of chemistry is required. Prer., working knowledge of high school algebra.

Chem. 102-5. General Chemistry. Spring only. Lect., rec., and lab. Continuation of Chem. 101 with brief introduction to organic and biochemistry for prenursing, physical education, physical therapy, and other students. Prer., Chem. 101.

Chem. 103-5. General Chemistry. Fall and Spring. Lect., rec., and lab. A beginning course for science majors, medical technologists, premedical, predental, and preveterinarian students. Prer., one year of high school chemistry or Chem. 100, and working knowledge of high school algebra.


Chem. 133-1. Topics in Chemistry. Different 5-week modules dealing with topics in chemistry. See current Schedule of Courses. Designed for nonscience majors to fulfill the natural science curriculum or area distribution requirements. No previous knowledge of chemistry is required. Prer., working knowledge of high school algebra.


Chem. 341-3. Organic Chemistry I. A lecture course designed as an introduction to the study of structure, reactions, properties, and mechanisms of organic molecules. Chem. 343 lab. to be taken concurrently by nonmajors. Chem. 348 lab. to be taken concurrently only by majors. Prer., Chem. 103 and 106.


Chem. 343-1. Organic Chemistry Laboratory I. A laboratory course to be taken concurrently with Chem. 341 illustrating the practical aspects of organic chemistry. Prer., Chem. 103 and 106; coreq., Chem. 341.

Chem. 344-1. Organic Chemistry Laboratory II. A laboratory course to be taken concurrently with Chem. 342 illustrating the practical aspects of organic chemistry. Prer., Chem. 341 and 343; coreq., Chem. 342.


Chem. 398-variable credit. Cooperative Education. Designed experiences involving application of specific, relevant concepts and skills in supervised employment situations. Prer., sophomore standing and 2.5 grade-point average.

Chem. 401-3. Modern Inorganic Chemistry. Fall only. Lect. Introduction to bonding and symmetry and the reactions of selected main group elements. Prer., Chem. 452 or consent of instructor.


Chem. 413-2. Instrumental Analysis Laboratory. Fall only. Laboratory practice to accompany Chem. 412. Required of chemistry majors and open to other students in Chem. 412. Coreq., Chem. 412.


Chem. 455-3. Experimental Physical Chemistry. Spring only. One lect. and two 3-hour labs per wk. Instruction in the experimental techniques of modern physical chemistry. Emphasis on the fundamental principles of chemical and thermodynamics, quantum chemistry, statistical mechanics, and chemical kinetics. For chemistry majors. Prer., Chem. 451; prer. or coreq., Chem. 452.

Chem. 481-3. General Biochemistry. Fall only. Lect. Primarily for chemistry majors. Topics include structure, conformation, and properties of proteins; enzymes; mechanisms and kinetics; intermediary metabolism; carbohydrates, lipids, energetics and metabolic control; and an introduction to electron transport and photosynthesis. Prer., one year of organic chemistry.

Chem. 482-3. General Biochemistry. Spring only. Continuation of Chem. 481. Topics include macromolecules; metabolism of nucleic acids and nitrogen-containing compounds; biosynthesis and function of macromolecules including DNA, RNA, and proteins; biochemistry of subcellular systems; and special topics. Prer., Chem. 481.

Chem. 501-3. Advanced Inorganic Chemistry I. Lect. Introduction to bonding in transition metal complexes, and study of selected transition metal and main group elements. Not open to students who have had Chem. 401. Prer., Chem. 452 and graduate standing.


Chem. 512-2. Selected Topics in Analytical Chemistry. Lect. Newer methods of chemical analysis. Topics covered vary from year to year with emphasis on small digital computers, separation techniques, automation, and other recent analytical developments. Prer., one year of analytical chemistry.


Chem. 558-3. Introductory Quantum Chemistry. Lect. Basic principles and techniques of quantum mechanics; includes the Schrodinger formulation of quantum mechanics, the variation method.

1Students enrolled at the 500 level may expect additional work and evaluation commensurate with graduate standards.
and basic theories of chemical valance. Molecular orbital theory of conjugated systems, examples of calculation of energies, charge densities, bond orders, and indices of chemical reactivity. Prereq. Chem. 452.


Chem. 581-3. General Biochemistry. Fall only. An introduction to biochemistry for graduate students who may or may not have had a previous course in biochemistry. Topics are similar to Chem. 481, but emphasis is placed on the primary and review literature as source material and on the interpretation of important experiments in biochemistry.

Chem. 582-3. General Biochemistry. Spring only. A continuation of Chem. 581. Topics are similar to Chem. 482, but emphasis is similar to that detailed for Chem. 581.

Chem. 940-1 to 3. Independent Study (Undergraduate). Consent of instructor required.
Chem. 960-1 to 3. Independent Study. (Graduate).

Infrequently Offered Courses
Chem. 593-3. Topics in Chemistry.

GEOGRAPHY

Geog. 110-3. World Regional Geography. An analysis of the relationships of man and the landscape based on geographic distributions in the world.


Geog. 130-3. Introduction to Human Geography. Systematic introduction to basic concepts and approaches in human geographic analysis.

Geog. 306-3. Map Reading and Elementary Surveying. Introduction to the analysis and use of maps, and elementary field techniques as research tools. Two all-day field trips.

Geog. 312-3. Anglo-America. Regional survey of the U.S. and Canada, focusing on urban, economic, and environmental problems in regions of both countries.

Geog. 315-3. Middle East. A physical, cultural, and economic approach to the arid lands of the Middle East including Arab lands of the Sahara.

Geog. 316-3. China. Regional survey of the physical, cultural, and economic features characterizing the geography of China.

Geog. 317-3. Africa. A physical, cultural, and economic approach to an understanding of man-land relationships on the continent.

Geog. 332-3. Geographic Analysis of Issues in American Society. The geographic investigation of such socio-economic concerns as pollution, poverty, racism, crime, and political reorganization.


Geog. 396-variable credit. Cooperative Education. Designed experiences involving application of specific, relevant concepts and skills in supervised employment situations. Prereq., sophomore standing and 2.5 grade-point average.

Geog. 400-3. Introductory Quantitative Methods in Geography. The application of quantitative techniques to geographic research problems.

Geog. 403-3. Analytical Techniques in Environmental Perception. A survey of techniques employed by environmental geographers, behavioral scientists, and planners to assess the impact of visual and other environmental influences on attitudes and behavior. Prereq., urban topics course or consent of instructor.


Geog. 420-3. Microclimatology. Examination of microscale climatic patterns and their impact on man, animals, and plants. The urban atmospheric environment and regional planning implications of various microclimates will be examined. Prereq., Geog. 100 or consent of instructor.

Geog. 421-3. Climatology. Analysis of energy exchange, temperature, wind, pressure, and atmospheric humidity as elements and controls leading to an understanding of physical climatology. Prereq., Geog. 100 or equivalent.

Geog. 441-3. Environmental Conservation. Introduction to various environmental problems such as water, air pollution, soil erosion, and deforestation.


Geog. 463-3. Transportation Geography. Concepts and theories leading to description and understanding of the relationships between people, products, and transportation systems over space and time.

Geog. 465-3. Location Analysis. The study of commercial and industrial activities, emphasizing theories of locational structure and methods of analysis.


Geog. 500-3. Introductory Quantitative Methods in Geography. A graduate-level analysis of the application of quantitative techniques to geographic research problems. Not open to students who have had Geog. 400.

Geog. 503-3. Analytical Techniques in Environmental Perception. A graduate-level course investigating the techniques employed by environmental geographers, behavioral scientists, and planners to assess the impact of visual and other environmental influences on attitudes and behavior. Not open to students who have had Geog. 403.


Geog. 542-3. Urban Land Use Models. Theoretical and empirical approaches to the analysis of urban land-use patterns. Prereq., Geog. 461/561 or consent of instructor.

Geog. 561-3. Urban Geography: Economic. Detailed analysis of research efforts concerning the origin, economic growth processes, distribution, and functions of urban areas. Not open to students who have had Geog. 461.

Geog. 562-3. Urban Geography: Social. Graduate-level investigation of the social, behavioral, and other factors influencing the spatial arrangement of cities. Not open to students who have had Geog. 462.

Geog. 563-3. Transportation Geography. Consideration of advanced concepts and theories leading to description and understanding of the relationships between people, products, and transportation systems over space and time. Not open to students who have had Geog. 463.

Geog. 564-3. Problems in Urban Geography: Socioeconomic. A study of contemporary social and economic problems of metropolitan areas and introduction to applicable research techniques. Prereq., Geog. 461/561 or consent of instructor.

Geog. 565-3. Location Analysis. A graduate-level seminar focusing on commercial and industrial activities, emphasizing theories of locational structure and methods of analysis. Not open to students who have had Geog. 465.

Geog. 566-3. Problems in Urban Geography: Physical. An examination of urban environmental problems such as air, water, soil and noise pollution; flooding, soil erosion; and climatic modification. Field trips to be arranged.


Geog. 568-3. Seminar: Tropical Agriculture. Analysis of

1Students enrolled at the 500 level may expect additional work and evaluation commensurate with graduate standards.
characteristics and problems of agriculture in tropical areas. Emphasis on
primitive societies.

**Geog. 573-3. Population Geography.** In-depth analysis of
population dynamics. Investigation of the processes influencing
population distributions, densities, and migration flows. Not open to
students who have had Geog. 473.

**Geog. 599-Variable Credit. Reading in Geography.** Section 1:
1-credit; 2-credit; 3-credit; 4-credit; 5-credit.

**Geog. 600-3. Advanced Quantitative Methods in Geography.**
Continuation of Geog. 400/500 with emphasis on more advanced
mathematical and statistical techniques in geography and related fields.
Prer.: Geog. 450/500 or consent of instructor.

**Geog. 681-3. Seminar: Regional Analysis and Planning.** Selected
regional development theories and planning programs are described and
evaluated.

465/565 with emphasis on more advanced topics in classical,
neoclassical, and behavioral location theory. Prer., Geog. 465/565 or
consent of instructor.

**Geog. 670-3. Seminar: Geography of Social Problems.** A critical
examination of contemporary American social issues and application
of geographic research techniques to social problems.

**Geog. 673-3. Seminar: Population Geography.** Regional popula-
tion case studies involving analysis of demographic characteristics,
spatial distribution, and population-resource ratios. Prer., Geog.
473/573.

**Geog. 680-3. Seminar: Regional Geography.** The objectives, tools,
and methods of regional analysis. Application of research techniques to
selected areas.

**Geog. 700-6. Master’s Thesis.**

**Geog. 800-1 to 8. Doctor’s Thesis.**

**Geog. 940-1 to 3. Independent Study (Undergraduate).**
Independent research primarily for undergraduate majors. Prer.,
consent of department.

**Geog. 960-1 to 3. Independent Study (Graduate).** Independent
research for graduate major students. Prer., consent of department.

**Infrequently Offered Courses**

**Geog. 308-3. Introduction to Cartography.**

**Geog. 309-3. Intermediate Cartography.**

**Geog. 320-2. Descriptive Meteorology.**

**Geog. 324-3. Introduction to Soils.**

**Geog. 401-3. Methods of Regional Analysis.**

**Geog. 424/524-4. Principles of Geomorphology.** (Geol. 463/563.)

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**GEOLOGICAL SCIENCES**

**Geol. 101-4. Introduction to Geomorphology.** (Geog. 124.) Study
of earth materials, features, and processes, and how they relate to man.
Includes Sunday field trips. Intended for CLAS science requirement.

**Geol. 207-4, 208-4. Physical Geology and Geophysics.** A two-
semester process-oriented introductory course in physical geology,
designed for geology majors or students with more than a cultural
interest in geology. The first semester (Geol. 207) covers surface
processes such as stream, glacial and wave erosion, and the landforms
they produce. The second semester (Geol. 208) covers the processes and
properties of the earth’s interior, with plate tectonics as the underlying
theme. Topics in Geol. 208 include the origins of sedimentary, igneous,
and metamorphic rocks and their associated mineral resources, rock
deformation, geophysics, mountain building, and plate tectonics.
Includes three Sunday field trips per semester. Prer., basic high school
courses in mathematics, physics, and chemistry are advisable. Students
may follow Geol. 101 with Geol. 208 if they wish additional work in
general geophysics, and internal processes, or they may begin the 207-208
sequence with Geol. 208 with consent of the instructor.

**Geol. 301-4. Mineralogy.** Principles of mineralogy, including
crystallography, crystal chemistry, and a systematic study of the more
important nonsilicate and silicate minerals. Origins and occurrences of
minerals. Prer., physical geology and college-level chemistry, or
consent of instructor.

**Geol. 312-5. Structural Geology.** Descriptive and interpretive study
of structures found in sedimentary, metamorphic, and igneous rocks.
Includes an introduction to field and laboratory studies of geologic
structures, techniques of geometric analysis, and the tectonic
significance of structures. Prer., Geol. 207-208, Math. 112.

**Geol. 323-4. Introductory Petrology.** An introduction to classi-
fication, distribution, and origin of igneous, metamorphic, and
sedimentary rocks, including their identification in hand specimens.
Prer., physical geology and mineralogy.

**Geol. 341-4. Introductory Paleontology.** The study of fossils,
including a survey of the organic world and its history in the geologic
past. Includes invertebrates, protista, vertebrates and plants, an
introduction to evolution and paleoecology, and discussion of the uses
of fossils in geologic correlation. Prer., introductory geology or
biology. Offered occasionally.

**Geol. 342-4. Introductory Stratigraphy.** Principles of stratigraphy
and interpretation of sedimentary rocks. Prer., Geol. 101-208.

**Geol. 398-variable credit. Cooperative Education.** Designed
experiences involving application of specific, relevant concepts and
skills in supervised employment situations. Prer., sophomore standing
and 2.5 grade-point average.

**Geol. 411-4. Field Geology.** An introduction to methods of geologic
mapping in sedimentary, igneous, and metamorphic rocks. Includes
plane table surveying, Brunton and pace methods, and the use of aerial
photographs. Prer., Geol. 312.

**Geol. 425-3. Groundwater.** Occurrence, movement, and problems
of pollution of subsurface water and the hydrologic properties of
waterbearing materials. Prer., Geol. 101 (Geog. 124.) or Geol. 207 or
consent of instructor.

**Geol. 481-3. Sedimentary Basin Analysis.** Analysis of the
depositional framework, tectonic evolution and economic potential of
sedimentary basins, both marine and continental. Topics covered
include the plate tectonic settings of different kinds of sedimentary
sequences, tectonic and environmental controls on facies relations,
and synthesis of basin development through time in terms of depositional
systems and tectonic settings. Prer., stratigraphy or sedimentary
geoscientific course.

**Geol. 485-3. Plate Tectonics and Regional Structural Analysis.**
The evolution of the classical structural provinces of North America are
analyzed in the light of present plate tectonic theory. Topics discussed in
the first part of the course include: methods used in determining relative
velocities between lithospheric plates; interpretation of paleomagnetic
data; geologic processes at rises, trenches, and transforms; and causes
of plate motions. The second half of the course includes analysis of the
Rocky Mountain, Basin and Range, Colorado Plateau, California
Coast Range, and Appalachian structural systems. Prer., Geol. 312 or
equivalent.

**Geol. 493-4. Introduction to Geophysical Prospecting.** Basic
principles of geophysical prospecting for oil and other earth resources.
Seismic, magnetic, gravity, electrical and electromagnetic methods will
be discussed. Basic courses in physics, mathematics, and geology
recommended.

**Geol. 494-4. Mineral Resources in World Affairs.** (Geog. 434.)
Non-technical study of distribution, reserves, and uses of mineral resources.

**Geol. 581-3. Sedimentary Basin Analysis.** Analysis of the
depositional framework, tectonic evolution, and economic potential of
sedimentary basins, both marine and continental. Topics covered
include the plate tectonic settings of different kinds of sedimentary
sequences, tectonic and environmental controls on facies relations,
and synthesis of basin development through time in terms of depositional
systems and tectonic settings. Prer., stratigraphy or sedimentary
geoscientific course.

**Geol. 585-3. Plate Tectonics and Regional Structural Analysis.**
The evolution of the classical structural provinces of North America are
analyzed in the light of present plate tectonic theory. Topics discussed in
the first part of the course include: methods used in determining relative
velocities between lithospheric plates; interpretation of paleomagnetic
data; geologic processes at rises, trenches, and transforms; and causes
of plate motions. The second half of the course includes analysis of the
Rocky Mountain, Basin and Range, Colorado Plateau, California
Coast Range, and Appalachian structural systems. Prer., Geol. 312 or
equivalent.

**Geol. 593-4. Introduction to Geophysical Prospecting.** Basic
principles of geophysical prospecting for oil and other earth resources.
Seismic, magnetic, gravity, electrical and electromagnetic methods will
be discussed. Basic courses in physics, mathematics, and geology
recommended.

**Geol. 940-1 to 3. Independent Study (Undergraduate).**

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1Students enrolled at the 500 level may expect additional work and evaluation commensurate with graduate standards.
Infrequently Offered Courses

Geol. 463-4. Principles of Geomorphology. (Geog. 424.) Systematic study of weathering, mass-wasting, fluvial, wind, and marine processes and the landforms they produce. Prer., introductory college-level geology and chemistry, or consent of instructor.


Geol. 563-4. Principles of Geomorphology.1 (Geog. 524.) Systematic study of weathering, mass-wasting, fluvial, wind, and marine processes and the landforms they produce. Prer., introductory college-level geology and chemistry, or consent of instructor.

MATHMATICS


Math. 108-3. Polynomial Calculus. A one-semester course in calculus. No knowledge of trigonometry or analytic geometry is presupposed. Intended especially for social science and business students and for the general liberal arts student. Those planning to take more than one semester of calculus should take Math. 140 instead of Math. 108. Prer., 1 1/2 years high school algebra.

Math. 111-3. University Mathematics I. Advanced topics in algebra, especially designed for students who intend to take the calculus sequence. Prer., Math. 101 or 1 1/2 years of high school algebra and one year of geometry.

Math. 112-3. University Mathematics II. Topics in trigonometry and elementary functions, especially designed for students who intend to take the calculus sequence. Prer., Math. 111 or four years of high school mathematics.

Math. 113-4. PreCalculus Mathematics. This course is intended for college students who need a review of precalculus mathematics. All essential precalculus topics are covered. After this course, the student can proceed directly to the study of calculus. Students taking this course should have a background that includes geometry, algebra, and trigonometry. This course is not designed as a first-time learning experience.

Math. 131-1. Topics in Mathematics. Different five-week course modules dealing with various topics in mathematics. See current Schedule of Courses for the particular topics being offered. Designed for nonscience majors to fulfill the natural science requirement.


Math. 201-3. Topics in Contemporary Mathematics I. Designed for nonmathematics and nontechnical majors who are interested in a survey of some of the key ideas of modern mathematics. Topics include sets, logic, systems of numeration, and mathematical systems, with historical background and current relevance. Prer., sophomore standing with a 2.75 GPA.


Math. 300-3. Introduction to Abstract Mathematics. The student learns to prove and critique proofs of theorems by studying elementary topics in abstract mathematics, including such necessary basics as logic, sets, functions, equivalence relations, etc. Prer., Math. 241 or consent of instructor.

Math. 303-3. Mathematics for Elementary Teachers I. Designed to help provide appropriate mathematical background to teach K-6 mathematics. This is not a methods course, but each topic is related to the elementary curriculum through concurrent examination of relevant text and laboratory materials as each topic is studied. Topics include sets, the concept of number, place value numeration and associated algorithms, the structure of the natural numbers, the integers, and the rational numbers. Applications and problem solving are included. Carries credit only for elementary education majors.

Math. 304-3. Mathematics for Elementary Teachers II. Designed to meet objectives as described for Math. 303 above. Topics include intuitive and logical development of geometric ideas relevant to K-6 curriculum; measurement of length, area, volume, mass, angle, temperature, and time; stress is on the metric system; further study of the rational number system; applications and problem solving. Carries credit only for elementary education majors. Prer., Math. 303 or consent of instructor.


Math. 411-3. Theory of Numbers.1 Divisibility, greatest common divisor, prime numbers, fundamental theorem of arithmetic, congruences and other topics. Prer., Math. 300 or consent of department.

Math. 412-3. Topics in Mathematics. Special topics in mathematics will be covered. Students should check the current Schedule of Courses to obtain the topics to be covered as well as the prerequisites. With permission, this course may be taken for credit more than once.


Math. 431-1. Advanced Calculus I. Calculus of one variable, the real number system, continuity, differentiation, integration (possibly

1Students enrolled at the 500 level may expect additional work and evaluation commensurate with graduate standards.

2This is one of several courses offered alternatively by UCD and Metropolitan State College. See appropriate Schedule of Courses.
Riemann-Stietjes. Prer., Math. 242 and Math. 300 or consent of department.

Math. 432-3. Advanced Calculus II. Sequences and series, convergence, uniform convergence; Taylor's theorem; calculus of several variables including continuity, differentiation and integration; Picard's theorem in ordinary differential equations and Fourier series if time permits. Prer., Math. 431 or consent of department.

Math. 433-3. Advanced Calculus II. Vector fields, implicit function theorem, inverse function theorem; Green's, Stokes' and divergence theorems; Taylor's theorem for functions of several variables; calculus on manifolds if time permits. Prer., Math. 432 or consent of instructor, and Math. 315 or 319.


Math. 493-2, 494-2. Honors Seminar. Intended for candidates for departmental honors and other superior students. Topics covered vary from year to year. Student participation is stressed.

Math. 495-1 to 3. Topics in Mathematics for Elementary Teachers I, II. Variable credit depending upon specific topics covered. Course content designed in consultation with groups of practicing teachers who desire courses to meet their specific needs. Students may register for this course more than once with consent of appropriate discipline adviser. Prer., consent of department.

Math. 496-1 to 3. Topics in Mathematics for Secondary Teachers. Variable credit depending upon specific topics covered. Course content designed in consultation with groups of practicing teachers who desire courses to meet their specific needs. Students may register for this course more than once with consent of appropriate department. Prer., consent of department.


Math. 507-3. Advanced Calculus III. Vector fields, implicit function theorem, inverse function theorem; Green's, Stokes' and divergence theorems; Taylor's theorem for functions of several variables; calculus on manifolds if time permits. Prer., Math. 432 or consent of instructor, and Math. 315 or 319. Not open to students who have had Math. 433.


Math. 511-3, 512-3. Theory of Numbers I, II. Prer., abstract algebra or consent of instructor.


Math. 557-3, 558-3. Topics in Applied Mathematics. Selected topics in mathematical problems arising from various applied fields such as mechanics, electromagnetic theory, economics, etc. Prer., consent of instructor.

Math. 546-3. Theory of Automata. (C.S. 546.) Finite-state machines, regular expressions, paths on graphs, and the relations among these. Turing machines, some equivalent machines, and the idea of computability. Machines between the preceding ones on computational power and the elements of their relation to formal languages.

Math. 549-3. Introduction to Partial Differential Equations I. Boundary value problems for the wave, heat, and Laplace equations;

1This is one of several courses offered alternatively by UCD and Metropolitan State College. See appropriate Schedule of Courses.
Math. 429-3. Mathematical Foundations of Quantitative Methods II. Parametric and nonparametric statistics which treat statistics in a Decision Framework (includes introduction to Decision Theory). Bayesian statistics and applications with exercises in probability representative of simple probabilistic models (e.g., queuing, single-server models, etc.) Prereq., Math 427 or consent of instructor.


Math. 456-3. Laplace Transforms for Engineers and Scientists. Topics include the general methods, transforms of special functions, heaviside expansion theorems, transforms of periodic functions, convolution integrals, the inverse transforms, and solutions of ordinary and partial differential equations. Prereq., ordinary differential equations.

Math. 457-3. Theory of Equations. A study of the classical theory of equations, including such topics as higher degree polynomials and their zeros, symmetric functions of polynomial coefficients; general solution of the cubic and quartic equations; resultants, and elementary graphical analysis. Prereq., Math 242.

Math. 458-3. Calculus of Variations for Engineers and Scientists. Techniques and applications of the powerful tools of the variational calculus will be developed and both classical and modern optimization problems will be attacked. Prereq., ordinary and partial differential equations.


Math. 469-3. Estimation Theory for Engineers and Scientists II. A continuation of Math. 468. Selected topics will be developed extensively in accordance with the needs of the class. With the consent of the department, students may register for this course more than once with department approval. Prereq., consent of department.

Math. 475-3. Topics in Finite Mathematics. Especially suitable for those students who are not majoring in engineering or physical science. Prereq., consent of department.

Math. 505-3. Topics in Combinatorial Analysis. Topics such as finite combinatorial analysis, combinatorial questions entering in topology, infinite permutations and transformations, graph theory. Prereq., consent of instructor.


This is one of several courses offered alternately by UCD and Metropolitan State College. See appropriate Schedule of Courses.


Math. 573-3, 574-3. Advanced Set Theory I, II. Cardinal and ordinal arithmetic, generalizations of Ramsey's theorem, independence of the axiom of choice, and of the generalized continuum hypothesis. Prereq., Math. 455 and 451, or consent of instructor.

Math. 580-3. Sample Surveys. Application of statistical sampling theory to the design of population surveys, including simple random, stratified, systematic and cluster sampling. Ration estimates and cost minimization. Prereq., undergraduate statistics, or consent of instructor.


Math. 585-3, 586-3. Introduction to Stochastic Processes I, II. An intermediate course in random processes with emphasis on basic principles. Topics will include Markov chains, birth and death processes, first-passage time problems, theory of runs, and dam theory. Includes review of probability theory. Applications to behavioral, biological, and physical sciences. Prereq., consent of instructor.

Math. 587-3. Statistical Methods in Research. A one-semester course in the design and analysis of experiments, employing various statistical techniques such as t-tests, chi-square tests, analysis of variance and covariance, regression, analysis, distribution-free methods, graphical and other quick and approximate procedures. Emphasis on the application of the above techniques as an aid to research in the behavioral, biological, and physical sciences. Prereq., consent of instructor.


Math. 593-3. Linear Programming. The general linear programming problem and commonly used techniques for its solution. Prereq., Math. 315 and advanced calculus, or consent of instructor.

PHYSICS

Phys. 105-4. General Astronomy. The methods and results of modern astronomy (solar system, stars, galaxies, cosmology) at an elementary level.


Phys. 130-2. Contemporary Topics in Physics. Covers various current topics in physics at a qualitative level. Designed primarily for students intending to major in physics, engineering, and chemistry.

Phys. 133-1. Topics in Physics. Different five-week course modules dealing with various topics in physics. See current Schedule of Courses for the particular modules being offered. Designed for non-science majors to fulfill the natural science requirement.


Phys. 233-4. General Physics II. Covers electromagnetic fields, oscillatory systems, introductory quantum physics, and waves. Three hours of lecture and one recitation per week. Prereq., Phys. 231 and Calculus II; coreq., Calculus III.


Phys. 251-5, 252-5. Physics for the Life Sciences. A two-semester introductory physics course emphasizing those subjects relevant to biology and medicine. Topics covered will include mechanics, fluids, thermodynamics, sound, optics, electricity, magnetism, atomic and nuclear physics, and their applications to the life sciences. Three hours of lect., one rec. and two lab. per week.

Phys. 308-3. Energy and Environment. A course in the supply and usage of energy resources and the environmental problems associated with our energy usage. Prereq., one course in college science or mathematics.

Phys. 311-3, Methods of Mathematical Physics I. Covers vector analysis, coordinate systems, matrices and determinants, infinite series, and complex analysis. Prereq., Calculus II.


Phys. 321-4. Analytical Mechanics. Topics include the Lagrange and Hamiltonian formulations, the two body problem, rigid body motion,
Phys. 362-3. Sound and Music. This course will consider the basic nature of sound waves, the ear and hearing, and musical instruments. No prer. Although this course is primarily descriptive, some high school algebra will be used.
Phys. 363-1, Sound Laboratory. Laboratory course to accompany Phys. 362 as an option. Students will do an acoustical project on a subject of their own choice. Coreq. Phys. 362.
Phys. 389-3. Advanced Physics Topics. This course covers a particular topic, as announced in the schedule. May be taken more than once for credit in different topics. Prer., Phys. 213 or 233 or as announced.
Phys. 398-variable credit. Cooperative Education. Designed experiences involving application of specific, relevant concepts and skills in supervised employment situations. Prer., sophomore standing and 2.5 grade-point average.
Phys. 429-variable credit. Psychophysics Methods and Research. This course covers the methodology of psychophysics by involving students in actual research in perception. Prer., Psych. 416 and 417 or Psych. 362 and 363, and a knowledge of statistical analysis.
Phys. 441-3. Statistical Physics. Foundations of statistical mechanics and topics of interest, such as systems of interacting particles or spins, transport theory, irreversible processes, and fluctuations. Prer., Phys. 341 and 381.
Phys. 461-2. Computational Physics. A course designed to provide an understanding of the role of the computer in modern theoretical physics by studying the simulation of physical phenomena in various fields of physics. Prer., Phys. 312.
Phys. 464-3. Creative and Cultural Aspects of Physics. One of two independent courses (with Phys. 466) dealing with the interplay between physics and culture. It examines the lives and works of individual scientists and the relationship of physical theory to culture and creativity. Prer., upper division standing.
Phys. 466-3, Art, Science and Technology. One of two independent courses (with Phys. 464) dealing with the interplay between physics and culture. It examines the relationship between physics and art and the possibilities of art based on science and technology. Prer., upper division standing.
Phys. 481-3, Atomic and Molecular Structure. A course in which quantum mechanical methods are applied to problems in atomic and molecular physics. Prer., Phys. 381.
Phys. 495-2, 496-2. Senior Laboratory. Individual project laboratory with emphasis on modern physical experiments. 
Phys. 910, 920-variable credit. Independent Study for Lower Division.
Phys. 930, 940-variable credit. Independent Study for Upper Division. Students must check with a faculty member before taking this course.

Infrequently Offered Courses
Phys. 429-variable credit. Psychophysics Methods and Research.
Phys. 552-2, Spectroscopy. Survey of atomic spectra is made from the point of view of the vector model. Zeeman and Stark effects are included. Prer., Phys. 213, 215, 331, and some vector analysis.

PSYCHOLOGY
Psych. 204-3, General Psychology. II. Continuation of Psych. 203, covering topics of individual differences and their assessment and experimental social psychology.
Psych. 211-3, Experimental Research in Psychology. An introduction to research methods and statistical designs.
Psych. 212-3, Social-Personality Research in Psychology. Correlations and regression and analysis of variance. Prer., Psych. 211. Students must take both Psych. 211 and 212 to fulfill the statistics requirement.
Psych. 320-3, 321-3, Human Behavior and Maturation Through the Life Span. Three hours lect. per week. Analysis of the normal range of behaviors found in each development stage from birth through senescence.
Psych. 341-3. Psychology of the Asian In America. An introduction, combining lecture and discussion, of the psychological perspective of being an Asian in America. Deals directly with aspects of mental health, problems, and approaches for the Asian-American. Some field experience will be included. Prer., 3 hrs. of psychology; Soc. Sci. 329 recommended.
Psych. 365-3, Adolescence and Youth. Principles of development in adolescence, including physical, cognitive, and social development. Prer., Psych. 203-204 or 4 hours of psychology.
Psych. 398-variable credit. Cooperative Education. Designed experiences involving application of specific, relevant concepts and skills in supervised employment situations. Prer., sophomore standing and 2.5 grade-point average.
Psych. 405-3, Physiological Psychology. The morphological, neurochemical, and physiological bases of behavior. Prer., Psych. 203-204 and 6 additional hours of psychology.
Psych. 407-2. Laboratory in Physiological Psychology. Laboratory projects and demonstrations of techniques used in physiological psychology. This class may be used to fulfill the advanced laboratory requirement in the psychology major. Prer. or corq., Psych. 405.
Psych. 414-3, Cognitive Psychology. Introduction to the study of cognitive processes in man: the development of conceptual behavior, memory, and thinking. Prer., Psych. 203-204 and 6 additional hours in psychology, or consent of instructor.


Psych. 422-2. Laboratory in Learning. Laboratory projects demonstrating basic principles of operant and respondent conditioning. Class meetings for discussion as well as laboratory work will be required. May be used to fulfill the advanced laboratory requirement for the psychology major. Prer. or cor., Psych. 322.


Psych. 431-4. Psychopathology. Intensive analysis of the major theories of personality and behavior disorders. Open to majors only, and not open for credit to those who have taken Psych. 430. Prer., Psych. 203-204, 6 additional hrs. of psychology, and upper division standing.

Psych. 438-3. Advanced Animal Behavior. (Biol. 438.) Comparison of behavior in a variety of species, with emphasis on social behavior and its evolution. Prer., Psych. 425 or consent of instructor.

Psych. 439-2. Laboratory in Animal Behavior. (Biol. 439.) Laboratory projects and field observations of the behavior of animals. Prer. or cor., Biol./Psych. 225 or Biol./Psych. 425.


Psych. 441-3. Experimental Social Psychology. Readings and lectures focused on the formulation of researchable problems in social psychology. Prer., Psych. 203-204, 210, cor., Psych. 444. May be used to fulfill the advanced laboratory requirement in psychology.

Psych. 444-1. Psychological Laboratory. Experimental methods of studying social psychological processes. Cor., Psych. 441. May be used to fulfill the advanced laboratory requirement in psychology.


Psych. 449-2. Cultural Psychology. (GenEd B.) The influence of culture and subculture on personality, including sex roles, patterns of child rearing, attitudes and values, and mental illness. Prer., 6 sem. hrs. of courses in psychology, sociology, and/or anthropology in any combination.


Psych. 498-1 to 3. Topics in Psychology. Advanced study of special topics in psychology to be selected by the instructor. May be repeated for credit. Prer., consent of instructor.

Psych. 501-2. Problems in Advanced Development Psychology. (Biological 500 B.) Survey of normal developmental psychology and conditions affecting normal development. First of a two-semester sequence which together will cover pre-natal through age six. Prer., consent of instructor.


Psych. 525.2. Seminars in Animal Behavior.

Psych. 536-3. Psychosocial dysfunction with Young Children. Survey of methods. Students will be assigned cases for planning and implementing of intervention. Limited to students who are admitted to the graduate program in psychology.


Psych. 540-3. Assessment of Pre-School Children. Psychometric theory and practice in assessment of pre-school children with focus on the Stanford-Binet, and some attention to the DDST, WPPSI, and WISC-R. Limited to students who are admitted to the graduate program in psychology.

Psycho. 541-3. Infant Assessment. Psychometric theory and practice in assessment of infants, with focus on the Bayley Scales, and some attention to the Brazelton, McCarthy, etc. Limited to students who are admitted to the graduate program in psychology.


Psych. 571-3. Quantitative Methods I: The Inference of Causality. Experimental design and analysis of controlled interventions and evaluations. Emphasis will be on multifactor analysis of variance, orthogonal contrasts, and post-hoc tests. Prer., consent of instructor.

Psych. 572-2. Quantitative Methods II: Inferences From Observations. Introduction to correlation, regression, factor analysis, multiple discriminant analysis and cluster analysis. Emphasis will be placed on the application of these techniques to applied, developmental psychology research. Prer., Psych. 571.

Psych. 583-2. Parent Counseling. Introduction to the theoretical and research basis for brief methods of working with parents of young children with developmental problems. Each student does a series of videotaped simulations of parent interviews. Limited to students who are admitted to the graduate program in psychology.

Psych. 598-1 to 3. Topics in Psychology. Advanced study of special topics in psychology to be selected by the instructor. May be repeated for credit. Prer., consent of instructor.


Psych. 940-1 to 3. Independent Study (Undergraduate). Prer., consent of instructor.

Psych. 950-1 to 4. Independent Study (Graduate). A structured experience, planned and implemented with the assistance of a sponsoring faculty member, in ongoing programs of research or other scholarly activity. Prer., admission to the graduate program in psychology.

Psych. 954-4 to 8. Psychology Internship. Half or full time in an agency providing cases requiring screening, diagnosis, education/therapeutic intervention, and/or research, with supervision by qualified professionals. Prer., completion of one year in the UCD graduate program in psychology.
Infrequently Offered Courses

Psych. 409-3. Hormones and Behavior.
Psych. 412-3. Quantitative Genetics. (Biol. 412.)
Psych. 413-3. Drugs and the Nervous System.
Psych. 421-1. Theories of Learning and Motivation.
Psych. 439-2. Laboratory in Animal Behavior. (Biol. 439.)
Psych. 509-3. Hormones and Behavior.¹
Psych. 512-3. Quantitative Genetics.¹ (Biol. 512.)
Psych. 513-3. Drugs and the Nervous System.¹

Division of Social Sciences

ANTHROPOLOGY

Anth. 103-3. Introduction to Anthropology I. Evolution of man; his physical and cultural development from his beginnings. Includes consideration of man as a biological organism, his origin and relationship with nonhuman and prehuman primates, and development of culture as an adaptive device.

Anth. 202-3. Archaeology. An introduction to the subject of archaeology which provides an appreciation of the major achievements of archaeologists through review of some of the major excavation projects throughout the world. Emphasis on landmark projects which help clarify man’s progressive achievement of civilization.

Anth. 203-3. Nature of Language. The origin and evolution of language; its special relationship to the human brain; and communication systems of animals, especially nonhuman primates. How children acquire language. Other topics include language pathology and the study of nonverbal communication.

Anth. 227-3. Pre-Columbian America: Archaeology of the New World. A study of the native peoples of the New World from the time of the earliest settlement through the rise of agriculture and civilization. Considerations of the origin and conditions of a broad sample of societies drawing upon both archaeological and ethnographic information, and the general impact upon New World societies of Europeans after Columbus reached the New World.

Anth. 300-3. Topics in Anthropology. A flexible format for dealing with a specific topic of special interest in anthropology, on an introductory level, such as aging, race and prejudice, science and human values, war and aggression, food and nutrition, cultural diversity through film, myth and folklore, Colorado prehistory. The specific topic explored in a given semester is to be announced in the Schedule of Courses.

Anth. 314-3. Primate Behavior. Examination of morphology and behavior of selected primate species from a comparative evolutionary point of view, with emphasis on social and communicative behavior and on issues relating to human evolution.

Anth. 360-3. Anthropology of Sex. Study of sex as a factor in human evolution, contemporary biological variation, and in the allocation of roles and responsibilities in different cultures. (Special emphasis will be placed on roles and attributes of women.)

Anth. 380-3. Cross-Cultural Field Experience. (Soc. Sci. 380.) Intensive contact with another culture through supervised travel in that country other than the United States. Pre-trip orientation lectures; in-country lectures by local resource people and supervising UCD faculty who will also evaluate written reports by the students.

Anth. 398-variable credit. Cooperative Education. Designed experiences involving application of specific, relevant concepts and skills in supervised employment situations. Prereq. sophomore standing and 2.5 grade-point average.

Anth. 402-3. Medical Anthropology. Concerned with the underlying biological and cultural determinants of health throughout the human life cycle in contemporary Western society and in selected non-Western cultures. Medical anthropology is a new field which attempts to synthesize the mainstream of anthropological thinking with a health-oriented set of points of view.

Anth. 405-3. Quantitative Methods in Anthropology. A survey of the ways of deriving meaning from anthropological data by numerical means; including, but not confined to, basic statistical procedures.


Anth. 415-3. Human Ecology. A study of demographic and ecological variables as they relate to man. Aspects of natural selection, overpopulation, and environmental deterioration will be considered.


Anth. 421-3. Archaeology of the American Southwest. Prehistoric cultures of the southwestern U.S. and adjacent Mexico, their origins, characteristics, and interrelationships.

Anth. 422-3. Archaeology of Mesoamerica. Prehistoric and protohistoric cultures of Mexico and northern Central America, including the Aztec and the Mayan.

Anth. 444-3. Urban Anthropology. An anthropological approach to the comparative study of factors influencing urbanization in different parts of the world along with the implications of environments, economy, values, and psychology of urban living in general. Cross-cultural, but with emphasis on the modern Western world.


Anth. 447-3. Ethnohistory. A central feature of ethnohistory is the writing of history of nonliterate peoples. The course focuses upon questions of methods and theories involved in doing ethnohistory, with critical evaluation of ethnohistorical and historical works and the application of the concept of culture to understanding both the past and present.

Anth. 448-3. Culture and Community. A presentation of the community study method from the perspective of anthropology and as a widely applicable research technique in planning, development, and other areas of public affairs. Also includes analyses of case studies and student field research.

Anth. 450-3. Family Dynamics. The course examines processes of change in values, roles, and relations involved in marriage and family structure, using contemporary cross-cultural materials leading to understanding of such problems as generation gap and sex role change. Special attention is given to changing structure of authority, economics, and the emotional components associated with marriage and family life of today’s America.

Anth. 451-3. Applied Cultural Anthropology. Concept, methods, and problems in the application of anthropology to community and institution organization, development, and administration; exemplified through analysis and discussion of U.S. and cross-cultural case materials. Urban and medical problems as well as ethical issues to be included.

Anth. 453-3. History of Anthropology. Foundations and development of major concepts and approaches in the study of the relationship between culture and social character and between culture and...
individual personality. Anthropological perspectives on the effects of various sociocultural contexts on individual experience.

Anth. 465-3. Culture Dynamics. Theories and perspectives in the study of culture process. Analysis and discussion of case material dealing with persistence, innovation, situations of culture contact and acculturation, directed change and resistance, and long-term sociocultural development.

Anth. 458-3. Contemporary American Indian Cultures. Beginning with the historical background on American Indian acculturation and persistence, but emphasizing present-day relations between Indian communities and dominant society, stressing conditions and events in Denver and the Southwestern generally.

Anth. 458-3. Political Anthropology. Analysis of institutions of political control both comparatively and from an evolutionary perspective; the interconnections between political and other aspects of human cultural systems.


Anth. 462-3. Ethnohistory of the American Southwest. Geographic affinities, culture, history, traditional ways of life, and culture change in the American Southwest.


Anth. 481-3. Language and Culture. Relationship of language to human behavior, the typological classification of languages, the study of linguistic universals, and the evolutionary implications of such studies.

Anth. 499-variable credit. Guided Study. Directed individual study based on a specific subfield of anthropology. Consent of instructor required.

Anth. 502-3. Medical Anthropology. Concerned with the underlying biological and cultural determinants of health throughout the human life cycle in contemporary Western society and in selected non-Western cultures. Medical anthropology is a new field which attempts to synthesize the mainstream of anthropological thinking with a health-oriented set of points of view.

Anth. 505-3. Quantitative Methods in Anthropology. A survey of the ways of deriving meaning from anthropological data by numerical means; including but not confined to basic statistical procedure. Prer., either Anth. 100, 101, 102, or consent of instructor.


Anth. 515-3. Human Ecology. A study of demographic and ecological variables as they relate to man. Aspects of natural selection, overpopulation, and environmental deterioration will be considered.


Anth. 521-3. Archaeology of the American Southwest. Prehistoric cultures of the southwestern U.S. and adjacent Mexico, their origins, characteristics, and interrelationships.

Anth. 522-3. Archaeology of Mesoamerica. Prehistoric and protohistoric cultures of Mexico and northern Central America, including the Aztec and the Maya and other Mesoamerican cultures.

Anth. 539-3. Research Methods in Archaeology. Methods and theory of archaeology, emphasizing the interpretation of materials and data and the relationships of archaeology to other disciplines.

Anth. 544-3. Urban Anthropology. An anthropological approach to the comparative study of factors influencing urbanization in different parts of the world along with the implications of environments, economic values, and urban living in general. Cross-cultural, but with emphasis on the modern Western world.


Anth. 547-3. Ethnohistory. A central feature of ethnohistory is the writing of history of nonliterate peoples. The course focuses upon questions of methods and theories involved in doing ethnography, with critical evaluation of ethnographic and historical works and the application of the concepts of culture to understanding both the past and present.

Anth. 548-3. Culture and Community. A presentation of the community study method from the perspective of anthropology and as a widely applicable research technique in planning, development, and other areas of public affairs. Also includes analyses of case studies of student field research.

Anth. 550-3. Family Dynamics. The course examines processes of change in values, roles, and relations involved in marriage and family structure, using contemporary cross-cultural materials leading to understanding of such problems as generation gap and sex role change. Special attention is given to changing structure of authority, economies, and the emotional components associated with marriage and family life of today's America.

Anth. 551-3. Applied Cultural Anthropology. Concept, methods, and problems in the application of anthropology to community and institution organization, development, and administration; exemplified through analysis and discussion of U.S. and cross-cultural case materials. Urban and medical problems as well as ethical issues to be included.


Anth. 555-3. Culture Dynamics. Theories and perspectives in the study of culture process. Analysis and discussion of case materials dealing with persistence, innovation, situations of culture contact and acculturation, directed change and resistance, and long-term sociocultural development.

Anth. 556-3. Contemporary American Indian Cultures. Beginning with the historical background on American Indian acculturation and persistence, but emphasizing present-day relations between Indian communities and the dominant society, stressing conditions and events in Denver and the Southwestern generally.

Anth. 558-3. Political Anthropology. Analysis of institutions of political control both comparatively and from an evolutionary perspective; the interconnections between political and other aspects of human cultural systems.


1Students enrolled at the 500 level may expect additional work and evaluation commensurate with graduate standards.
Economics

Econ. 201-4. Principles of Economics I: Macroeconomics. Purpose is to teach fundamental principles, to open the field of economics in the way most helpful to further and more detailed study of special problems, and to give those not intending to specialize in the subject an outline of the general principles of economics. Subject matter includes topics of inflation, unemployment, national income, growth and problems of the national economy, stabilization policy, plus others at the discretion of the instructor. Open to qualified freshmen. Recitation is required.

Econ. 202-4. Principles of Economics II: Microeconomics. Complementary to and normally taken following Econ. 201. Subject topics include price determination in a market system composed of households and firms, resource allocation and efficiency of various market structures, plus others at the discretion of the instructor. Econ. 201 is not prere. to Econ. 202.

Econ. 250-3. Capitalism and Slavery. History of the development of slavery as an American institution from 1619 to 1970. Includes growth of the slave trade, development of the plantation system, stimulation of the American economy by slavery, economic implications of the Civil War, theoretical freeing of the slaves in 1863, and the development of modern slavery in America from Reconstruction to the present.

Econ. 300-3. Accelerated Principles of Economics. Condensation of Econ. 201 and 202. Intended for students who have taken Soc. Sci. 210 and 211 and others who want a one-semester introduction to economics. Open to seniors without prere. Not open to students who have taken Econ. 201 and 202.

Econ. 320-3. Economic Problems of the 1980s. Topics in the likely development of the economy into the next decade: inflation, unemployment, environment, population, sociopolitical interaction with economics. No prere.

Econ. 320-3. Women and Economics. An examination of women's roles in the economy from the perspectives of traditional and radical economics. The course covers the history of women's economic roles, recent developments in the literature on economics of household, labor force, and economic consequences of women's movement.

Econ. 379-3. Consumer Economics. Application of microeconomics to the problems of the ordinary consumer: budget management, purchases, interest, etc. Intended for nonmajors.


Econ. 389-variable credit. Cooperative Education. Designed experiences involving application of specific, relevant concepts and skills in supervised employment situations. Prer., sophomore standing and 2.5 grade-point average.


Econ. 409-3. History of Economic Thought. Survey of the development of economic thought from ancient to modern times.

Econ. 411-3. Monetary and Banking Systems. Survey of major economic and fiscal institutions such as commercial banks, the Federal Reserve System, and savings institutions; and the structure of debt. The relationships between households and firms and financial intermediaries are explored and the tools available to macroeconomic policy makers are described and evaluated.

Econ. 412-3. Monetary Theory and Policy. An analysis of monetary models and money as a policy determinant in national and international economies. Topics include the importance of interest rates, the effectiveness of monetary and fiscal policy, examination of portfolio balance models and international models. Prer., Econ. 411.

Econ. 417-3. Comparative Socialism. (P. Sci. 462.) Comparative analysis of public policy of governments describing themselves as socialist—as committed to abolishing social classes, ending alienation, and achieving equality and abundance; emphasis on historical conditions, political and economic organization, work incentives, economic technology, and popular culture.

Econ. 419-3. Radical Political Economy I. An introduction to the Marxist world view including the dialectic, Marx's view of human nature and his theory of alienation. Course focus is Volume I of Capital and contemporary extensions of this analysis of capitalist production and capital accumulation.

Econ. 420-3. Radical Political Economy II. Application of Marxian economics to analysis of contemporary capitalism focusing on theory and data on imperialism, crisis, technological change, inflation, militarism, and the roles of ideology and the state. Prer., Econ. 419.


Econ. 422-3. Public Finance II: Taxation and Other Revenues. Analysis of the revenue half of fiscal policy, including sources of surplus, all elements of revenue, examining major tax sources, public debt, intergovernmental grants-in-aid, gifts, charges, and fees.


Econ. 427-3. Economics of Transportation. Survey of transportation in U.S. First part of course deals with development of intercity transportation via water, rail, highway, and air. Second part deals with the urban transportation problem, comparing private and public alternatives.

*Students enrolled at the 500 level may expect additional work and evaluation commensurate with graduate standards.
Econ. 431-3. Practicum in Economics Education I. Classroom teaching of introductory-level Principles of Economics discussion sections under the supervision of an economics faculty member. Seminar and analysis of problems in the teaching of introductory economics, demonstrations, and evaluation of alternative teaching strategies and materials for use in discussion sections and appraisal of student teaching. Prer., Econ. 407, 408.

Econ. 432-3. Practicum in Economics Education II. Continuation of Econ. 431. Prer., Econ. 407, 408, 431.

Econ. 441-3. International Trade and Finance. Theories of international and comparative trade, private and public trade, world population and resources, tariffs, and commercial policy. International economic organization.

Econ. 450-3. The World Economy: Origins and Present Condition. (P.Sci. 450.) East Europe, Russia, and Central Asia from earliest times to the present. Equal emphasis on economics, culture, and politics. Particular attention to 20th-century developments.

Econ. 451-3. Economic History of Europe. Evolution of industrial society with emphasis upon the growth and development of English industry and commerce.

Econ. 452-3. Economic History of the United States. American economic organization and institutions and their development from colonial times to present.


Econ. 454-3. Environmental Economics. The causes of environmental destruction in a market economy and ways this can be overcome; the problems of economic growth and its limits, especially from the point of view of the adaptability of capitalism to a non-growth economy; introduction to major tools of economics useful to environmental planners. Prer., Econ. 202.

Econ. 455-3. Energy in the U.S. Economy. Institutional structure of the energy industry, patterns of energy use; theoretical analysis of the economics of energy; recent history of the energy crisis and political debate over an energy policy for the U.S., long-run implications for the U.S. (and world) economy. Prer., Econ. 201-202.

Econ. 460-3. Introduction to Human Resources. Economics of investments in man, including the economics of poverty and the analysis of public and private social insurance programs.

Econ. 461-3. Labor Economics. Study of problems associated with determination of wages, hours, and working conditions in the American economy. History and analysis of economic effects of trade unionism and other social institutions, including agencies of formal government. Introduction to manpower studies.

Econ. 462-3. Economics of Collective Bargaining. Scientific analysis of the bargaining process by which labor and management democratically reach agreements; how differences between labor and management are settled by means of grievance procedure and arbitration; and overall economic effect of collective bargaining on goods produced by the national economy. Demonstrations, workshops, and lectures.


Econ. 464-3. Collective Bargaining, Labor Law, and Administration. Study of social pressures that are shaped into labor policy acceptable to labor, management, and the general public by various means of social control. Evolution of a "common law" of labor relations out of free collective bargaining and arbitration. Prer., senior status.

Econ. 466-3. Health Economics. Presents an economic analysis of the health/medical sector of the U.S. economy. Lectures, assigned readings, and special projects are used to increase the student's awareness of issues in health care. Prer., Econ. 201, 202, and graduate standing.

Econ. 469-3. Government in the Economy. Analysis of the role of government in the economy; neoclassical microeconomic theory as a point of departure for understanding what a free market system can and cannot accomplish.


Econ. 477-3. Economic Development—Theory and Problems I. Theoretical and policy analysis of problems of economic development in both underdeveloped and advanced countries.

Econ. 478-3. Economic Development—Theory and Problems II. Current conditions of economic development, with emphasis on accelerating and maintaining growth.


Econ. 481-3. Introduction to Econometrics. The application of mathematical and statistical techniques to problems of economics theory. Emphasis is on principles rather than computational methods or mathematical rigor. Major topics include demand, production, and cost analysis. Prer., two semesters of calculus and one semester of statistics or consent of instructor.

Econ. 482-3. Introduction to Econometrics II. Continuation of Econ. 481. Prer., Econ. 481.

Econ. 492-variable credit. Special Economic Problems. For majors in economics; others by consent of instructor. Designed to give seniors a chance to evaluate critically some practical or theoretical problems under supervision, and to present results of their thinking to fellow students and instructors for critical evaluation.

Econ. 507-3. Applied Economic Theory. Course develops competence in techniques of applied micro/macroeconomic theory for those going directly into policy and problem solving jobs. Topics include estimating demand, cost, and production functions; operational models of production, processes from industry/agriculture, capital theory with resource applications, benefit-cost analysis.

Econ. 509-3. History of Economic Thought. Survey of the development of economic thought from ancient to modern times.

Econ. 511-3. Monetary and Banking Systems. Survey of major monetary and fiscal institutions such as commercial banks, the Federal Reserve System, and savings institutions; and the structure of debt. The relationships between households and firms and financial intermediaries are explored and the tools available to macroeconomic policy makers are described and evaluated.

Econ. 512-3. Monetary Theory and Policy. An analysis of monetary models and money as a policy determinant in national and international economies. Topics include the importance of interest rates, the effectiveness of monetary and fiscal policy, examination of portfolio balance models and international models. Prer., Econ. 511.

Econ. 519-3. Radical Political Economy I. An introduction to the Marxist world view including the dialectic, Marx's view of human nature and the theory of alienation. Course focus is Volume I of Capital and contemporary extensions of this analysis of the capitalist production and capital accumulation.

Econ. 520-3. Radical Political Economy II. Application of Marxist economics to an analysis of contemporary capitalism focusing on theory and data on imperialism, crisis, technological change, inflation, militarism, and the roles of ideology and the state. Prer., Econ. 419 or 519.

Econ. 521-3. Public Finance I: Budgeting and Expenditures. Analysis of the budgeting half of fiscal policy and making of choices regarding public expenditures, federal, state, local.

Econ. 522-3. Public Finance II: Taxation and Other Revenues. Analysis of the revenue half of fiscal policy, including sources of support for all elements of government, examining major tax sources, public debt, intergovernmental grants-in-aid, gifts, charges, and fees.

Econ. 525-3. Urban Economics. Analysis of the level, distribution stability, and growth of income and employment in urban regions. Urban poverty, housing, land use, transportation, and local public services, with special reference to economic efficiency and social progress.

Econ. 527-3. Economics of Transportation. Survey of transportation in the U.S. First part of course deals with development of inter-city transportation via water, rail, highway, and air. Second part deals with the urban transportation problem, comparing private and public alternatives.

Econ. 541-3. International Trade and Finance. Theories of international and international trade, private and public trade, world population and resources, tariffs, and commercial policy. International economic organization.

1 Students enrolled at the 500 level may expect additional work and evaluation commensurate with graduate standards.
Econ. 551-3. Economic History of Europe. Evolution of industrial society with emphasis on the growth and development of English industry and commerce.

Econ. 552-3. Economic History of the United States. American economic organization and institutions and their development from colonial times to present.


Econ. 556-3. Economics of Agriculture. Economic analysis of the agricultural sector and of problems and policies related to agriculture and other primary industries.

Econ. 560-3. Introduction to Human Resources. Economics of investments in man, including the economics of poverty and the application of cost benefit analysis to social welfare programs.

Econ. 561-3. Labor Economics. Study of problems associated with determination of wages, hours, and working conditions in the American economy. History and analysis of economic effects of trade unionism and other social institutions, including agencies of formal government. Introduction to manpower studies.

Econ. 562-3. Economics of Collective Bargaining. Scientific analysis of processes by which labor and management democratically reach agreements; how differences between labor and management are settled by means of grievance procedure and arbitration; and overall economic effect of collective bargaining on goods produced by the national economy. Demonstration, workshops, and lectures.


Econ. 564-3. Collective Bargaining, Labor Law, and Administration. Study of the labor market issues that are shaped into labor policy acceptable to labor, management, and the general public by various means of social control. Evolution of a common law of labor relations out of free collective bargaining and arbitration. Prer., senior status.

Econ. 566-3. Health Economics. Presents an economic analysis of the health/medical sector of the U.S. economy. Lectures, assigned readings, and special projects are used to increase the student's awareness of issues in health care.

Econ. 569-3. Government in the Economy. Analysis of the role of government in the economy, neo-classical, microeconomic theory as a point of departure for understanding what a free market system can and cannot accomplish.


Econ. 577-3. Economic Development — Theory and Problems I. Theoretical and empirical analysis of problems of economic development in both underdeveloped and advanced countries.

Econ. 578-3. Economic Development — Theory and Problems II. Current conditions of economic development, with emphasis on accelerating and maintaining growth.


Econ. 581-3. Introduction to Econometrics I. The application of mathematical and statistical techniques to problems of economic theory. Emphasis is on principles rather than computational methods or mathematical rigor. Major topics include demand, production, and cost analysis. Prer. two semesters of calculus and one semester of statistics, or consent of instructor.

Econ. 582-3. Introduction to Econometrics II. Continuation of Econ. 581. Prer., Econ. 581.

Econ. 582-variable credit. Special Economic Problems. By consent of instructor. Designed to give students a chance to evaluate critically some practical or theoretical problems under supervision and to present results of their thinking to fellow students and instructors for critical evaluation.

Econ. 600-3. History of Economic Thought. This course fosters or advances the student's cultural appreciation of the technical apparatus of current economic concepts. To gain this insight the student must read in the original texts of certain great economic writers from the Industrial Revolution to the 1920s. Secondary sources will be used in some instances.


Econ. 602-3. Macroeconomic Theory I. Considers general equilibrium and aggregative analysis in economic theory with particular emphasis given to theory of employment, consumption, and investment.

Econ. 603-3. Microeconomic Theory II. Continuation of Econ. 601.

Econ. 604-3. Macroeconomic Theory II. Continuation of Econ. 602.


Econ. 612-3. Seminar: Fiscal Policy. Continuation of Econ. 621. A critical analysis on fiscal policy with emphasis on problems of economic stability, growth, and employment. Either course may be taken independently for credit.


Econ. 626-3. Seminar: Urban Land Economics. Critical analysis of alternatives with respect to land use in urban areas: the forces at work, the institutional arrangements, economic incentives, environmental consequences, the quality of life.

Econ. 627-3. Seminar: Urban Transportation. Problems and methodology in dealing with urban transportation. Planning models, characteristics of systems, direct and indirect costs and benefits with emphasis on Denver. Required paper on some aspects of transportation in Denver. Prer., Econ. 427 or equivalent.


Econ. 630-2. Economics as a Social Science. The content and methodology of economics are reviewed and compared with our knowledge of and methods of studying the total social system.

Econ. 631-3. Practicum in Teaching College Economics. Classroom teaching of introductory-level Principles of Economics discussion sections under the supervision of an economics faculty member. Seminar analysis of problems in the teaching of introductory economics, demonstrations and evaluation of alternative teaching strategies and materials for use in discussion sections, appraisal of student teaching, experience designing learning activities and evaluation instruments. Prer., Econ. 407, 408.


Econ. 653-3. Natural Resources Economics. Application of economic theory to physical resources such as land and renewable

*Students enrolled at the 500 level may expect additional work and evaluation commensurate with graduate standards.*
resources, as well as to exhaustible resources. Prer., Econ. 407 or 408.
Econ. 654-3. Seminar: Environmental Economics. Effects of economic
environmental policy on the environment; application of economic theory
of external diseconomies. cost-benefit analysis, program budgeting and
welfare economics to problems of the physical environment. Prer.,
consent of instructor.
Econ. 661-3. Seminar: Labor Economics. Advanced study of the
history, nature, and function of labor organization; the process of wage
determination; and the formation of public policy.
Econ. 666-3. Seminar: Human Resources. The economics of
investment in human capital including the economics of poverty and the
application of cost-benefit analysis to social welfare programs.
Econ. 670-3. Seminar: Regional Economics. Theory of regional
analysis, problems of regional research such as location of industry and
regional resources.
Econ. 672-3. Comparative Economic Systems. Comparative
analysis of the economic systems of different countries and stages of
development; interrelations with the production and distribution of
wealth and with systems of property; contemporary approaches to
economic planning and economic integration.
Econ. 674-3. Comparative Industrial Organization and Planning.
A study of the ways in which common decisions are made and
implemented under various patterns of industrial organization, ranging
from those relying on the pure-market system to those employing a high
degree of centralized planning.
Econ. 675-3. Seminar: Industrial Organization and Control. The
large firm in relation to its rivals, suppliers, and customers (theory and
industry studies); social control of business through antitrust and other
government regulation.
Econ. 677-3. Economic Planning and Development. Deals with
role of planning in economic development with particular reference to
investigation of planning problems in Southeast Asia and the Middle
East.
Econ. 681-3. General Economic Statistics I. Application of
statistical inference to economic research. Principal topics are
probability theory, statistical inference, and regression analysis.
Econ. 687-3. Seminar: Economics of Latin America I. Research on
the economic problems of Latin America. Prer., Econ. 487 or 587;
Spanish 212 or equivalent.
Econ. 690-3. Seminar: Economic Problems. Special problems in
economic theory and in contemporary economic affairs.
Econ. 691-2. Seminar: Water Resources Development and
Management. A multidisciplinary exploration of the principles
governing water resource planning and development. Emphasis on the
sciences of water — physical, engineering, chemical, biological, and
social — and their interrelationships.
Econ. 700-4 to 6. Master's Thesis.
Econ. 707-3. Seminar: Mathematical Economics. Selected topics
on mathematical approaches to demand and production theory,
general equilibrium theory, and theory of capital accumulation and
economic growth. Emphasis on periodical literature. Prer., consent of
instructor.
Econ. 711-3. Advanced Monetary Theory. Major contributions to
monetary and banking theory up to the present day and current issues.
Econ. 732-3. Seminar: Teaching of College Economics. Analysis
of the theoretical and institutional content of economics, introduction
of pedagogical problems, and alternative approaches to teaching
economics principles and problems. Students ordinarily design, teach,
evaluate their own course in macro or micro principles of
economics. In the seminar they appraise the quality of their teaching,
discuss alternative strategies and materials, and design evaluation
procedures.
Econ. 783-3. Seminar: Economometrics I. Theory, construction, and
testing of generalized, linear, single-equation models.
Econ. 940-variable credit. Independent Study (Undergraduate).
Consent of instructor.
Econ. 960-variable credit. Independent Study (Graduate). To be
arranged with individual faculty members.

ETHNIC STUDIES

Asian American Studies
Et. St. 329-3. The Asian Americans. (Also Soc. Sci. 329.) A socio-
historical study of the Asian American experience. Examines anti-
Asian movements in the U.S., oppressive immigration laws, U.S.
foreign policy as it affects Asian American groups, and image.
Comparative Asian American immigrants, communities, and
problems also will be discussed.
Et. St. 330-3. Topics on Asian Americans. (Also Soc. Sci. 329.) Ex-
amines specific topics on Asian Americans to be selected by the
instructor and the students. Detailed study of subjects related to the
Asian American experience and communities.
341.) An introduction, combining lecture and discussion, of the
psychological perspective of being an Asian in America. Deals directly
with aspects of mental health, problems and approaches for the Asian-
American. Some field experience will be included. Prer., 3 hours of psy-
chology. Soc. Sci. 329 recommended.
Et. St. 398-variable credit. Cooperative Education. (Also Soc. Sci.
398.) Designed experiences involving application of specific, relevant
concepts and skills in supervised employment situations. Prer.,
sophomore standing and 2.5 grade-point average.

Black Studies
Et. St. 110-3. Black Contemporary Social Issues. Designed to
expose the student to those areas of intellectual, social, cultural,
economic, political, and educational concerns relevant to the Afro-
American experience. Principally an introductory survey of primary
issues currently affecting the black man.
Et. St. 125-3. Minority Folklore. Designed to explore the beliefs
and customs of various ethnic groups from a cultural perspective, with
reference to history, anthropology, and psychology.
Et. St. 203-3. Behavioral Analysis I. A psychology course which deals
with the interrelationships between the black individual and his social
environment. Social influences upon motivation, perception, and
behavior. The development and change of attitudes and opinions in the
ghetto.
Et. St. 204-3. Behavioral Analysis II. Psychological analysis of small
groups, social stratification, and mass phenomena such as riots.
Continuation of Et. St. 203.
survey of modern Africa with special emphasis on selected countries, both
independent and nonindependent. Southern Africa: political impact of
racial and religious problems, stressing recent development in
Rhodesia, South Africa, and the Portuguese colonies of Angola and
Mozambique.
Et. St. 215-3. Afro-American History I. Survey of the history of Afro-
Americans. Study, interpretations, and analysis of major problems,
issues, and trends affecting the black man from preslavery to the
present.
Et. St. 220-3. Black Social Movements. (Also social science credit.)
Developmental paradigms for black social movements. Differential
liner movements, theories of nationalism, integration, separation,
rhetorical nationalism, and tyranny.
Et. St. 223-3. Religion of the Black Man. Critical examination of the
black family's utilization of religious beliefs and practices.
Et. St. 250-3. Capitalism and Alienation. (Econ. 250.) The develop-
ment of slavery as an American institution from 1619 to 1970, the
plantation system, the growth of the slave trade, the simulation of
the American economy by slavery, the Civil War as an economic conflict
between the industrialists of the North and the agriculturalists of the
South.
Et. St. 251-3. Capitalism and Slavery I. (Econ. 251.) Post-Civil War
to the present, trade unions, legislation, the urban crisis, and "Black
Capitalism," Continuation of Et. St. 250.
Et. St. 270-3. African-American Art History I. (Also fine arts credit.)
A study of black art in both Africa and the Americas: problems in
depicting real life experiences of black people.
Et. St. 274-3. The American Writer and the Black Man I. Close
reading and analysis of significant literary works by black or white
American writers treating black Americans: novels, poems, plays, and
essays.
Et. St. 275-3. The American Writer and the Black Man II. Con-
tinuation of Et. St. 274 but may be taken independently of that course.
Et. St. 279-3. Survey of Ethnic Literature. (Engl. 279.) This course
covers various ethnic writers and their contributions to literature from
their own particular culture with reference to their perception of life
through their literary efforts.
Infrequently Offered Courses

El. St. 112-3. Introduction to Black Studies. Designed to acquaint new students with the history, purpose, organization, and goal of the Black Education Program.

El. St. 160-3. Economic History of Africa. A study of the black man in Africa before and after the coming of Europeans, with emphasis on the economic aspect of Africa's historical development.

El. St. 221-3. Black Social Theory. (Also social science credit.) Developmental paradigms for black social movements. Theories of nationalism, integration, separation, racial identity, and political economy.

El. St. 277-3. African-American Art History II. (Also fine arts credit.) Continuation of Et. St. 270.

El. St. 331-3. Law and the Black Man. A two-semester seminar which will place major emphasis on the law and legal institutions in America. Particular emphasis on the legislative and judicial functions in the structure for civil rights. All major U.S. Supreme Court decisions, as well as significant legislative enactments, will be examined in depth.

Mexican American Studies

El. St. 100-3. Introduction to Mexican American Studies. Required of all incoming M.A.E.P. students. Course will review techniques for studying languages, science, mathematics, and social areas. Systems of note-taking, research methods (including proper use of library facilities), preparation for and taking examinations, as well as building self-confidence will be discussed.

El. St. 111-3. Introduction to Drama: Chicano Workshop. Designed to encourage and guide the development of student acting, directing, and playwriting, with a concentration on the specialized techniques and content of Teatro Campesino.

El. St. 112-3. Bilingual Skills. A basic language course in which students with a background of both Spanish and English can learn the similarities as well as the differences in the two languages. Oral as well as written exercises in Spanish. Readings in Southwest folklore.

El. St. 127-3. Contemporary Mexican American I. (Also social science credit.) An introductory sociology course in which the basic terminology of the Chicano movement is defined and a survey made of the Chicano movement from its early manifestations to the present.

El. St. 135-1. Beginning International Folk Dance, Spanish and Mexican. Basic dances of Mexico and Spain: El Jarabe Tapatío; La Bamba; jotas, and pasodobles.

El. St. 136-1. Advanced International Folk Dance, Spanish and Mexican. An advanced course in the dances of Spain and Mexico including jotas, pasos dobles, huapangos, and zarabandas.

El. St. 211-3. Contemporary Mexican Literature in Translation. Mexican literature since World War I has been in the forefront of literary innovations directly reflecting the rapid progress and changes in the society. The purpose of the course is literary but serves also to dispel many false views of Mexico as a rural, traditionally conservative country.

El. St. 212-3. Contemporary Latin American Literature in Translation. The approach is the same as in Et. St. 211. The best of the contemporary Latin American authors are studied: Borges, Fuentes, Rulfo, Carpentier, Cortazar, and others.

El. St. 213-3. History of Chicano Art. A survey of art, indigenous as well as that with Spanish and Mexican influence. The focus on the Mexican American includes the fields of painting, sculpture, and architecture.

El. St. 302-3. Methodology of Tutoring the Educationally Disadvantaged. A course designed to improve the tutorial skills of upper classmen, especially Chicanos, or those who expect to help minority students. Concentration on tutoring of basic skills required for M.A.E.P. and Special Services tutors.

El. St. 303-3. History of the Spanish Language in the Southwest. A survey of the Spanish language as spoken in the various subgroups in the Southwest. The Spanish of the southwest is compared with that spoken in other areas of the world. The course is the first and most basic in the linguistic series in the Spanish discipline. Basic linguistic terminology is introduced and applied in the analysis of Southwest Spanish.

El. St. 304-3. Workshop in Southwest Spanish. A research-oriented workshop designed to conduct an in-depth analysis of Southwest Spanish through field study. Basic fundamentals of field research will be introduced. Prereq.: Et. St. 303 or consent of instructor.

El. St. 310-3. Mexican American Ethnic Relations. (Also anthropology credit.) Anthropology of North Americans of Spanish, Spanish-Indian, and Mexican national descent, their recent sociohistorical backgrounds, current interrelations and social movements among rural and urban groups. Cultural patterns, identity maintenance, and social forms and problems of national incorporation.


El. St. 312-3. Mexican Literature in Translation—Narrative. A survey of the masterpieces of Mexican narrative works in English translations, from the Popol Vuh to a Chicam Balam to the contemporary period.

El. St. 340-3. Social Psychology and the Mexican American. (Also psychology credit.) Exposes students to the research on Mexican Americans in the fields of intelligence and achievement, language and learning ability, attitudes, perception, personality, and motivation.
ET SL 350-3. The Creation of the Stories of Zapotec, Hopi, Sioux, and Mayan. This course will trace the history of man in the Americas through his legends and myths.

ET SL 371-3. The Film Idea. (C.T. 371.) A seminar and practicum in basic public service announcement and film production. Emphasizes the opportunities in the media to get film ideas aired on TV and radio. The class will produce public service announcements and one short film in cooperation with KOA-TV and KBTV. Prer., junior or senior standing.

ET SL 383-3. History of Mexican American in Colorado I. (Also history credit.) Research-oriented seminar course in which the student is expected to gather material on the subject from original sources.

ET SL 384-3. History of Mexican American in Colorado II. (Also history credit.) Continuation of Et. St. 383.

ET SL 398-variable credit. Cooperative Education. Designed experiences involving application of specific, relevant concepts and skills in supervised employment situations. Prer., sophomore standing and 2.5 grade-point average.


ET SL 405-3. Intergroup Relations. (Also social science credit.) A study of intergroup (race) relations at the small group level. Includes analysis of a group that has been stratified into a majority number of white students and a fixed number of minority students.


ET SL 432-3. Education in Multilingual Communities. (Also social science credit.) Sociolinguistic approach to education in multilingual communities in the United States Southwest. Topics considered will include historical and contemporary trends in schools' language policies and practices; intra-school social and academic stratification.

ET SL 455-3. The Mexican American in Politics. (Pol. Sci. 455.) Analysis of the social, cultural, and economic factors which affect political behavior of Mexican American citizens. Special attention will be paid to the Mexican American cultural heritage and to relations between Mexican Americans and Anglo Americans.

ET SL 459-3. The Mexican American in the Southwest. A study of the development of the social structures of the Mexican American in the Southwest and the forces that have affected them.

ET SL 460-3. The Chicano Community and Community Organization. (Also social science credit.) Examination of the origin of the terms "community" and "barrio." A comparative analysis of the internal barrio structure and the larger society. Community organization and community development. Positive and negative role models/leaders. Methods and techniques of community organization as related to La Raza.

ET SL 476-3. Contemporary Chicano Literature. (Engl. 476.) A study of the present narrative literature produced by Chicanos. No political slant is imposed. The literary value is emphasized.

Native American Studies

ET SL 249-3. Native American Literature. An introduction to Native American literature and other expressive forms with emphasis on the aesthetic, linguistic, psychological, and historical properties, as well as the native author and his material.

ET SL 260-3. The American Indian Experience. Survey of the relationships between Indian and non-Indian peoples, particularly in the context of the unique interaction between tribes and the federal government.


ET SL 321-3. The American Indian and Federal Law. (Soc. Sci. 321.) A survey of the special status of American Indians, as well as the problems, costs, and benefits affecting various tribal groups and individually. (Also anthropology credit.) Special attention given to the environment, the frontier, the city, American diplomacy, reform movements, women in American society, the presidency, etc.

ET SL 329-3. From Diversity to Unity: Canada to 1867. The history of the Canadian colonies from the founding of Quebec to the establishment of the dominion in 1867. The French regime, the British conquest, the menace from the United States, and the evolution toward federation are emphasized.

ET SL 334-3. Unity Within Diversity: Canada Since 1867. Canadian history from establishment of the dominion to the present. Major developments emphasized are the growth of self-government and the sense of nationhood leading to national sovereignty, and the tensions and divisions which have strained the national fabric.

ET SL 399-3. Cross Cultural Field Experience. (Soc. Sci. 390.) Intensive contact with another culture through supervised travel in a country other than the United States. Pre-trip orientation lectures; in-country lectures by local resource people and supervising UCD faculty.
who will also evaluate written reports by these students.


Hist. 398-variable credit. Cooperative Education. Designed experiences involving application of specific, relevant concepts and skills in supervised employment situations. Prer., sophomore standing and 2.5 grade-point average.

Hist. 399-3. The American Southwest From Reconstruction to the Present. Examines the continuing emergence of the New South since the end of Reconstruction in 1876 to the Carter presidency. Focuses on the forces which have made the South distinctive and which have profoundly affected the history of its peoples, both white and black.

Hist. 422-3. The Second World War. The war in its totality: causes, military strategies (equal treatment to European and Pacific theaters), campaigns, impact of technology and weapons, political and social upheaval.


Hist. 439-3. American Colonies in the 18th Century. The maturation of the American colonies within the British Empire, the development of the five port towns as commercial and intellectual centers, the creation of a uniquely American politics, and the unfolding of critical differences between North and South.

Hist. 441-3. History of Africa to 1840. A survey of the diverse histories of the peoples of Africa with emphasis on the sub-Saharan regions. Africa provides a wide range of political development, economic cooperation, and cultural variety.

Hist. 442-3. History of Africa Since 1840. A continuation of Hist. 441, although 441 is not a prerequisite. Central topics will be African potential and economic changes in response to European intrusions into the continent, the struggle against colonialism, and the growth of African nationalism.

Hist. 449-3. The Gilded Age: U.S. History, 1865-1900. Topical study of evolution and growth of major American institutions. Among the topics to be covered are the rise of big business, industrialism, immigration, the plight of native Americans, the West, agrarian discontent, and foreign policy.

Hist. 451-3. The American Revolution. The crisis of the British Empire in North America from the end of the French and Indian War to the ratification of the American Constitution. Topics include the emerging economy, constitutional arguments against Britain, the conduct of the war, and the definition of a republic.

Hist. 452-3. Early National America. This survey of the 40 years following the inauguration of Washington considers the establishment of the new government, the roles of the president and the Supreme Court, westward expansion and its effects on American economic and political life, and the War of 1812.

Hist. 453-3. Civil War and Reconstruction. This course examines the causes and outbreak of the American Civil War, aspects of the war itself, and its impact on American society. The second half of the course covers the federal efforts to reconstruct southern society and extend equal rights to black Americans.

Hist. 454-3. The Progressive Movement and After: U.S. History, 1900-1929. A topical study of changes in basic American institutions, including attempts to control the corporate giants; growth of labor organizations; World War I and reaction; rise of consumerism in the 1920s; causes of the crash in 1929.

Hist. 456-3. The Jacksonian Era. This course surveys the period 1828-1848 as the era of the new politics of the common man and the era of reform. It deals with America's accommodation to expansion and the problems of slavery, industrialization and the problems of immigration and labor.

Hist. 459-3. The American Southwest Since 1800. An examination of the development of the Southwest beginning with the arrival of Americans during the early 19th century and concluding with the present state of the Southwest. Major focus is on the activities of Americans and their impact on the Southwest's environment, peoples, and cultures.

Hist. 460-3. Mexican-American Southwest. The history of the Mexican American people in the Southwest with major emphasis on their experiences during the 19th and 20th centuries. Examines the response of Mexican Americans to American domination and emergence of the Chicano movement.


Hist. 463-3. Social and Intellectual History to 1860. Major topics include the evolution of Protestantism from Puritans to Transcendentalists; humanitarian reforms such as abolition, temperance, and women's rights; European influences on American thought; the effect of industrialization on the development of class society; and American nostalgia for agrarian life.

Hist. 464-3. American Society and Thought Since 1860. A topical study of main currents of American thought and their impact upon society. Topics include American philosophy, literature (extensively), art, music, immigration and urbanization, technology, extremism of both left and right, education, etc.

Hist. 465-3. The U.S. in Depression and War, 1929-1952. Major topics include the collapse of the economy, FDR's efforts at recovery, the coming of World War II and U.S. intervention, its role in wartime, adjustment to postwar prosperity, and the Cold War.

Hist. 466-3. Affluence and Anxiety: The U.S. Since 1948. Major developments in the U.S. since 1948. Topics include the onset of the Cold War, growth of unparalleled prosperity, problems of internationalist foreign policy, civil rights movement, division over Vietnam, and economic uncertainty during the 1970s.

Hist. 467-3. Isolation and Expansion: U.S. Foreign Policy to 1912. The development of American foreign policy to the eve of World War I. The two chief concepts probed are isolation from European affairs and the drive for hegemony in North America. In addition, the Monroe Doctrine, Open Door in the Far East, and relations with Great Britain, Canada, and Latin America will be discussed.

Hist. 468-3. The Reluctant Giant: U.S. Foreign Policy Since 1912. The chief thrust is the emergence of the U.S. from isolation toward full-scale participation in the affairs of Europe and other areas. Special attention is given to our intervention in two world wars, the Cold War, and the over-extension of U.S. commitments since 1960.

Hist. 470-3. History of Urban America. Rise of the American city from colonial time to present. Major emphasis on the process of urbanization since 1840: town promotion, the industrial city, immigration, "boss" politics and reform, urban technology, transportation systems, minorities, city planning, and the future of urban America.

Hist. 471-3. America and Americans in the Pacific. This course explores some well-known, other little-known facets of American interest and influence in the Pacific. Major topics include development of trade; the growth of the U.S. as a Far Eastern power; evolution of our colonial empire; causes, course, and effects of World War II in the Pacific.

Hist. 479-3. From Feast to Famine: U.S. Military History and Policy to 1900. The chief focus is the enormous difference in public opinion toward army and navy in war and peace. Major topics include the roots of military policy and the impact of technology upon these changes.

Hist. 480-3. In Peace and War: U.S. Military History in the 20th Century. This course is not simply a history of America's recent wars. The chief theme is interaction of peacetime and wartime military policies. Other topics include the evolution of military technology and changes wrought by the Cold War.

Hist. 481-3. History of Mexico to 1821. The history of Mexico from the appearance of prehistoric man to the gaining of independence from Spain in 1821. Major focus on Mayan and Aztec cultures, the Spanish conquest, and the evolution of colonial New Spain.
Hist. 482-3. History of Mexico Since 1921. The history of Mexico from 1821 to contemporary times. Examines the political and cultural forces of the 19th century which led to the Mexican Revolution, the major events and leaders of the Revolution, and Mexico’s efforts to come to terms with its own revolution.


Hist. 486-3. The Old South and National Disunion. History of the Old South from the founding of the southern colonies and the introduction of slavery to the formation of the Southern confederacy in 1861. Major emphasis on the emergence of a distinctive southern culture, the institution of slavery, the abolition movement, and the road to secession.

Hist. 487-3. History of Southern Africa. A history in depth of the clash of peoples and cultures in Africa south of the Zambezi River. African and Africaner political, economic, and cultural development in a single land and the consequences of several competing nationalisms existing side by side will be examined. Apartheid and African opposition to it will be analyzed.

Hist. 493-3. Russia Through the 17th Century: Kiev, Mongol, and Muscovite Russia. Covers prehistoric Russia. The richness of the 17th century is next considered, from the adoption of Islam in the Crimea, to the development of the Polish-Lithuanian Commonwealth to the struggle for power within the Russian Empire. The influence of Russia, the rise of Moscow and its dominance over other contenders for rule, autocracy, serfdom, and the ecclesiastical schism.

Hist. 494-3. The Emergence of Modern Russia: From Peter the Great to 1856. The development of political institutions, church-state relationships; class stratification; scientific, educational, and cultural development in the 18th and early 19th centuries. Russia at the end of the period.

Hist. 495-3. The Russian Revolutions: Russia From the 1860s Through 1917. Emphasis upon Russia's attempts to modernize, beginning with great reforms of the 1860s and 1870s; increasing polarization of government and opposition groups. Also emphasizes theory including thought of Marx, Engels, Lenin, and Trotsky.

Hist. 496-3. The Soviet Regime: Russia Since 1917. Studies the development of the Soviet Union from its formation in the October Revolution, through the civil war, the New Economic Policy, the Stalinist purges, industrialization, collectivism, up to the present.

Hist. 497-3. Russian Intellectual History. Students read the works of ten 19th-century literary figures in order to analyze Russian political and social institutions, economic conditions, social relationships, and philosophical currents.


Hist. 505-3. The New South From Reconstruction to the Present. Examines the continuing emergence of the New South since the end of Reconstruction in 1876 to the Carter presidency. Focuses on the forces which have made the South distinctive and which have profoundly affected the history of its peoples, both white and black.

Hist. 506-3. History of the British Empire. An examination of issues, events and individuals responsible for the extraordinary growth of British imperial territory in the 18th Century. The phenomenon of imperialism provides a major focus.

Hist. 522-3. The Second World War. The war in its totality; causes, military strategies (equal treatment to European and Pacific theatres), campaigns, impact of technology and weapons, political and social upheaval.


Hist. 534-3. Seventeenth-Century America. Explores America’s first settlements along the Atlantic coast and the reasons why some fared better than others, American reaction to the Indians, the origins of slavery, New England Puritanism, and the evolution of the British imperial system.

Hist. 539-3. American Colonies in the 18th Century. The maturation of the American colonies within the British Empire, the development of the five port towns as commercial and intellectual centers, the creation of uniquely American politics, and the unfolding of critical differences between North and South.

Hist. 541-3. History of Africa to 1840. A survey of the diverse histories of the peoples of Africa with emphasis on the sub-Saharan regions. Africa provides a wide range of political development, economic cooperation, and cultural variety.

Hist. 542-3. History of Africa Since 1840. A continuation of Hist. 541, although 541 is not a prerequisite. Central topics will be African potential and economic changes in response to European intrusions into the continent, the struggle against colonialism, and the growth of African nationalism.

Hist. 549-3. The Gilded Age: U.S. History, 1865-1900. Topical study of evolution and growth of major American institutions. Among the more important are the rise of big business, impact of industrialism, immigration, the plight of native Americans, the West, agrarian discontent, and foreign policy.

Hist. 551-3. The American Revolution. The crisis of the British Empire in North America from the end of the French and Indian War to the ratification of the American Constitution. Topics include the emerging economy, constitutional arguments against Britain, the conduct of the war, and the definition of a republic.

Hist. 552-3. Early National America. This survey of the 40 years following the inauguration of Washington considers the establishment of the new government, the roles of the President and the Supreme Court, westward expansion and its effects on American economic and political development. The War of 1812.

Hist. 553-3. Civil War and Reconstruction. This course examines the causes and outbreak of the American Civil War, aspects of the war itself and its impact on American society. The second half of the course covers the federal efforts to reconstruct southern society and extend equal rights to black Americans.


Hist. 555-3. The Jacksonian Era. This course surveys the period 1828-1848 as the era of the new politics of the common man and the era of reform. It deals with America’s accommodation to expansion and the problems of slavery, industrialization and the problems of immigration and labor.

Hist. 559-3. The American Southwest Since 1800. An examination of the development of the Southwest beginning with the arrival of Americans during the early 19th Century and continuing with the present state of the Southwest. Major focus is on the activities of Americans and their impact on the Southwest’s environment, peoples, and cultures.

Hist. 560-3. Mexican-American Southwest. The history of the Mexican American people in the Southwest with major emphasis on their experiences during the 19th and 20th centuries. Examines the response of Mexican Americans to American domination and emergence of the Chicano movement.


Hist. 563-3. Social and Intellectual History to 1860. Major topics include the evolution of Protestantism from Puritans to Transcendentalists; humanitarian reforms such as abolition, temperance, and women’s rights. European influences on American thought; the effect of industrialization on the development of class society; and American nostalgia for agrarian life.

Hist. 564-3. American Society and Thought Since 1860. A topical survey of main currents of American thought and their impact upon society. Topics include American philosophy, literature (extensively), art, music immigration and urbanization, technology, extremism of both left and right, education, etc.

Hist. 565-3. The U.S. in Depression and War, 1929-1952. Major topics include the collapse of the economy, FDR’s efforts at recovery, the coming of World War II and U.S. intervention, its role in wartime, adjustment of postwar prosperity, and the Cold War.

Hist. 566-3. Affluence and Anxiety: The U.S. Since 1948. Major developments in the U.S. since 1948. Topics include the onset of the Cold War, growth of unparalleled prosperity, problems of

*Students enrolled at the 500 level may expect additional work and evaluation commensurate with graduate standards.*
internationalist foreign policy, civil rights movement, division over Vietnam, and economic uncertainty during the 1970s.

**Hist. 567-3. Isolation and Expansion: U.S. Foreign Policy to 1912.** The development of American foreign policy to the eve of World War I. The two chief concepts probed are isolation from European affairs and the drive for hegemony in North America. In addition, the Monroe Doctrine, Open Door in the Far East, and relations with Great Britain, Canada, and Latin America will be discussed.

**Hist. 568-3. The Reluctant Giant: U.S. Foreign Policy Since 1912.** The chief thrust is the emergence of the U.S. from isolation toward full-scale participation in the affairs of Europe and other areas. Special attention is given to our intervention in two world wars, the Cold War, and the over-extension of U.S. commitments since 1960.

**Hist. 570-3. History of Urban America.** Rise of the American city from colonial times to present. Major emphasis on the process of urbanization since 1840, town promotion, the industrial city, immigration, “boss” politics and reform, urban technology, transportation systems, minorities, city planning, and the future of urban America.

**Hist. 571-3. America and Americans in the Pacific.** This course explores some well-known, other little-known facets of American interest and influence in the Pacific. Major topics include development of trade; the growth of the U.S. as a Far Eastern power; evolution of our colonial empire; causes, course, and effects of World War II in the Pacific.

**Hist. 579-3. From Feast to Famine: U.S. Military History and Policy to 1900.** The chief focus is the enormous difference in public opinion toward army and navy in war and peace. Major topics include the origins of military policy and the impact of technology upon these changes.

**Hist. 580-3. In Peace and War: U.S. Military History in the 20th Century.** This course is not simply a history of America’s recent wars. The chief theme is interaction of peacetime and wartime military policies. Other topics include the evolution of military technology and changes wrought by the Cold War.

**Hist. 581-3. History of Mexico to 1821.** The history of Mexico from the appearance of prehistoric man to the gaining of independence from Spain in 1821. Major focus on Mayan and Aztec cultures, the Spanish conquest, and the evolution of colonial New Spain.

**Hist. 582-3. History of Mexico Since 1821.** The history of Mexico from 1821 to contemporary times. Examines the political and cultural forces of the 19th century which led to the Mexican Revolution, the major events and leaders of the revolution, and Mexico’s efforts to come to terms with its own revolution.

**Hist. 585-3. Modern Spain.** Covers the medieval and early modern background, political and economic modernization, the crisis of the 20th century, and the evolution of Spanish civilization.

**Hist. 586-3. The Old South and National Disunion.** History of the Old South from the founding of the southern colonies and the introduction of slavery to the formation of the Southern confederacy in 1861. Major emphasis on the emergence of a distinctive southern culture, the institution of slavery, the abolition movement, and the road to secession.

**Hist. 587-3. History of Southern Africa.** A history in depth of the clash of peoples and cultures in Africa south of the Zambesi River. African and Afrikaner political, economic, and cultural development in a single land and the consequences of several competing nationalisms existing side by side will be examined. Apartheid and African opposition to it will be analyzed.

**Hist. 593-3. Russia Through the 17th Century: Kievan, Mongol, and Muscovite Russia.** Covers prehistoric Russia. The richness of the Kievan period: icons, architecture, internationalism of Kiev, Mongol society, its influence on Russia, the rise of Moscow and its dominance over other contenders for rule, autocracy, serfdom, and the ecclesiastical schism.

**Hist. 594-3. The Emergence of Modern Russia: From Peter the Great to 1856.** The development of political institutions, church-state relationships; class stratification; scientific, educational, and cultural developments in 17th-, 18th-, and early 19th-century Russia.

**Hist. 595-3. The Russian Revolutions: Russia from the 1860s Through 1917.** Emphasis upon Russia’s attempts to modernize, beginning with great reforms of the 1860s and 1870s; increasing polarization of government and opposition groups. Also emphasizes theory, including thought of Marx, Engels, Lenin, and Trotsky.

**Hist. 596-3. The Soviet Regime: Russia Since 1917.** Studies the development of the Soviet Union from its formation in the October Revolution, through the civil war, the New Economic Policy, the Stalinist purges, industrialization, collectivism, up to the present.

**Hist. 597-3. Russian Intellectual History.** Students read the works of ten 19th-century literary figures in order to analyze Russian political and social institutions, economic conditions, social relationships, and philosophical currents.

**Hist. 600-3. Historical Philosophy and Method.**

**Hist. 601-3. Historiography.**

**Hist. 634-3. Readings in European Intellectual History.**

**Hist. 643-3. Readings in Modern European History.**

**Hist. 644-3. Readings in Modern European International History.**

**Hist. 645-3. Readings in South African History.**

**Hist. 646-3. Readings in African History.**

**Hist. 648-3. Readings in British Commonwealth History.**

**Hist. 650-3. Readings in U.S. Colonial History.**

**Hist. 651-3. Readings in U.S. History, 1776-1815.**

**Hist. 652-3. Readings in U.S. History, 1815-1860.**

**Hist. 660-3. Readings in the American Southwest.**

**Hist. 663-3. Readings in American Society and Thought.**


**Hist. 666-3. Readings in U.S. History Since 1948.**

**Hist. 668-3. Readings in American Diplomatic History Since 1900.**

**Hist. 669-3. Readings in the Emergence of Modern America, 1870-1900.**

**Hist. 670-3. Readings in the History of Urban America.**

**Hist. 682-3. Readings in Latin American National History.**

**Hist. 683-3. Readings in Mexican American Southwest.**

**Hist. 686-3. Readings in History of the Old South.**

**Hist. 690-3. Introduction to Archival and Records Management Procedures.**

**Hist. 693-2. Readings in Modern Russian History.**

**Hist. 699-variable credit, Independent Study.**

**Hist. 700-4 to 6, Master’s Thesis.**

**Hist. 734-3. Seminar: Modern European History.**

**Hist. 740-3. Seminar: European Intellectual History.**

**Hist. 741-3. Seminar: British Empire History.**

**Hist. 742-3. Seminar: African History.**

**Hist. 754-3. Seminar: Modern European Diplomatic History.**

**Hist. 764-3. Seminar: American Society and Thought.**


**Hist. 768-3. Seminar: American Diplomatic History Since 1900.**

**Hist. 770-3. Seminar: History of Urban America.**

### Infrequently Offered Courses

**Hist. 241-3. History of England to 1832.**

**Hist. 242-3. History of England Since 1832.**

**Hist. 258-3. History of Colorado.**

**Hist. 281-3. History of Latin America I.**

**Hist. 282-3. History of Latin America II.**

**Hist. 322-3. Women in History.**

**Hist. 370-3. History of Denver.**

**Hist. 384-3. History of the Mexican Americans in Colorado.**

**Hist. 412-3. Intellectual History of Medieval Europe.**

**Hist. 416-3. History of Science.**

**Hist. 419-3. Intellectual History of Early Modern Europe.**

**Hist. 420-3. Intellectual History of Modern Europe.**

**Hist. 423-3. Europe During the Renaissance.**

**Hist. 424-3. Europe During the Reformation.**

**Hist. 428-3. History of East Central Europe.**

**Hist. 430-3. History of France.**

**Hist. 436-3. History of Germany.**

**Hist. 437-3. International History of Europe in the 19th Century.**

**Hist. 438-3. International History of Europe in the 20th Century.**

**Hist. 440-3. Social and Economic Change in African History.**

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1 Students enrolled at the 500 level may expect additional work and evaluation commensurate with graduate standards.
Hist. 450-3. A Political History of Africa.
Hist. 475-3. History of Japan In the Modern Age.
Hist. 489-3. The Modern Middle East, 1789 to the Present.
Hist. 499-variable credit. Independent Study.
Hist. 524-3. History of the United States Since 1850.
Hist. 528-3. History of the United States Since 1850.
Hist. 530-3. America In the Modern Age.
Hist. 533-3. History of Japan Since 1850.
Hist. 546-3. History of Ireland.
Hist. 573-3. History of China to 1850.
Hist. 574-3. History of China Since 1850.
Hist. 589-3. The Modern Middle East, 1789 to the Present.
Hist. 598-3. Senior Colloquium.
Hist. 950-variable credit. Independent Study (Graduate).

**POLITICAL SCIENCE**

**General Courses**

Pol.Sci. 100-3. Introduction to Political Science. Introduction to the study of politics, its human importance, and its relationship to social institutions. Analysis of the relationship between individual political behavior and characteristics of the political system. Development of key concepts such as power, legitimacy, authority, political socialization, and revolution. Required of all majors.

Pol.Sci. 200-3. Research In Contemporary Political Topics. Development of basic research skills in areas of current political controversy and conflict, such as poverty, crime, racism, corruption, censorship, and imperialism. Choice of research topics related to interests of the student. Required of all majors. Prer., Pol.Sci. 100 or consent of instructor.

Pol.Sci. 398-variable credit. Cooperative Education. Designed experiences involving application of specific, relevant concepts and skills in supervised employment situations. Prer., sophomore standing and 2.5 grade-point average.

Pol.Sci. 940-1 to 3. Independent Study (Undergraduate). 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 to them. Subjects chosen and arrangements made to suit the needs of each student. Primarily for seniors. Prer., 15 semester hours in political science and consent of instructor.

Pol.Sci. 950-1 to 3. Independent Study (Graduate).

Pol.Sci. 699-1 to 3. Graduate Research Topics. Independent research in some subject of interest to the graduate student. Subjects are chosen and arrangements are made to suit the needs of each particular student. Prer., consent of instructor.


**American Government and Politics**

Pol.Sci. 110-3. The American Political System. General introduction to the American political system with emphasis upon the interrelations among the various levels and branches of government, formal and informal institutions, processes, and behavior. Required of all majors. Not open to those who have had Pol.Sci. 101 and/or 102.

Pol.Sci. 210-3. Power in American Society. Who has power in the United States; how it is distributed and used; sources of power and legitimacy; checks and potential checks on decision making by the powerful; consequences of power allocation and use of citizen well-being; continuity and change in the structure of power in America.

Pol.Sci. 320-3. Practical Politics. Liberal, conservative, and radical approaches to political action. Political resources, opportunities, and consequences of political action. The political process and information sources. Moral and pragmatic dilemmas of political action. Individual and group interest versus the public good. Student political involvement required.

Pol.Sci. 350-3. Law for Survival. Survey of law applicable to situations frequently encountered in America, including civil and criminal actions, negligence, intentional torts, divorce, wills, home purchase, landlord-tenant, partnership, corporate law, civil liberties. Role of the lawyer in these areas is examined.

Pol.Sci. 353-3. The Modern Capitalist State. An examination of various models of Western advanced capitalist states: laissez faire, pluralist, welfare state, Marxist, and postindustrial. Student research for purposes of testing the alternative models. Emphasis on the U.S.


Pol.Sci. 406-3. State Government and Administration. 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 to the government of Colorado.

Pol.Sci. 407-3. Urban Politics. Examination of the structure of political and social influence in urban areas; selection of urban leadership; relationship of the political system to governmental and social institutions.

Pol. Sci. 435-3. The Environment and Public Policy. Each major environmental issue will be studied through concrete case studies showing how the various political levels and constituencies control the world in which we live. The heart of the course will be an environmental investigation project; students will be divided into small teams and will choose a current Colorado environmental problem to research, investigate, analyze, and outline.

Pol.Sci. 444-3. Contemporary Culture and Politics in America. Intellectual and experimental investigation of the interplay of culture and politics in American society, as manifested in literature, social and political philosophy, political and legal writings, and cultural and political movements, and daily behavior.

Pol.Sci. 449-3. American Judicial System. Examination of the principal actors in the legal system: police, lawyers, judges, citizens. About half of the course will be devoted to the study of judicial behavior, especially at the Supreme Court level.


Pol.Sci. 455-3. The Mexican American In Politics. (ElSt. 445.) Analysis of the social, cultural, and economic factors which affect political behavior of Mexican Americans. Special attention will be paid to the Mexican-American cultural heritage and to relations between Mexican Americans and Anglo Americans.


Pol.Sci. 457-3. Political Socialization. An examination of the processes involved as individuals develop and change their political values, beliefs, and patterns of participation over the life cycle. The context under which political socialization contributes to systems maintenance and/or change variations across genders, classes, ethnic groups, and political systems will be considered.

Pol.Sci. 492-3. Women and the Law. An examination of the role of the courts in the development of public policy toward women; how the legal system affects the economic power, family roles, safety, and political participation of women.

Students enrolled at the 500 level may expect additional work and evaluation commensurate with graduate standards.
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Pol.Sci. 493-3. Contemporary Issues in Civil Liberties. An examination of major issues in civil liberties such as the rights of defendants, the role of religion in society, and the suppression of political dissent.

Pol.Sci. 501-3. Seminar: American Politics. Intended primarily for students who have had an undergraduate course in American politics, this course will be devoted to the preparation and criticism of research papers, with some examination of literature in the field. Prer., graduate standing or consent of instructor.


Pol.Sci. 562-3. Seminar: the Politics of Male/Female Relations. This course will examine the empirical literature on male/female power relations, critique the existing theory, and seek to reconceptualize the nature and scope of politics in order to fully incorporate the study of women into political science. Papers and a research design.

Pol.Sci. 603-3. Research Seminar: Democratic Theory, Participation, and Industrial Democracy. Two-fold purpose: to introduce students to the literature of direct and industrial democracy and to provide an experience in research (research design, text construction, and interviewing).

Comparative Politics

Pol.Sci. 302-3. Introduction to Comparative Politics. Comparison of the basic political features of selected countries. Themes examined include evolution and revolution, socioeconomic development, political instability, and elite-mass relations.

Pol.Sci. 310-3. Women in a Changing World. (Soc.Sci. 335.) Offers an understanding of the historical, economic, and sociocultural background of women's changing roles and functions in the contemporary world. The approach and material are multidisciplinary. The goal is a balanced understanding through analysis and discussion.

Pol.Sci. 380-3. Cross-Cultural Field Experience. (Soc.Sci. 380.) Intensive contact with another culture through supervised travel in a country other than the United States. Pre-trip orientation lectures; in-country lectures by local resource people and supervising UCSD faculty who will also evaluate written reports by the students.

Pol.Sci. 409-3. Comparative Metropolitan Systems. Comparative analysis of the major metropolitan systems in different countries; the structural environment, decision-making in the bureaucracies and political groupings, governmental interaction and communication.

Pol.Sci. 410-3. Advanced Comparative Politics — Western Europe. An intensive and comparative analysis of the political systems and processes of Western Europe. Emphasis on political culture and constitutionalism; executive-legislative relationships; electoral systems; political parties, movements, and interest groups; administrative and judicial parties and interest groups; administrative and judicial processes; and the impact of social changes on political institutions.


Pol.Sci. 415-3. Political Systems of the Middle East and North Africa. Comparative analysis of political processes in the Middle East and North Africa. Islamic political theory and its contemporary manifestation. The role of nationalism and the quest for modernity in the political development of this region. Parties and programmed mass mobilization in transitional politics. Modernization and system change.

Pol.Sci. 419-3. Political Systems of Sub-Saharan Africa. Analysis of major types of political systems in Sub-Saharan Africa and intensive case studies of selected countries exemplifying each type. Anticolonial movement, adoption and rejection of Western political institutions and values. Special political problems of multiracial and multicultural societies.

Pol.Sci. 450-3. The Soviet World: Origins and Present Condition. (Econ. 450.) East Europe, Russia, Central Asia from earliest times to the present. Equal emphasis on economics, culture, and politics. Particular attention devoted to problems of development and achieving equality and abundance. Emphasis on historical conditions, political and economic organization, work incentives, education, technology, and popular culture.


Pol.Sci. 462/Econ. 417-3. Comparative Socialism. Comparative analysis of public policy of governments describing themselves as socialist—as committed to abolishing social classes and achieving equality and abundance. Emphasis on historical conditions, political and economic organization, work incentives, education, technology, and popular culture.

Pol.Sci. 464-3. Comparative Political Leadership. This course deals with political leadership from historical, conceptual, and comparative points of view. It seeks to illuminate the types of leadership that have emerged in peasant societies, empires, and revolutionary movements and applies these approaches to modernizing and bureaucratic leadership.

Pol.Sci. 511-3. Seminar: Political Development. Writing and discussion of comprehensive papers on selected aspects of political development within the non-Western world. Focus on the theory of political development and the heuristic value of this conceptual framework for the study of non-Western politics. Violent and nonviolent change. Introduction to research methods and materials in this field.


Pol.Sci. 515-3. Seminar: Political Economy of Marxist Socialists. Critical examination of variables which affect political system development in countries characterized by a state-owned, planned economy. Countries selected for study, degree to which the seminar focuses on one or more states, and allocation of work between common reading and individual research may vary with each offering.

Pol.Sci. 560-3. Seminar: Comparative Political Parties and Interest Groups. Critical examination of selected topics relating to social forces, parties, and interest groups. Analysis of concepts, theories, and case studies. Party systems in comparison; their social bases and ideologies. The role of groups and the determinants of groups politics. Research material and reports.


Pol.Sci. 569-3. Seminar: Political Anthropology. A general consideration of the nature of political systems, law, and authority from an evolutionary point of view. Different types of stateless societies—egalitarian, rank, and stratified—will be examined as well as ancient and modern state systems.

International Relations

Pol.Sci. 365-3. The United States in World Affairs. Intensive study of the interaction of the United States with other nations in the international political economy; U.S. political, economic, and military roles in world affairs; symbolic impact of the U.S. model abroad in comparison with selected other national models.

Pol.Sci. 421-3. International Politics. The system of national states, concepts of national interest, goals of foreign policies, conduct of diplomacy, and the bearing of these elements on the problem of peace. Presentation and evaluation of the solutions that have been offered for the maintenance of peace. Great powers and regions of the earth in international politics today and their roles in international tensions.

Pol.Sci. 423-3. American Foreign Policy. Examination of the foundations, assumptions, objectives, and methods of U.S. foreign policy. Special attention to the revolutionary international environment and to problems of diplomacy and influence.

Political Theory and Public Law

Pol.Sci. 472-3. Soviet and Chinese Foreign Policy. Foreign policies of the Soviet Union and China, including the Sino-Soviet conflict; relations with Western powers and the Third World; interaction of domestic developments and foreign policy; role of national interest, ideology, and elite personalities.

Pol.Sci. 473-3. Middle East and World Affairs: Relations Between Middle Eastern Countries and Between the Middle East and the World. Focuses on issues of contemporary concern such as the status of Israeli-Palestinian relations, and the politics of oil.


Pol.Sci. 521-3. Seminar: International Relations. Primarily devoted to writing and discussion of comprehensive research papers in the field of international power politics and the attempts at controlling conflicts among nations. Introduction to research methods and materials in the field.

Pol.Sci. 523-3. Seminar: American Foreign Relations. Examination of select methodological and substantive problems. Particular emphasis on elements of national decision making, America's adaptation to the changing world, and on opportunities for student contributions through research and discussion.

Political Theory and Public Law

Pol.Sci. 340-3. Love, Responsibility, and Justice: An Exploration Through Film. Using films, novels, and plays, this course offers an opportunity to develop a way of living with oneself in society. Questions explored include individual needs for love and for justice; conflicting commitments to self, immediate others, and the larger society; the individual in collective action; the use of unlawful or violent means in pursuit of a just and peaceful order.


Pol.Sci. 440-3. Early Political Thought. Main currents of political thought in their historical setting from Plato to the 17th century, with a critical evaluation of those elements of continuing worth. Required of all majors.


Pol.Sci. 447-3. Constitutional Law I. Nature and scope of the following American constitutional principles as developed by the U.S. Supreme Court: federalism, jurisdiction of the federal courts, separation of powers, the taxing power, and the commerce power. Case method.

Pol.Sci. 448-3. Constitutional Law II. Continuation of Pol.Sci. 447, with emphasis on the war power, powers of the president, citizenship, the Bill of Rights, and the Civil War Amendments. Case method. Not open to freshmen and sophomores.

Pol.Sci. 490-3. Revolution and Political Violence. Study, discussion, and evaluation of alternative frameworks for the analysis of revolution and political violence. Theoretical material will be firmly couched in case situations such as western, class, colonial, urban, international, historical, racial, religious, and intergenerational violence. Development by the class of its own theoretical model.

Pol.Sci. 540-3. Seminar: Topics in the History of Political Thought. Selected topics, such as freedom, justice, equality, and revolution, in leading political philosophies from classical and modern political thought.

Pol.Sci. 541-3. Seminar: Selected Political Theories. Selected political philosophies or theories in classical or modern political thought.


Pol.Sci. 547-3. Seminar: American Constitutional Law. Intensive analysis of the most recent doctrinal developments in the areas of federal jurisdiction, federalism, separation of powers, commerce, taxing and war powers, civil liberties, civil rights, etc. Designed primarily for graduate students who intend to offer American government as a field for examination for an advanced degree. Prer., Pol.Sci. 447-448 or consent of instructor.

Pol.Sci. 549-3. Seminar: The Behavioral Study of Public Law. Intensive, critical examination of theoretical and substantive literature dealing with the behavior of the primary actors in the legal system—police, lawyers, judges, and citizens. Emphasis will be on the empirical approach and quantitative methods. Research papers will be required.

Pol.Sci. 590-3. Seminar: Conflict Behavior—The Politics of Violence. Theoretical and empirical analysis of conflict behavior with special emphasis on the explanation of political violence. Revolution, international warfare, and urban unrest are studied as forms of political violence, and the role of systematic empirical research is emphasized in the development of general theories of intergroup conflict.

Pol.Sci. 594-3. Seminar: Political Psychology. Role of personality variables in political attitudes, behavior, and system-maintenance and change; human nature as a parameter; political relevance of psychoanalytic, behaviorist, existential, and social psychology; alienation, ethnocentrism, dogmatism, and aggression as political variables. Prer., consent of instructor.

Pol.Sci. 642-3. Seminar: Political Thought. Intensive research in and presentation of selected topics intended to introduce the mature student to broad context with which political ideas arise. Deals with classical and modern thought. Prer., Pol.Sci. 440, 441, or consent of instructor.


Pol.Sci. 690-3. Seminar: The Formal Study of Power. Approaches to the conceptualization and measurement of power as a social behavior with applications to community, national, and international power systems. Various structures of political authority are studied with regard to the power relations implicit in each. Forms of economic and interpersonal expressions of power relationships are also examined.

Public Administration


Infrequently Offered Courses

Pol. Sci. 539-3. Administrative Problems in Developing Countries.
SOCIAL SCIENCE

Note: These courses can satisfy, in part, the area requirement in the social sciences.

Soc. Sci. 210-3. Urbanization in America: Problems and Prospects. (URS 210.) Introduces students to theories, taken from six social science disciplines, of the urbanization process and of the nature of cities, with applications to the U.S. experience, to cross-cultural field-trip experience related to important land-use and neighborhood patterns in Denver through walking and bus tours to study important urban social problems as they relate to Denver.

Soc. Sci. 310-3. Historical Geography of American Indians. (Et.St. 313, URS 310.) A study of American Indians and their culture in relationship to the environment. Emphasis will be given to individual tribes during the post-European contact period.

Soc. Sci. 316-3. Law and Minorities. (Et.St. 316.) Designed to acquaint students with the legal system of American society, including contracts, buying and selling, debtors and creditors, landlord and tenant, criminal law, in order to develop a cooperative relationship between the law and minorities.

Soc. Sci. 321-3. The American Indian and Federal Law. (Et. St. 321.) Objectives are to survey a special status as set forth in federal law, to identify its problems, costs, and benefits to Native Americans and to acquaint course participants with applications and politics of the law through the study of actual case materials.

Soc. Sci. 325-3. Pathology of the Ghetto I. (Et. St. 325.) Major emphasis on social and institutional ills found in the disadvantaged black community.


Soc. Sci. 330-3. Topics on Asian Americans. (Et. St. 330.) Examination of topics and issues concerning Asian Americans. Topics to be selected by instructor and students.

Soc. Sci. 335-3. Women In a Changing World. (Pol. Sci. 330.) Offers an understanding of the historical, economical, and sociocultural background of women's changing roles and functions in the contemporary world. The approach and material are multidisciplinary. The goal is a balanced understanding through analysis and discussion based on objective information.

Soc. Sci. 340-3. Love, Responsibility, and Justice: An Exploration Through Film. (Pol. Sci. 340.) Using films, novels, and plays, this course examines the capacity to develop a social conscience about women's roles and position in society. Questions explored include individual needs for love and justice; conflicting commitments to self, immediate others, and the larger society; the individual in collective action; the use of unlawful or violent means in pursuit of a just and peaceful order.

Soc. Sci. 345-3. Due Process and the Socially Disadvantaged. (Et. St. 345.) This course examines and develops an understanding of the relationships that exist between employers and employees with reference to litigation, legal rights, due process, affirmative action, and operational procedures of organizational structures.


Soc. Sci. 360-3. The Creation of the Stories of Zapotoc, Hopi, Sioux, and Mayan. This course will trace the history of man in the Americas through legends and myths.

Soc. Sci. 380-3. Cross-Cultural Field Experience. (Anthro./Hist./Pol. Sci. 380.) Intensive contact with another culture through supervised travel in a country other than the United States. Pre-trip orientation lectures; in-country lectures by local resource people and supervising UCD faculty who will also evaluate written reports by the students.

Soc. Sci. 398-variable credit. Cooperative Education. Designed experiences involving application of specific, relevant concepts and skills in supervised employment situations. Prer., sophomore standing and 2.5 grade-point average.


Soc. Sci. 473-3. Methods in Urban Environmental Perception. Develops an understanding of and competence in environmental perception research. Seminar format. Student projects developed around a major research method will be required. The field of environmental perception is interdisciplinary and is of interest to urban designers, architects, planners, sociologists, anthropologists, geographers, and others concerned with man's relationship to the environment.

Soc. Sci. 510-5. Method and Purpose in Social Science. Exploration into the fundamentals of the conduct of inquiry; aspects of the scientific approach in social sciences concepts from the philosophy of science.

SOCILOGY

Soc. 100-3. Introduction to Sociology. A survey course in which the main concepts that define the sociological perspective are presented and a picture of society is provided by examining major social institutions and forms of social organization within society.


Soc. 103-3. Analysis of Socio-Cultural Process and Personal Relations. Study of the relations between social and cultural processes in modern industrial societies and their import for patterns of social relations and personal growth and development.

Soc. 104-3. Social Problems and Social Change. Sociological analysis of problems resulting from recent social changes including occupational shifts and the redefinition of work: adolescent roles and responses; public responses to crime, delinquency, and mental illness: race and minority relations; community disorganization, and the effects of population growth and redistribution on underdeveloped areas.

Soc. 105-3. Analysis of Modern Society. Examination of various sociological views of modern society including those of Lundberg, Richardson, Mills, Riesman, Goffman, Sorokin, Cohen, and others.

Soc. 119-3. Deviance. Study of the processes by which non-normative behavior, interpersonal relations, and groups and organizations are labeled in subcultures and society.

Soc. 202-3. Race and Ethnic Relations. Race and ethnicity; facts and myths about great populations, including social and cultural sources of bias and discrimination.

Soc. 222-3. Populations and Societies. Elements of demography, natality, mortality, international and internal migration, population growth, population policy.


Soc. 246-3. Social Psychology and Small Group Processes. Study of the development and functioning of persons, especially within a group context, and the dynamics of small groups. Emphasis is on symbols as a import of communication, development of self-concepts, and the processes of cooperation and cooperation in group dynamics.

Soc. 248-3. Social Movements. Social bases and development features of such modern social and political movements as communism, socialism, liberalism, and conservatism.


Soc. 299-variable credit. Independent Study in Sociology. Consent of instructor required.

Soc. 300-3. Urban Sociology. The city and urban society are examined in terms of social structure, residential and institutional patterns, processes of interaction, demographic processes, and patterns of growth and change.

Soc. 301-3. Social Stratification. The relations among the concentration of income and wealth, economic organization and power, power and class phenomena in the United States.


Soc. 304-3. Sociology of the Family. The family as a social institution. Historical development and the contemporary cross-cultural analysis with emphasis on the contemporary American family.

Soc. 305-3. Sociology of Work. The analysis of work in a variety of organizational settings with an emphasis on the changing meaning of work.


Soc. 307-3. Sociology of the Labor Market: How People Find Work. Attempts to review and integrate labor market research studies, job-finding advice from recognized authorities, and findings of national employment projects. Causes of unemployment are analyzed and alternative job-search strategies are identified and discussed, with an emphasis on the Denver job market.

Soc. 308-3. Sociology of Sex Roles. Causes and consequences of sex role differentiation at the individual, group, and social levels are examined.

Soc. 342-3. The Sociology of Alienation. Comparison of historical and contemporary conceptions of alienation in sociology with other perspectives in an attempt to reach a fuller understanding of the contemporary situation of human beings and their potential for growth and fulfillment.

Soc. 384-3. Environment and Behavior. Focuses on the influence of both rational and man-made environments upon human behavior and social organization.

Soc. 389-variable credit. Cooperative Education. Designed experiences involving application of specific, relevant concepts and skills in supervised employment situations. Prer., sophomore standing and 2.5 grade-point average.

Soc. 400-3. Contemporary Sociological Theory. The explication of various conceptual approaches to the problems of social order, societal functioning and integration, social conflict, and social structural change by the examination of the works of contemporary sociological theorists.

Soc. 401-3. History of Sociological Thought. An analysis of the main contributions and detriments of earlier social analysts to present-day social thought and analysis of pertinent sociological issues.

Soc. 402-4. Statistics. Quantitative techniques used in analyzing social phenomena. Prer., Math. 107 or its equivalent, or consent of instructor.

Soc. 409-3. Research Practicum. Practical experience for undergraduates in application of principles of research design and data presentation to a research problem defined by the instructor.


Soc. 422-3. City and Region. Reviews and appraises theory and research concerning the relationship of the city to its hinterland. The analysis examines institutional, demographic, and ecological patterns evolving from dynamic city-region relationships.


Soc. 433-3. Communities. Examines various ways of studying community behavior in metropolitan, city, and small town settings. Students will have opportunity to apply theory to an examination of an area of their concern within the community.

Soc. 443-3. Technology and Modernization. Description and analysis of social structures and social relationships as a response to technological innovation and change.

Soc. 449-3. Social Control. Informal and formal regulative processes in social behavior, with reference to techniques and processes of social control, such as propaganda, the political order, and other institutions.


Soc. 454-3. Social Mobility. Status, occupational, and income change examined from viewpoints of individual, organization, and society as a whole. Special attention to methods of analyzing change, comparative social mobility, and status equilibrium.


Soc. 466-3. Advanced Social Psychology. An in-depth course in social psychology viewed from a sociological perspective.


Soc. 471-3. Political Sociology. The analysis of political processes in modern society with emphasis on the sociological conceptions of power, structure, and processes, at the community, national, and international units of social organization.


Soc. 486-3. Sociology of Aging. The role of the aged in today's society. Emphasizes interrelationships of the aged with the family, community, work, retirement, and leisure.


Soc. 488-3. Sociology of Socialization. The processes by which individuals become members of social groups and the social groups themselves.

Soc. 498-3. Senior Seminar: Seminar for senior sociology majors considering important concepts, issues, and problems in sociology.


Soc. 508-3. Seminar: Research Methods. Practical applications of research design and methods and statistical techniques in a variety of research settings with a focus on student research projects. Restricted to M.A. graduate students in sociology.

Soc. 509-variable credit. Research Practicum. Consent of instructor required.


Soc. 518-3. Seminar: Secondary Analysis. A research-oriented seminar stressing the utilization of social data already collected in the test or generation of sociological theory.

Soc. 519-3. Seminar: Deviant Behavior. Examination of current theory and research on deviant behavior with an emphasis on the relationship between deviance and patterns of social exclusion.


Soc. 540-3. Seminar: Small Group Processes. Empirical and theoretical analysis of basic forms of social interaction, including such processes as attraction, conformity, cooperation, competition, social exchange, etc.


distribution among distinct social groups and the effects on social structure.

**Soc. 571-3. Seminar: Political Sociology.** Analysis of theories related to the political order from viewpoints of social structure, cultural values, and group behavior.

**Soc. 577-3. Seminar: Sociological Analysis of Organizations.** Analysis of theoretical and research issues in the study of organizations of all types.

**Soc. 578-3. Seminar: The Sociology of Work.** Analysis of the growth and function of modern work systems and their role in the community.

**Soc. 579-3. Seminar: Bureaucracy.** An inquiry into the consequences of bureaucracy based on analysis of diverse theories concerning the functions of large-scale organization.

**Soc. 603-variable credit. Guided Research in Sociology.** Consent of instructor required.


**Soc. 940-variable credit. Independent Study in Sociology (Undergraduate).** Consent of instructor required.

### STUDY SKILLS

**St. Sk. 100-1. Developmental Composition.** Offered as an aid to improving writing skills. Areas in which the student feels a need for growth are explored, and a concentrated program for improvement is then determined for each individual. The mechanics of writing as well as methods of research are reviewed as a general guide for composition growth.

**St. Sk. 101-1. Developmental Reading.** Offered as a means of improving general reading habits with an additional emphasis on comprehension. Improvement of reading skills such as skimming and scanning, critical reading, reading for the main idea, and significant facts are included.

**St. Sk. 102-1. College Preparatory Mathematics.** Offered as both a refresher course for those interested in brushing up previous algebra skills and an aid for students requiring specific help with any algebra course offered by this University.

### URBAN STUDIES

*Note:* These courses can satisfy, in part, the area requirement in the social sciences.

**URS 210-3. Urbanization in America: Problems and Prospects.** (Soc. Sci. 210.) Introduces students to theories, taken from six social science disciplines, of the urbanization process and of the nature of cities, with applications to the U.S. experience, to cross-cultural field trip experience related to important land-use and neighborhood patterns in Denver through walking and bus tours to study important urban social problems as they relate to Denver.

**URS 210-3. Historical Geography of American Indians.** (Soc. Sci. 310.) A study of American Indians and their culture in relationship to the environment. Emphasis will be given to individual tribes during the post-European contact period.

**URS 311-3. World Patterns of Urbanization.** This course will examine major urban regions and cities in the non-western and western world. Urbanization of the “world cities” will be analyzed and special topics and issues affecting the quality of urban life in countries outside the U.S. will be emphasized.

**URS 371-3. Ethnic Groups in the American City.** The historical-spatial settlement patterns of major ethnic groups in the U.S. will be presented. The theories of assimilation and acculturation will be presented as a conceptual framework in which to view the generational changes that each ethnic group experienced in its residential and social mobility.

**URS 473-3. Methods in Urban Environmental Perception.** (Soc. Sci. 473.) This course will develop an understanding of and competence in environmental perception research. The course will be a seminar format. Student projects developed around a major research method will be required. The field of environmental perception is interdisciplinary and interest to urban designers, architects, planners, sociologists, anthropologists, geographers, and others concerned with man-environmental relations.

### DEPARTMENT OF MILITARY SCIENCE

**M.S. 101-1. Introduction to Military Science.** Develops the history of ROTC and the traditions and origins of the U.S. military in today’s world. Also examines the opportunities and alternatives that are available in the military (emphasis on the Army) and illustrates the specific ways an academic major can be used to the best advantage.

**M.S. 102-1. Career Pathing Through Military Science.** Defines and analyzes the Army’s functional skill requirements for commissioned officers. Discussions focus on the structural means (career development system) employed to integrate different skills and skill levels into a professional career management system.

**M.S. 202-1. Introduction to Organizational Leadership.** Develops a foundation for understanding the theoretical framework for analyzing human behavior in relating to the basic problems of military leadership and management.

**M.S. 202-2. Military Management.** Develops theories of management in a military context showing how the theories of leadership are applied in military organizations. Management by objectives, organization theory, and organizational effectiveness are studied. Course involves student participation in management simulation exercises and group projects.

**M.S. 203-2. Introduction to Military Science and Career Pathing.** An introduction to the role the military plays in American society based on an examination of traditional attitudes and philosophies. The role of an officer in service to his country and responsibilities to the military organization will be presented. Opportunities available through ROTC and the significant issues and personal decisions for a student considering a military commission will be discussed.

**M.S. 204-2. Leadership Practicum—Lower Division.** Officer professional development skills and leadership exercises are presented on an integrated basis. Student will be introduced to such skills as communications, marksmanship, physical training, first aid, rappelling, and techniques of leadership. Students will be placed into a situation where they will be required to execute under stress and while in positions of responsibility to help develop confidence and assess leadership ability. Class work will be divided between in-class lecture and discussion and practical experiences external to the classroom.

**M.S. 301-2. Educational Psychology and Military Instruction.** A seminar that develops and refines student skills in human learning and individualized military instruction. A portion of the course provides students a working knowledge of Army branches and services and military skills.

**M.S. 302-3. Control Aspects of Small Unit Operations.** Provides the student with an exposure to advanced camp subject matter. Classroom and field training exercises are used to learn small unit tactics, operations techniques, and military skills.

**M.S. 303-1. Leadership Practicum—Upper Division.** A practical laboratory course complementing M.S. 301 which emphasizes student performance in drill and ceremonies, physical conditioning, and orienteering for the third-year military science student.

**M.S. 401-1. Uniform Code of Military Justice.** Provides the MS IV cadet an overview of the military justice system, with emphasis on the general role of the commissioned officer in its implementation. Course consists of lectures/discussions, a guest presentation, several spot quizzes, and a final examination. Satisfactory completion of the course is a prerequisite for commissioning.

**M.S. 402-1. Seminar in Officer Development.** A seminar that introduces subjects which prepare the student to make a smooth transition into the U.S. Army. Image of the Army officer, customs and courtesies of the service, financial planning, and promotion policies are representative topics.

**M.S. 403-1. Leadership Practicum—Senior Division, Fall Semester.** Practical experience in organizing, preparing, and conducting military tactical and adventure training and exercises. Students will be required to either prepare and present a block of instruction or plan and conduct a training exercise for underclass ROTC cadets.

**M.S. 404-1. Leadership Practicum—Senior Division, Spring Semester.** Same as M.S. 403 except it is offered during the spring semester.

**M.S. 940-1 to 3. Independent Study.** Prer., written consent of instructor.
College of Music

MUSIC

Music 031-1. University Choir.
Music 051-1 through 070-1. Applied Instruction. Private instruction in vocal or instrumental technique and interpretation: bassoon, clarinet, trumpet, flute, french horn, percussion, piano, saxophone, string bass, trombone, viola, violin, cello, voice, synthesizer, and guitar. Open only to accepted music majors enrolled for a minimum of 7 credit hours of non-applied courses.
Music 100-3. Theory and Musicianship. Fall. A study of harmonic styles from early periods to the present day, with emphasis on contemporary practices. Prereq., placement test.
Music 182-2. Music for Listeners. For nonmusic majors who want to learn how to listen to music with greater understanding and pleasure. No credit for music majors.
Music 281-1. New Singers. Prereq., audition with instructor.
Music 275-1 through 279-1. Chamber Ensembles. Prereq., audition with instructor.
Music 303-2. Scoring and Arranging. Writing for instruments and voices in various combinations with emphasis on contemporary styles. Prereq., Music 207.
Music 375-1 through 379-1. Chamber Ensembles. Prereq., audition with instructor.
Music 403-3. Advanced Scoring and Arranging. Writing for instruments and voices in various small combinations with emphasis on contemporary styles. Prereq., Music 303.
Music 420-2. Advanced Composition. Creative work in small to large forms. May be repeated for credit. Prereq., Music 305 or consent of instructor.
Music 461-1. New Singers. Prereq., audition with instructor.
Music 466-3. Chamber Music Literature: Winds and Percussion. Stylistic-historical survey in various genres from the Baroque era to the present. Prereq., Music 381 or consent of instructor.
Music 480-1 to 3. Special Studies: Recording. Prereq., consent of instructor and junior standing.
Music 482-1 to 3. Special Studies: Business. Prereq., consent of instructor and junior standing.
Music 484-3. Music Aesthetics. Various philosophies of music as they have developed during the past 100 years in writings of philosophers, psychologists, sociologists, composers, critics, and historians. Prereq., junior standing or consent of instructor.
Music 486-3. Chamber Music Literature: Strings. Stylistic historical survey in various genres from the Baroque era to the present. Prereq., Music 381 or consent of instructor.
Music 492-1 through 498-1. Special Studies. Advanced undergraduate studies or special projects in selected areas. May be repeated for additional credit. Prereq., consent of instructor.
Music 504-2. Advanced Instrumentation,1 Scoring for chamber groups and large ensembles. Prereq., Music 405.
Music 518-2. Selected Studies in Music Education,1 May be repeated for additional credit. Prereq., consent of instructor and appropriate chairman of graduate studies.
Music 554. Sound Reinforcement and Recording. 1 Facilities fee: $18. (See Music 454.)
Music 556. Electronic Music I, II. 1 Facilities fee: $18. (See Music 456.)
Music 564. History of Jazz. 1 (See Music 464.)
Music 575-1 through 579-1. Chamber Ensembles. 1 Prereq., audition with instructor.
Music 580-1 to 3. Special Studies: Recording. Prereq., consent of instructor. May be repeated for additional credit.
Music 582-1 to 3. Special Studies: Business. Prereq., consent of instructor.
Music 584-3 to 4. Music Aesthetics. 1 (See Music 484.)
Music 585-1 to 3. Special Studies: Education. Prereq., consent of instructor.
Music 590-3, 591-3. Music and Media. 1 (See Music 490.)
Music 592-1. Topics In Music Education. 1 A seminar series of various topics concerning the educator and the music industry. Credit awarded through UCD Division of Continuing Education. May be repeated for credit with consent of graduate adviser.

Cross-listed Equivalent Courses With MSC
Music 268. Jazz Ensemble I. (MSC M-190.)
Music 269. Jazz Ensemble II. (MSC M-190.)
Music 468. Jazz Ensemble I. (MSC M-390.)
Music 469. Jazz Ensemble II. (MSC M-390.)

Graduate School of Public Affairs

CRIMINAL JUSTICE ADMINISTRATION
C.J. 500-3. 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.
C.J. 502-3. Legal Analysis, Research, and Legislative Analysis. Combination lecture and experiential course introducing the student to methods of legal research, briefing, the nature of the legislative process, researching legislative history, statutory construction, and legislative drafting and drafting.
C.J. 510-3. 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. 520-3. Criminal Justice Policy Analysis 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. 600-3-6. Field Study In Criminal Justice. For students who have not had practitioner experience, a full- or part-time internship is required. Consent of instructor. Prereq., 12-15 hrs. of criminal justice course work.
C.J. 604-3. Survey of Civil Law. A survey course on the law of contracts, torts, corporations, natural resources, uniform commercial code, domestic relations, wills, estates, and labor relations.
C.J. 630-3. Seminar: Police Administration. The role of the police in a rapidly changing society; relationship between police services, the courts, and correctional administration.

C.J. 622-3. Research in the Criminal Justice Process. Examination of current research in criminal justice; problems in the implementation of research findings.
C.J. 635-3. Seminar: 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. 642-3. Juvenile Justice Administration. 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. 663-3. Seminar: Criminal Justice Policy Analysis. This course 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 (e.g., New York minimum sentencing for drug offenders, Omnibus Crime Control, and Safe Streets Act).
C.J. 660-3. Seminar: Judicial Administration and Organization. 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. 680-3. Advanced Seminar In Criminal Justice. A study of contemporary problems relevant to criminal justice, taught by highly qualified persons in the particular subject matter. Each semester a different problem is studied.
C.J. 690-3. Seminar: Minorities and the Criminal Justice System. An examination of prejudice and stereotyping in American society with particular emphasis on criminal justice institutions. How these criminal justice institutions harbor and reinforce racial/ethnic stereotyping and impact on opportunities for racial and ethnic minority groups and women.
C.J. 950-1 to 6. Independent Study. Affords students the opportunity to do independent creative work. Prereq., consent of adviser.

PUBLIC ADMINISTRATION
P.Ad. 501-3. Public Administration: Fundamentals and Environment II. Governmental policy making, including legislative, executive, judicial and regulatory roles and systems; administrative management functions, structures, and methods; introduction to key management systems and processes such as personnel, financial control, and accounting; managerial, behavioral, and ethical dimensions of public administration and analysis of special problems.
P.Ad. 502-3. Quantitative Analysis I. Provides a basic foundation for the use of statistical analysis in public administration including organizing and presenting data, descriptive statistics, probability, inferential statistics, survey methods, computer procedures, and computer packages and methodologies.
P.Ad. 503-3. Applied Analytic Methods in Public Administration. Survey of analytic methods in government, including research methods, program management and evaluation methods, policy analysis, and

1 Students enrolled at the 500 level may expect additional work and evaluation commensurate with graduate standards.
decision aids. Strengths and limitations of analytic methods; the role of analysts and analysis in government.

P.Ad. 504-3. Organization Theory and Administrative Behavior. The study of roles, structure, motivation, morale, performance, decision making, evaluation, and innovation in the management of public organizations.

P.Ad. 505-3. Financial Administration and Policy Formulation. Introduction to financial administration and policy formulation with a general study of the principal structures and processes and analysis of specific problems through supervised research. Includes principles and policies of public resource allocation, budgetary systems, taxation, intergovernmental finance, debt management and supervised research on pertinent topics.


P.Ad. 508-3. Organizational Impact of Perceptions and Behavior. Development of perceptual fields within individuals and groups, their effects on an organization because of resultant attitudes, actions and behaviors of moving toward, away from, or against people. Individual and group perceptions and behaviors viewed in the context of governmental, school and business organizations.

P.Ad. 510-3. Urban Administration. Study of the public and quasi-public organizations which formulate and implement governmental policies in urban communities, theory of organizational behavior and change, effects of agency structure and interagency relations on performance, intergovernmental relationships, and problems of bureaucratic performance.


P.Ad. 515-3. Political Environment of Public Administration. Investigates various political phenomena which affect the administration of governments.

P.Ad. 521-3. The Politics of Urban Management. Examination of the politics of urban and public management: citizen participation in administrative decisions; managerial competition for limited resources; long-range planning in a political system; and the conflicts between urban politics and administrative efficiency.

P.Ad. 538-3. Intergovernmental Relations. Investigation and analysis of the American federal system, including its constitutional, political, and administrative characteristics. Problems considered include federal-state relations, state-local relations, regionalism, interstate cooperation, and grants-in-aid.

P.Ad. 545-3. Administration of Public Works I. A descriptive course concerned with the administration of engineering and planning aspects of urban public works and with listing and comparing modern methodologies.


P.Ad. 550-3. Governmental Accounting. Accounting for governmental administrators, including use of accounting systems by the public manager; accounting theory and principles, basic accounting methods, such as double-entry accounting, trial-balances, financial statements, and their analysis.

P.Ad. 570-3. Introduction to Systems. Overview of systems ranging from general system theory to the application of systems technology. Includes an introduction to information systems, process flowcharting, data standards, system security and confidentiality, simulation models, and geocoding.

P.Ad. 595-1 to 3. Workshop in Public Administration. Mini-courses to develop skills in public administration.

P.Ad. 598-3. Special Problems in Public Administration. A study of special problems relevant to public administration taught by highly qualified persons in the particular problem area. Each semester a different problem of high impact is studied.

P.Ad. 600-3 to 6. Field Study in Public Administration. For students who have not had government experience. Studies and reports are made while students have full- or part-time administrative traineeships, internships, or similar positions in government agencies or government-related organizations. Consent of instructor required. Prer., 12-15 hrs. in MPA program.

P.Ad. 601-3. Administrative Analysis. Analysis, diagnosis, and evaluation of administrative organizations and operations at various levels of government. Special attention to the appropriateness of organizations and operations in relation to goals. Students work with government agencies in making analyses, evaluations, and recommendations.

P.Ad. 603-3. Statistical Analysis. Develops basic competence in the application of advanced statistical techniques to public problems and the use of computers for data analysis: correlational methods, multiple regression, topics in multivariate analysis. Prer., P.Ad. 502 or equivalent.

P.Ad. 606-3. Public Management Communication Systems. The responsibilities of complex public agencies in maintaining effective communication systems, internal and external, the nature of the systems and problem areas.

P.Ad. 608-3. Organization Development. A study of the dynamics involved in managing and facilitating change in organizations by application of behavioral science knowledge. Emphasis is placed on both cognitive and experiential learning. A background in organization theory and administrative behavior is required. Prer., P.Ad. 504 or consent of instructor.

P.Ad. 609-3. Group Dynamics. An in-depth study of the pattern of forces relating to groups interaction and effectiveness. Subject matter includes a survey of the literature relating to group cohesiveness, power and influences, decision making, communications, leadership and performance, and motivational processes in groups. Prer., P.Ad. 504, or consent of instructor.

P.Ad. 613. Application of Quantitative Decision Models. The use of analytic models as an aid to judgment and improved decision making. Models from operations research, economics, mathematics, and psychology are examined. Prer., P.Ad. 503.

P.Ad. 615-3. Consultation Skills in Public Organizations. A seminar for doctoral and advanced master's students, oriented toward the theoretical and experiential aspects of organizational entry, contracting, data gathering, and problem diagnosis in a cognitive and experiential framework. Attendance by consent of instructor only. Prer., P.Ad. 504 and 608 or equivalent.

P.Ad. 620-3. Legal Environment of Public Administration. Examination of the role of law in society, with particular reference to its impact on the administration of public affairs. The special concerns of the law in administrative procedure, administrative adjudication, and the rights of individuals and groups.

P.Ad. 621-3. Administrative Law. An examination of the development of American administrative law, especially the judicialization of the administration process. It examines the nature of the legal process and its compatibility with the administrative process and legal approaches to administration.


P.Ad. 631-3. Analysis of Environmental Policy. An examination of the theories and concepts of environmental analysis, the analytic techniques in environmental planning, and an analysis of selected environmental policy problems.


P.Ad. 670-3. Classic Literature of Public Administration. Study of the contribution of landmark publications to the evolution of the theory and practice of public administration. Prer., P.Ad. 500, or consent of
instructor.


P.Ad. 681-4. Accounting and Management Reporting. Covers an introduction to accounting concepts and conventions, financial statements, analysis of financial statements, cost behavior, external reporting, budgeting, management control, and auditing. Consent of instructor only.


P.Ad. 684-2. Organization and Management of Health Systems. Considers management process, personnel management, internal communication, and organizational behavior and development. Consent of instructor only.

P.Ad. 690-3. Labor Relations and Public Employment. Relationships between public employees and their employers reflecting the change from a localized concern to the more generalized concern of the nation's affairs; analysis of the evolution of management and worker organizations in government on all levels and their involvement in collective bargaining with or without legal controls.

P.Ad. 691-3. Collective Negotiations in Public Employment. An examination of historical development of labor management relations, the theories of labor relations, analysis of labor organizations, the legal basis for public labor relations, the negotiating process, analysis of labor contract implementation, development and resolution of labor disputes.

P.Ad. 695-3. Minorities in Public Administration. A study of minorities in urban administration. Includes discussion on the identity crisis; the female administrator; the minority administrator and affirmative action; technology and data systems; ethics, corruption and other considerations; and how to survive a bureaucracy.


P.Ad. 701-3, 702-3. Foundation /Survey Seminar. Basic seminar for all students in the initial year. Problems in public administration are covered: financial and economic policy, policy program, and process analysis; organization theory, behavior, and development; human resources management; public policy issues; intergovernmental relations; and values and ethics.


P.Ad. 705-3. Research Methods. Comparative and indepth overview, consideration and application of research and statistical methods, designs and technologies applicable to public policies. Approached from theoretical and applied perspectives. Applicable to planning, evaluation and public management and policymaking. Prer., Doctoral students only.


P.Ad. 708-3. Doctoral Seminar and Practicum in Organization Development. A doctoral-level seminar emphasizing intervention theory/method in effectuating organizational change in a client system. The third party role deals with group development, educational processes, conflict resolution, organizational interventions, strategy, and the ethical and skill requirements of the consultative role. Doctoral students only; consent of instructor required.

P.Ad. 709-3. Dynamics of Interpersonal Behavior. Application of skills in problem diagnosis, empathy, and communications in group and interpersonal settings. A strong emphasis is placed on clear understanding of human behavior and interpersonal dynamics in a laboratory setting. Doctoral students only; consent of instructor required.

P.Ad. 710-3. Process Consultation. The third party role in analysis and consultation of such processes as communication, decision making, problem solving, functional roles, and nonverbal behavior in the organizational setting. Doctoral students only; consent of instructor required.

P.Ad. 798-3. Special Problems in Public Administration. A study of special problems relevant to public administration taught by highly qualified persons in the particular problem area. Each semester a different problem of high impact is studied. Prer., doctoral students only.

P.Ad. 800-1 to 12. Doctoral Dissertation.

P.Ad. 950-1-6. Independent Study. Affords students the opportunity to do independent, creative work. Prer., consent of adviser.

URBAN AFFAIRS

U.A. 500-3. Research Methods. Comprehensive overview of research design, methods, techniques, and reporting, emphasizing limitations and potentials for using scientific research for public policy making. Approached from applied and theoretical perspectives, applicable to planning, evaluation, public management, and policy making.

U.A. 501-3. Dynamics of the Contemporary Urban Polity. An interdisciplinary examination of the problems of man in the urban setting; analysis of urban systems within the expanding metropolitan and regional setting; examination of functional problem areas of the urban community (for example, crime, housing, discrimination in employment, etc.); consideration of the adequacy of present institutional responses to the problems.

U.A. 505-3. Financial Administration and Policy Formulation. Introduction to financial administration and policy formulation with a general study of the principal structures, and processes involved as well as concentrated analysis of specific problems through supervised research. Includes principles and politics of public resource allocation, budgetary systems, taxation, intergovernmental finance, and debt management.

U.A. 510-3. Urban Administration. Study of the public and quasi-public organizations which formulate and implement governmental policies in urban communities; theory of organizational behavior and change; effects of agency structure and interagency relations on performance; intergovernmental relationships; problems of bureaucratic performance.

U.A. 521-3. The Politics of Management. Examination of the politics of urban and public management: citizen participation in administrative decision; managerial competition for limited resources; planning in a principal structure, and the conflicts between urban politics and administrative efficiency.

U.A. 536-3. Intergovernmental Relations. Investigation and analysis of the American federal system, including its constitutional, political, and administrative characteristics. Problems considered include federal-state relations, state-local relations, regionalism, interstate cooperation, and grants-in-aid.

U.A. 570-3. Introduction to Systems. Overview of systems ranging from general system theory to the application of systems technology. Includes an introduction to information systems, process flowcharting, data standards, system security and confidentiality, simulation models and geocoding.

U.A. 599-3, 6. Independent Study. Affords students the opportunity to do independent, creative work. Prer., consent of adviser.

U.A. 610-3. Public Relations and the Urban Administrator. Examination of the role of governmental public relations in contemporary urban society; emphasis on the urban administrator's interface with mass media and interest and citizens' groups; the future of public relations to urban society.

U.A. 621-3. Administrative Law. An examination of the development of American administrative law, especially the judicialization of the administration process. It examines the nature of the legal process and its compatibility with the administrative process and legal approaches to administration.

and reports on sharing of revenue sources and of expenditure functions. Particular emphasis on the intergovernmental grants systems.

**U.A. 624-3. Governmental Budgeting.** Budget methods course for administrators and budget and management analysts in local, state, and federal governments; methods of budget preparation, justification, review, execution, and performance evaluation plus practical aspects of planning, programming, and budgeting systems. Instruction in concepts is augmented by a series of specific individual problems and group exercises.

**U.A. 650-1 to 3. Urban Information Systems I.** A lecture series covering the principles and concepts of the design of urban information systems. Such peripheral topics as geocoding, data access control and confidentiality, data base and data processing integration, data management systems, among others, are addressed in the series.


**U.A. 656-3. Urban Policies and Services Internship.** For students who have not had agency experience. Studies and reports are made while students have full- or part-time administrative traineeships or internships.

**U.A. 690-3. Seminar: Urban Philosophy.** Comprehensive examination of philosophical thought concerning public affairs, public management, and urban life, including future urban systems. Emphasis upon developing a comprehensive, philosophical, and synergistic decision-making framework for application to future public affairs. Prer., completion of 18 semester hours.

**U.A. 700-3. Urban Research Project/Thesis.** Refer to guidelines of the Graduate School of Public Affairs for research project and/or thesis.

**U.A. 950-1-6. Independent Study.** Affords students the opportunity to do independent, creative work. Prer., consent of adviser.
Faculty

NOTE: This roster lists primarily faculty members holding regular and special appointments during the 1979-80 academic year, although some appointments for 1980-81 are included.

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