SCHOOL OF ARCHITECTURE AND PLANNING

Architecture
Architecture in Urban Design
Interior Design

Landscape Architecture
Urban and Regional Planning

COLLEGE OF BUSINESS AND ADMINISTRATION AND GRADUATE SCHOOL OF BUSINESS ADMINISTRATION

Accounting
Business Administration
Business Administration for Executives
Entrepreneurship and New Venture Development
Finance
Health Administration
Health Administration
Executive Program
Human Resources Management

Information Systems
International Business Management
Management Science and Information Systems
Marketing
Operations Management
Quantitative Methods
Real Estate Transportation and Distribution Management

SCHOOL OF EDUCATION

Teacher Certification Programs
Administration, Curriculum, and Supervision
Instructional Technology Counseling and Personnel Services
Early Childhood Education and Early Childhood Special Education
Educational Psychology
Elementary Education
Foundations

Instructional Technology
Corporate Instructional Development and Training
Instructional Computing Specialist
Instructional Technologist
Library Media Specialist
Language and Culture
Reading and Writing
Research and Evaluation Methodology
Secondary Education
Special Education/Educationally Handicapped

COLLEGE OF ENGINEERING AND APPLIED SCIENCE

Applied Mathematics
Civil Engineering
Electrical Engineering and Computer Science

Mechanical Engineering
Engineering, Master of

COLLEGE OF LIBERAL ARTS AND SCIENCES

Anthropology
Basic Science, Master of Biology
Chemistry
Communication and Theatre
Economics
English
Environmental Science, Master of
Ethnic Studies
Fine Arts
Geography
Geology

History
Humanities, Master of Mathematics
Modern Languages Philosophy
Physics
Political Science
Psychology
Social Science, Master of Sociology
Technical Communication, Master of

MILITARY SCIENCE

Army ROTC

Air Force ROTC

COLLEGE OF MUSIC

Music

Performance Music

GRADUATE SCHOOL OF PUBLIC AFFAIRS

Criminal Justice

Public Administration

Directory of Programs and Degrees — Inside Back Cover
### Legend
- A/P: School of Architecture and Planning
- BA: Bachelor of Arts
- BFA: Bachelor of Fine Arts
- BS: Bachelor of Science
- BS (CSE): Bachelor of Science in Computer Science and Engineering
- CB: College of Business
- CLAS: College of Liberal Arts and Sciences
- CB: College of Business
- CU: College of Arts and Sciences
- CSRE: College of Social Work
- ED: School of Education
- ENGR: School of Engineering
- ENSP: College of Nursing
- GSBA: Graduate School of Business Administration
- MARCH: Master of Architecture
- MBA: Master of Business Administration
- MBS: Master of Basic Science
- ME: Master of Engineering
- MIA: Master of Interior Architecture
- MPA: Master of Public Administration
- MURP: Master of Urban and Regional Planning
- PH D: Doctor of Philosophy
- XMB: Executive Master of Business Administration
- XMSHA: Executive Master of Science in Health Administration

### Degree Programs

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<th>Degree Program</th>
<th>Degree</th>
<th>University</th>
<th>Course Code</th>
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CU-Denver is celebrating the 50th anniversary of its authorization by the Board of Regents to establish permanent educational presence within the city. Today, CU-Denver — the city's only public university — has become a leader in quality undergraduate, graduate, and professional education.

CU-Denver's new replacement facility — five stories high and totaling 250,000 square feet of space — is the largest higher education facility ever developed by the State of Colorado. Completion of the facility is expected in early 1988.
The University of Colorado had been offering special courses for Denverites since 1912, when the Extension Division was established. It was only in 1938, however, that the Denver Center was formally organized as a permanent unit of CU in Denver with an office, an administrator, and one full-time faculty member. CU expected a couple of hundred Denverites to take advantage of college credit courses — 1,500 showed up! The C.A. Johnson Building at 509 17th St., became the first "permanent" home of the DENVER CENTER in the winter of 1939.

The DENVER EXTENSION CENTER leased the Fraternal Building, 1405 Glenarm Pl., in 1948.

In 1957, a move was made to the former Tramway Building at 1100 14th St.
Although this bulletin was prepared on the basis of the best information available at the time, all information (including the academic calendar, admission and graduation requirements, course offerings and course descriptions, and statements of tuition and fees) is subject to change without notice or obligation. CU-Denver is an affirmative action/equal opportunity institution. For current calendars, tuition rates, requirements, deadlines, etc., students should refer to a copy of the Schedule of Classes for the semester in which they intend to enroll.

The courses listed in this bulletin are intended as a general indication of the University of Colorado at Denver curriculum. 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.
### ACADEMIC CALENDAR

<table>
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<th>Summer 1987&lt;sup&gt;2&lt;/sup&gt;</th>
<th>Summer 1988&lt;sup&gt;2&lt;/sup&gt;</th>
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<td>May 27-29</td>
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<td>August 7</td>
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**Fall 1987<sup>2</sup>**
- August 17-21: Registration.
- August 24: First day of classes.
- September 7: Holiday (no classes).
- November 26-27: Thanksgiving holidays (no classes).
- December 16: End of term.

**Winter 1988<sup>2</sup>**
- August 18-23: Orientation and registration.
- August 25: First day of classes.
- September 5: Holiday (no classes).
- November 24-25: Thanksgiving holidays (no classes).
- December 19: End of semester.

**Spring 1988<sup>2</sup>**
- January 11-15: Registration.
- January 18: First day of classes.
- March 21-25: Spring vacation (no classes).
- May 13: End of semester.

**Summer 1988<sup>2</sup>**
- June 6-10: Orientation and registration.
- June 13: First day of classes.
- July 4: Holiday (no classes).
- August 5: End of term.

**Fall 1988<sup>2</sup>**
- August 18-23: Orientation and registration.
- August 25: First day of classes.
- September 5: Holiday (no classes).
- November 24-25: Thanksgiving holidays (no classes).
- December 19: End of semester.

**Spring 1989<sup>2</sup>**
- January 16-20: Orientation and registration.
- January 23: First day of classes.
- March 20-24: Spring vacation (no classes).
- May 19: End of semester.

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<sup>1</sup>The University reserves the right to alter the Academic Calendar at any time.

<sup>2</sup>Consult the Schedule of Classes for application deadline dates, deadlines for changing programs (dropping and adding classes), and procedures for registration.
Message From the Chancellor

Dear Student:

Welcome to the University of Colorado at Denver. On behalf of the faculty, staff, and students, I offer to you the challenging environment of one of Colorado's premier institutions of higher education. Your decision to attend CU-Denver shows your willingness to learn at Colorado's only urban public university.

CU-Denver is one of the four campuses of the University of Colorado system. As a vital part of that system, offering baccalaureate, master's, and doctoral programs, we have achieved distinction nationally and internationally because of the high quality of our programs, faculty, and alumni. Located in downtown Denver, the University challenges its students both academically and personally in an intellectual environment that encourages commitment, curiosity, and imagination.

A distinguishing characteristic of CU-Denver is our urban perspective that is an integral theme in our academic programming, the orientation of our faculty, and the identity of our student body. Since 1972, enrollment has grown to approximately 10,617 students, including 5,790 undergraduates and 4,827 graduate students.

The University offers some 40 degree and degree option programs at the baccalaureate level and over 60 degree and degree option programs at the post baccalaureate level designed to provide you with a foundation on which to build your intellectual, aesthetic, and moral capacities as individuals and as citizens. Components of this educational experience include student involvement in independent study, research, and the creative process as a complement to classroom study. The University's seven colleges and schools (Business, Public Affairs, Liberal Arts and Sciences, Engineering and Applied Science, Music, and Architecture and Planning) and The Graduate School provide instruction and research programs that focus on the fundamental areas of knowledge, including interdisciplinary and professional study. We are committed to making available to you the opportunities for gaining knowledge, training, skills, and credentials which will enhance your economic and personal lives.

We at the Denver campus take great pride in the diversity of our students and our ability to serve their varied needs. This is reflected in a commitment to an enriched baccalaureate education and the applied aspects of graduate and professional work. Our academic programs focus on applications relevant to regional as well as national issues and also seek to provide a humanistic understanding of social needs and problems.

We look forward to working with you as you join our community of scholars/teachers and dedicated staff. I promise a rich intellectual environment and a challenging educational experience. Most of all, I look forward to seeing you at graduation and awarding you the CU-Denver degree.

My best wishes to you and to your future.

Glendon F. Drake
Chancellor
University of Colorado at Denver
ADMINISTRATION

Board of Regents

CHARLES M. ABERNATHY, JR., M.D., Montrose, term expires 1988
RICHARD J. BERNICK, Littleton, term expires 1992
ROBERT E. CALDWELL, Colorado Springs, term expires 1992
PETER C. DIETZE, Boulder, term expires 1990
LYNN J. ELLINS, Longmont, term expires 1990
HUGH C. FOWLER, Denver, term expires 1988
SANDY F. KRAEMER, Colorado Springs, term expires 1988
NORWOOD L. ROBB, Littleton, term expires 1990
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THEO. VOLSKY, JR., Vice President for Administration; Professor of Psychology. B.S., M.S., Kansas State University; Ph.D., University of Minnesota.

H.H. ARNOLD, Executive Secretary of the Board of Regents and of the University. B.A., LL.B., University of Colorado.

EDWARD W. MURROW, Treasurer for the University and Assistant Vice President for Budget and Finance. B.S., University of Colorado.

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and External Affairs ........... Mary T. Cramer
Director, Public Relations and
Publications .................... Bob Nero
Director, Campus Affairs ........ Barbara O'Brien

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Assistant Vice Chancellor for Research and Creative Activities ............ Fernie Baca

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Acting Dean, Student
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Director, Center for Internships and Cooperative Education .......... Janet Michalski
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Director, Budgets and Fiscal Planning .................. Julie Torres
Bursar .................. Norman Chandler
Director, Computing Services .................. George E. Funkey
Director, Financial Aid/Student Employment .................. Ellie Miller
Director, Financial and Business Services .................. Kenneth E. Herman
Acting Director, Personnel Services .................. Phillip H. Becker
Director, Student Administrative Services .................. George L. Burnham

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Director, Institutional Research and Planning .................. Ralph Henard

CU FOUNDATION

Vice President, CU Foundation at Denver .................. Barbara S. Allar
Assistant Director of Alumni and Annual Fund .................. Beverly Brunson
Chancellor's Advisory Group

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JACQUES W. BERNIER, Manager, Personnel Administration, Aerospace Systems Program, Hughes Aircraft Company
DIANA BOULTER, President, The Denver Partnership
THE HON. JEANNE FAATZ, Colorado State Representative
WILLIAM W. FLETCHER, President and General Manager, Rocky Mountain News
DAVID GREENBERG, Greenberg/Baron Associates
THE HON. REGIS GROFF, Colorado State Senator
JOHN KASSER, College Football Associates
LEE LARSON, Vice President/General Manager, KOA Radio 85
FRANK NEWMAJ, President, Education Commission of the States
C. NEIL NORGREN, Chairman of the Board and Chief Executive Officer, Butler Fixture Company

THOMAS PECHT, Publisher, Denver Business Journal
BRUCE ROCKWELL, Executive Director, The Colorado Trust
HERRICK ROTH, President, Herrick Roth Associates
ROBERT SCANLAN, Regional Manager, Coldwell Banker
BILL SCHEITLER, President of the City Council, Denver
GAIL SCHOETTLER, Colorado State Treasurer
JEROME SERACUSE, Fellow, American Institute of Architects
TOM STRICKLAND, Brownstein, Hyatt, Farber & Madden
KEN TONNING, Vice President/General Manager, KUSA-TV, CH 9
BEN TRUJILLO, President, Hispanic Chamber of Commerce
SOLOMON TRUJILLO, Colorado Vice President and Chief Executive Officer, Mountain Bell
CLAIR VILLANO, Director, Consumer Fraud Division
THE HON. WILMA WEBB, Colorado State Representative
MICHAEL R. WISE, Chairman of the Board, Silverado Banking

The University of Colorado seal, adopted in 1908, depicts a male Greek classical figure seated against a pillar and holding a scroll. A burning torch framed in laurel is placed beside him. The Greek inscription means "Let your light shine."

According to Denver designer Henry Reed, the classical design was used because Greek civilization "stands as the criterion of culture." The laurel symbolizes honor or success, the youth of the figure suggests the "morning of life," and the scroll represents written language.
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The University of Colorado at Denver is one of the most important educational resources in the Denver metropolitan area. CU-Denver, one of four institutions in the University of Colorado system, is an urban, non-residential campus located in downtown Denver. Major civic, cultural, business, and governmental activities are in close proximity.

CU-Denver offers undergraduate degrees in more than 40 fields and graduate degrees in more than 60. Ph.D. degrees are offered in public affairs, applied mathematics, educational administration, and education technology. Doctoral studies also are available in engineering and other fields in cooperation with CU-Boulder. Special emphasis is placed on programs that will help assure students professional opportunities after graduation. All programs are tailored to meet the needs of the diverse student population. Classes are offered during weekday and evening hours, and in CU-Denver’s Weekend University.

Students’ ages range between 17 and 75. The average student age is 27. Two-thirds hold full-time jobs and 53 percent attend part time. Sixty-five percent are enrolled at the upper division or graduate levels.

CU-Denver’s faculty actively promote the special role of an urban institution in meeting the needs of students. Many faculty bring their work experiences to the classroom. They are alert to the challenges and advantages of the urban environment and responsible to the needs of students and the community. The combination of CU-Denver’s talented faculty and highly motivated students creates a vital and exciting educational environment. Students are offered the unique educational opportunity to combine “real world” experience with academic excellence.

History

Just over a century ago the University of Colorado was founded in Boulder, in 1876. In 1912, the University of Colorado’s Department of Correspondence and Extension was established in Denver, to meet the needs of the burgeoning population. As the breadth of course offerings expanded, so did the demand for degree-granting status. The Denver Extension Center was renamed the University of Colorado -Denver Center in 1965, and by 1969, 23 fields of undergraduate study and 11 of graduate study were offered. In 1972 the Colorado General Assembly appropriated support to build the Auraria Campus, CU-Denver’s current site. And in this same year the Denver “Center” was renamed CU-Denver. Two years later the University of Colorado was reorganized into four campuses — Denver, Colorado Springs, Health Sciences (Denver), and Boulder.

University of Colorado System

As one of four campuses of the University of Colorado, CU-Denver has a special role and mission in Colorado higher education. The University of Colorado at Boulder now serves about 22,000 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 more than 5,500 students in the Pikes Peak region, offering undergraduate, graduate, and professional programs. CU-Denver’s role within the University system is primarily to address the needs for undergraduate and graduate instruction in the Denver metropolitan area. Emphasis is given professional, pre-professional, and liberal arts training in the context of a strong multidisciplinary and applied agenda for research and creative activities. CU-Denver students have access to the library resources of all campuses and cultural events sponsored within the University system.

Academic Structure

Each of the four campuses of the University of Colorado System — Denver, Boulder, Colorado Springs, and Health Sciences in Denver — has its own Chancellor and campus administration. The Chancellors, in turn, report to the President of the CU-System. The Board of Regents of the University of Colorado approve the overall direction provided by the President of the System. The System President represents the University of Colorado and manages the planning for development of the System, apportionment of resources across campuses, the System-wide Graduate School, and general policy regarding academic standards, instructional initiatives, and faculty and staff personnel matters. A system-wide Faculty Council is the major component of faculty governance. It is supported by a system-wide Faculty Senate. CU-Denver, as well, has its own faculty governance structure. Students also have their own governance institutions.

The Chancellor of CU-Denver represents CU-Denver and manages campus goal-setting, policy development, academic affairs, and budget and financial matters. Three Vice Chancellors assist the Chancellor in the fields of Academic Affairs, Administration and Finance, and Planning and Enrollment Management. Each of these
Vice Chancellors is responsible for the essential components of the campus enterprise. The Vice Chancellor for Academic Affairs acts in the absence of the Chancellor, sets the highest standards in teaching, research, and service, and oversees all academic units. The Vice Chancellor for Student Services: Counselor Training, Testing, Educational Opportunities Program, Student Activities, the Women's Resource Center, Veterans Affairs, Center for Academic Enrichment, Legal Services, and Internships and Cooperative Education. Senior Citizens' programs are also available. The Vice Chancellor for Planning oversees the ongoing process of strategic planning for campus initiatives. One element of this process is "enrollment management." Such management addresses the development and the implementation of a comprehensive strategy to promote the campus, build appropriate academic programs, and ensure an effective relationship with prospective and current students, and with graduates of CU-Denver. An Office of Public Relations reports directly to the Chancellor and assists in orchestrating all promotional efforts and the external affairs of the campus.

The CU-Denver Graduate School is a component of the CU-System counterpart. All graduate units reside within The Graduate School except Architecture and Planning, Business, and Public Affairs.

Academic Programs

CU-Denver is, above all, devoted to the needs of the citizens of Denver and the region. But, with the rapid development of the national recognition earned by its graduate faculty, it is not surprising that an increasing number of advanced students from across the nation and overseas elect to pursue their studies here. Today CU-Denver is composed of seven distinct academic units:

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

These units now accommodate over 10,500 students — nearly half as large as CU-Boulder itself — taught by about 300 regular, full-time faculty members. The diversity of the student body is a hallmark of CU-Denver and a source of deep pride. Among them are traditional students who have elected to pursue college degrees immediately after high school. There also are older students who, perhaps for financial reasons or the press of family commitments or because they've only lately recognized the value of a college education, have delayed entry. And there are professionals who seek to strengthen their base of skills or broaden their appreciation of the world around them.

The undergraduate colleges admit freshmen and transfer students 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 pre-professional training in the fields of education, law, journalism, and the health sciences. The School of Education offers programs leading to teacher certification. The Graduate School offers master's programs in the arts, sciences, humanities, engineering, education, and music to students with baccalaureate degrees. The School of Architecture and Planning, the Graduate School of Business Administration, and the Graduate School of Public Affairs provide programs leading to master's degrees in their specialized areas. CU-Denver doctoral programs are available in public affairs, education, and applied mathematics. Doctoral work in engineering also is available in cooperation with CU-Boulder. And CU-Denver faculty also participate in a few other doctoral programs offered at CU-Boulder.

For a complete account of bachelor's and master's degree programs offered by CU-Denver, see the listing of degree programs on the inside back cover of this bulletin. The college and school sections of this bulletin describe specific policies on requirements for graduation, course requirements for various majors, course load policies, course descriptions, and similar information.

CU-Denver has kept pace with the demand for education which leads to improved professional opportunity in the Information Age. Many programs emphasize practical business world applications, and all CU-Denver students are given the opportunity to attain computer literacy. Specific computer-oriented academic programs are offered in the computer science (engineering), applied mathematics (liberal arts and sciences), and information systems (business) programs.

The Future

CU-Denver is committed to the highest standards of education, scholarship, and service to the community. From this commitment springs the vital energy that infuses every campus pursuit. The pace is fast, perhaps unprecedented. Undergraduate studies are at once becoming more and more varied, challenging, and rewarding. CU-Denver is reaching out to all who can benefit from the high quality education it has to offer. Not only has the academic reach extended to nights and weekends, but a significant new center for advanced studies is under way at Greenwood Plaza in the southern area of the metropolitan region. New, highly innovative applied and professional graduate degrees are being developed that address the emerging needs of the region's economy. And centers for state-of-the-field research at CU-Denver are generating important practical solutions to some of Colorado's and the nation's most
serious social, economic, environmental, and technological problems. Through history, urban civilization and the arts and humanities have evolved in a rich synergy. CU-Denver — an urban campus — is deeply involved in enriching the cultural milieu of the Denver area. Clearly, the University of Colorado at Denver is on the move. Join us and share in an exciting adventure in learning.

The Weekend University

The Spring 1987 semester was the first term of CU-Denver's Weekend University. The Weekend University course offerings are part of the regular academic program at CU-Denver. Students who apply for admission to the Weekend University are also eligible to take CU-Denver classes which meet during the week. All CU-Denver students may choose to take Weekend University classes. Weekend University courses appear in the Schedule of Classes and are open for registration by mail.

Accreditation and Memberships

ACCREDITATION

American Assembly of Collegiate Schools of Business
North Central Association of Colleges and Secondary Schools
Accrediting Commission on Education for Health Services Administration
American Society of Landscape Architects
American Planning Association
National Council for the Accreditation of Teacher Education
National Architectural Accrediting Board
See the College of Engineering and Applied Science section of this bulletin for the programs accredited by the Engineering Accreditation Commission of the Accreditation Board for Engineering and Technology
National Association of Schools of Music
National Association of Schools of Public Affairs and Administration

MEMBERSHIPS

Listed below are the organizations affiliated with the various divisions and departments at CU-Denver:

School of Architecture and Planning
American Institute of Architects
American Institute of Planners
American Institute of Certified Planners
American Society of Landscape Architects
American Society of Interior Designers
Association of Collegiate Schools of Planning
Association of Collegiate Schools of Architecture
Council of Landscape Architecture Educators

College of Business and Administration
The Economic Club of Colorado

School of Education
Colorado Principals Center
National Educational Renewal Projects-Partnerships

College of Engineering and Applied Science
Colorado Minority Engineering Association
Associated Engineering Students
American Society of Civil Engineers
American Society of Mechanical Engineers
Institute of Electrical and Electronic Engineers
Society of Women Engineers

Graduate School of Public Affairs
American Society for Public Administration
National Association of Schools of Public Affairs and Administration
Association for Public Policy Analysis and Management
Pi Alpha Alpha, Public Affairs Honorary Association
Western Executive Seminar Center
Metro Air Quality Council
Institute for Nonprofit Organization Management

College of Liberal Arts and Sciences
Denver Natural History Museum
Denver Art Museum
Mesa Verde National Park
Denver Zoological Garden
Denver Public School System
Colorado Chapter of the American Chemical Society
Psi Chi

College of Music
Colorado Choir, Inc.
Sigma Alpha Iota

Continuing Education
Rocky Mountain Chapter of Chartered Life Underwriters
Colorado Chapter: Purchasing Management Association
Colorado Department of Labor and Employment
League of Women Voters

Student Academic Services

Alpha Kappa Delta
American Planning Association
Venture Network
Apartheid Awareness Group
Associated Engineering Students
Big Mountain Support Group
Central American Support Alliance
Chinese Student Association
Dela Sigma Phi
Entrepreneur's Club
Fine Arts Club
Geology Club
Green Coalition
Tau Beta Phi
Iranian Cultural Club
Mexico Information Committee
Musicians Association
Phi Chi Theta
Pre-Law Club
Second Stage
Society of Women Engineers
Venture Network
Institute of Electronic and Electrical Engineers
American Society of Mechanical Engineers

National Educational Renewal Projects-Partnerships

Vietnamese Students Association
American Marketing Association
American Society of Civil Engineers
Amnesty International
Associated Black Students
Auraria Peace Council
Black Student Planners Association
Chemistry Club
Deezone Club
Economics Club
Eta Kappa Nu
Forensics Team
Golden Key National Honor Society
Health Careers Club
International Christian Fellowship
MBA Association
Mineral Landsmen
Native American Student Organization
Phi Sigma Alpha
Psi Chi
Sigma Alpha Iota
Sociology Club
FACULTY

About 300 highly qualified faculty members teach full-time at CU-Denver; well over four in five have doctoral degrees. The faculty is alert to the challenges of the urban environment and responsive to the needs of the commuter student.

Research Award Winners for 1986-87

Gerald Audesirk, Biology — for significant research and sizable grants in the area of neurobiology and effects of trace metals on nervous system functioning.


William Fowler, Music — for his series of textbooks on piano pedagogy and the importance of visualizing the keyboard before playing.

Lynn Johnson, Civil Engineering — in recognition of research on "Microcomputer Programs for Pavement Drainage" and "Flash Flood Forecasting," and for the sizeable grants he received for these projects.

Yuk Lee, Urban and Regional Planning — in recognition of his consistently high level of research productivity. His research covers urban spatial analysis, urban economic retail locational analysis, spatial cognition, urban planning, and mathematical and quantitative analysis.

Norma Livo, Education — for two decades of tremendous creativity, productivity, and community involvement in her field. She has helped revive storytelling through books and articles she has written, conferences organized, hundreds of school presentations, and through her own masterful storytelling.

Eric Poole, Criminal Justice — for his phenomenal research and publication record. A nationally recognized scholar, he has published more than 40 research articles and continues to publish an average of one article every two months.


Ruth Thorne-Thomsen, Fine Arts — in recognition of her national reputation for photography exhibits. In the last two years her outstanding work has been displayed in major cities in the U.S.
Teachers of the Year — 1986-87

Peter Bryant (left), Associate Professor of Management Science and Information Systems. Since joining the CU-Denver faculty in 1981, Professor Bryant has taught undergraduate, graduate, and Executive MBA courses in the College of Business. He is currently area coordinator for Management Science and Information Systems.

Laura Goodwin (center), Associate Professor of Education, specializes in teaching and research related to statistics, research methods, and evaluation. She is very productive in research and writing, and presently coordinates the Educational Psychology program. Professor Goodwin came to CU-Denver in 1983 from the CU Health Sciences Center.

John Mays (right), Professor of Civil Engineering, joined CU-Denver in 1967. As a structural engineer, he teaches an array of classes which are not only technical but remarkably well received. His classroom is characterized by orderly presentations and superior support materials including innovative computer-based approaches.
Auraria Higher Education Center

The Auraria Higher Education Center is the site for the University of Colorado at Denver, Metropolitan State College, and the Community College of Denver. The three institutions share library (which is administered by CU-Denver), classroom, and related facilities on a 171-acre Auraria campus. Certain courses and programs are cooperatively offered.

On the Auraria campus are administrative and classroom buildings, the Auraria Library, the student center, book center, child care and development centers, physical education facilities, science building, and service buildings.

The new buildings share the campus with the reminders of Denver's past — historic Ninth Street Park, restored church buildings, and the Tivoli brewery built in 1882. The Tivoli has been newly renovated into a complex containing specialty shops, restaurants, and entertainment.
Affirmative Action/Equal Opportunity
Title IX

CU-Denver follows a policy of equal opportunity in education and in employment. In pursuance of this policy, no Denver campus 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 the Titles VI and VII of the Civil Rights Act of 1964, Title IX of the Education Amendments of 1972, 504 of the Rehabilitation Act of 1973, Vietnam-Era Veterans Readjustment Act of 1974, and Age Discrimination in Employment Act of 1967.

A CU-Denver Affirmative Action/Equal Opportunity program has been established to implement this policy. For information about these provisions on equity, discrimination, or fairness contact the Director of Affirmative Action, 1250 14th St., Suite 740, 556-2509.

Research and Other Creative Pursuits

CU-Denver is strongly committed to the pursuit of new knowledge through the research of its faculty. It is equally supportive of the other creative endeavors of its faculties in the arts, humanities, and design fields. These achievements not only advance knowledge and enhance the quality of life, but also strengthen teaching by grounding instruction in scholarship and professional practice. In addition, these activities constitute an important component of CU-Denver's service to the community at large.

An important thrust in research and other creative activities at CU-Denver is the multidisciplinary and applied. Research in every school and college at CU-Denver addresses questions of great significance for the welfare of Denver and the larger region. Its position within a thriving metropolitan area serves, as well, as a base for exploring topics of national and even international import. But not all research at CU-Denver yields solutions of immediate practical significance. Major efforts now explore topics on the cutting edge of the basic disciplines. These, of course, are carried out within the rich dialogue of scholarship that knows no national bounds. These efforts may yield insights that eventually open the way to practical applications in the next century.

Research projects, training, and public service programs at CU-Denver encompass both traditional and nontraditional fields of study, with a focus on issues that relate to city, state, national, and international issues. Funded research is a major priority at CU-Denver. During 1985-86, CU-Denver faculty and staff received external grants and contracts totalling $3,600,380 for research, training, and public service programs. All signs point to a steady increase in funded research in the years ahead at CU-Denver. And the benefits for the campus will be substantial. Such research assists in sustaining scholarly discourse, enables faculty members to engage in the advancement of knowledge, provides the foundation for solving pressing practical problems of vital concern for society, and enhances the education of students. Many students actively participate in research activities overseen by faculty members.

Current externally funded projects address such diverse topics as these: novel mechanisms in aqueous coal liquefaction; educational assistance to public schools, cities, counties, and local governments; training in health administration; education and applied research programs for field-based service in rural Colorado settings; minority business development and technical assistance; development of curricula which use instructional video for teaching science to high school students; preparation of personnel to provide special education and related services to newborn and infant handicapped children; flash flood forecasting using radar sensing of rainfall; quantitative relationships for sporangiophore growth of phycomyces; a cellular analysis of lead effects on the nervous system; a paleoecological investigation of the Minturn Formation; acidification status of Colorado lakes; and algebraic multigrid and the fast adaptive composite multigrid method in large scale computation. Perspectives on public works decision making and provision of administrative and technical services in support of metropolitan air quality are additional externally funded activities. Much research, of course, goes on without substantial external support. This effort also yields important insights that are conveyed to a national audience through faculty publication, presentations, exhibits, performances, and professional activities.

Many members of our faculty are leaders within the national scholarly community. All these pursuits bring recognition to the campus, and establish the credibility of its faculty and enhance the value of the degrees it confers.

CENTERS AND INSTITUTES FOR RESEARCH, SERVICE, AND TRAINING

School of Architecture and Planning

CENTER FOR COMMUNITY DEVELOPMENT AND DESIGN

The Center for Community Development and Design is the research, community service, and the student field studies division of the School of Architecture and Planning. Building upon two decades of experience, the Center believes that the creative, synthetic processes of design and planning can reach appropriate solutions to community and environmental problems through active involvement of citizens and applied research. As the outreach unit of the School, the Center responds to and
initiates a variety of opportunities for research and educationally-oriented public service projects for faculty, staff, and students.

In undertaking project work, the Center organizes interdisciplinary research and assistance teams, capable of addressing complex policy, planning, design, and development problems and needs of Colorado and the Rocky Mountain West. Over one hundred requests for assistance and new research projects are handled annually. Colorado and the Rocky Mountain West provide a dynamic learning laboratory for applied research and service in such areas as economic development, housing policy, neighborhood and small town planning, participatory design, park and open space design, and urban design. The Center offers field study opportunities in both urban neighborhoods and in rural communities.

Scope of Work

Solving urban and rural problems in the Rocky Mountain West means confronting both high plains semi-arid conditions and the fragile alpine environment. The sensitive development of human settlement in harmony with this delicate natural environment is an overarching goal of the School. This goal is realized through pragmatic service and applied research projects. Faculty and student research and assistance teams have conducted projects in such areas as:

Commercial Revitalization. The Center assists small and medium size towns, urban neighborhoods, and municipal agencies in developing comprehensive economic development plans for older commercial districts and downtown business areas. Working with community and merchant organizations, the Center helps develop public-private resources to implement strategic plans for the long-term diversification of local economies. Center staff assist twelve to fifteen communities a year, identify their unique competitive opportunities, develop design guidelines, prepare financing packages, provide designs for strategic parcels of land, and evaluate the success of the projects.

Housing Policy. In an era of fundamental shifts, policies have drastically reduced resources for housing — especially for low and moderate income citizens. The Center has undertaken several research initiatives, to affect housing policies for those groups. The Center works with housing agencies to assess current conditions and to conduct research on and development of new policies and programs. Based on its research and work with constituent groups, the Center was instructional in convincing city leaders to develop an $11 million Housing Trust Fund for Denver, developing city policies and plans to eliminate homelessness, and is currently engaged in research to evaluate and modify private lending practices in inner-city neighborhoods, and housing needs assessment for the disabled.

Rural Community Assistance. The Rocky Mountain West is overwhelmingly rural in character and is often described as “the boom or bust” center of the United States because of the historic instability of mineral and natural resources industries. Rural communities are pursuing opportunities for economic diversification in the hope of leveling out the “peaks and valleys” of their economies. In response to this need, the School of Architecture and Planning has teamed with the Colorado State Department of Local Affairs and with Mountain Bell Corporation to form Colorado Initiatives.

This program's purpose is to assist rural Colorado counties and municipalities in developing sound community economic strategies that improve local conditions. Each year ten communities are selected for specialized technical research and financial planning assistance. In addition to this targeted assistance, the School works with other rural communities in a more broad based, developmental way on a variety of local issues. For example, the town of Burlington, Colorado, requested assistance with a site plan for an old town museum. This one project led to six other projects over a two-year period in the town of 3,500 people: a site design for a 190-acre industrial park, a market study for the Old Town, a design for the town entrance and unified public signage system, and a main street revitalization study. These projects have culminated in a regional economic base study for the surrounding four-county area.

Minority Business Development. In responding to one of Denver's and Colorado Springs' urgent inner-city needs, the Center has developed a program to strengthen minority and women-owned businesses. This program is designed to improve their access to capital and provide better goods and services to inner-city neighborhoods. As these businesses become stronger, they hold the potential for creating new jobs for inner-city residents. Five corporations, three government agencies, two non-profit corporations, and the School provide support to this program which is operated and managed by the Center. Seventy-five individual businesses obtain management and technical assistance, loan packaging, market research, or assistance for building renovation each year.

School of Education

THE COLORADO PARTNERSHIP FOR EDUCATIONAL RENEWAL

The Colorado Partnership for Educational Renewal consists of the University of Colorado System, Metropolitan State College, and several Colorado School districts. The basic purpose of the Partnership is to stimulate change in the K-12 public school system and simultaneously in the education of educators. Serving as equal partners, the University and School have a stake in and responsibility for public school improvements, just as the public schools have a like interest in and responsibility for the education of those who staff the schools. More specifically, The Colorado Partnership seeks solutions to persistent “hard rock” issues such as minority achievement, at-risk youth, dropouts, teacher education, the common curriculum, research and evaluation, and educational leadership. Contact Lance V. Wright, Executive Director, for more information.
**COLORADO PRINCIPALS' CENTER: ORIGIN AND DESCRIPTION**

During Summer 1985, a group of Colorado principals spent ten days at the Harvard Principals' Center Summer Institute. Their experience was so positive and renewing, that they returned home with the question: “Why not a principals' center in Colorado?” Several key people and two institutions responded to the question.

The University of Colorado at Denver's School of Education, headed by Dean Bill Grady, and the Colorado Association of School Executives (CASE), headed by Dr. Gerald Difford, formed a partnership to develop the idea into a reality. A planning luncheon was attended by principals and other school executives. Several superintendents agreed to enter the partnership by contributing funds for center development. Thus began the Colorado Principals' Center.

The primary mission of the Colorado Principals' Center is to enable principals to shape their professional intellectual development. Activities related to this mission include topical seminars, panel discussions, roundtable discussions, and ongoing special interest groups.

Topical seminars feature individual presenters (primarily principals) who provide information on promising or successful practices, demonstrations or models, and opportunities for participant interaction. Panel discussions highlight current "high-relevance" topics, with panel and participant interaction in formal and informal settings. Special interest groups facilitate exploration of relevant problems, and issues through brainstorming and idea sharing during a series of meetings. The opportunity for reflective writing is a major feature of Center events.

The Center also focuses on conducting and disseminating research. Current plans include the initiation of two research projects, one of which will assess the needs and expectations principals want their Center to meet. The other project will study the effects of principal peer coaching and reflection to improve instructional leadership. Newsletters feature periodic current research abstracts.

Graduate students are hired by the Center as research assistants. Additionally, graduate students in the School of Education carrying 9 semester hours or more, or enrolled as administrative interns, are offered student membership at no cost.

In addition to part-time research assistants, Center staff includes an executive director who is also an assistant professor, and a secretary, both shared with the Department of Administration, Curriculum, and Supervision.
STORYTELLING CONFERENCE

The School of Education sponsors an annual Storytelling Conference. Presentors include poets, artists, and yarnspinners from throughout the U.S. In its 11th year, the conference draws local school teachers as well as interested persons from the general public.

YOU, ME AND TECHNOLOGY PROJECT

This project in the School of Education is based on a curriculum of science, technology, and society that is being implemented by an instructional television series. Its purpose is to help students become effective citizens in our highly developed technological society. The project is funded by the National Science Foundation.

Currently five programs, with the appropriate teaching materials and transparency masters, are available nationally from the Agency for Instructional Technology. The remaining seven programs are on schedule in design, production, and evaluation. A national team of highly competent educators, scientists, engineers, and television producers are contributing skills to assure a high quality of accomplishment for the project.

Minaruth Galey, director of the national You, Me and Technology Project, introduces an instructional television program to high school students.
College of Engineering and Applied Science

CENTER FOR URBAN TRANSPORTATION STUDIES

The Center for Urban Transportation Studies (CUTS) has as its responsibility:

1. To assume a leading role in developing research and interdisciplinary programs in urban transportation.
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.

CUTS is interested in helping to optimize the quality of human life by concentration on research, service, and education in the transportation sector of society. Particularly, CUTS is desirous of improving the mobility of people and goods so as to provide enhanced safety, economy, efficiency, and overall amenity.

Administratively, the Center (CUTS) is a part of the Department of Civil Engineering in the College of Engineering and Applied Science. The director of CUTS is a civil engineering faculty member representing the transportation engineering and planning disciplines.

Recent and current research include investigations of (1) the relationship between rutting of asphalt pavements and truck tire pressures, and (2) the performance of a new type of urban interchange in order to improve its design from the standpoint of safety and capacity. Service activities have involved workshops and short courses to help advance the state-of-the-practice relative to the state-of-the-art in transportation engineering.

As an element of the University, the fundamental thrust of CUTS is, and properly must remain, educational. The Center's emphasis is the broad field of transportation, and includes both urban and non-urban aspects of transportation. Since transportation concerns itself with the safe, efficient, and environmentally responsible movement of people and goods, it either directly or indirectly affects all citizens and many facets of their day-to-day living. This breadth necessarily involves most of the disciplines within the University. The need for better trained researchers and practitioners in all of the transportation related disciplines is clearly evident. CUTS provides "hands-on" experience within the traditional University structure, offering an opportunity for students through research and service activities which emphasize these otherwise unavailable learning opportunities. These activities take place under conditions of competent supervision that ensure the provision of sound advice and research results to those served by CUTS.

LAND INFORMATION SYSTEMS GROUP

A Land Information Systems Group (LISG) has been formed at CU-Denver to provide opportunity for faculty and students to pursue interests in this multidisciplinary subject area. Housed in the College of Engineering and Applied Science, the LISG is headed by Lynn Johnson, Associate Professor of Civil Engineering.

The objectives of the LISG are to facilitate the educational, research, and public service mission of CU-Denver in the subject areas of computer-aided planning and design, water resources planning, land records systems, geoprocessing and geographic information systems, facilities management and mapping, computer-aided design, and related legal and policy issues.

LISG is multidisciplinary and provides an avenue for individuals to participate together on research and development projects, curriculum development, and to share hardware and software resources. For further information contact Professor Johnson at 556-2739 or 556-2871.

The Graduate School

CENTER FOR ENVIRONMENTAL SCIENCES

The Center for Environmental Sciences conducts basic and applied research which focuses on understanding and providing solutions for environmental issues. The Center reports to the Associate Vice Chancellor for Academic Affairs and Dean of The Graduate School. The Center typically organizes faculty, graduate students, and undergraduate students into interdisciplinary teams to study environmental concerns of interest to the Denver metropolitan area, Colorado, and the Rocky Mountain Region. Typical projects in the past have involved studies of pollution resulting from oil shale production, coal mining, and uranium tailings. These projects have been funded by federal agencies, industry, and private foundations.

In recent years the Center has had a major program dealing with acid rain. The Center has a state-of-the-art analytical chemistry laboratory. The Center has also been at the forefront in the application of artificial intelligence methods to the interpretation of large environmental databases. Approximately fifteen CU-Denver faculty from ten different departments (and three colleges) have participated in Center projects. In addition, more than thirty faculty from other campuses of the University of Colorado, as well as other universities in Colorado, New Mexico, and South Dakota, have participated in these projects which have provided opportunities for theses and jobs to numerous students.

College of Liberal Arts and Sciences

CENTER FOR RESEARCH IN RHETORIC

The Center for Research in Rhetoric began in 1984 for the purpose of conducting original and applied research in rhetoric, broadly conceived. The Center engages in projects that involve faculty and students who carry out research studies that contribute to our understanding of rhetoric and discourse in the broad realm of human affairs. The interdisciplinary nature of the Center draws on the diverse strengths and unique perspectives of individuals from various disciplines in the University.
Reports presenting the results of research projects are published by the Center and are available in the English department office.

COMPUTATIONAL MATHEMATICS GROUP

A particularly strong Computational Mathematics Group has made CU-Denver a regional center for computational mathematics with a national and international reputation. Mathematics clinics investigate contemporary societal issues through the application of mathematical concepts to specific problems. Other research includes the development of fast algorithms for the numerical solution of partial differential equations on super computers, the analysis and development of combinatorial algorithms used in scheduling artificial intelligence, and the applications of discrete mathematics to problems in ecology, engineering, and computer science.
Graduate School of Public Affairs

THE CENTERS

In just a few short years, the Center for Public Private Sector Cooperation and The Center for the Improvement of Public Management have emerged as a highly effective force in helping to identify and solve some of Colorado's and the Rocky Mountain West's most pressing problems.

Under the auspices of the Graduate School of Public Affairs, The Centers have taken a leadership role in a wide range of public policy arenas.

Dean Marshall Kaplan, head of the Graduate School of Public Affairs, established The Centers in 1981. The idea was to create a center that would take an active, hands-on approach to solving community, state, and regional problems, provide academic enrichment for students and faculty — and get results. The Centers are accomplishing these goals — and will continue to do so.

Founded with the support of the Piton and Gates Foundations, The Centers are nonprofit units of the Graduate School of Public Affairs. They have a staff of skilled professionals who are supplemented by faculty and students. The Centers' Advisory Board consists of distinguished university, public, and private sector leaders who help guide the activities and counsel the staff of each center.

THE CENTER FOR THE IMPROVEMENT OF PUBLIC MANAGEMENT

The underlying idea of this Center is simple — the better our public officials are trained, the better will be the quality of life for all residents of the Rocky Mountain Region.

This Center focuses on management training and career development for public officials. It provides exceptional educational and leadership programs that were not available in the Rocky Mountain West until the Center was established.

At the heart of the Center's activities is the highly successful Rocky Mountain Program, an intensive 10-day training seminar conducted twice yearly for mid- to upper-level public managers. Some of the nation's most distinguished scholars, public administrators, and consultants lead workshops and discussion groups. The program relies on case studies and on developing practical, effective approaches to deal with real-world problems confronting public managers.

The Centers fulfill the desire of the Graduate School of Public Affairs to take an innovative, highly active part in strengthening the abilities of business, nonprofit organizations, community groups, and governments to deal with the complex problems of today's society.

While they work together on many projects, each center has its own mission.

THE CENTER FOR PUBLIC-PRIVATE SECTOR COOPERATION

This Center specializes in bringing together people from the private, public, and nonprofit sectors in cooperative efforts to address the state's and region's needs in areas such as housing, growth management, air pollution, public finance, social services, and capital investment. It serves as a catalyst for forging bonds between leaders with common interests but different constituencies.

As one respected businessman noted, the Center has helped build bridges of understanding and cooperation between governments and business.

The Center helps organizations build skills in the areas of strategic planning, economic development, program management, financing, leadership training, public participation, consensus building, and conflict resolution. The Center has had a direct, major impact on improving life throughout Colorado.

National Veterans Training Institute

CU-Denver, working in cooperation with Colorado's Department of Labor and Employment, houses the nation's first National Veterans Training Institute. The program provides skills development training to approximately 1,200 veterans' employment representatives and employees of the Disabled Veterans Outreach Program. The program indirectly serves veterans, with an increased emphasis on improving the quality and quantity of services for disabled veterans.

The program is funded by the U.S. Department of Labor Veterans Employment and Training Service (VETS).
ADMISSION POLICIES AND PROCEDURES

All questions and correspondence regarding admission to CU-Denver and requests for application forms should be directed to:

Office of Admissions and Records
University of Colorado at Denver
P.O. Box 1469
Denver, CO 80201-1469
(303) 556-2660

General Policies

CU-Denver 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 academic ability and accomplishment, as indicated by scores on national aptitude tests.
3. Evidence of maturity, motivation, and potential for academic success.

CU-Denver 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.

Applicants who request degree programs unavailable at CU-Denver will be considered for admission to the College of Liberal Arts and Sciences with an undetermined major.

Admission of Undergraduate Degree Students

RECEIPT OF DOCUMENTS DEADLINES

<table>
<thead>
<tr>
<th>Undergraduate Students</th>
<th>Fall 1986</th>
<th>Spring 1987</th>
<th>Summer 1987</th>
</tr>
</thead>
<tbody>
<tr>
<td>New Students</td>
<td>July 22</td>
<td>Dec. 1</td>
<td>May 3</td>
</tr>
<tr>
<td>Transfer Students</td>
<td>July 22</td>
<td>Dec. 1</td>
<td>May 3</td>
</tr>
<tr>
<td>Former University of Colorado Students</td>
<td>July 22</td>
<td>Dec. 1</td>
<td>May 3</td>
</tr>
<tr>
<td>Intrauniversity Transfer Students</td>
<td>60 days prior to the beginning of the term</td>
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</tbody>
</table>

International Students

Undergraduate: July 22
Graduate: May 29

The University reserves the right to change documents/credentials deadlines in accordance with enrollment demands. Applicants should apply as early as possible. Updated information is available from the Office of Admissions (303) 556-2660. For an applicant to be considered for a specific term, ALL documents required for admission must be received by the Office of Admissions by the DEADLINE for that term. Applicants who are unable to meet the deadline may elect to have admission consideration made for a later term. Transfer students are reminded that sufficient time should be allowed to have transcripts sent from institutions attended previously, and foreign students are advised that it usually takes 120 days for credentials to reach the Office of Admissions from international locations.

ADMISSION REQUIREMENTS FOR FRESHMEN

New freshmen may apply for admission to the College of Business and Administration, Engineering and Applied Science, Liberal Arts and Sciences, or Music. 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 who are high school graduates should have completed a minimum of 15 units of acceptable secondary school (grades 9-12) academic credit. Students applying for admission to the Colleges of Engineering and Business must have completed a minimum of 16 units of acceptable secondary school credit. A unit of credit is one year of high school course work. The other undergraduate colleges have the following requirements:

College of Business and Administration

English (one year of speech/debate and two years of composition are strongly recommended) ........... 4
Mathematics (including at least two years of algebra and one year of geometry) .................... 4
Natural sciences (laboratory type) .............. 2
Social sciences (including history) ............ 2
Foreign language (both units in a single language) ..... 2
Electives ........................................ 2
(Additional courses in English, foreign language, mathematics, natural or social sciences, not to include business courses.)

Total ........................................ 16

College of Engineering and Applied Science

English (literature, composition, grammar) ........... 4
Mathematics distributed as follows:
Algebra ........................................ 2
Geometry ....................................... 1
Additional mathematics (trigonometry recommended) .................... 1
Natural sciences (physics and chemistry recommended) .......... 2

1See the College of Engineering and Applied Science section of this bulletin for more specific information, and for new high school requirements effective Fall 1988.
Social studies and humanities
(Foreign languages and additional units of English, history, and literature are included) 3
Electives 3
Total 16

College of Music

English 3
Theoretical music
Physical science
Social science 8
Foreign language
Mathematics
Additional high school academic units 4
Total 15

All students are expected to 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. Applicants may substitute tape recordings (about 10 minutes in length) and a statement of excellence from a qualified teacher in lieu of the personal audition. Interested students should write to the College of Music, CU-Denver, for audition information and applications.

College of Liberal Arts and Sciences

Academic Units 15
Total 15

Beginning in the Fall Semester 1988, freshmen entering the University of Colorado will be required to meet the following University-wide minimum academic preparation: 4 years of English (with emphasis on composition), 3 years of college preparatory mathematics (excluding business and consumer mathematics), 3 years of natural science including one year of U.S. or world history, and 2 years of a single foreign language. The University of Colorado at Denver will require units of credits indicated in the following chart:

<table>
<thead>
<tr>
<th>College (total units)</th>
<th>English</th>
<th>Mathematics</th>
<th>Natural Science</th>
<th>Social Science</th>
<th>Foreign Language</th>
<th>Other</th>
</tr>
</thead>
<tbody>
<tr>
<td>Business (16)</td>
<td>4(^a)</td>
<td>4</td>
<td>3(^c)</td>
<td>2</td>
<td>2</td>
<td>1(^f)</td>
</tr>
<tr>
<td>Engineering (16)</td>
<td>4(^b)</td>
<td>4</td>
<td>3(^d)</td>
<td>2</td>
<td>2</td>
<td>1(^b)</td>
</tr>
<tr>
<td>Liberal Arts and Sciences (14)</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Music (15)</td>
<td>4(^a)</td>
<td>3</td>
<td>3</td>
<td>2</td>
<td>2</td>
<td>1(^b)</td>
</tr>
</tbody>
</table>

\(^a\) Includes two years of a laboratory science.
\(^b\) Includes at least two years of algebra, one year of geometry, and one year of college preparatory mathematics such as trigonometry, analytical geometry, or elementary functions.
\(^c\) Includes two years of a laboratory science.
\(^d\) Includes one year of physics and one year of chemistry.
\(^e\) All units must be in a single foreign language.
\(^f\) One year of academic elective (not including high school business courses).

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

1. Preferred consideration is given to applicants who rank in the top 40% 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); however, business and engineering applicants are expected to have strong mathematics and science background, higher class rank and higher test scores. Music applicants also must successfully pass a music audition.

2. Applicants who rank in the lower 60% 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 reviewed on an individual basis.

To be considered for admission, applicants with a High School Equivalency Certificate must have an average standard GED score of 45 with no score below 36 on any section of the test. Applicants who complete the Spanish Language General Educational Development Test also must submit scores from Test VI, "English as a Second Language."

How to Apply

1. Students should obtain an application for undergraduate admission from a Colorado high school counselor or from the CU-Denver Office of Admissions.
2. The application must be completed in full and sent to the Office of Admissions with a $30 (subject to change) non-refundable fee. For applicants who are granted admission but are unable to enroll for that term, the $30 application fee will remain valid for 12 months, provided the Office of Admissions is informed of the intent 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. Official transcripts are those sent by the issuing institution directly to the CU-Denver Office of Admissions. Hand-carried copies are not official.
4. Students who did not graduate from high school are required to send a copy of their GED test scores and GED certificate to the CU-Denver Office of Admissions.
5. Students also are required to take either the American College Test (ACT) or the Scholastic Aptitude Test (SAT) and to request that test scores be sent to CU-Denver (ACT code 0533 or SAT code R-4875). High school students may obtain information about when and where these tests are administered by contacting their counselors.
Applicants who took one of these tests and did not designate CU-Denver to receive scores must request the testing agency to send scores to CU-Denver. Complete a Request for Additional Score Report at test centers or from the offices listed below.

Registration Department
American College Testing Program (ACT)
PO. Box 414
Iowa City, Iowa 52240

College Entrance Examination Board (SAT)
PO. Box 592
Princeton, New Jersey 08540

College Entrance Examination Board (SAT)
PO. Box 1025
Berkeley, California 94704

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

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 (556-2717). International students must submit proof of language proficiency.

Transfer students are given priority consideration for admission as follows:

1. College of Liberal Arts and Sciences and College of Music. Transfer applicants 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 also must pass an audition. Contact the College of Music for audition information (556-2727).

2. College of Business and Administration. To be considered for new transfer admission, students must have completed at least 24 semester hours which will apply to the degree, Bachelor of Science (Business). Applicants with an overall GPA of 3.0 in applicable course work will be automatically admitted. Students with less than a 3.0 overall GPA, but with a 3.25 in the last 24 semester hours of applicable course work attempted, will be automatically admitted.

Applicants with at least a 2.6 in applicable course work in the last 24 semester hours will be considered as space is available. Students with less than a 2.6 GPA in the last 24 semester hours of applicable course work will be denied admission to the College of Business and referred to the College of Liberal Arts and Sciences for admission consideration.

No applicant will be accepted with less than a 2.0 GPA in all college level course work attempted. Similarly, no applicant will be accepted who is not eligible to return to all institutions previously attended.

3. College of Engineering and Applied Science. Applicants to the College of Engineering should have at least a 2.75 cumulative grade-point average (on a 4.0 scale) for all work attempted, should have completed two semesters each of calculus and physics, and must be eligible to return to all institutions previously attended.

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.

The primary factors used when considering students individually are (1) probability of success in 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 CU-Denver Office of Admissions.
2. The application form must be completed and returned with the required $30 nonrefundable application fee.
3. The student is required to have two official transcripts sent to the Office of Admissions from each collegiate institution attended. Official transcripts are those sent by the issuing institution directly to the CU-Denver Office of Admissions. Hand-carried copies are not official. If a student is currently enrolled at another institution, 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.)

Liberal arts and music applicants with fewer than 12 semester hours (18 quarter hours) of college work completed also must submit a high school transcript and ACT or SAT test scores.

ALL engineering applicants with fewer than 24 semester hours also must submit high school transcripts and ACT/SAT scores.

Business applicants with fewer than 24 semester hours also must submit high school transcripts and ACT/SAT scores.

Applicants to the College of Liberal Arts and Sciences should be aware that the College requires elementary proficiency in a foreign language for graduation. Applicants to the College have fulfilled this requirement if they have completed three years of any classical or modern foreign language in high school and present a high school transcript to the College Advising Office for verification. For further information, students should contact the College Advising Office, 556-2555.

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

Transfer of College-Level Credit

After all official transcripts have been received and the applicant has been admitted as a degree student, the
Office of Admissions and the appropriate academic unit will determine which courses taken at other institutions can be applied to a degree program at CU-Denver. In general, transfer credit will be accepted insofar as it meets the degree, grade, and residence requirements at CU-Denver.

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. Courses taken Pass/Fail are transferred when a grade of C or higher is required to pass.

The University may accept up to 72 semester credits (108 quarter hours) of work from a two-year institution toward the baccalaureate degree requirements and may accept up to 112 semester credits (153 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 accepted insofar as it meets the degree, grade, and residence requirements at CU-Denver.

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. A maximum of 60 semester hours of work from a two-year institution may be applied toward baccalaureate degree requirements. All correspondence courses are evaluated to determine their acceptability, and business courses may not be taken through correspondence.

The College of Music requires that 56 of the hours needed for graduation be completed in residence. This total may be reduced by the faculty on the basis of excellent work done at CU-Denver and high scholarship exhibited at institutions previously attended. In no case shall the minimum be fewer than 40 hours distributed over three semesters.

READMISSION REQUIREMENTS FOR FORMER AND RETURNING CU STUDENTS

CU-Denver students who have not registered and attended classes at CU-Denver for one year or longer, and who have not attended another institution since CU, are returning students and must formally apply for readmission. Application forms are available at the Office of Admissions.

Former students who have attended another college or university since last attending the University of Colorado must apply as transfer students and meet the transfer student Receipt of Documents deadlines. This requires payment of the $30 non-refundable application fee and submission of official transcripts from all colleges and universities previously attended. Transcripts must be sent directly from the issuing institution to CU-Denver.

ADMISSION REQUIREMENTS FOR INTERNATIONAL STUDENTS

The University of Colorado at Denver encourages international students to apply for admission to undergraduate and graduate programs.

Undergraduate: Admission requirements for CU-Denver's schools and colleges vary, and international students seeking admission must meet the requirements of the program to which they are applying. In addition, all international students whose first language is not English are required to have a minimum TOEFL (Test of English as a Foreign Language) score of 525. Prospective students should request an International Student Application packet from the Office of Admissions. Information about requirements for each college and school can be found in this bulletin.

Deadlines for receipt of documents have been established to allow for the timely mailings of I-20's.

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<thead>
<tr>
<th>Fall 1987</th>
<th>Spring 1988</th>
<th>Summer 1988</th>
</tr>
</thead>
<tbody>
<tr>
<td>Undergraduates:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>July 22</td>
<td>December 1</td>
<td>May 3</td>
</tr>
<tr>
<td>Graduates:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>May 29</td>
<td>October 30</td>
<td>March 12</td>
</tr>
</tbody>
</table>

Graduate. International students who wish to pursue graduate study at CU-Denver must have earned an undergraduate bachelor's degree, or its equivalent, and must fulfill all other requirements of the graduate program to which they are applying. Applications are available from The Graduate School. Application and credentials should be received by The Graduate School six months prior to the term for which the student is applying.

Note: Except for summer terms, international students must be in a degree-seeking status. They may attend summer terms as a non-degree student. This exception is strictly limited to summer terms.

CU-DENVER INTRAUNIVERSITY TRANSFER OR CHANGE OF CAMPUS

CU-Denver students may change colleges or schools within CU-Denver provided they are accepted by the college or school to which they wish to transfer. CU-Denver Intrauniversity Transfer Forms may be obtained from the Office of Admissions. Students should observe application deadlines indicated in the current Schedule of Classes. Decisions on intrauniversity transfers are
made by the college or school to which the student wishes to transfer.

CU-Denver students may change University of Colorado campuses by applying directly to the Admissions Office of the 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 CU-Denver with special approval for one term only. This approval may be renewed. Credit for courses taken may subsequently be applied toward a University degree program. For more information and application instructions, contact the CU-Denver Office of Admissions (303-556-2660).

Admission of Graduate Degree Students

All correspondence and questions regarding admission to the graduate program at CU-Denver should be directed to the following:

Programs in Business
Office of Graduate Studies
Graduate School of Business Administration
623-4436

Programs in Architecture and Planning
School of Architecture and Planning
556-2755

Programs in Public Affairs
Graduate School of Public Affairs
556-2825

All Other Programs
The Graduate School
556-2663

GRADUATE PROGRAMS

As a principal part of its mission, CU-Denver offers graduate and professional-level programs and during the 1986-1987 academic year, approximately 45 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 (School of Education, College of Engineering and Applied Science, College of Liberal Arts and Sciences, College of Music), and outside The Graduate School by the Graduate School of Business Administration, the School of Architecture and Planning 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 of this bulletin.

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 (e.g., electrical engineering, education, English, etc.). Applicants should consult the general information section of The Graduate School portion of this bulletin as well as the college or school sections for requirements and deadlines for specific programs.

Admission of Non-Degree Students

Persons who want to take University courses but do not plan to work toward a University of Colorado degree may be admitted as non-degree students. In general, correspondence and questions regarding admission as a non-degree student should be directed to the Office of Admissions. Those seeking admission as non-degree students for the purpose of teacher certification should contact the School of Education, 556-2717. Each school/college limits the number of semester hours transferable toward a degree program. Students should contact the school/college to which they will be applying (as a degree student) for information about the acceptable number of hours which may be taken as a non-degree student.

Undergraduate. CU-Denver will enroll persons without an undergraduate degree as non-degree students, but applicants are encouraged to apply to an undergraduate program rather than to apply as a non-degree student. Courses taken as a non-degree student are for credit and can be used for transfer to other institutions or for professional improvement. Non-degree students must maintain a grade-point average of 2.0 at CU-Denver.

Note: International students are not admitted as non-degree students, except for summer terms.

Graduate. Students with the baccalaureate degree who are not accepted to specific degree programs may enroll for course work as non-degree students. There are several types of these students. Among them are teachers who seek renewal of certification; students who have attained the degree or credential status they want, but who wish to take additional course work for professional or personal improvement; and students who feel a need to make up deficiencies before entering a specific program.

Non-degree students should be aware that generally only a limited number of course credits taken by a non-degree student may be applied toward a degree program at CU-Denver.

To permit continuing registration as a non-degree student, a minimum grade-point average of 2.0 must be maintained.

Note: International students are not admitted as non-degree students, except for summer terms.

HOW TO APPLY FOR NON-DEGREE STUDENT ADMISSION

To apply for admission as a non-degree student, obtain a Non-degree Student Application form from the Office
Return the completed application by the deadline for the term desired. A $10 nonrefundable application fee is required. No additional credentials are required. Applicants who seek teacher certification must apply separately to the School of Education and submit the required credentials. Non-degree students are advised that registration for courses is on a space available basis.

CHANGING STATUS FROM NON-DEGREE TO DEGREE STUDENT

Non-degree students may apply for admission to an undergraduate degree program by following the instructions outlined in the Non-degree to Degree procedures available from the Office of Admissions. Academic credentials (i.e., transcripts and/or test scores) and a $30 nonrefundable application fee also must be submitted. Non-degree students who are accepted as undergraduate degree students may generally transfer a limited number of semester hours for courses taken as a non-degree student to an undergraduate degree program, with the approval of the dean. Non-degree students should consult with the college to which they are applying during the first semester of their enrollment for the maximum number of semester credit hours acceptable toward a degree program as a non-degree student. (Students enrolled as non-degree students prior to the fall semester of 1970 are subject to the policies in effect between January of 1969 and August of 1970.)

Non-degree 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 non-degree 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 non-degree student during the semester the student has applied for admission to the desired degree program.

Official Notification of Admission

Official notification of admission to CU-Denver as an undergraduate, graduate, or non-degree student is provided by the Office of Admissions on a Statement of Admission Eligibility Form. Letters from various schools and colleges indicating acceptance into a particular program are pending subject to official notification of admission to the institution. Applicants who do not receive official notification of admission within a reasonable period of time (approximately 3 weeks) after submitting application materials should contact the Office of Admissions (303) 556-2660.

Tentative Admission. Students who are admitted pending receipt of additional documents will be permitted one term to submit the documents. Registration for subsequent terms will be denied when documents have not been received.

1Subject to change
<table>
<thead>
<tr>
<th>Type of Applicant</th>
<th>Criteria for Admission</th>
<th>Required Credentials</th>
<th>When to Apply</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>FRESHMAN (Student seeking bachelor's degree who has never attended a collegiate institution)</td>
<td>A) Ranks in top 40% of high school graduating class. B) Has 15 units of acceptable high school work. C) Test scores: ACT comp: 23 or SAT comb: 1000</td>
<td>Complete application $30 application fee Official high school transcript showing rank-in-class, date of graduation, 7th semester grades, 8th semester courses Official ACT or SAT score report.</td>
<td>Not later than: July 22 for fall Dec. 1 for spring May 3 for summer</td>
<td>For specific requirements refer to the college sections of this bulletin. For example, Music requires an audition.</td>
</tr>
<tr>
<td>TRANSFER (Student seeking a bachelor's degree who has attended a collegiate institution other than CU)</td>
<td>Must be in good standing and eligible to return to all institutions previously attended. Applicants must have minimum 2.0 GPA on all work attempted. Business and Engineering applicants will be required to have a higher GPA.</td>
<td>Complete application $30 application fee Two official transcripts sent from each college attended.</td>
<td>Not later than: July 22 for fall Dec. 1 for spring May 3 for summer</td>
<td>Liberal Arts and Music transfers with fewer than 12 sem. hrs. of college work. Business transfers with fewer than 24 sem. hrs., and Engineering transfers with fewer than 24 sem. hrs. must also submit all freshman credentials.</td>
</tr>
<tr>
<td>NON-DEGREE (Student who is not seeking a degree at this institution)</td>
<td>Must be high school graduate or have a G.E.D.</td>
<td>Complete application $10 application fee</td>
<td>Not later than: July 22 for fall Dec. 1 for spring May 3 for summer</td>
<td>Non-degree students who have earned a baccalaureate degree should see Graduate School section for additional information.</td>
</tr>
<tr>
<td>RETURNING CU STUDENT (Returning non-degree and or degree student who has not attended another institution since CU)</td>
<td>Must be in good standing</td>
<td>Former student application</td>
<td>Not later than: July 22 for fall Dec. 1 for spring May 3 for summer</td>
<td>Will be admitted to their previous major unless a new major is requested. Students under academic suspension in certain schools or colleges at the University of Colorado may enroll during the summer terms to improve their grade-point averages.</td>
</tr>
<tr>
<td>FORMER CU STUDENT (Degree student who has attended another institution since attending CU)</td>
<td>Same as for transfer</td>
<td>Complete application $30 application fee Two official transcripts from each intervening college</td>
<td>Not later than: July 22 for fall Dec. 1 for spring May 3 for summer</td>
<td>Will be admitted to previous major unless a different major is requested on application.</td>
</tr>
<tr>
<td>CHANGE OF STATUS: NON-DEGREE TO DEGREE (CU non-degree student who wishes to enter a degree program)</td>
<td>Same as for transfer</td>
<td>Complete application $30 application fee CU transcript</td>
<td>Not later than: July 22 for fall Dec. 1 for spring May 3 for summer</td>
<td>Must meet the same criteria as transfer student.</td>
</tr>
<tr>
<td>CHANGE OF STATUS: DEGREE TO NON-DEGREE (Former CU degree student who has graduated and wishes to take additional work)</td>
<td>Must have completed degree</td>
<td>Non-degree student application $10 application fee</td>
<td>Not later than: July 22 for fall Dec. 1 for spring May 3 for summer</td>
<td>Only students who have completed and received degrees are eligible to change to non-degree status.</td>
</tr>
<tr>
<td>INTERCAMPUS TRANSFER (Student who has been enrolled on one CU campus and wishes to take courses on another)</td>
<td>Must be in good standing</td>
<td>Former student application Transfer to Denver, not later than: July 22 for fall Dec. 1 for spring May 3 for summer Transfer from Denver: refer to the bulletin for other campus.</td>
<td></td>
<td>Transfers from Denver to another campus of CU should refer to the bulletin of the campus to which they are applying for additional requirements. Will be admitted to previous major unless a different major is requested on application.</td>
</tr>
<tr>
<td>INTRAUNIVERSITY TRANSFER (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)</td>
<td>Same as for transfer. Must be a continuing student enrolled on the campus to which you are applying.</td>
<td>Intrauniversity transfer application CU transcript</td>
<td>60 days prior to the beginning of the term</td>
<td></td>
</tr>
</tbody>
</table>

1Requirements for individual schools or colleges may vary.  
2Foreign students should see International Students in the Admissions section of this bulletin.  
3Preferred deadline.
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 following rates are for the 1986-87 academic year and are provided to assist prospective students in anticipating cost.

Other Fees

1. Student Activity Fee (required for all students):
   - Fall semester 1986 .......... $ 12.00
   - Spring semester 1987 .......... $ 12.00
   - Summer term 1987 .......... $ 8.00

2. Auraria Bond Retirement Fee (required for all students):
   - Each term ....................... $ 19.00

3. Student Information System Fee (a non-refundable fee required of all students each term) $ 3.00

4. Matriculation Fee (mandatory for the first term for all new students): .................. $ 15.00
   This is a non-refundable fee charged at the student's first registration to cover costs of generating transcripts.

5. Health Insurance Fee (optional):
   - Fall semester ....................... $ 64.50
   - Spring semester (includes summer) $109.00
   - Summer term only ................ $ 44.50

Students who wish health insurance coverage must complete and submit a request card with the Bursar's Office before the end of the drop/add period.

The insurance program primarily subsidizes major medical expenses according to the schedule of benefits stated in the insurance brochure, which may be obtained from the Office of Student Academic Services. Dependent coverage (spouse and/or children) also is available at an additional charge. Further information on health insurance is available from the Office of Student Academic Services, 556-2861.

6. Doctoral dissertation fee (mandatory for all students certified by The Graduate School for enrollment for doctoral dissertation). Students should contact The Graduate School for guidelines established for charges for enrollment.

7. Comprehensive examination fee: Any student in The Graduate School, the Graduate School of Business Administration, or Graduate School of Public Affairs must be enrolled during the term in which the Comprehensive Examination for a master's degree is completed. Students who are not taking regular courses during that term must enroll as "Candidate for Degree." Students enrolled only as "Candidate for Degree" pay $97 in the Graduate School of Business, $87 in the College of Engineering and the Graduate School of Public Affairs, $74 in the College of Liberal Arts and Sciences, and $77 for all other programs.

8. Laboratory breakage fee (mandatory for students enrolled in a chemistry laboratory course):
   - Breakage deposit ................ $ 20.00
   An $8 deduction is assessed for expendable items. The unused portion is returned at the end of the semester.

9. Music laboratory fee (mandatory for College of Music students and others enrolled in certain music courses):
   - Music fee ........................ $ 24.00

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 $24 fee during a given term.

10. Reinstatement fee: Students must pay a reinstatement fee in addition to the original balance and interest before they may register for classes again or receive grades for completed work.
   - Reinstatement fee ............... $ 25.00

Payment of Tuition and Fees

All tuition and fees (except application fee) are assessed and payable when the student registers for the term, according to guidelines in the current Schedule of Classes. Arrangements may be made through the Bursar's Office at the time of registration to defer payment of part of the charges. Specific information on deferred payment is included in the Schedule of Classes published before each semester or summer term.

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 Classes. 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 special certificate. The only exception to this regulation involves loans and other types of indebtedness which are due after graduation.

Personal checks are accepted for any University obligation. Any student who pays with a check that is not acceptable to the bank will be charged an additional service charge of $15.

Audit

To qualify as an auditor for Fall or Spring Semester, a student must be 21 years of age or older or approved by the Registrar. Auditors may not be registered for any other University of Colorado courses during the time they are auditing and are not eligible to audit courses if they are under suspension from the University or have outstanding financial obligations to the University. The

1Subject to change.
### FALL 1986 AND SPRING 1987 TUITION

#### UNDERGRADUATE DEGREE STUDENTS IN THE COLLEGE OF LIBERAL ARTS AND SCIENCES AND THE COLLEGE OF MUSIC

and non-degree students without an undergraduate degree (SO)

<table>
<thead>
<tr>
<th>Credit hours</th>
<th>Resident</th>
<th>Non-resident</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-1</td>
<td>$ 54</td>
<td>$ 246</td>
</tr>
<tr>
<td>2</td>
<td>108</td>
<td>492</td>
</tr>
<tr>
<td>3</td>
<td>162</td>
<td>738</td>
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<tr>
<td>4</td>
<td>216</td>
<td>984</td>
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<tr>
<td>5</td>
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<tr>
<td>6</td>
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<td>1,476</td>
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<tr>
<td>7</td>
<td>378</td>
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<td>432</td>
<td>2,455</td>
</tr>
<tr>
<td>9</td>
<td>486</td>
<td>2,455</td>
</tr>
<tr>
<td>10-15</td>
<td>543</td>
<td>2,455</td>
</tr>
<tr>
<td>each credit</td>
<td>54</td>
<td>246</td>
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</table>

#### UNDERGRADUATE DEGREE STUDENTS IN THE COLLEGE OF BUSINESS AND THE COLLEGE OF ENGINEERING.

<table>
<thead>
<tr>
<th>Credit hours</th>
<th>Resident</th>
<th>Non-resident</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-1</td>
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<td>$ 256</td>
</tr>
<tr>
<td>2</td>
<td>128</td>
<td>512</td>
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<tr>
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<tr>
<td>4</td>
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<tr>
<td>9</td>
<td>576</td>
<td>2,555</td>
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<tr>
<td>10-15</td>
<td>643</td>
<td>2,555</td>
</tr>
<tr>
<td>each credit</td>
<td>64</td>
<td>256</td>
</tr>
</tbody>
</table>

#### GRADUATE DEGREE STUDENTS: with programs in the College of Liberal Arts and Sciences and in non-Denver campus programs: Nursing, Medicine, Law, etc.

<table>
<thead>
<tr>
<th>Credit hours</th>
<th>Resident</th>
<th>Non-resident</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-1</td>
<td>$ 74</td>
<td>$ 258</td>
</tr>
<tr>
<td>2</td>
<td>148</td>
<td>516</td>
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<tr>
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<td>774</td>
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<td>2,584</td>
</tr>
<tr>
<td>9</td>
<td>666</td>
<td>2,584</td>
</tr>
<tr>
<td>10-15</td>
<td>741</td>
<td>2,584</td>
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<tr>
<td>each credit</td>
<td>74</td>
<td>258</td>
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#### GRADUATE DEGREE STUDENTS: with programs in the Graduate School of Business Administration and Education Administration

<table>
<thead>
<tr>
<th>Credit hours</th>
<th>Resident</th>
<th>Non-resident</th>
</tr>
</thead>
<tbody>
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<td>174</td>
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<tr>
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<td>810</td>
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<tr>
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<td>1,080</td>
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<tr>
<td>5</td>
<td>435</td>
<td>1,350</td>
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<tr>
<td>6</td>
<td>522</td>
<td>1,620</td>
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<td>7</td>
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<tr>
<td>8</td>
<td>696</td>
<td>2,703</td>
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<tr>
<td>9</td>
<td>783</td>
<td>2,703</td>
</tr>
<tr>
<td>10-15</td>
<td>873</td>
<td>2,703</td>
</tr>
<tr>
<td>each credit</td>
<td>87</td>
<td>270</td>
</tr>
</tbody>
</table>

Graduate degree students who are registered as "candidate for degree" will be assessed the corresponding resident tuition for one credit hour plus the Student Information System fee.
Records Office does not keep any record of courses audited; therefore, credit for these courses cannot be established. Auditors may attend as many courses as they wish (except those courses with laboratories or where equipment is used), provided they have received permission from each instructor. Auditor's cards are issued after classes begin. This card should be presented to the instructor when requesting permission to attend a class.

There is no auditor status in summer. Auditors, whether resident or nonresident, pay resident tuition for the audited courses during the Fall or Spring Semester for class instruction and library privileges only. Auditors do not receive student parking privileges.

Residency Classification for Tuition Purposes

Tuition classification is governed by CRS 23-7-101, et. seq. (1973) as amended. Institutions of higher education are bound to the provisions of this statute and are not free to make exceptions to the rules set forth.

The statute provides that an in-state student is one who has been a legal domiciliary of Colorado for one year or more immediately preceding the beginning of the term for which the in-state classification is being sought. Persons over 22 years of age or who are emancipated establish their own legal domicile. Those who are under 22 years of age and unemancipated assume the domicile of their parent or court appointed legal guardian. An unemancipated minor's parent must, therefore, have a legal domicile in Colorado for one year or more before the minor may be classified as an in-state student for tuition purposes.

Domicile is established when one has a permanent place of habitation in Colorado and the intention of making Colorado one's true, fixed, and permanent home and place of habitation. The tuition statute places the burden of establishing a Colorado domicile on the person seeking to establish the domicile. The question of intent is one of documentable fact and needs to be shown by substantial connections with the state sufficient to evidence such intent. Legal domicile in Colorado begins the day subsequent connections with Colorado are made sufficient to evidence one's intent. The most common ties with the state are (1) change of driver's license to Colorado; (2) change of automobile registration to Colorado; (3) Colorado voter registration; (4) permanent employment in Colorado; (5) and most important, payment of state income taxes as a resident by one whose income is sufficient to be taxed. Caution: payment or filing of back taxes in no way serves to establish legal domicile retroactive to the time filed.

In order to qualify for in-state tuition for a given term, the 12-month waiting period (which begins when the legal domicile is established) must be over by the first day of classes for the term in question. If one's 12-month waiting period expires during the semester, in-state tuition cannot be granted until the next semester.

Once the student's tuition classification 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 to the Office of Admissions and Records within 15 days of the change.

Once a student is classified as non-resident for tuition purposes, the student must petition the Office of Admissions and Records for a change in classification. Petitions must be submitted no later than two weeks before the first day of classes of the term for which the student wishes to be classified as a non-resident so that the classification will be determined prior to registration and payment of fees. It is preferred for petitions to be received 30 days prior to the term. Late petitions will not be considered until the next semester. Specific information may be obtained from the Office of Admissions and Records.

Resident Tuition for Active Duty Military Personnel

The Colorado Legislature approved resident tuition beginning with the Fall 1986 Semester for active duty military personnel on permanent duty assignment in Colorado and for their dependents. ELIGIBLE STUDENTS MUST BE CERTIFIED EACH TERM. Students obtain a completed verification form from the base education officer, and submit the form with their military ID to the Record-Office after they have registered, before the end of the drop/add period. At that time the student's bill will be adjusted to reflect the resident tuition rate. Students who have been certified remain classified as non-residents for tuition purposes and must petition to change their status once they establish permanent ties to Colorado.

FINANCIAL AID AT THE UNIVERSITY OF COLORADO AT DENVER

The financial aid program is designed to assist those students who would be unable to attend the University without assistance. Whereas the primary responsibility for meeting the costs of education rests with the individual students and their families, financial aid funds are offered to supplement whatever funds students and their families can provide. Because requests generally exceed the availability of funds, students and their families should be aware of procedures and deadlines in order to

1 A copy of the Colorado Revised Statutes (1973), as amended, is available in the University of Colorado at Denver Admissions Office.
receive maximum consideration. Questions and requests for forms should be directed to the Office of Financial Aid/Student Employment at CU-Denver, Central Classroom Building, Room 105, 556-2886.

Estimated Expenses

Educational expenses at CU-Denver include tuition, fees, and the cost of books and related instructional materials. Students who do not live with their parents also must 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. The Office of Financial Aid/Student Employment establishes standard budgets for different types of students (dependent students living at home with parents, single students living away from home, married students, etc.) to bring about consistency and equity in determining the financial needs of all students. The standard budgets are established in line with parameters set by the Colorado Commission on Higher Education and the U.S. Department of Education.

For the 1986-87 academic year the standard budgets allowed $255 per month living allowance for dependent students living at home, $565 per month for single students not living at home, and $845 per month for married students. An allowance of $170 per month was added per dependent child in the student's home. The living allowance included amounts for rent, food, utilities, personal expenses, and transportation. The approximate full-time cost of tuition, fees, and medical expenses for the 1986-87 academic year was $1,272 for a resident student and $5,115 for a non-resident student. Books and supplies were estimated at $400 for the 1986-87 academic year.

All expenses will increase slightly for the 1987-88 academic year. The State of Colorado and the Board of Regents usually set tuition guidelines and rates during the month of June for the summer and academic year. The standards for living allowances usually are set during the spring semester for the following summer and academic year.

Students who have additional costs above the standard allowances can request a review of their situation by the Financial Aid Committee. The committee must receive documentation of extra expenses and can consider an individual exception to the standard allowances. Examples of these kinds of exceptions are babysitting, medical, dental, and optical expenses.

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 family contribution (summer savings, term earnings, a spouse contribution, and a parental contribution) and awards from agencies outside the University.

The family contribution 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 and complete application materials have been received, 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) proportionate to the available funds and to the number of needy students applying. A small portion of Colorado work-study funds is available to interested students who do not document financial need.

How to Apply

Application forms may be obtained by contacting the Office of Financial Aid/Student Employment. Students are asked to complete an institutional application and a need analysis form. The application includes a checklist of other documents to be submitted.

Parents are expected to contribute toward a student's educational costs. However, in certain cases students
may be considered financially independent of their parents. The need analysis form includes a complete explanation of self-supporting status.

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

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 application for financial aid is analyzed according to the uniform needs analysis formula to determine the student's ability to contribute his or her educational costs during the academic year.

To be eligible for federal 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. In addition, students who are required to register for the draft through Selective Service must be registered in order to be eligible for federal financial aid. All students must sign a Statement of Selective Service Registration Compliance, and proof of registration may be required.

Application and Completion Dates

A student may apply for a Pell Grant at any time up to May 1988. GSL, PLUS, and Supplemental Student Loan applications must be submitted approximately 55 days before the end of the academic term of the loan period. Other aid is offered on a first-come, first-served basis to needy students who have complete applications on file with the Office of Financial Aid/Student Employment.

Students should begin the application process by February 1, 1987, and all materials should be submitted to the Office of Financial Aid/Student Employment and forms processed by ACT and the Pell Grant contractor by April 1987. In every case, the aid offered depends upon the student showing financial need and funds being available.

Special Note: An application for financial aid does not constitute an application for admission to the University. Please contact the CU-Denver 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. Non-degree students are not eligible for most financial aid.

Types of Aid Available

The following information is subject to change by state and federal law and regulation.

SCHOLARSHIPS

Colorado Scholarships. Colorado Scholars Awards provide funds for resident undergraduate students and are funded by the State of Colorado. Information and application materials are available in the Office of Financial Aid/Student Employment.

Regents Scholarships. Regents Scholarships, funded by the State of Colorado, provide tuition and regular student fees to new resident undergraduate students (freshmen and transfers). The CU-Denver Office of Admissions and Records should be contacted for further information.

Deans Scholarships. Deans Scholarships, funded by the State of Colorado, provide funds for resident undergraduate students. Contact your dean's office for further information.

GRANTS

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

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, the Family Financial Statement, and other required documents.

Supplemental Educational Opportunity Grant. Supplemental Educational Opportunity Grants are undergraduate federal grants varying in amounts from $100 to $2,000 per year. These grants are based on student need and availability of funds. Application for this grant is made by submitting the University application, the Family Financial Statement, and other required documents.

Colorado Student Incentive Grant. This is the name given in Colorado to the federal program known as State Student Incentive Grant. The program is for Colorado residents seeking their first undergraduate degree who show substantial financial need. Awards range from $100 to $2,000 per year and are funded one-half by the State of Colorado and one-half by the federal government. Application for this grant is made by submitting the University application, the Family Financial Statement, and other required documents.

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, the Family Financial Statement, and other required documents. The award is funded by the State of Colorado.

Graduate Fellowships. Grants for graduate students are awarded based upon academic merit. Contact your graduate department for more information.

LOANS

Colorado Guaranteed Student Loan Program. The primary purpose of this program is to make low-interest,
long-term loans available to students to help them meet their post secondary educational expenses. The student first must obtain an application from a participating lending institution or the Colorado Guaranteed Student Loan Program office. Some lenders provide the Office of Financial Aid/Student Employment with a supply of application forms. Arrangements for repayment must be made within four months after graduation or other termination of at least half-time studies. The student must contact the lender to arrange a repayment schedule. The interest rate under this plan is limited to 8 percent per annum simple interest for first-time borrowers (for previous borrowers, the interest rate will be 7 or 9 percent). In return for its guarantee of a student's loan, CGSLP requires the student to pay in advance a guarantee fee equal to one percent per annum on the outstanding principal balance to cover the anticipated in-school period plus a six-month grace period and a 5 percent (of the original principal amount) origination fee.

A financial need test must be done by the Office of Financial Aid/Student Employment. If the student shows financial need, then the student is eligible to borrow the loan. All students should complete the need analysis form and submit it along with the regular Guaranteed Student Loan application, the University GSL application, and copies of family tax returns to the Office of Financial Aid/Student Employment.

The maximum a freshman or sophomore undergraduate student may borrow is $2,625 a year. A junior or senior undergraduate may borrow up to $4,000 per year. A graduate or professional student may borrow up to $7,500 a year. The total that may be borrowed for undergraduate study is $17,250. The total for all undergraduate and graduate study is $54,750. The government pays the interest on loans until the repayment period begins, six months after the student ceases to be at least a half-time student. Repayment is usually at the rate of $50 per month and cannot exceed ten years.

Carl Perkins Loan Program (formerly National Direct Student Loan). The Carl Perkins Loan is a federal loan available to undergraduate and graduate students with financial need. A student may borrow up to (a) $4,500 during the freshman and sophomore years; (b) $9,000 total for undergraduate study; (c) $18,000 total for graduate and undergraduate study. Application for the loan is made by submitting the University Application for Financial Aid, the Family Financial Statement (FFS), and other required documents. Interest and payment on the loan are deferred while the borrower is enrolled on at least a half-time basis at an approved institution of higher education. Interest at 5 percent per year begins to accrue 9 months after the borrower ceases to be at least a half-time student. Repayment is due at that time usually at the rate of $50 per month plus interest, and cannot exceed 10 years.

Parents Loans to Undergraduate Students. This type of loan allows parents to borrow funds for their dependent children. Repayment begins 60 days after disbursement, at 12% interest. Parents of dependent undergraduate students may borrow up to $4,000 per year. PLUS loan borrowers must pay an insurance premium of up to 1% of the total loan, collected in advance. Refinancing at lower interest rates may be possible.

Colorado Alternative Student Loan Program (CASL). This loan program allows students to borrow up to $7,000 per academic year for educational expenses and it also permits other individuals, such as parents, other relatives, or close friends, to borrow on behalf of the student. The borrower must have sufficient income and credit to qualify to be eligible for CASL. The interest rate will probably be less than 13% per year and will be specified at the time private funds are committed for this loan program. Monthly repayment of interest begins immediately and continues for up to four years if the student continues to be enrolled in college. Loan principal repayment begins 120 days after the student ceases enrollment and the entire loan must be repaid within ten years. The student must be pursuing a degree at CU-Denver in order to be eligible for CASL, but there is no minimum number of credit hours required. The program is funded by private funds and is managed by the Colorado Student Loan Program.

Supplemental Loans. Students who do not qualify for Guaranteed Student Loan may borrow through the Supplemental Loan Program. Students may apply for up to $4,000 per year with a cumulative limit of $20,000. Beginning with new or refinanced loans made on or after July 1, 1987, the interest rate for both PLUS and Supplemental Loans will be variable, set annually at 3.75 percent above the T-Bill rate with a 12 percent cap.

Employment

College Work-Study Program. The College Work-Study Program is designed to provide jobs to undergraduate and graduate students. 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. Students are permitted to choose their own job from the eligible positions posted. Awards average up to $2,800 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, the Family Financial Statement, and other required documents. Students and employers in the Work-Study Program are expected to assume responsibilities considered normal in an employee-employer relationship.

Part-time Student Employment. The Auraria Student Assistance Center, Career Planning and Placement Office, and the CU-Denver Office of Student Employment assist students in obtaining part-time employment other than that based on financial need. Further information and/or application may be obtained from these offices.

Other Sources of Aid

See the Office of Financial Aid for details of these programs:
General Information

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

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

**Advantage Scholarship.** CU-Denver funded this special program during 1986-87 for the first time. The program is designed to provide special services to minorities or first generation college students, including financial aid counseling, admissions assistance, academic advising, part-time employment on-campus, and tuition assistance if no other grant or scholarship is available. Contact the Office of Financial Aid/Student Employment for application materials and information.

**Academic Requirements**

Students receiving financial aid must demonstrate that they are maintaining satisfactory academic progress as defined by the Office of Financial Aid/Student Employment. The satisfactory academic progress standards have three sections: 1) A student must complete a minimum number of hours compared to hours attempted each term by obtaining a grade of D or better if undergraduate, or a grade of C or better if graduate; 2) A student must maintain a cumulative grade-point average of 2.0 for undergraduates and 3.0 for graduates; and 3) A student is eligible for financial aid only until a certain number of credit hours have been earned. Students should obtain a complete copy of the CU-Denver Satisfactory Progress Policy from the Office of Financial Aid/Student Employment to determine their eligibility for financial aid. Colorado Scholars, Regents Scholars, Deans Scholars, Pell Grant, Guaranteed Student Loan, Supplemental Loan, Advantage Scholarship, and PLUS loans may be received by students who are enrolled at least halftime. Other aid may be received only by full-time students.

**Duration of Aid**

Financial aid is offered for one year at a time. Students must reapply for summer and for each academic year, according to the established priority dates.

**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 Classes for each term. For the Fall 1986 Semester, the policy for refunds upon complete withdrawal from the University was 100% tuition and refundable fees minus $25 refund if the student withdrew before the term began, 75% of tuition and refundable fees if the student withdrew by the third day of the third week of classes, and 50% of tuition and refundable fees if the student withdrew by the fourth week of classes. 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 CU-Denver Office of Financial Aid/Student Employment. Specific application procedures and policies are subject to change.

**Further Information and Application Forms**

Further information and application forms may be obtained from the Office of Financial Aid/Student Employment, Central Classroom Building, Room 105, on the Auraria campus, or by writing to the Office of Financial Aid/Student Employment, University of Colorado at Denver, 1100 Fourteenth Street, Campus Box 125, Denver, Colorado 80202. Persons in the Denver metropolitan area are encouraged to visit the office to receive application forms and information. Peer counselors and
University counselors are available to discuss individual situations and aid eligibility.

REGISTRATION

Selecting a Program and Courses

Students should review the following sections of this bulletin that describe the academic programs available at CU-Denver, and that provide information by school or college on the various majors available, course requirements by major, course load policies, and other pertinent information.

Courses available during a particular semester or summer term are listed in the Schedule of Classes, published several weeks before registration. These are available from the Office of Admissions and Records.

Undergraduate students who need assistance in planning a program or in selecting courses should contact the academic unit in which they are enrolled to arrange for an advising appointment prior to registration.

Graduate students should contact their graduate program for assistance.

Course Scheduling and Abbreviations

For information on scheduling courses, students are encouraged to contact an advisor 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>
</tr>
<tr>
<td>700</td>
<td>Master's thesis</td>
</tr>
<tr>
<td>800</td>
<td>Doctor's thesis</td>
</tr>
<tr>
<td>900</td>
<td>Independent study</td>
</tr>
</tbody>
</table>

The 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 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 during a 15-week term. 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
- **Sem.** — Semester
- **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.

**Orientation**

An orientation program for all new students is held at the beginning of the Fall and Spring Semesters, prior to the first day of classes. The orientation, conducted by the Office of the Dean of Student Academic Services and the various schools and colleges, introduces the academic programs, activities, and services available at CU-Denver. Information on the registration process and on degree requirements also is provided.

**Registration**

CU-Denver conducts common registration in cooperation with Metropolitan State College. Registration involves the following processes: (1) mail registration, (2) walk-in registration, and (3) course adjustment (drop/add).

Students eligible for mail registration who choose to take advantage of this process may register and pay tuition and fees by mail. A walk-in registration will be available for students who do not wish to, or are not eligible to, register by mail.

For complete instructions, students should refer to the Schedule of Classes published at the beginning of each semester and summer term.

**POOLED COURSES**

Certain courses in the College of Liberal Arts and Sciences have been pooled with similar courses at Metropolitan State College. CU-Denver students may register for any of the pooled courses listed in the CU-Denver Schedule of Classes. CU-Denver students are expected to take at least half their hours in CU-Denver courses each term.

**INTERINSTITUTIONAL REGISTRATION**

CU-Denver degree students may enroll for courses offered by the various campuses of the Community College of Denver. Students must be enrolled at CU-Denver for at least one course during the semester or summer term to be eligible to register interinstitutionally. Registration is on a space available basis. CCD courses are not included in a CU-Denver student's grade-point average.

**CONCURRENT ENROLLMENT**

Degree-seeking students who wish to attend two University of Colorado campuses concurrently must contact the Office of Admissions and Records on their own campus.

**Course Loads**

Students wishing to take more than 18 semester hours (12 in the summer term) must have the overload approved by the dean of their college or school. The student should obtain the dean's signature on the Registration Form or Course Change Form during Walk-in Registration.

Suggested maximum course loads for the fall and spring semesters for undergraduate students who are employed:

- **Employed**
  - 40 or more hours per week: 3-6 semester hours
  - 30-39 hours per week: 5-8 semester hours
  - 20-29 hours per week: 7-11 semester hours
  - 10-19 hours per week: 9-15 semester hours

Students must weigh their capabilities against the demands of each course.

**DEFINITION OF FULL- AND HALF-TIME STATUS FOR FINANCIAL AID AND LOAN DEFERMENT: FALL AND SPRING**

- **Undergraduates:**
  - Full time: 12 or more semester units
  - Half time: 6 or more semester units

- **Graduates:**
  - Full time: 8 or more hours
  - Half time: 4 or more hours

- **Summer**
  - Undergraduates: Full time: 8 or more semester units
  - Half time: 4 or more semester units
  - Graduates: Full time: 5 or more hours
  - Half time: 3 hours

CCD courses are not considered for full- or half-time status. Individual exceptions to the minimum graduate course load levels are considered for financial aid purposes by the Financial Aid Committee. Students must file a written appeal with the Office of Financial Aid.

**SHORT-TERM COURSES**

Courses are also offered in five-week modules, in special weekend courses, and in seminars. Topics in Science modular courses are self-contained units designed to cover specific problems or issues in science. Students should contact the college/school office for information on short-term courses offered each semester.
**ACADEMIC POLICIES AND REGULATIONS**

**Advanced Standing and Advanced Placement Credit**

Undergraduate students may obtain credit for lower-division 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 (CEE) 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\(^1\) 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\(^4\) may be considered for advanced placement by the discipline concerned. For more information contact your high school counselor or the Director of Admissions for CU-Denver.

**Credit By Examination**

Degree students may take examinations for credit. To qualify for an examination, the student must be formally working toward a degree at CU-Denver, have a grade-point average of at least 2.0, and be currently registered. Examinations are arranged through the Records Office, 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**

Incoming CU-Denver students 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 Examinations Program (CLEP) of the College Entrance Examination Board testing service. The cost for a single examination is $30. For more information call 556-2861.

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

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**Credit for Military Service and Schooling and ROTC**

**MILITARY SERVICE AND SCHOOLING**

To have credit for educational experiences evaluated, applicants with military experience should submit the following with their application: (1) a copy of DD Form 214 and (2) DD Form 295, Application for the Evaluation of Education 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 the credit is applicable to the degree the student is seeking at CU-Denver.

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 6 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 then 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.

**GRADE SYMBOLS**

The instructor is responsible for whatever grade symbol (A, B, C, D, F, I/F, 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 Pass/

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\(^1\)Students 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.
fail designations 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 points per credit hour.

C—competent/average—2 credit points per hour.

D—minimum passing—1 credit point per credit hour.

F—Failing—no credit points per credit hour.

Some schools and colleges have approved use of a PLUS/MINUS grading system, where a B+ corresponds to 3.3 credit points per credit hour, and a B — corresponds to 2.7 credit points per credit hour. Instructors in those schools and colleges may, at their discretion, use the PLUS/MINUS system, but are not required to do so.

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

IW — incomplete — regarded as W if not completed within one year maximum.

IP — in progress — thesis at the graduate level only.

An incomplete grade is only awarded when special circumstances prevent a student's completing a course during the term. Students have one year to complete an INCOMPLETE. After one year, an IW is regarded as a DROP-FAILING; an IF as a DROP-FAILING. Students should not re-register for courses for which they have received INCOMPLETES.

Students receiving INCOMPLETES: most schools and colleges require a contract between the instructor and student outlining the work necessary to "complete" the incomplete.

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. Graduate students enrolled at the 500 level of a slash course (400/500) will be expected to complete additional work and be evaluated commensurate with graduate standards as specified by the course instructor.

PASS/FAIL PROCEDURE

1. Any student who wishes to register for a course on a pass/fail basis should do so during the regular registration. Changes to or from a pass/fail basis only may be made during the regular drop/add period.

2. Up to 16 semester hours of regular course work may be taken on a pass/fail basis and credited toward the bachelor's degree. Only 6 hours of course work may be taken pass/fail in any given semester.

3. Academic deans and faculty will not be informed of pass/fail registration. All students who register on a pass/fail basis are automatically converted by the grade application system, explained under Pass/Fail Procedure.

A—superior/excellent—4 credit points per credit hour.

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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. Graduate students enrolled at the 500 level of a slash course (400/500) will be expected to complete additional work and be evaluated commensurate with graduate standards as specified by the course instructor.

PASS/FAIL PROCEDURE

1. Any student who wishes to register for a course on a pass/fail basis should do so during the regular registration. Changes to or from a pass/fail basis only may be made during the regular drop/add period.

2. Up to 16 semester hours of regular course work may be taken on a pass/fail basis and credited toward the bachelor's degree. Only 6 hours of course work may be taken pass/fail in any given semester.

3. Academic deans and faculty will not be informed of pass/fail registration. All students who register on a pass/fail basis 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 points per credit hour.

C—competent/average—2 credit points per hour.

D—minimum passing—1 credit point per credit hour.

F—Failing—no credit points per credit hour.

Some schools and colleges have approved use of a PLUS/MINUS grading system, where a B+ corresponds to 3.3 credit points per credit hour, and a B — corresponds to 2.7 credit points per credit hour. Instructors in those schools and colleges may, at their discretion, use the PLUS/MINUS system, but are not required to do so.

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

IW — incomplete — regarded as W if not completed within one year maximum.

IP — in progress — thesis at the graduate level only.

An incomplete grade is only awarded when special circumstances prevent a student's completing a course during the term. Students have one year to complete an INCOMPLETE. After one year, an IW is regarded as a DROP-FAILING; an IF as a DROP-FAILING. Students should not re-register for courses for which they have received INCOMPLETES.

Students receiving INCOMPLETES: most schools and colleges require a contract between the instructor and student outlining the work necessary to "complete" the incomplete.

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

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## PASS/FAIL OPTION RESTRICTIONS

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<tr>
<td>Engineering and Applied Science</td>
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<tr>
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<td>May not be used by students graduating with only 30 semester hours taken at the University.</td>
</tr>
<tr>
<td>Music</td>
<td>Only non-music electives may be taken Pass/Fail. No more than 6 hours P/F any semester.</td>
<td>Includes courses taken in the honors program</td>
<td></td>
</tr>
</tbody>
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**Adding and Dropping Courses**

### ADDING COURSES

Students may add courses to their original registration during the first 12 (7 in the summer) days of full-term classes, provided there is space available.

### DROPPING COURSES

1. Students may drop courses without approvals during the first 12 days of the fall or spring semester (8th day of the summer term). Tuition will not be charged for the dropped courses which are dropped as long as the student is not withdrawing. No record of the dropped course will appear on the student’s permanent record.
2. After the 12th day of a fall or spring semester (8th day of the summer term), the instructor’s signature is required and the instructor must indicate whether the student is passing or failing. If the student is passing, the course will appear on the student’s permanent record.

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1For the exact dates, check the **Schedule of Classes** for the appropriate term.
with the grade of W. If the student is falling, the course will appear on the permanent record with an F grade. No adjustment of tuition is made for courses which are dropped after the 12th day (8th day for the summer term) of full-term classes.

3. After the 10th week of a fall or spring semester (7th 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.

4. Dropping all courses requires an official University withdrawal form.

**Withdrawal from the University**

To withdraw from the University, the student must obtain approval of the dean's office, Bursar's Office, and Records Office. 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 (9th 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 (7th week of the summer term) except under documented circumstances clearly beyond their control.

Students who are receiving veteran's benefits or financial aid also must obtain the required signature of those respective offices. A student who stops attending classes without officially withdrawing from the University will receive grades of F for all course work enrolled for during that term.

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

For specific signatures, requirements, and tuition adjustment the student should refer to the *Schedule of Classes* published prior to the beginning of each term.

**Originality of Work**

In all academic areas it is imperative that either work be original or explicit acknowledgment be given for the use of other persons' ideas or language. Students should consult with instructors to learn specific procedures appropriate for documenting the work of others in each given field. Breaches of academic honesty can result in disciplinary measures ranging from lowering of a grade to permanent compulsory withdrawal from the University.

**Inspection of Educational Records**

Periodically, but not less than annually, the University of Colorado informs students of the Family Educational Rights and Privacy Act, with which the institution intends to comply fully. The Act 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, listing all educational records maintained on students by this institution, may be found in the Office of Admissions and Records on each campus.

The following items of student information have been designated by the University of Colorado as public or directory information: student 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. This information may be disclosed by the University for any purpose at its discretion.

Currently enrolled students may withhold disclosure of any category of information under the Family Educational Rights and Privacy Act. To withhold disclosure, written notification must be received in the Office of Admissions and Records on the appropriate campus prior to the end of the drop/add period in each and every term. Forms requesting the withholding of directory information are available in the Office of Admissions and Records.

Students must request each term to have directory information withheld for that term. The University of Colorado assumes that when a student fails to request to have directory information withheld for that term, the student is indicating approval for disclosure of information for that term and following terms until otherwise requested.

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 school or college, an undergraduate student must maintain a grade-point average of at least 2.0 (*C*) in all course work attempted. A graduate degree student must maintain a grade-point average of at least 3.0. Non-degree students must maintain a minimum grade-point average of 2.0. Policies on academic probation, suspension, and dismissal vary by college or school, and students should
refer to sections of this bulletin dealing with the colleges and schools for information.

Student Classification

Students are classified according to the number of semester hours passed:

- Freshman: 0-29 hours
- Sophomore: 30-59 hours
- Junior: 60-89 hours
- Senior: 90+ hours

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 overdue financial obligations to the University will not be permitted to register for any subsequent term, to graduate, or to be listed among those receiving a degree or credit from the University. Transcripts will not be released for a student with an overdue financial obligation to the University.

STUDENT SERVICES

Dean of Student Academic Services

This office is responsible for providing student advocacy leadership for the Student Academic Services programs and offices. It also serves as a liaison with student government, provides CU-Denver representation in Auraria-shared student services, and coordinates orientation programs for new students, commencement, the Senior Citizens Program, the Ahlin Fund for disabled students, and student research programs. The office telephone is 556-8427.

The Dean of Student Academic Services office protects student rights and responsibilities by administering the Standards 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 his or her rights as a citizen and has a basic obligation not to commit or to tolerate any infringement on the rights of others. Copies of the standards and information regarding all student grievance procedures may be obtained in the Student Academic Services office.

Student Conduct Policies and Standards

Students should thoroughly familiarize themselves with the academic and nonacademic student conduct standards of the University. Academic standards questions should be directed to the dean of the school or college in which the student is enrolled. Nonacademic conduct questions should be directed to the Office of the Dean of Student Academic Services.

Your enrollment in the University is voluntary. When you were admitted, you became responsible for appropriate performance and behavior as defined and described in this document. As a member of the University community, you are held accountable for civil and criminal laws as well as University Standards. Enrollment in the University does not confer either immunity or special consideration with reference to civil and criminal laws.

You are accountable to both civil and University authorities for acts which constitute violations of laws as well as violations of University rules and regulations. Disciplinary action by the University will not be subject to challenge or postponement on the ground that criminal charges involving the same incident have been dismissed, reduced, or are pending in civil or criminal court. In addition, the University reserves the right to pursue disciplinary action if a student violates standards as defined within this document and withdraws from the University before administrative action is final.

All persons on University property are required, for reasonable cause, to identify themselves when requested by University or Auraria Public Safety officials acting in the performance of their duties. Acting through its administrative officers, the University reserves the right to exclude those posing a danger to University personnel or property and those who interfere with its function as an educational institution.

All persons on CU-Denver/Auraria property who are not students or employees of the University are required to adhere to the Standards of Conduct applicable to University students and to abide by University policies and campus regulations.

The following guidelines attempt to balance your needs and the needs of the University. If you are found in violation of one of the Standards of Conduct, one of the University’s primary interests will be to help you avoid further inappropriate behavior and become a responsible member of the university community. However, if you fail to correct inappropriate behavior, or if you violate one of these Standards of Conduct, the University will consider taking disciplinary action that may, in some cases, lead to your suspension or permanent expulsion from the University. The behavior outlined below will not be tolerated because they threaten the safety of individuals and violate the basic purpose of the University and the personal rights and freedoms of its members.

1. Intentional obstruction, disruption, or interference with teaching, research, disciplinary proceedings, or other University activities, including its public service and administrative functions or authorized activities on the CU-Denver/Auraria premises.

2. Willful obstruction or interference with the freedom of movement of students, school officials, employees, and invited guests to all facilities of the CU-Denver/Auraria campus.

3. Physical abuse of any person on property owned or controlled by the CU-Denver/Auraria Higher Education
Center or at functions sponsored or supervised by the University, or conduct that threatens or endangers the health or safety of any such person.

4. Verbal or physical harassment and/or hazing in all forms, which includes, but is not limited to, striking, laying hands on, treating with violence, or offering to do bodily harm to another person with intent to punish or injure; or other treatment of a tyrannical, abusive, shameful, insulting, or humiliating nature.

5. Prohibited entry to or use of CU-Denver/Auraria facilities, defined as unauthorized entry or use of CU-Denver/Auraria property or facilities for illegal purposes or purposes detrimental to the University.

6. Forgery, fraud (to include computer fraud), alteration, or use of University documents, records, or instruments of identification with intent to defraud.

7. Theft or damage to CU-Denver/Auraria property and the private property of students, university officials, employees, and invited guests when such property is located upon or within CU-Denver/Auraria buildings or facilities.

8. Possession of firearms, explosives, or other dangerous weapons or materials within or upon the grounds, buildings, or any other facilities of the CU-Denver/Auraria campus. This policy shall not apply to any police officer or other peace officer while on duty authorized by the University, or others authorized in writing by the Chief of the Auraria Public Safety or designee. (A dangerous weapon is an instrument that is designed to or likely to produce bodily harm. Weapons may include, but are not limited to, firearms, explosives, BB guns, slingshots, martial arts devices, brass knuckles, bowie knives, daggers or similar knives, or switchblades. A harmless instrument designed to look like a firearm, explosive, or dangerous weapon which is used by a person to cause fear in or assault on another person is expressly included within the meaning of the term firearms, explosive, or dangerous weapon.)

9. Sale, distribution, use, possession, or manufacture of illegal drugs within or on the grounds, buildings, or any other facilities of the CU-Denver/Auraria campus.

10. Off Campus: physical abuse of any person, or conduct that threatens or endangers the health or safety of any person, or conduct which interferes with the public or private rights of citizens, when it is determined that the continued presence of the student would clearly constitute a threat or danger to the CU-Denver/Auraria community.

Nothing in this section shall be construed to prevent peaceful and orderly assembly for the redress of grievances. For additional information, students shall refer to the University of Colorado Students' Rights and Responsibilities Regarding Standards of Conduct, Discipline and Review.

Student Activities

The Office of Student Activities is the coordinating and resource center for student government, clubs, organizations, student programs, Greek social organizations, and academic honor societies. All student fee expenditures are monitored to assure that they meet all ASUCD, CU-Denver and state regulations and procedures. The Student Activities Officer also represents the Dean of Student Academic Services on a number of CU-Denver, ASUCD, and AHEC committees and maintains a good communication level with MSC, CCD, and AHEC. Student Activities is located in Room 153, Student Center, 556-3399.

Academic Center for Enrichment

The Academic Center for Enrichment is a learning assistance center that provides the following types of services to the students at the University of Colorado at Denver: (1) instruction — English-as-a-second-language and study skills courses (math, reading, writing); (2) tutorial — individualized, group, and specialized; (3) diagnostic tests — math, reading, spelling, vocabulary, study skills, and composition; (4) counseling coordination — personal, career, and academic; (5) workshops — college survival skills and study skills; and (6) peer advocacy.

Services are available to all students including returning veterans, first generation college participants, teenagers, ethnic minorities, recipients of financial aid, physically handicapped, and working people.

GRE and GMAT review courses are coordinated with the Division of Continuing Education. The center also operates an ethnic library from which students may borrow books for reports or leisure reading. For information call 556-2802.
their academic classroom learning with on-the-job work experiences or internships related to their academic studies. The center is open to all students in the colleges and schools of CU-Denver who have completed their freshman year and have maintained a grade-point average of at least 2.5. Students are placed either as paid Co-op trainees or volunteer Co-op interns with corporations, businesses, or government agencies in positions that complement their academic course work. Co-op students can work full time by alternating semesters of work with semesters of full-time school, or they can work part time year around. The College of Liberal Arts and Sciences and the College of Music award academic credit at the 398 level for a Co-op or internship experience. Students placed by the center in paid or volunteer assignments, as well as students who have obtained their own jobs, may be eligible to earn Co-op internship credit. For more information contact the center at 556-2892.

**Counselor Training Center**

Using the services of students in master's level counseling programs, help is provided to deal with personal concerns. Group meetings address topical issues and crisis counseling is available. Information and appointments can be made by contacting the center at 556-8427.

**Educational Opportunity Program**

The Educational Opportunity Program assists all ethnic minority students at CU-Denver. Support programs include specialized recruiting, student advocacy, intensive counseling, tutorial services, and community outreach programs. The program is designed to provide assistance to minority students and to acquaint students with the history and culture of Asian Americans, Blacks, Hispanics, and American Indians. Student organizations provide assistance with recruitment, counseling, and tutoring; financial assistance is available through grants and the Work/Study Program. For more information call 556-8427.

**Legal Services**

The legal staff is available to assist the students with off-campus legal problems through such services as legal advice, litigation preparation, document interpretation, assistance in negotiation, and referral to private attorneys at a reduced rate. The service is a free, student fee funded program; however, a charge may be assessed for actual costs incurred such as copying, typing, etc. Contact the office for further details at 556-3333, Room 255A, Student Center.

**Non-degree Student Advising**

All non-degree students who are undecided about a major may receive counseling about admission procedures and academic advising during orientation. See *Schedule of Classes* under Orientation. Non-degree students who have decided on a major should contact the
school or college offering that major. For information contact 556-2861.

**Student Health Insurance Program**

A student medical hospital-surgical plan is available for all students: dependent coverage also is available at an additional charge. For further information refer to the portion on Tuition and Fees in the General Information section of this bulletin, or call 556-8427.

**Testing Center**

This multi-faceted assistance center provides various testing for all levels of postsecondary education, professional certification, accreditation, and academic and career planning evaluations. The center provides registration information concerning the following:

- ACT (American College Test)
- CAT (California Achievement Test)
- CEII (Colorado Educational Interest Indicator)
- GRE (Graduate Record Examination)
- GMAT (Graduate Management Admissions Test)
- GSFLT (Graduate School Foreign Language Test)
- MAT (Miller Analogy Test)
- MBTI (Myers-Briggs Type Indicator)
- TOEFL (Test of English as a Foreign Language)
- CLEP (College Level Examination Program)
- SCI (Strong-Campbell Interest Inventory)

For further information contact 556-2861.

**Office of Veterans Affairs**

The Office of Veterans Affairs is an initial contact point for veteran-students attending CU-Denver under their veterans benefits earned while serving in the Armed Forces.

The office maintains proper certification for each veteran-student so that the Veterans Administration is assured that veterans are, in fact, pursuing specific academic programs.

In addition, the OVA provides Vocational Rehabilitation referrals, tutorial assistance, Colorado Tuition Assistance Program, and work/study positions for qualified veterans. For further information contact 556-2630.

**Women’s Resources**

CU-Denver provides female students and prospective students with programming and various resources. Services offered include on-going workshops, student advocacy, seminars, support and educational groups as well as career and personal counseling. Referral sources related to family, health, legal, and financial matters are provided. Women’s Resources also offers four scholarships to women, and has extensive scholarship and financial aid information available. For further information contact 556-2815.
The Auraria Student Assistance Center (ASAC) is composed of five offices offering specialized assistance to all present and prospective Auraria students.

1. Office of Information and Referral Services. This is a central information source that provides objective assistance to prospective students desiring to enroll at CU-Denver or one of the other academic institutions on the Auraria campus.

2. Office of Career Planning Placement Services. Assistance is offered to students and alumni in planning their careers and seeking employment.

3. Office of Disabled Student Services. This office provides academic support of services to ensure programmatic access for students with disabilities.

4. Office of Vocational Rehabilitation. Campus branch office of the State of Colorado Department of Social Services. This office assists disabled students in becoming fully employable and self-supporting.

5. Office of International Student Services. The office assists international students on campus from 80 countries by providing support services and aiding in bridging the cultural gaps which many of them experience when entering the community to attend college.


SPECIAL PROGRAMS AND FACILITIES

Alumni Association

The CU-Denver Alumni Association supports the development and awareness of the University through a variety of networks and activities. Founded in 1976, students automatically become members upon graduation. Friends and non-degreed former students are also welcome to participate.

Horizons, a newspaper published in the fall, winter, and spring of each year, is mailed to members of the association. Alumni are invited to attend periodic reunions and/or activities on campus which might interest them. The Mack Easton Award for Distinguished Service is bestowed each year at commencement and is sponsored by the Association. A program of alumni access to the campus recreation center, library, and parking lots has been recently instituted.

The governing board is comprised of alumni representing all of the schools and colleges on campus. This group plans events, implements programs, and raises funds with the goal of advancing the University and increasing the visibility of alumni.

Auraria Book Center

The Auraria Book Center carries a complete stock of academic, technical, reference, and examination preparation books. The Book Center also stocks computers and peripherals, software, and supplies for office, art, and engineering. Special orders for books are welcomed, and a search for out-of-print books is available at no charge.

Students should bring their printouts to locate course books. Subject areas are marked on each set of shelves; the course call number is printed on a shelf tag below each required or optional book.

When available, used books sell for 75 percent of the new book price. A full refund is given for new and used books returned within the first three weeks of a regular semester's start. Two ID's are required for purchases paid for by check. The Book Center also accepts MasterCard and VISA.

The Convenience Store is located near the main store in the Student Center lower mall and offers extended hours for those wishing to buy snacks, magazines, sundries, and school supplies. Used texts are bought back from students throughout the year, and refunds and exchanges also are handled here.

Photocopying services are available in the Convenience Store; Transparencies, reductions, and other options may be specified, and a self-serve copier is available for small orders.

The Book Center is located in the Auraria Student Center, lower level, 9th and Lawrence Streets. For further information and hours, contact 556-3230.
Auraria Child Care Center

The Auraria Child Care Center is a non-profit organization which provides a high quality child care and preschool program for the children of students, faculty, and staff of the Auraria Higher Education Center.

The Center operates from 7 a.m. to 6 p.m. and is fully licensed by the Colorado Department of Social Services to serve 150 children at a time. It is divided into two toddler classrooms, three preschool classrooms, and one kindergarten/after-school classroom. Children must be 18 months to eight years of age to attend.

The philosophy of the Center is to foster the development of competence in intellectual and social skills and to provide a safe, nurturing environment. The program involves the assessment of individual needs, establishing goals and activities that are appropriate for development. Close parent-teacher communication is a key to the responsive, individually-oriented program provided at the Center.

Parents may register their children on a full-time, part-time or hourly basis to accommodate students' varying class schedules. For additional information, please call 556-3188.

Auraria Student Center

The Student Center, located at 9th and Lawrence, houses a cafeteria, the campus Book Center, a study lounge, game room, offices for student government and organizations, a copy center, exhibit space, locker rentals, meeting and conference facilities, and a tavern.

Computing Services

The Computing Services department supports computer use by both the academic and administrative communities at CU-Denver. Currently there are several resources used to achieve this purpose. The Boulder campus houses a Cyber 170/720 and an IBM 4381 system. The IBM 4381 is used for administrative purposes, and faculty and students may access the Cyber system through the Denver campus or dial-in lines.

The Denver campus maintains a PRIME 750-9950 computer network, a Digital Equipment Corporation VAX 11/780, a PYRAMID Technologies 90X, an Intel HyperCube, and a number of IBM and Apple Personal Computers. The PRIME system operates with 13.5 megabytes of memory and 2550 megabytes of disk storage; the VAX with 4 megabytes of memory and 822 megabytes of disk storage; the PYRAMID with 4 megabytes of memory and 400 megabytes of disks; and the Intel with 16 megabytes of memory and 40 megabytes of disks. These systems are the ones primarily used for instructional purposes. Increasing emphasis is being placed on the use of the personal computers, and to that end Computing Services maintains five teaching labs. These are used in conjunction with regularly scheduled classes.

Computing Services staff provides assistance to academic and administrative users on all computing systems available and on every phase of their use. Advisers assist students enrolled in computing courses with questions regarding programming and use of the computer systems and software available. Administrative users are assisted in their duties by the data processing staff and a systems analyst. Computing systems at every location on campus are maintained by an operations supervisor and staff who assist faculty and staff with hardware questions and problems.

The goal of the Computing Services department is to assist all members of the CU-Denver community in using computing as an effective tool in their work. For further information call 556-2583.

Division of Continuing Education

Through its Division of Continuing Education (CE), the University of Colorado at Denver provides off-campus credit and noncredit educational opportunities for
the life-long learner and the non-traditional student. More than 7,000 employees of business, industry, and government, homemakers, senior citizens, and alumni participated in CE classes, workshops, and seminars during the past year.

To provide easy access to as many students as possible, CE uses the city and its environs as its classroom. CU-Denver's excellent faculty is teamed with highly talented part-time instructors from the Denver metropolitan area to ensure quality and excellence in instruction. Credit class offerings provide a linkage between CU-Denver's resident degree program on-campus and the part-time, off-campus student. Programs are specially designed to offer career updating for such professionals as teachers, engineers, attorneys, and architects. Off-campus credit classes at Lowry Air Force Base and Fitzsimons Army/Medical Center give the military student the opportunity to take core course requirements that will later lead to the completion of a degree.

CE delivers a wide array of noncredit courses for those interested in career updating, personal enrichment, and intellectual stimulation. Specific programs are developed at the request of business and professional groups. These programs include licensing and refresher courses for engineers, accountants, life insurance agents, and architects. Seminars and certificate programs for business and industry are designed to help keep supervisors and managers abreast of new technologies and their management. Courses in the arts and humanities explore such topics as parenting, self-awareness, music and art, photography, languages, and literature.

Through these off-campus programs, and as part of its public service mission, CU-Denver seeks to extend its educational resources to the off-campus student. Individuals, groups, and organizations with special education interests are invited to call the Division of Continuing Education at 556-2735.

Development Program

In 1981-82 CU-Denver established a development program in conjunction with the University of Colorado Foundation Inc. The CU Foundation was established in 1967 at the direction of the Board of Regents of the University as a privately governed, non-profit corporation, chartered under the laws of the State of Colorado. It is operated exclusively for charitable, scientific, or educational purposes designed to promote the welfare of CU. The CU Foundation and its development offices are the approved agency to solicit, receive, and administer gifts from private sources for the benefit of all campuses.

The Development Program also is integrally related to the Alumni Association and offers leadership to that group.

International Education

The Office of International Education on the Boulder campus 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 at CU-Boulder. The office also arranges study abroad programs and offers over 30 different programs around the globe. Students on any CU campus can participate in these programs.

Some of the study abroad programs are of the traditional junior year abroad variety, in which students are placed directly in foreign universities for an academic year. Such programs are available at the Universities of Lancaster and Reading, England; the University of Bordeaux, France; the University of Costa Rica in San Jose; the American University in Cairo, Egypt; the University of Regensburg, West Germany; the Hebrew University of Jerusalem, Israel; the Institute of Higher Education and Technology in Monterrey, Mexico; Konan University, Kobe, Japan; the University of Seville, Spain; and the National Taiwan University in Taipei.

For students unable to spend an academic year abroad, programs for a single semester or summer are available with various emphases, including intensive language learning. Single semester programs are offered in Chambéry and Rennes, France; Guadalajara and Monterrey, Mexico; London, England; San Jose, Costa Rica; Seville and Alicante, Spain. Summer programs are located in Kassel, West Germany; Perugia, Italy; and London, England. Special summer programs, e.g., art history in Italy, are organized with specific departments upon request.

Students remain enrolled at the University of Colorado while participating in these study abroad programs. A B
average with the equivalent of two years of college level work in the appropriate language is required for most of the academic year programs. Financial aid from CU-Denver can be applied to program costs in most cases, and all credit earned while abroad is considered resident credit.

More information about study abroad programs is available in the Office of International Education, Boulder campus, 492-7741.

**Weekend University**

Weekend University course offerings are part of the regular academic programs at CU-Denver. Students who apply for admission to Weekend University classes also are eligible to take CU-Denver classes which meet during the week.

A wide variety of course options are offered to students during the weekend period from noon Fridays through Sundays. Some students will register as non-degree students — those not seeking a degree — while others may already be enrolled in degree programs at CU-Denver, but desire the additional flexibility provided in the weekend offerings.

Courses are drawn from all colleges and schools at CU-Denver, and the number of offerings is expected to grow to accommodate an even wider variety of educational purposes. It will eventually include a significant number of general education course requirements in the University’s undergraduate programs. A wider array in graduate offerings will emerge as important certificate and degree programs are drawn into the weekend format.

For admission information, students should refer to the Schedule of Classes for the semester in which they intend to enroll.
"The Library is both physically and intellectually the heart of the campus. It is a good place to think, to plan, and to learn."
— Patricia Senn Breivik, Director
Auraria Library
Auraria Library

**Director:** Patricia Senn Breivik
**Associate Director:** Jean F. Hemphill
**Assistant Director for Collection and Automation Services:** Marilyn J. Mitchell
**Assistant Director for Instruction and Research Services:** Mary Lou Goodyear
**Assistant Director for Media and Telecommunications Services:** Muriel E. Woods

**Offices:** Auraria Library, 10th and Lawrence Sts.
**Telephone:** — Administration: 556-2805
**Telephone:** — Information: 556-2741

**Faculty:**
- **Professor:** Patricia Senn Breivik
- **Associate Professor:** Jean F. Hemphill
- **Assistant Professors:** Dene L. Clark, Patricia A. Eskoz, Elnora Mercado, Terry Ann Mood, Martin A. Tessmer, Robert L. Wick, Muriel E. Woods
- **Instructors:** Anneli Ahtola, Lori Arp, Anthony J. Dedrick, Nikki Dilgarde, Mary Lou Goodyear, Eileen Guleff, Kathleen Kenny, Marilyn J. Mitchell, Kay Nichols, Elizabeth Porter, Linda D. Ranson, Jay Schafer, Louise T. Stwalley, Rutherford W. Witthus, Christina J. Woo, Eveline L. Yang

Board of Directors, Friends of Auraria Library

Claudia Allen, Gannett Outdoor
Robert Backus, Holme Roberts and Owen
Patricia Breivik, Director, Auraria Library
Carol Chapman, Assistant to the Director, Auraria Library
Tom Clark, Forward Metro Denver Group, Denver Chamber of Commerce
Lucy Creighton, First Interstate Bank of Denver
Nancy Ellins
Mark E. Jones, Merrill Lynch
Michael R. Moore, Arthur Young & Co.
Darwin Niekerk, Modeling and Analysis, Adolph Coors Co.
Christopher G. Nims, Gensler & Associates
Elizabeth Quinn, Fairmont Hotel
Joan Ringel, Colorado Association of Commerce and Industry
Clair E. Villano, Consumer Fraud Division, District Attorney's Office
Lester Woodward, Davis, Graham & Stubbs

*Students using the online Public Access Catalog find a wealth of information at their fingertips.*
Access to information is essential to academic success. The Auraria Library, located at the center of the campus, provides a wide range of learning resources and services to support academic programs. The Library is administered by the University of Colorado at Denver.

The Collection

The Auraria Library has a collection of over 600,000 volumes. In addition to a strong, up-to-date book collection, the Library also has over 2,000 journal and newspaper subscriptions and a film/videotape collection. The Library is a select depository for U.S. government publications and a full depository for Colorado state documents. The Auraria Library's collection is supplemented by providing access to other libraries within the state and nationally through interlibrary loan services.

The Online Public Access Catalog

Access to the Auraria Library's collection is through the online Public Access Catalog (PAC), a user-friendly system that also allows for searching of the collections of many other libraries throughout the state. The online Public Access Catalog, which was developed as a cooperative project by the Colorado Alliance of Research Libraries, has received national recognition for being on the cutting edge of information technology. The online PAC system allows faster and more comprehensive searches than were possible with the traditional card catalog. In addition to using PAC at the Library, patrons may obtain dial-up access through a home or office computer with a modem; PAC also appears as a menu item on the CU-Denver mainframe computer.

Reference Services

The Auraria Library's reference department stands ready to assist students and faculty in using the Library's resources. The reference department is staffed during all times the Library is open. In addition, brief reference questions, such as whether or not the Library owns a particular item, can be answered over the phone.

Media Services

The Media and Telecommunications Division of the Library offers a full range of media services. The media distribution department manages the Library's media collection, which consists of videotapes, audiotapes, records, 16mm films, and kits. These materials are listed in the online Public Access Catalog. This department also houses media viewing and listening facilities. The Library operates an 18-channel television distribution system which is wired into all classrooms on campus; at a faculty member's request a film or videotape can be transmitted directly into the classroom over this system. This system also can transmit live programs from St. Cajetan's, the Student Center, and the Library's television studio to other locations on campus. A self-service graphics lab is also available for student use in the Media and Telecommunications Division and a professional graphic designer is available to assist users.
Computer Assisted Research

Online database searching, for which there is a fee, can save many hours of researching printed abstracts and indexes. In some cases, it provides the only access to certain materials. The Library has access to well over 200 databases. In addition to bibliographic information, many of the business databases also contain directory and financial information. Questions about the Computer Assisted Research service should be directed to the Library's reference department.

Information Retrieval Service

The information retrieval service was instituted as a special aid for busy researchers. For a reasonable fee, Library staff can assist patrons in locating and checking out the library materials they need. Working from the patron's bibliography, staff can: locate and check out books owned by the Library; photocopy articles from journals owned by the Library; submit interlibrary loan requests for materials which the Library does not own; and deliver the materials to the patron's home or office. Inquiries about this time-saving service should be directed to the reference department.

Library Instruction

The Library is committed to educating people to meet the demands of the Information Society. The Library offers a wide range of instructional programming, including a self-paced audiocassette walking tour of the Library, as well as class sessions to teach information access skills and strategies.

Architecture and Planning Library

The Library's main collection is supplemented by the material housed at the nearby Architecture and Planning Branch Library. With a collection of over 21,000 books, 120 periodical subscriptions, and 12,000 slides, this branch library offers specialized information to students of architecture, interior design, landscape architecture, urban design, and planning. This branch library is open to any student who needs access to these materials.

Services for Persons with Disabilities

The Library is committed to making its resources and services accessible to all students; in addition to owning a variety of adaptive equipment to assist persons with disabilities, personal assistance in using the Library is available from the reference department.

Additional Facilities

Coin-operated typewriters, a copy center, change machines, and study rooms are all available at the Library.

Internships

The Library offers internships, practicums, and independent studies to students interested in telecommunications or information management.

Students get experience in front of and behind the camera in the Media and Telecommunications Division of the Library.
"Graduate education is learning how to increase knowledge, and the focus of graduate education at CU-Denver is on the process of scholarship — not just on obtaining information. We hope that our graduates will become tomorrow’s problem solvers."

— Dean David W. Greenfield
The Graduate School
The Graduate School

Dean: David W. Greenfield
School Office: 1250 14th St., Suite 700
Telephone: 556-2663

INFORMATION ABOUT THE SCHOOL

The 1983 Brademas report on Graduate Education in America concluded that "Graduate education and research are the bedrock of every important area of our national life." The report highlighted the fact that a strong national security program, a healthy growing economy, and the prospects for improvement in the quality of life are all dependent upon high quality and vigorous graduate programs in our universities.

High quality graduate programs are synonymous with the University of Colorado. Professors are actively involved in research or creative activity in their disciplines and, thus, are teacher/scholars who continue to study and absorb new data, ideas, and techniques and bring this cutting edge knowledge to the classroom. Graduate students at CU-Denver not only gain from interactions with the graduate faculty but also gain from other students in the classroom. Because most of CU-Denver’s graduate students are older and employed, they bring practical experience gained in the Denver community to the classroom and are ready to relate the realities of practice to the models presented in the classroom.

The Graduate School is a University-wide body that authorizes programs within its constituent colleges and schools. At CU-Denver, 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. Doctoral-level programs on the CU-Denver campus are either coordinated through the office of the system graduate dean or through the corresponding Denver or Boulder department. The Ph.D. degrees in applied mathematics, educational administration, and educational technology are system degrees in which application is made to The Graduate School at CU-Denver. In a number of other disciplines with integrated degrees, most or all course work for the Ph.D. can be completed at Denver and the research adviser may be a member of the CU-Denver faculty, but the degree program is administered by the Boulder department. In other disciplines, a significant portion of the course work required for the Ph.D degree may be taken at CU-Denver. 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 write to the dean of The Graduate School, University of Colorado at Denver, 1100 14th Street, Denver, CO 80202.

Degrees Offered

The following graduate programs are authorized for completion through The Graduate School at CU-Denver. 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
- Communications and theatre
- Economics
- English
- Geography
- Counseling and personnel services
- Early childhood education
- Educational administration
- Educational psychology
- Educational technology
- Elementary education
- Foundations, education
- Instructional technology

The Master of Science (M.S.) in:

- Applied mathematics
- Chemistry
- Civil engineering
- Computer science
- Electrical engineering
- Environmental science
- Mechanical engineering
- Technical communications

The Master of Basic Science (M.B.S.)
The Master of Engineering (M.E.)
The Master of Humanities (M.H.)
The Master of Social Science (M.S.S.)
The Specialist in Education (Ed. S.)
Significant course work can be taken at the Denver campus in the following master's degree programs:

- Fine arts
- Geology
- Journalism
- Philosophy

The Doctor of Philosophy (Ph.D.) in:

- Applied mathematics
- Education (emphasis in education administration and education technology)

Significant course work is available at the Denver campus in the programs listed below. Students can be resident on the Denver campus studying in these areas in order to take advantage of the multi-campus activities of The Graduate School. It is usually advised that a student complete some course work at another campus of the University.

<table>
<thead>
<tr>
<th>Department</th>
<th>Course Work Available</th>
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<tr>
<td>Biology</td>
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<td>Chemistry</td>
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<td>Civil engineering</td>
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<td>Mechanical engineering</td>
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The Graduate School at CU-Denver

An average of 3,180 students are enrolled in graduate programs at CU-Denver each Fall and Spring Semester, and an additional 1,833 non-degree students take graduate courses. Of these, approximately 53 percent are part-time students.

Faculty

The faculty teaching in these programs are headquartered at CU-Denver, although resources of other University of Colorado campuses are used.

Computing Services

The Computing Services department supports computer use by both the academic and administrative communities at CU-Denver. For a complete description of services offered see Special Programs and Facilities in the General Information section of this bulletin.

Financial Aid for Graduate Study

COLORADO GRADUATE GRANT

The Colorado Graduate Grant is administered by The Graduate School. Competition for these funds is based on demonstrated need and is open to graduate students who are residents of the State of Colorado. Grant awards are announced each semester for the following semester. Applications are available from the Office of Financial Aid.

COLORADO GRADUATE FELLOWSHIPS

Colorado Graduate Fellowships are awarded primarily to entering and continuing regular degree doctoral students. These are awarded to entering students on the basis of academic promise, and to continuing students on the basis of academic success. In order for fellowships to be renewed, students holding them must reapply each year to The Graduate School.

GRADUATE STUDENT TEACHING APPOINTMENTS

Many departments employ graduate students as part-time instructors or 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 1986-87 was: one-half time instructor, $8,500 for the academic year; one-half time teaching assistant, $6,800 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. Compensation is based on the number of hours per week. Nonresident students employed as assistants may or may not be eligible for the nonresident tuition differential stipend for their first-year appointment as an assistant only. Exceptions extending beyond the first year must be approved in advance by the respective dean. 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. Nonresident students who are appointed as research assistants in nongeneral fund accounts may or may not be eligible for resident tuition rates. Assistants must be enrolled students.

LOAN FUNDS

Graduate students wishing to apply for long-term loans 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 also are occasional summer programs offering academic credit.

Peace Corps information may be obtained from the Office of International Education.

For additional information contact the Office of International Education, Boulder campus, 492-7741.

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.

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 graduate study in the field chosen.

4. Have at least a 2.75 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 intended advanced degree 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 contains 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. Upon the recommendation of the Admissions Committee and concurrence of the dean of The Graduate School, a department may admit provisional students for a probationary term, 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, according to 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. Students who fail to maintain such a standard of performance, 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.

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 the requirements for a bachelor's degree, may be admitted to The Graduate School by special permission of the dean.

A University of Colorado senior enrolled in the College of Engineering and Applied Science who needs not more than 18 semester hours or 36 credit points to meet the requirements for a bachelor's degree may be admitted to The Graduate School, but is not eligible for financial aid, scholarships, or fellowships as a graduate
student until the equivalent of the minimum requirements for the bachelor's degree have been satisfied.

Application Procedures

Graduate students who expect to study at CU-Denver should contact the CU-Denver Graduate School office 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 CU-Denver Graduate School office, and two official transcripts from each university attended. The application must be accompanied by a nonrefundable application fee of $30 (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 all departments require three or four letters of recommendation.

When a prospective degree student applies for admission, the chairperson 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 Graduate School dean's office, which will inform the student. Persons not wishing to work toward an advanced degree are referred to as non-degree students (below).

A completed application must be in the office of the major department at least 90 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 1987-88, 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).

READMISSION OF FORMER AND SUSPENDED STUDENTS

Students who were previously admitted to a graduate degree program but who did not complete that degree program and who have not been continuously registered at the University must:

1. Clarify their status with the department to determine their eligibility to return and pursue the same degree.

2. After receiving departmental approval, as indicated above, submit a former student application to the Graduate School dean's office before deadlines are passed for the term in which they expect to return to the University. Application deadlines are available from the department.

Former students who wish to change from undergraduate to graduate status or from one major to another must complete the appropriate forms at the time they apply for readmission.

Students transferring from one campus to another must apply and be accepted to the new campus.

A student admitted to The Graduate School for the master's program must reapply for the doctoral program.

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 the case of appeal by the student, the final decision will be made by the Executive Committee.

FOREIGN APPLICANTS

Prospective foreign students should have completed applications on file in The Graduate School office prior to February 15 for the Summer Term, March 15 for the Fall Semester, and August 1 for the Spring Semester. The application packet should include the $50 fee, TOEFL scores, financial documentation, Graduate Record Examination scores, official English translation of all school records, and other documents as noted in the previous section on Application Procedures.

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 semester 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 CU-Denver Testing Center, or from The Educational Testing Service, Box 1502, Berkeley, California 94701, or Box 955, Princeton, New Jersey 08540.

OTHER GRADUATE QUALIFYING EXAMINATIONS

Students entering professional schools and special programs may obtain information at the Student Testing Center on the following examinations: Graduate Management Admissions Test (GMAT), Miller Analogies Test (MAT), Dopllet, and Law School Admissions Test (LSAT).

NON-DEGREE STUDENTS

A student not wishing to earn an advanced degree from the University of Colorado should apply to the Office of Admissions and Records, CU-Denver, 1100 14th Street, Denver, CO 80202. Non-degree students will be allowed to register only on the campus to which they have been admitted.

Non-degree 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 credit toward the
requirements of a master's degree for courses taken either as a student at another recognized graduate school, as a non-degree student at the University, or both. In addition, the department may recommend to the graduate dean the acceptance of credit courses taken as a non-degree student at this University during the term for which the student applied for admission to The Graduate School, provided such admission date was delayed through no fault of the student. A grade of B or better must be obtained in any course work transferred in this manner.

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 The Graduate School. If unable to attend that semester they must notify the department that has accepted them and submit the necessary forms to the Office of Admissions and Records at CU-Denver 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 Classes). 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, CU-Denver, stating the exceptional circumstances that 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.

Withdrawal

A graduate student who desires to withdraw from the University must apply to the dean of The Graduate School for permission to withdraw in good standing. A student who discontinues attendance in a course without official withdrawal will be marked as having failed the course.

Master's Thesis

Graduate students working toward master's degrees, if they expect to present a thesis 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. 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. The final grade will be withheld until the thesis is completed. If the thesis is not completed at the end of the term in which the student is so registered, an in progress (IP) will be reported. (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 in a combination of undergraduate/graduate/professional course work acceptable for graduate credit, or any number of thesis hours.

A maximum of two-thirds of a semester of resident credit may be earned during the summer if a student registers for three semester hours of other graduate work, or any number of thesis hours.

For the number of hours required for financial aid see Financial Aid at the University of Colorado at Denver in the General Information section of this bulletin. A graduate student may contact the dean's office for information on the appeal process regarding the full load requirement for financial aid purposes.

MAXIMUM LOAD

No graduate student may receive 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 CU-Denver is 10 hours per 10-week summer term. A graduate student may contact the dean's office for information on the appeal process regarding an overload.

UNIVERSITY EMPLOYEES

Full-time employees of the University may not undertake more than 6 credit hours per semester. Part-time employees, including assistants, may take such work as is approved by the major department.

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 advance 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 obtain all the training, knowledge, and grasp of ideas necessary to meet the requirements for an advanced degree from formal courses. They should work on their own initiative, reading widely and thoughtfully, reaching their own conclusions, and acquiring a sense of values, perspective, 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 while enrolled in The 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 appeal by the student, the final decision will be made by the Executive Committee.

Repeating a Course

A graduate student who receives a grade of C, D, or F in a course may repeat the course once, upon written recommendation to the dean by the chairman of the student's advisory committee and major department, provided the course has not previously been applied toward a degree.

In calculating a student's grade-point average for Graduate School purposes, the grade for a repeated course will substitute for the old grade. Grades earned in courses taken as an undergraduate or as a non-degree student, as well as grades earned in first and second year foreign language courses, will not be used in calculating The Graduate School grade-point average; however, all grades received will appear on the student's transcript.

Change of Department or Major

A graduate student wishing to change department or major must submit a new Part I and Part II of the graduate application to the new department or school and request the former department to forward recommendations and credentials.

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 Master of Arts, Master of Science, or other master's degrees 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.

Students planning to graduate should ascertain current deadlines of The Graduate School. It is the graduate student's and the department's responsibility to see that all requirements and deadlines are met (i.e., changing of IW grades, notifying The Graduate School of final examinations, etc.).

Departments or program committees may have additional deadlines that must be met by the graduate students in that department or program. It is the student's responsibility to ascertain such requirements and to meet them as designated by the department or program chair.

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 that are listed at the 500 level or above and that are offered by professors who are members of the graduate faculty, or that 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 the 400 level and above, provided they are approved for graduate rank for a specific degree plan by the faculty of the degree-granting program and the dean of The Graduate School.

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 students have made a satisfactory record in this University for at least one semester or summer term and after they have removed any deficiencies that were determined at the time of admission or by qualifying examinations or otherwise, they should confer with their major department and request that a decision be made on their status. This definite status must be set by the major department before students 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 5-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 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 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. To be eligible for courses to be considered for transfer, a student must have an overall B average in all courses taken at the University of Colorado in The Graduate School.

**Continuing Education Course Work**

Students may use the resources of the Division of Continuing Education in the pursuit of graduate study only if they obtain proper academic approval from the major department and the graduate dean in advance.

**Residence**

In general, the residence 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 a combination of other course work acceptable for graduate credit. See Limitation of Registration, Full Load, for requirements for full residence credit during the summer. A student who is noticeably deficient in his/her 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 halftime. 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 in 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 the major department, certifying that the student's work is satisfactory and that the program outlined in the application meets the requirements set for the student.

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 outlined in University of Colorado Graduate School Specifications for Preparation of Master's Theses and Doctoral Dissertation, which is 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 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 (in progress) will be reported for terms during which the 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/she is still taking required courses for the degree, provided he/she 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.

Supplemental Examinations

Supplemental examinations should be simply an extension of the original examination and given immediately. If the student fails the supplemental examination, three months must elapse before he or she may attempt the comprehensive examination 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.

Master's Thesis Credit

Every graduate student working toward a master's degree who expects to present a thesis 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. 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. The final grade will be withheld until the thesis is completed. If the thesis is not completed at the end of the term in which the student is so registered, an in progress (IP) will be reported. (The student may not register again for any portion of thesis credit on which an IP grade has been submitted.)

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. Candidates for the master's degree are expected to complete their work with reasonable continuity.

Deadlines for Master's Degree Candidates Expecting to Graduate During 1987-88

Deadline dates for the following can be obtained by calling The Graduate School office, 556-2663.
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.

DOCTOR OF PHILOSOPHY

The Doctor of Philosophy (Ph.D.) degree is the highest academic degree conferred by the University. To state the requirements for the degree in terms of credit hours would be misleading because the degree is not conferred merely upon the satisfactory completion of a course of study, however faithfully pursued. Students who receive this degree must demonstrate that they are proficient in some broad subject of learning and that they can critically evaluate work in this field; furthermore, they must have shown the ability to work independently in their chosen field and must have made an original contribution of significance to the advancement of knowledge. The technical requirements stated below are minimal requirements for all candidates for the degree; additional conditions set by the departments will be found in the announcements of separate departments. Any department may make additional regulations consistent with these general rules.

Studies leading to the Ph.D. degree must be chosen so as to contribute to special competence and a high order of scholarship in a broad field of knowledge. A field of study chosen by the student may be in one department or it may include two or more closely related departments. The criterion as to what constitutes an acceptable field of study shall be that the student's work must contribute to an organized program of study and research without regard to the organization of academic departments within the University.

Students planning to graduate should obtain current deadline dates in the office of The Graduate School. It is the graduate student's and the department's responsibility to see that all requirements and deadlines are met (i.e., changing of IW grades, notifying The Graduate School of final examinations, etc.).

Department or program committees may have additional deadlines that must be met by graduate students in that department or program. It is the student's responsibility to ascertain such requirements and to meet them.
as designated by the department or program chair.

**Minimum Course/Dissertation Requirements**

A minimum of 30 semester hours of graduate courses and 30 semester hours of dissertation credit are required for the Ph.D. degree.

**Course Work Requirement.** A minimum of 30 semester hours of courses numbered 500 or above is required for the degree, but the number of hours of formal courses will ordinarily exceed this minimum. At least 20 of the required hours must be in graduate courses taken at this University. Students who have been admitted to The Graduate School with deficiencies may expect to receive little or no residence credit until the deficiencies have been removed.

**Dissertation Hours Requirement.** To complete the requirements for the Ph.D. a student must register for a total of at least 30 hours of doctoral dissertation credit, with no more than 10 of these credit hours in any single semester. Not more than 10 dissertation hours may be taken preceding the semester of taking comprehensive examinations. In addition, up to 10 hours may be taken in the semester in which the student passes comprehensive examinations. Dissertation credit does not apply toward the minimum 30 hours of required course work specified above and will not be included in calculation of the student’s grade-point average. Only the grades of A, B, C and IP shall be used.

Course work and work on dissertation may proceed concurrently throughout the doctoral program; however, at no time shall a doctoral student register for more than 15 hours of 500-level and above courses. Normally a student must have earned at least three and not more than six semesters of residency before admission to candidacy.

**Quality of Work**

Students are expected to complete with distinction all work in the formal courses in which they enroll. A course mark below B is unsatisfactory and will not be counted toward fulfilling the minimum requirements for the degree. Upon recommendation by the advisory committee and the chair of the department and with the approval of the dean, a student may be required to withdraw at any time for failure to maintain satisfactory progress toward the degree.

**Advisory Committee**

As soon as the field of specialization has been chosen, the candidate will request the faculty member with whom the candidate wishes to work to act as chair of the advisory committee. The chair, with the advice and approval of the chair of the department, may select two or more others to serve on the committee, so that the several fields related to the student’s special interest will be represented. A purpose of the advisory committee (beyond guiding the student through graduate study) is to ensure against specialization that is too narrow. The student shall obtain the signature of the chair of the committee (thereby signifying his or her willingness to act) on the Application for Admission to Candidacy form. Any change in the membership of the advisory committee is to be similarly reported.

**Residence**

The student must be properly registered to earn residence credit. The minimal residence requirement shall be six semesters of scholarly work beyond the attainment of an acceptable bachelor’s degree. Mere attendance shall not constitute residence as the word is here used. Residence may be earned for course work completed with distinction, for participation in seminars, or for scholarly research performed here or elsewhere under the auspices of the University of Colorado.

As a guiding policy in determining residence credit for employed students, those who are employed in three-fourths to full-time work that does not contribute directly to their program toward a degree may not earn more than one-half residence credit in any semester. Students who are employed more than one-fourth time and less than three-fourths time in work that does not contribute directly to the degree may earn not more than three-fourths residence credit. Those who have one-fourth time employment or less may earn full residence credit. (All these provisions are subject to the definition of residence credit given in the preceding paragraph.) In case the interpretation of residence credit for any student needs to be clarified, a decision will be made by the chair of the student’s advisory committee, the chair of the student’s major department, and the dean of The Graduate School.

Two semesters of residence credit may be allowed for a master’s degree from another institution of approved standing, but at least four semesters of residence credit, two of which must be consecutive in one academic year, must be earned for work (course and/or dissertation) taken at this University.

**Preliminary Examination**

Each department will satisfy itself (by examination or other means) that students who signify intent to undertake study for the Ph.D. degree are qualified to do so. The means by which each department makes this evaluation shall be specified in departmental requirements. Students who are thus evaluated will be notified immediately of the results. The results of this preliminary evaluation shall be reported to The Graduate School office on the Application for Candidacy form filed by the student at least two weeks before the comprehensive examination is attempted.

**Language Requirement**

Students are required to meet the following language requirements.
Communication Requirement. All graduate students for whom English is the native language are required to demonstrate at least second-year college proficiency in a foreign language of their choice. This requirement may be satisfied in the following ways.

1. The student's undergraduate transcript may be presented, showing completion of grade C or better of at least 3 semester hours of a fourth-semester undergraduate college course in a foreign language. The transcript must accompany the student's Application for Admission to Candidacy when it is submitted to The Graduate School.

2. The student may take The Graduate School Foreign Language Test (GSFLT) at the Testing Office before or after admission to The Graduate School. Students should check with The Graduate School for the passing score required for each language.

3. If the student wishes to demonstrate competence in a language for which the GSFLT is not available, a test designed and administered by the appropriate language department at the University of Colorado may be taken, with the passing criterion to be set comparable to the above GSFLT criterion.

4. The student may register at the University for any fourth-semester course in a foreign language and pass it with a C or better. (Registration in such courses is contingent upon the language department's approval.) A student who elects 2, 3, or 4 above must complete the requirements before the Ph.D. comprehensive examination may be scheduled.

Students whose native language is not English will, by passing their courses and completing their graduate work at the University, demonstrate sufficient ability in English to meet the communication requirement.

Special Languages. When special languages are needed as tools to read foreign literature in a particular field, the individual academic departments may require further training in foreign languages for all their Ph.D. graduate students. The choice and number of languages as well as the required levels of skill and the methods of testing these skills are determined by the individual departments.

Credit by Transfer

Resident graduate work of high quality earned in another institution of approved standing will not be accepted for transfer to apply toward the Doctorate until the student has established in this Graduate School a satisfactory record in residence, but such credit must be transferred before the student makes application for admission to candidacy for the degree. Such transfer will not reduce the minimum residence requirement at this University, but it may reduce the amount of work to be done in formal courses.

The maximum amount of work that may be transferred to this University for the Ph.D. is 10 semester hours.

Application for Admission to Candidacy

A student must make formal application for admission to candidacy for the Ph.D. degree on forms supplied by The Graduate School office at least two weeks before the comprehensive examination is attempted.

A student shall have earned at least three semesters of residence, shall have passed the language requirements, and shall have passed the comprehensive examination before admission to candidacy for the degree.

Continuous Registration Requirements for Doctoral Candidates

Following successful completion of comprehensive examinations, students must register continuously. Students admitted to "candidacy for degree" will register for and be charged for 10 hours of credit for each full-time term of doctoral work. For each term of part-time enrollment, students will be charged for 7 hours of dissertation credit, except that students not making use of campus facilities may petition The Graduate School for 3-credit-hour status. Continuous registration during the academic year will be required until completion of the dissertation defense. It is expected that the student and adviser will consult each semester as to the number of hours for which the student will register, consistent with the classifications identified above.

If a student who is certified for the Ph.D. degree, or who has received permission to take the comprehensive and passes them prior to meeting the language requirement must be continuously enrolled as stated above. This continuing registration is independent on whether the candidate is in residence at the University. (See also section on Residence.)

Comprehensive Examination

Before admission to candidacy for the Ph.D. degree, the student must pass a comprehensive examination in the field of concentration and related fields. This examination may be oral, written, or both, and will test the student's mastery of a broad field of knowledge, not merely the formal course work completed. The oral part is open to members of the faculty. The student must be registered at the time the comprehensive examination is attempted.

The examination shall be conducted by an examining board appointed by the chair of the department concerned and be approved by the dean. The board shall consist of the advisory committee and additional members as necessary to a minimum of five. A successful candidate must receive the affirmative votes of a majority of the members of the examination board. In case of failure, the examination may be attempted once more after a period of time determined by the examining board.

Dissertation Requirements

A thesis based upon original investigation and showing mature scholarship and critical judgement as well as familiarity with tools and methods of research must be
written upon some subject approved by the student's major department. To be acceptable, this dissertation should be a worthwhile contribution to knowledge in the student's special field. It must be finished and submitted in typewritten form at least 30 days (in some departments, 90 days) before the day of the final examination and must be formally approved and made available for inspection by the examining committee before the final examination may be taken.

In mechanical features all dissertations must comply with the specifications of The Graduate School as outlined in the *University of Colorado Graduate School Specifications for Preparation of Master's Theses and Doctoral Dissertation*, which may be obtained from The Graduate School.

It is the student's responsibility to notify The Graduate School of the exact title of the dissertation at least six weeks prior to the commencement at which the student will graduate. This title will be printed in the commencement program.

One formally-approved, typewritten copy of the dissertation, including abstract, plus one additional copy of the title page and abstract must be filed in The Graduate School office at least two weeks before the date on which the degree is to be conferred.

The abstract, not to exceed 350 words, will be published in *Dissertation Abstracts International*. The determination of what constitutes an adequate abstract shall rest with the major department.

All dissertations must be signed by no fewer than two members of the major department staff who are regularly engaged in graduate instruction.

All approved dissertations are kept on file in the library.

When the dissertation is deposited in The Graduate School, the candidate must pay the thesis-binding fee and sign an agreement with *University Microfilms International* to allow for publication in *Dissertation Abstracts International*; and to grant *University Microfilms International* the right to reproduce and sell (a) copies of the manuscript in microform and/or (b) copies of the manuscript made from microform. The author retains all rights to publish and/or sell the dissertation by any means at any time except by reproduction from negative microform.

**Final Examination**

After the dissertation has been accepted, a final examination of the dissertation and related topics will be conducted. This examination will be wholly or partially oral, the oral part being open to anyone. The examination will be conducted by a committee appointed by the dean, which will consist of at least five persons, one of whom must be from outside the student's department. More than one dissenting vote will disqualify the candidate in the final examination.

Arrangements for the final examination must be made in the dean's office at least two weeks in advance. The examination must be scheduled not later than two weeks before the date on which the degree is to be conferred. A student must be registered at the time of the final examination.

**Time Limit**

If a student fails to complete all requirements for the degree within four years of the date on which the comprehensive examination was passed, a second examination similar in extent to the first will be required before the candidate may take the final examination. If the second comprehensive examination is failed, it may be attempted once more after not fewer than eight months of further work.
"Our approach to planning and design encompasses a broad array of educational approaches and professional perspectives. We seek not only to provide students with the skills which are essential for professional practice, but also to engender an appreciation of historical antecedents, modes of inquiry, and paradigms which inform the fields of architecture, urban and regional planning, landscape architecture, and urban and interior design.”

— Dean Hamid Shirvani
School of Architecture and Planning
School of Architecture and Planning

Dean: Hamid Shirvani
Associate Dean: M. Gordon Brown
Assistant to the Dean: Nancy Briggs
School Office: 1250 14th St., Second Floor
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Dean’s Advisory Council:
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Rodney Cobi, ASLA, City of Boulder Planning Department
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INFORMATION ABOUT THE SCHOOL

The School of Architecture and Planning is nationally unique because of its students and alumni, its faculty and staff, its missions, and its location. The School has been able to attract high quality students with a strong professional career orientation. Through their achievements, the alumni of our School are major contributors to its image. The School of Architecture and Planning is committed to offer professional and specialized degree programs through rigorous instruction and research programs in the fields of architecture, landscape architecture, interior design, urban design, and urban and regional planning. The School is committed to excellence in instruction and research while providing a balance of design skills and intellectual inquiry. As a graduate school with five degree offerings, and a part of a university with a mandate for excellence and national and international recognition, we are evolving as the intellectual design forum in the Western region.

The School of Architecture and Planning is devoted to “design” as its central intellectual concern. The term design is used here in its broadest sense to include full range of philosophies, ideologies, theories, and methods. Students are introduced to fundamentals of design analysis and synthesis based on humanistic ideals as the means of meeting their personal aspirations. They learn how to think, analyze, synthesize, and be creative, and develop an intellectual framework in regard to design and planning.

Our interest is to educate designers who are able to deal with a variety of issues, programs, and problems within their particular context and time frame. In other words, we are interested in educating designers with the capacity to think innovatively and to challenge each situation on its own merit. The School of Architecture and Planning is dedicated to excellence in design education.

SUPPORT FACILITIES

Architecture and Planning Library

The Architecture and Planning Library, a branch of the Auraria Library, serves as a learning resource center in the fields of architecture, design, and planning. It contains the following collections to support the curriculum of the School:

Reference — technical materials selected to support design and planning studio projects.
Circulating — material in the fields of architecture, landscape architecture, interior design, urban design, and urban and regional planning.
Documentary — planning documents issued by local, regional, state, and national agencies with an emphasis on planning materials pertaining to Colorado communities and concerns.
Periodical — current materials relating to architecture, design, and planning.
Reserve — resource materials for required and supplemental class reading.
Nonprint — media, including architectural slides and micro-computer software.

The library is open 71 hours per week, including evenings and Sundays. The staff consists of a librarian, library assistant, and several student assistants. The library provides a number of services including reference and research assistance and library-use instruction. Additional services, such as interlibrary loan and computer-assisted research, are provided through the Auraria Library.
Computer Laboratory

The Computer Laboratory of the School of Architecture and Planning is equipped for upcaled computer-aided design and drafting with a micro-computer based networking system. Six Zenith 2200 PC/ATs in addition to four IBM PC/XTs are now linked with a Novell central file server and 120 megabyte hard disk drive for storage. This network and six additional PC/AT workstations are linked through the addition of AutoCAD compatible software that extends and enhances the ongoing use of AutoCAD and AE/CADD. Now possible is:

AutoWord — An interactive word processing package for editing and displaying text of drawings.
Auto CoGo — A coordinate geometry program that allows entry of survey and engineering data for site planning and engineering.
LandSoft — A system for introducing landscape architectural symbols and drafting extension into the AutoCAD and AE/CADD utilities.
Generic Template — A means of customizing or creating unique design and drafting templates.

The six high resolution PC/AT workstations also make use of the latest School CAD/D software, the computer-Vision system which includes the Personal Architect and Personal Designer packages. Hardware in the School Laboratory CAD/D system therefore includes:

Ten PC workstations (as mentioned above), eight with high resolution monitors and digitizing tablets.
Novell NS68B Central File Server with two megabytes of memory, a Novell NPS2 120 megabyte drive, and ports to accommodate up to 24 workstations and five shared output devices.
Zenith Z100 PC with Tecmar 60MB magnetic tape backup system, used for systems operation and as a plot station with Gould Colorwriter 6320 and Hewlett/ Packard plotters. (Large format (24” x 36”) plotting must be done at the University computing Center on a Calcomp Plotter.)
Calcomp 9100 24” x 36” Digitizer with 16 button cursor.

With this very specialized equipment and software, students and faculty can create computer-generated architectural plans; elevation and perspective drawings; interior design and landscape plans; drawings and renderings; and flowcharts, charts, graphs, and organizational charts while storing specifications, information, and other data that can be used in creating architectural schedules, engineering, HVAC and lighting calculations, or for estimating.

The network linked PCs mentioned above and an IBM/PC and Apple/PC may be used with a variety of software packages available through the Architecture and Planning Library to perform a variety of tasks such as word processing, spreadsheets, engineering, and energy calculations.

Model Shop and Photo Laboratory

The School maintains a darkroom for student use as well as a variety of camera and audiovisual equipment. These facilities are valuable aids in preparing class presentations, design projects, portfolios, and in learning multi-media techniques for presentations. The model shop is available for use in fabricating architectural models and in furniture design projects. A staff technician is on duty to assist students in the use of their facilities.

NON-RESIDENT STUDENTS

The School of Architecture and Planning at the University of Colorado at Denver actively seeks students from throughout the United States and abroad. Its faculty includes many whose work is nationally recognized. The curriculum in every academic professional program attempts to accommodate the variety of planning problems and design issues which arise across the nation. Each program's curriculum, of course, embodies a core of knowledge that underlies professional practice everywhere.

"In-state" students are eligible for the lower tuition rates available to residents. An in-state student, under statutory provisions of the State of Colorado, is one who has established a legal domicile in Colorado for at least one year preceding the beginning of the term for which in-state classification is sought. Persons over 22 years of age and those who are otherwise emancipated establish their own legal domicile. Domicile is established when one has a permanent place of habitation in Colorado and the intention of making Colorado one's true, fixed, and permanent home and place of habitation. For further information consult Residency Classification in the General Information section of this bulletin.

Information regarding financial assistance for both in and out-of-state students will be provided in response to inquiries about the programs in architecture and planning at CU-Denver. A limited number of non-resident tuition differential awards are available each year. These are provided to non-resident students having research or teaching assistantships supported by state appropriations. Additional support in the form of internships, fellowships, grants, and contract research with faculty members also is available.

INTERNATIONAL APPLICANTS

General Information

The University of Colorado at Denver Office of Admissions requires that all applicants to CU-Denver meet certain qualifications. Your qualifications are determined by records and credentials that you are required to provide. It is important that all documents are received by the School of Architecture and Planning before the deadline date of the term that you plan to attend. If your documents are received later than our
published deadline, you will be considered for the next available term.

**Admissions Requirements**

1. Application for admission.
2. $50 nonrefundable application fee must accompany the application.
3. A current CU-Denver Financial Resources Statement. Statements used for other institutions will not be accepted. Photocopied documents are not acceptable unless signed by the originator; signatures must not be photocopies.
4. Two certified copies of official academic records from each college you attended outside the United States. A certified literal English translation must accompany documents that are not in English.
5. Two official transcripts of college studies from each United States collegiate institution that you attended. Hand-carried copies are not acceptable. The transcript must be sent to this office by the issuing institution.
6. Official TOEFL Score Report to establish your English language proficiency. Institutional TOEFL reports are not acceptable. TOEFL score must be 500 or higher to be considered for admission by the University.
7. Four letters of recommendation.
8. Portfolio required for the architecture, interior design, landscape architecture, and urban design programs.

Additional supporting documents subsequently may be required by the office of admissions. All international applicants who are admitted to CU-Denver must have a valid visa and must enroll for and maintain a full course of study (12 or more semester hours) leading to the completion of a master’s degree.

**Financial Requirements**

You must provide evidence that sufficient funds are available for you to attend the University of Colorado at Denver. To provide this evidence you should follow these instructions:

1. Complete the “Financial Resources Statement.” You must prove that you have sufficient money to pay your expenses by submitting the Financial Resources Statement as part of your application.
   a. If you are using your own money, your bank must certify that you have the full amount of money on deposit to meet your tuition and expense costs. In Part 2, Section 1 of the Financial Resources Statement your bank must certify that the money you need is on deposit in your account.
   b. If you are being sponsored by a family member, or a friend, your sponsor must agree to provide the money, and sign the Financial Resources Statement in Part 2, Section 2. Your sponsor’s bank must certify that the sponsor has on deposit the amount of money you will need. **All subscriptions of Section 2 must be completed and signed.**
   c. If you have been awarded a scholarship, Part 2, Section 3, of the Financial Resources Statement must be completed.

2. An incomplete statement of Financial Resources or failure to prove the availability of the necessary money will delay your admission, or cause you to be denied admission, to the University. Be sure your Financial Resources Statement is accurate and complete.

**Application Deadlines**

- **Master of Architecture** . . March 15 Fall term
- **Master of Interior Design** . . March 15 Fall term
- **Master of Landscape Architecture** . . March 15 Fall term
- **Master of Urban and Regional Planning** . . March 15 Fall term (Priority deadline)
  May 1 Fall term (Space Available)

- **Master of Architecture in Urban Design** . . March 15 Fall term (Priority deadline)
  May 1 Fall term (Space Available)
  September 1 Spring term

**Programs of Study**

**ARCHITECTURE**

Program Director: Robert Kindig
Secretary: Annette Korslund
Department Office: 1250 14th St., Second Floor
Telephone: 556-2877
Faculty: Professors: Eugene F. Benda, Davis C. Holder, Robert W. Kindig, Gary Long, John M. Prosser, Hamid Shirvani
Associate Professors: M. Gordon Brown, Paul J. Foster
Assistant Professors: Gary Crowell, Francine Haber, Bennett Neiman, Gail W. Karn, Diane L. Wilk
Adjunct: Theodor Grossman, Marvin Hatami, Anthony Pellecchia, John Shuttleworth
Emeritus: G.K. Vetter

The architecture program in the School of Architecture and Planning is a professional design curriculum focused on four major architectural components: architectural design; design technology; history, theory, and criticism of architecture; and visual studies. The primary objective of the program is to prepare students to enter the professional practice of architecture with a thorough foundation in the bodies of knowledge and applied methods of planning and design in architecture. More specifically, the objectives of the program are to develop:
Awareness of sensitivity to the quality of the physical environment.

Intellectual understanding of the history, theory, and criticism of arts and architecture.

Professional competence in design technology.

Analytic, problem solving competence of synthesis and communication of the above knowledge into "physical form".

Understanding of the institutional framework within which design takes place.

Understanding of professional practice including management and professional conduct.

The ultimate goals of the program are to provide the architecture student with a deep appreciation of physical and environmental quality while acquiring critical capacity, through comprehension of all facets of architecture, and design expertise.

**Degrees Offered**

The architecture program offers both first and post professional Master of Architecture degrees. The first professional M.Arch. degree requires three and one-half years of full time study. The first professional degree can also be completed in two years (by admission with advanced standing to the three and one-half year program). A thesis is required in each of these programs. Students holding a Bachelor's degree in fields other than architecture would enter the first professional M.Arch. program which typically requires 106 credit hours for completion. Admission with advanced standing is open to holders of a B.S. in Architecture or Environmental Design. This group of students would pursue the first professional M.Arch. degree, completing their program in two years with 71 credit hours of study.

The architecture program also offers a one-year post-professional Master of Architecture open only to applicants already holding the first professional degree in architecture (B.Arch.) and entails a minimum of 30 credit hours. Individually organized studies focus on the student's specific interests in architecture and urban design. A thesis is required.

The first professional M.Arch. degree program is fully accredited by the National Architectural Accrediting Board (NAAB), the Association of the Collegiate Schools of Architecture, and the American Institute of Architects.

**Curriculum**

The curriculum includes studies in architectural design, graphics communication, history and theory, technology, and professional practice. Architectural design is the central focus of the curriculum and integrates history and theory, technology and professional practice. Design studios function as a laboratory for synthesis of the materials covered in lectures and seminars and for exploration into viable solutions to architectural problems. The design thesis is the culmination of the architecture curriculum.

Communication courses provide students with essential skills for expressing their ideas and concepts acting as an essential medium for expression of the architect's thought processes. Using this fundamental architectural tool, students learn to make the connections between conceptual ideas and actual image.

The body of knowledge offered in history and theory courses forms a foundation of spiritual, emotional, institutional, and cultural meanings upon which architectural ideologies are based. The student acquires an intellectual framework and awareness of architecture as a manifestation of the society's sociopolitical and cultural change.

Since architectural technology is essential knowledge for an architect, students also must become informed concerning structures, materials, environmental control, and all other technological aspects of architecture. Professional practice courses expose the student to actual implementation of architectural projects and the internship program exposes them to real office practice.

**Application and Admission**

The complete set of materials for application for admission to all Master of Architecture programs includes: the application form, two official transcripts from each institution the applicant has attended, three letters of recommendation, statement of purpose, a portfolio of academic, creative and/or professional work and a non-refundable application fee of $30. The portfolio must be no longer than 14 by 17 inches. International applicants see the section on International Applicants at the beginning of the School general information, for additional information.

To be considered for fall admission, all application materials must be received by March 15. Applications received after March 15 may be considered for non-degree student status only.

For application form and additional information please write to:

Office of the Dean
School of Architecture and Planning
University of Colorado at Denver
1100 Fourteenth Street
Campus Box 126
Denver, Colorado 80202
(303) 556-2755

Specific requirements, including prerequisites, for each of the master's degree programs are given below.

An Admissions Committee will review the application materials and select students to be admitted to programs. Applicants will be notified concerning their acceptance prior to May 1.

The recommended minimum grade-point average for admission is 3.00 on a 4-point scale. If the student's grade-point average is below 3.00, the Graduate Record
Examination (GRE) is recommended as part of the application materials. However, evaluation for admission will be on the basis of all application materials and not on grade-point average alone.

THREE-YEAR PROGRAM

The three-year program is open to students with a bachelor's degree. A particular program prerequisite is one year of basic college level physics and mathematics through beginning calculus. The physics and mathematics requirements must be met before entering the program or can be obtained while registered at the School of Architecture and Planning by attending the summer term prior to the fall entrance of first year.

Three-Year Program Course Requirements:

<table>
<thead>
<tr>
<th>Course</th>
<th>Semester Hours</th>
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<tbody>
<tr>
<td>Architectural Design</td>
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<td>Graphics</td>
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<tr>
<td>Technologies</td>
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<td>History/Theory</td>
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<td>Professional Practice and Construction Documents</td>
<td>6</td>
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Fall Semester, 500 Level

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<td>ARCH. 505. Introduction to Design and Planning</td>
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<td>ARCH. 510. Graphics I</td>
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<tr>
<td>ARCH. 551. Materials and Methods of Construction</td>
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<tr>
<td>ARCH. 552. Basic Structures I</td>
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</tr>
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<td>ARCH. 571. 19th and 20th Century History</td>
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<tr>
<td>ARCH. 501. Design</td>
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</tr>
<tr>
<td>ARCH. 511. Graphics II</td>
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<td>ARCH. 553. Basic Structures II</td>
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<td>ARCH. 630. Site Engineering</td>
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Spring Semester, 500 Level

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<td>ARCH. 502. Design/Construction Drawings</td>
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Summer Term, 500-600 Level

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Fall Semester, 600 Level

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<tr>
<td>ARCH. 600. Design</td>
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<td>ARCH. 650. HVAC</td>
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<td>ARCH. 665. Structures III</td>
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<tr>
<td>URP 500. Fundamentals Planning Policy</td>
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Spring Semester, 600 Level

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<td>ARCH. 601. Design</td>
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<tr>
<td>ARCH. 651. Lighting and Acoustics</td>
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<td>ARCH. 666. Structures IV</td>
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<tr>
<td>Theory Requirement</td>
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<td>Elective</td>
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Fall Semester, 700 Level

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<td>ARCH. 712. Thesis I</td>
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<td>ARCH. 660. Professional Practice</td>
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Spring Semester

<table>
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<td>ARCH. 713. Thesis Graphics</td>
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<td>ARCH. 750. Systems Synthesis</td>
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<td>Total</td>
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THREE-YEAR PROGRAM WITH ADVANCED STANDING

Advanced standing in the three-year program is available to students with a four-year Bachelor of Architecture or Environmental Design degree who seek the second professional degree in architecture. The minimum program is a two-year, 71 semester-hour series of studies leading to the Master of Architecture degree. The physics and mathematics prerequisites stated for the three-year program (above) must be met prior to admission with advanced standing.

Students from four-year design programs must have taken two semesters of architectural history, two semesters of basic structures (statistics and strength of materials), and must exhibit (in their portfolio) a graphics ability equivalent to that required in the school's 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 substituted if the grade received was B or above. The Master of Architecture degree is awarded upon satisfactory completion of 71 semester hours, all required courses and a thesis.

Minimum Course Requirements

<table>
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<tr>
<th>Course</th>
<th>Semester Hours</th>
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<tr>
<td>Architectural Design</td>
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<td>Theory</td>
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<tr>
<td>Professional Practice and Construction Documents</td>
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<td>Planning</td>
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Recommended Order of Studies

Fall Semester, 600 Level

<table>
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<th>Course</th>
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<tr>
<td>ARCH. 600. Design</td>
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<tr>
<td>ARCH. 605. Introduction to Arch. program</td>
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</tr>
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<td>ARCH. 650. HVAC</td>
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<table>
<thead>
<tr>
<th>Course</th>
<th>Semester Hours</th>
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</thead>
<tbody>
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<td>ARCH. 600. Design</td>
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<tr>
<td>ARCH. 605. Introduction to Arch. program</td>
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</tr>
<tr>
<td>ARCH. 650. HVAC</td>
<td>3</td>
</tr>
</tbody>
</table>
ARCH. 665. Structures III .................................. 2
URP. 500. Fundamentals Planning Policy .................. 3
Theory Requirement ......................................... 3

ARCH. 501-5. Architectural Design. Three studio-seminar periods per week. 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, structure, and materials.
ARCH. 502/602-8. Architectural Design and Construction Drawings. Summer session. Four studio-seminar periods per week. First five weeks involves design of building with emphasis on design process. In the second five weeks the schematic design is taken through design development into working drawings.
ARCH. 510-2, 511-2. Architectural Graphics I and II. Two lecture-studio periods per week. Graphic skills for design: diagramming, schematic sketches, communication, two and three-dimensional representation, shade and shadow, color.
ARCH. 600-5. Architectural Design. Three studio-seminar periods per week. Building design within the context of urban environments, site, climate, codes, utilities, and circulation. Integration of architectural form and space with structure and environmental controls.
ARCH. 601-5. Architectural Design. Three studio-seminar periods per week. Four independent studios offered for diversity of project scale, building type, and theoretical emphasis. Selection allows some degree of student initiative in exploration of personal interests.
ARCH. 700-5. Architectural Design. Three studio-seminar periods per week. Four studio selections organized as in ARCH. 601 above. ARCH. 601 and 700 studios include projects emphasizing urban design, urban context problems, major building complex problems, building type problems (e.g., housing), and energy-conscious design. One studio is organized around projects from the Center for Community Development and Design and another is arranged with other divisions for interdisciplinary work.
ARCH. 701-6. Thesis II. Three studio-seminar periods per week. The thesis is the final design product of the program and serves to integrate all prior architectural learning. During this phase, the student must demonstrate the self-discipline and self-direction necessary to accomplish a complete architectural design project. The project must present a major design challenge to the student; however, an area of interest may be selected by the student such as housing, health care facilities, recreational facilities, urban infrastructure, historic preservation, and architectural technology.
ARCH. 712-5. Thesis I. Three studio-seminar periods per week. Research and study leading to the development of a project program, including site selection and analysis. Projects may be developed for thesis work with the Center for Community Development and Design. Conceptual design may be commenced during this stage.
ARCH. 713-2. Thesis Graphics. This course is taught concurrently with ARCH. 701 and is intended to assist the student in all phases of thesis presentation and reproduction.

ONE-YEAR PROGRAM

The one-year program is available only to students already holding the first professional degree, the Bachelor or Master of Architecture. This Master of Architecture degree is awarded upon satisfactory completion of 30 semester hours of studio course work and a thesis. The program of study is flexible based on the student's background and area of interest.

COURSES

Architectural Design

ARCH. 501-5. Architectural Design. Three studio-seminar periods per week. 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, structure, and materials.

Technology

ARCH. 551-3. Materials and Methods of Construction. Two lectures and one lab or field trip per week. Study of materials and components for construction and construction methods and techniques for residential and commercial buildings.
ARCH. 552-3, 553-3. Basic Structure I and II. Two lectures per week. Analysis of basic structures. Applications of structural systems.
ARCH. 630-3. Site Engineering. Two lectures per week. Site analysis, legal description, topographic mapping, land use, drainage and site services.
ARCH. 651-3. Lighting and Acoustics. Two lectures per week. Illumination quantity and quality, daylighting and electric lighting, lighting design and application. Electrical distribution systems. Principles of sound transmission and absorption, room acoustics, architectural acoustics problems.
ARCH. 658-1. Elevators and Escalators. One lecture per week. Design and analysis of transportation systems.
ARCH. 667-3. Computer Graphics/Micro. One seminar and lab per week. Introduction to computers and their architectural applications. Hands on exercises with the school microcomputer lab and the University Prime system.
ARCH. 668-3. Computer Applications in Architecture. One seminar lab per week. Introduction to computers and applications in architectural graphics, word processing, business management, computer-aided design, and database management. Micro computer based.
ARCH. 722-3. Daylighting. One seminar per week. Quantitative and qualitative analysis of illumination from sky and sun and reflective surfaces, lighting and heat loss, heat gain.
ARCH. 723-3. Energy Audits. One seminar per week. Analysis of existing buildings for energy usage and design of retrofit options.

Professional Practice
ARCH. 660-3. Professional Practice. Two lectures per week. Ethics, management, documents, organization, legal aspects, and production procedures for a professional practice.
ARCH. 661-3. Construction Documents. Two labs per week. Construction communication techniques. Preparation of working drawings and specifications for a small building designed by the student in ARCH. 600 (Design).
ARCH. 663-2. Designer and the Law. One lecture per week. Provides a basic understanding of the designer's legal rights and responsibilities; covers basic legal concepts and their relation to the practice of the design professional.
ARCH. 760-3, 761-3. Internship. Eight hours per week. Work in a practicing professional's office during the regular semester. The student is placed in an office by the School and receives academic credit instead of pay. Student must have completed Professional Practice and Construction Documents and be in the last year of the program.

History and Theory
ARCH. 505/605-1. Introduction to Architecture Program. One lecture per week. Basic computer literacy and presentations by faculty member on design philosophy.
ARCH. 540-1. Design and Planning Journalism. One seminar period per week. Writing methods for architectural criticism; description and evaluation of the built environment.
ARCH. 571-3. Nineteenth- and 20th-Century Architectural History. Two lectures per week. The background for contemporary architecture. The development of the avant-garde from the late 19th century to the international style. Traditional and vernacular architecture. Recent developments.

ARCH. 672-3. European, Japanese, South American Architecture Now. Two seminars per week. Research and discussion on contemporary design theories, concentrating on non-American work, New Rationalism, regionalism, College City, high tech, and other topics. Prer. ARCH. 571 or equivalent.
ARCH. 673-3. Designer Philosophies. Two seminars per week. The ideas and contributions of key designers in history, style, culture and change.
ARCH. 684-3. Architecture Development/Politics. One seminar per week. Relationship of the architect to development and political processes.
ARCH. 686-3. Special Topics. Various topical courses are offered in architecture history, criticism, technology, professional practice, and other related areas.

Independent Study
ARCH. 960-1-3. Independent Study. Studies initiated by students or faculty and sponsored by a faculty member to investigate a special topic or problem related to architecture.

INTERIOR DESIGN
Program Director: Donald J. Sherman
Secretary: Louise Garcia
Department Office: 1250 14th St., Second Floor
Telephone: 556-3475
Faculty: Professor: M. G. Barr
Associate Professor: Donald J. Sherman
Assistant Professor: Gail W. Karr

The interior design program is intended to prepare students to enter professional practice at the first professional level; to advance their professional standing through the postprofessional focus; and/or to prepare them to teach at the university level.

The program has the following basic components: design theory, history and criticism, technology, visual studies, and professional practice.

Degrees Offered
The interior design program offers both first professional and postprofessional Master of Interior Design degrees.

The first professional master's degree program requires three years of full-time study and 96 credit
hours. It is suited for the student without an undergraduate professional design degree. The postprofessional M.I.D. degree emphasizes design theory and research and requires two years of full-time study and a minimum of 64 credit hours. Students opting for this degree must already have a professional design degree, i.e., B.I.D., B.Arch., B.L.A., etc. A thesis is required of all M.I.D. candidates.

Curriculum

The basis of the interior design curriculum is philosophical, scholarly, and practical. Using an integrated approach to design studio, the curriculum focuses on an advanced level of design process and problem solving producing creative and knowledgeable designers capable of thinking and designing comprehensively.

The interior design program is different from traditional programs in the following ways:

1. Multidisciplinary Approach. Individualized instruction and guidance enable the student to integrate skills and knowledge from several related disciplines, i.e., architecture, landscape architecture, and urban design. This allows students to develop individualized and personal skills for the analysis, design, and evaluation of appropriate interior environments.

2. Social and Behavioral Base. Understanding the social, behavioral, and biological implications of man/environment interaction is an integral part of research, design process, and problem-solving methods taught in design studios.

3. Coordinated University-Professional Practice Experiences. Professionals and educators working together provide relevant training and educational enrichment for students in interior design in many ways. By invitation, practitioners in interior design and architecture lecture, serve as studio jurors and critics, and serve on thesis committees. Whenever possible, students serve as part-time employees in design firms as another expression of the professional community's involvement and interest in the interior design student's education.

Application and Admission

The complete set of materials for application to the Master of Interior Design program includes the application form, two official transcripts from each institution the applicant has attended, three letters of recommendation, statement of purpose, a portfolio of academic, creative and/or professional work, and a nonrefundable application fee of $30. The portfolio must be no larger than 14 by 17 inches. Slides are acceptable but must be annotated. International applicants see the School general information at the beginning of this section.

To be considered for admission in the fall term, the complete set of application materials must be received by March 15. Applicants will be notified concerning their acceptance prior to May 1. Applications received after March 15 may be considered for non-degree student status only.

For application forms and additional information, please write to:

Office of the Dean
School of Architecture and Planning
University of Colorado at Denver
1100 Fourteenth Street
Campus Box 126
Denver, Colorado 80202
(303) 556-2755

The three-year program is open to students with a bachelor's degree. A particular program prerequisite is completed course work in college physics and mathematics through introductory calculus. For admission to the two-year program, applicants, in addition, must have a four-year degree in interior design, architecture, or environmental design.

The recommended minimum GPA for admission is 3.0 on a 4-point scale. If the student's GPA is below 3.0, the Graduate Record Examination (GRE) is recommended as part of the application materials. However, evaluation for admission will be on the basis of all application materials and not on grade-point average alone.

RECOMMENDED ORDER OF STUDIES,
THREE-YEAR PROGRAM

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<tr>
<th>Fall Semester, First Year</th>
<th>Semester Hours</th>
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<tbody>
<tr>
<td>INTD. 500. Interior Design Studio I</td>
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<td>INTD. 510. Interior Design Graphics I</td>
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<td>INTD. 530. Principles and Methods of Programming</td>
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<td>INTD. 551. Materials and Methods of Construction</td>
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<td>ARCH. 552. Structures I</td>
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<td>INTD. 672. Color Application</td>
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<td>ARCH. 653. Acoustics</td>
<td>1</td>
</tr>
<tr>
<td>INTD. 681. Interior Construction Detailing</td>
<td>3</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Spring Semester, Second Year</th>
<th></th>
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</thead>
<tbody>
<tr>
<td>INTD. 601. Interior Design IV</td>
<td>5</td>
</tr>
<tr>
<td>INTD. 620. History of Interiors I</td>
<td>3</td>
</tr>
<tr>
<td>INTD. 660. Furniture Design</td>
<td>3</td>
</tr>
</tbody>
</table>
### Fall Semester, Third Year

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>INTD 700</td>
<td>Interior Design Studio V</td>
<td>5</td>
</tr>
<tr>
<td>INTD 702</td>
<td>Thesis Preparation</td>
<td>3</td>
</tr>
<tr>
<td>INTD 724</td>
<td>Advanced Graphics</td>
<td>3</td>
</tr>
<tr>
<td>Electives/Semins</td>
<td></td>
<td>6</td>
</tr>
</tbody>
</table>

Total hours required, 3-year program: 96

### Spring Semester, Third Year

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>INTD 701</td>
<td>Thesis</td>
<td>6</td>
</tr>
<tr>
<td>Electives/Semins</td>
<td></td>
<td>9</td>
</tr>
</tbody>
</table>

Total hours required, 2-year program: 64

### COURSES

**INTD 500-5. Interior Design Studio I.** A project oriented studio introducing basic design principles and problem solving methods. A design vocabulary is presented and experienced through a series of projects which range from simple two and three dimensional studies to more complex exercises in space planning and material selection. Emphasis is placed on individual growth in the design process.

**INTD 501-5. Interior Design Studio II.** Continuation of Interior Design Studio I focusing on the development of design process, and introducing the rules of syntactics and analytics as they pertain to design.

**INTD 510-3. Interior Design Graphics Studio I.** Basic graphic tools — ink and color free-hand drawing, model making techniques, model photography, perspective shade and shadow, atmospheric perspective, reproduction methods, blueprint making — and their application to interior design graphics.

**INTD 511-3. Interior Design Graphics Studio II.** Continuation of Interior Design Graphics I focusing on more complex application of basic graphic tools to interior design graphics, and introducing professional portfolio design concepts which each student will develop into their own personal portfolio.

**INTD 530-2. Principles and Methods of Programming.** A survey seminar in design programming as it relates to the design process. Context includes information collection, interpretation, and documentation. The approach to the subject matter is multi-disciplinary in nature, allowing the student to apply skills and knowledge to his/her specific design field.

**INTD 552-2. Survey of Finish Materials.** This course is an in-depth investigation of materials commonly used as interior finishes. It provides the opportunity to study the composition and characteristics of the individual materials, the various applications of each, the processes used to transform the raw material into a finished product, and the governmental regulations and tolerances controlling the specification of them.

**INTD 600-5. Interior Design Studio III.** Problem solving and evaluation of the interior environment through functional and aesthetic necessities with attention paid to the contextual aspects. Practical and theoretical issues are presented. Design theory and philosophy are investigated in depth with space planning, spatial definition, human behavior, and history collectively explored.

**INTD 601-5. Interior Design Studio IV.** Studio class explores various situational problems and solutions in the design of the interior environment. Projects differ according to the context of the human experience with the students responsible for methodology and chronology through experience gained in previous design studios.

**INTD 620-3. History of Interior I.** Two lectures per week where design theory related to history provides a basis for exploring interior design and furniture from ancient to 18th Century English.

**INTD 621-3. History of Interior II.** A continuation of INTD 620, from 18th Century American to and including modern times.

**INTD 660-3. Furniture Design.** A project-oriented studio/lecture course, the main goal of which is a further development of the design process. Each project involves research, programming, design, and presentation. Areas of focus include physical human factors, material characteristics, structure, joinery, history of furniture, drawing skills, and model building skills.

**INTD 671-1. Color Theory.** This course explores the central issues of the science of color, exploring color affect and responses through exercises with color and form.

**INTD 672-1. Color Application.** Based on the knowledge of color theory, this course pursues the interaction of personality and color, use of color and the practical applications of the science of color.

**INTD 673-1. Lighting Theory.** The course investigates the processes and the objectives of lighting and provides the
vocabulary necessary to the understanding and interpretation of lighting needs in design.

INTD. 674-1. Lighting Application. Strategies and criteria for lighting are the focus of this course covering both the theoretical and practical issues of lighting. Hands-on experimentation will lead to the discovery of the visual definitions of lighting vocabulary.

INTD. 667-3. Computer Graphics/Micro. One seminar and lab per week. Introduction to computers and their architectural applications. Hands-on exercises with the School micro computer lab and the University Prime system.

INTD. 681-3. Interior Construction Detailing. Graphic representation of building construction related to the interior environment. Various types of interior construction, finishing, and terminology will be explored and conventional methods of graphic representation for these methods will be taught. Lecture material/exercises that produce construction documents for interior construction.

INTD. 686-3. Special Topics. Various topical courses are offered in Interior Design that relate theory and methods to specific problems/issues in the profession.

INTD. 700-5. Interior Design Studio V. A studio emphasizing interdisciplinary teamwork with architects, landscape architects, and planners with community-oriented projects related to interior design.

INTD. 702-3. Thesis Preparation. Independent study leading to the development of a finish project program.

INTD. 701-6. Thesis. Approved professional research or design project concentrations in an area of interior design. Each candidate for the graduate degree is required to submit and defend a thesis project to demonstrate a high level of competence in solving problems through research, design, and planning. A thesis proposal must be submitted to the program chairman and thesis committee in the semester preceding the semester of thesis work.

INTD. 724-3. Advanced Graphics. Programming and design development of sign systems and graphics as integral parts of total environments, with respect to information transfer and symbolic communication.

Electives/Seminars. Electives and seminars are offered on topics pertinent to the interior design discipline, i.e., environmental psychology, man-environment systems, sociology, environmental form, and research methods. Specific topics are listed in the Schedule of Classes for each semester.

LANDSCAPE ARCHITECTURE

Program Director: Harry L. Garnham
Secretary: Louise Garcia
Department Office: 1250 14th Street, Second Floor
Telephone: 556-3475
Faculty: Professor: Hamid Shirvani
Associate Professor: Harry L. Garnham
Assistant Professor: Lauri Johnson

The landscape architecture program in the School of Architecture and Planning is a professional design program. The primary objective is to educate students to be effective practicing landscape architects in both the private and public sectors. More specifically, the objectives of the program are to develop:

Awareness of and sensitivity to the quality of the landscape.

Intellectual understanding of the social arts and of humanistic and environmental approaches to design.

Analytic problem-solving competence of synthesis and communication of the above knowledge into physical form.

Technical competence for implementing the physical forms.

Understanding of the institutional framework within which design is executed.

Skills and understanding of professional practice including management and professional conduct.

The ultimate goal of the program is to provide the landscape architecture student with a deep appreciation of landscape and environmental quality while acquiring critical capacity through comprehension of all facets of landscape architecture and design expertise.

Degrees Offered

The landscape architecture program offers both first and second professional Master of Landscape Architecture degrees. The first professional M.L.A. degree requires three years of full-time study and a minimum of 96 credit hours. The first professional master's degree is suited for students without a professional design degree.

The second professional degree requires two years of full-time study and minimum of 64 credit hours. Students who enter this program must hold a professional design degree, i.e., B.L.A., or B.ARCH.

A thesis is required of all M.L.A. candidates.

The first professional Master of Landscape Architecture (M.L.A.) degree is fully accredited by the Landscape Architectural Accreditation Board of the American Society of Landscape Architects, and is recognized by the Council of Landscape Architecture Educators.

Curriculum

The curriculum has been planned to develop awareness and skills considered essential to core and advanced professional training in the field of landscape architecture. Emphases include design, land and construction technology, history and theory of the built environment, and a working knowledge of natural systems. The primary focus of the program is design of and on the landscape.

Opportunities exist to develop complementary knowledge and skills through interdisciplinary projects involving the other programs in the School of Architecture and Planning: architecture, interior design, urban design, and urban and regional planning.

The hierarchy of courses from term to term for the most part is planned sequentially to lead to the thesis, a comprehensive individual experience under the guidance of the L.A. faculty. The thesis itself requires two courses: Landscape Architecture Thesis Research and
Landscape Architecture Thesis. Either a design project or applied research may be the basis for the thesis.

Application and Admission

To be considered for admission into the landscape architecture program, applicants must submit application forms, a nonrefundable application fee of $30, two official transcripts from each institution the applicant has attended, three letters of recommendation, statement of purpose and a portfolio of academic, creative, and/or professional work. The portfolio should be 14 by 17 inches or smaller. International applicants see the School general information at the beginning of this section.

For admission to the fall term, these materials must be received by March 15. Applicants will be notified concerning their acceptance prior to May 1. Applications received after March 15 may be considered for non-degree student status only.

For application forms and information please write to:

Office of the Dean
School of Architecture and Planning
University of Colorado at Denver
1100 Fourteenth Street
Campus Box 126
Denver, CO 80202
(303) 556-2755

The recommended minimum grade-point average for admission is 3.00 on a 4-point scale. If the student's grade-point average is below 3.00, the Graduate Record Examination (GRE) is recommended as part of the application materials. However, evaluation for admission will be on the basis of all application materials and not on grade-point average alone.

The three-year program is open to students with a bachelor's degree. The program requires previous courses in college mathematics, physical science, and English.

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

RECOMMENDED ORDER OF STUDIES, 3-YEAR PROGRAM

<table>
<thead>
<tr>
<th>Fall Semester, First Year</th>
<th>Semester Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>LA. 500. Landscape Architecture Design I</td>
<td>5</td>
</tr>
<tr>
<td>LA. 505. Introduction to Design and Planning</td>
<td>1</td>
</tr>
<tr>
<td>LA. 510. Graphic Communication</td>
<td>3</td>
</tr>
<tr>
<td>LA. 561. Synthecology Field Research I</td>
<td>1</td>
</tr>
<tr>
<td>LA. 580. Rocky Mountain Plant Materials</td>
<td>3</td>
</tr>
<tr>
<td>LA. 590. Semi-Arid Region Ecology Seminar</td>
<td>3</td>
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</tbody>
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<thead>
<tr>
<th>Spring Semester, First Year</th>
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</thead>
<tbody>
<tr>
<td>LA. 501. Landscape Architecture Design II</td>
</tr>
<tr>
<td>LA. 550. Landscape Engineering I</td>
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<thead>
<tr>
<th>Fall Semester, Second Year</th>
<th>Semester Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>LA. 570. Landscape Architecture History and Theory Seminar</td>
<td>3</td>
</tr>
<tr>
<td>LA. 581. Rocky Mountain Plant Design</td>
<td>17</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Fall Semester, Second Year</th>
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</thead>
<tbody>
<tr>
<td>LA. 600. Landscape Architecture Design III</td>
</tr>
<tr>
<td>LA. 650. Landscape Engineering II</td>
</tr>
<tr>
<td>LA. 661. Synthecology Field Research II</td>
</tr>
<tr>
<td>LA. 667. Computer Graphics/Micro</td>
</tr>
<tr>
<td>LA. 691. Ecological Systems Analysis and Adaptation</td>
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<table>
<thead>
<tr>
<th>Spring Semester, Second Year</th>
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</thead>
<tbody>
<tr>
<td>LA. 601. Landscape Architecture Design IV</td>
</tr>
<tr>
<td>LA. 660. Landscape Engineering III</td>
</tr>
<tr>
<td>LA. 685. Advanced Landscape Architecture Computer Systems</td>
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<td>Elective</td>
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<thead>
<tr>
<th>Fall Semester, Third Year</th>
<th>Semester Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>LA. 700. Landscape Architecture Design V (Interdisciplinary)</td>
<td>6</td>
</tr>
<tr>
<td>LA. 761. Synthecology Field Research III</td>
<td>1</td>
</tr>
<tr>
<td>LA. 790. Landscape Architecture Thesis Research</td>
<td>4</td>
</tr>
<tr>
<td>Elective</td>
<td>3</td>
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<tr>
<td>Elective</td>
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<table>
<thead>
<tr>
<th>Spring Semester, Third Year</th>
</tr>
</thead>
<tbody>
<tr>
<td>LA. 701. Landscape Architecture Thesis</td>
</tr>
<tr>
<td>LA. 760. Landscape Architecture Professional Practice Seminar</td>
</tr>
<tr>
<td>Elective</td>
</tr>
</tbody>
</table>

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Total hours required for three-year M.L.A. degree 96

RECOMMENDED ORDER OF STUDIES, 2-YEAR PROGRAM

<table>
<thead>
<tr>
<th>Fall Semester, First Year</th>
<th>Semester Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>LA. 600. Landscape Architecture Design III</td>
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<tr>
<td>LA. 650. Landscape Engineering II</td>
<td>5</td>
</tr>
<tr>
<td>LA. 661. Synthecology Field Research II</td>
<td>1</td>
</tr>
<tr>
<td>LA. 667. Computer Graphics/Micro</td>
<td>3</td>
</tr>
<tr>
<td>LA. 691. Ecological Systems Analysis and Adaptation</td>
<td>3</td>
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<table>
<thead>
<tr>
<th>Spring Semester, First Year</th>
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</thead>
<tbody>
<tr>
<td>LA. 601. Landscape Architecture Design IV (Regional Design)</td>
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<tr>
<td>LA. 660. Landscape Engineering III</td>
</tr>
<tr>
<td>LA. 686. Advanced Landscape Architecture Computer Systems</td>
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17

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<th>Fall Semester, Second Year</th>
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<tbody>
<tr>
<td>LA. 700. Landscape Architecture Design (Interdisciplinary)</td>
</tr>
<tr>
<td>LA. 761. Synthecology Field Research III</td>
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<tr>
<td>COURSES</td>
</tr>
<tr>
<td>------------------------</td>
</tr>
<tr>
<td><strong>LA. 500-5. Landscape Architecture Design I.</strong> This initial studio in design focuses on the application of aesthetic principles which form the basis for landscape architectural design. Space, form, colors, texture, movement, and balance are explored in their application to design. Problem-solving process is introduced as a fundamental design tool as applied to basic site planning.</td>
</tr>
<tr>
<td><strong>LA. 501-6. Landscape Architecture Design II.</strong> 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.</td>
</tr>
<tr>
<td><strong>LA. 510-3. Graphic Communication.</strong> Two lecture/studio periods per week. Introductory graphics includes orthographic and isometric projections, and one two-point perspective, lettering, sheet layout, freehand sketching, useful equipment and materials, and reproduction techniques.</td>
</tr>
<tr>
<td><strong>LA. 550-5. Landscape Architecture Engineering I.</strong> Three lecture/studio periods per week. An introduction to grading and earthwork as a technical skill as well as a design technique. Site development systems, including topographic surveying technique, horizontal and vertical curves for road alignment, comprehensive site grading, and drainage/sewage.</td>
</tr>
<tr>
<td><strong>LA. 561-1. Synthecology Field Research I.</strong> A three-day intensive short course exploring on field location various aspects of the Rocky Mountain region ecological tolerances to development.</td>
</tr>
<tr>
<td><strong>LA. 570-3. Landscape Architecture History and Theory Seminar.</strong> One lecture/seminar period per week. Design theory related to historical and contemporary placemaking provides a basis for exploring landscape architecture resolutions from prehistoric to modern times. Students are required to contribute knowledge/research to the seminar periods, as well as prepare a term paper.</td>
</tr>
<tr>
<td><strong>LA. 580-3. Rocky Mountain Plant Materials.</strong> Two lectures or field trips per week. Deciduous trees and shrubs of the Rocky Mountain region. Identification, horticultural concerns, and planting design principles are explored.</td>
</tr>
<tr>
<td><strong>LA. 587-3. Rocky Mountain Planting Design.</strong> Two lecture/studios per week. Emphasis is on the design principles relating to Rocky Mountain plant material. Color, scale, form, orientation, sequence, and appropriateness are the principle concentrations.</td>
</tr>
<tr>
<td><strong>LA. 590-3. Semi-Arid Region Ecology Seminar.</strong> This course has been especially designed to produce a working discipline in the semi-arid region ecosystems for graduate level landscape architects. It is the first course in a sequence leading to Design Studio IV, Regional Design.</td>
</tr>
<tr>
<td><strong>LA. 600-6. Landscape Architecture Design III.</strong> Design Studio III expands skills learned in Studios I and II. Small scale design problems build into medium scale using urban design, housing, and recreational site planning problems. These studio projects further emphasize design process and focus on the systematic description and interpretation of ecological, behavioral, and functional criteria for the built environment. These learned skills become a springboard for the large scale landscape planning projects in design Studio IV.</td>
</tr>
<tr>
<td><strong>LA. 601-6. Landscape Architecture Design IV.</strong> The fourth design studio allows the students to work as a team to solve complex large scale/landscape planning related problems in both urban and rural areas of Colorado. With an environmental assessment previously completed in LA. 691, the students focus on synthesizing natural, cultural, and aesthetic information to develop plan frameworks for public or private clients. The results are packaged into a reproducible report that includes both narrative and graphic data, and becomes useful for the university, student, and client participants.</td>
</tr>
<tr>
<td><strong>LA. 650-5. Landscape Architecture Engineering II.</strong> Explores the array of wood, steel and concrete structural systems encountered in landscape architectural design. Pedestrian and vehicular paving systems and construction processes are also studied. The graphic systems for describing the assemblage of the engineering and construction parts in landscape architecture are working drawings. The comprehensive packaging skills for these systems as construction documents are developed.</td>
</tr>
<tr>
<td><strong>LA. 660-5. Landscape Architectural Engineering III. Hydrology and Hydraulics for Designers.</strong> Water-related issues for site design and regional planning. The study of rainfall/runoff, storm water detention design and elementary open channel hydraulics. Water supply issues are also addressed: western water rights, and site development systems for potable supply and irrigation. Design of appropriate small scale systems for storm water management and arid region irrigation.</td>
</tr>
<tr>
<td><strong>LA. 661-1. Synthecology Field Research II.</strong> A three-day intensive short course on field location exploring various aspects of Rocky Mountain region ecological tolerances to development.</td>
</tr>
<tr>
<td><strong>LA. 667-3. Computer Graphics/Micro.</strong> One seminar and lab per week. Introduction to computers and their architectural applications. Hands-on exercises with the School micro computer lab and the University Prime system.</td>
</tr>
<tr>
<td><strong>LA. 685. Advanced Landscape Architecture Computer System.</strong> Provides the student with advanced techniques of landscape evaluation processes. Also, introduces the use of computers in the program management and administration of the contemporary landscape architectural office practice.</td>
</tr>
<tr>
<td><strong>LA. 691-3. Ecological Systems Analysis and Adaptation.</strong> Assists students to become familiar with large scale spatial analysis methods, techniques, and models. By means of course assignments, lectures, laboratories, and field trips, students apply skills and knowledge related to the description and interpretation of the physical environment. Students are assigned to a site and are required to complete an environmental assessment that ultimately becomes the framework for the LA. 601 studio. Knowledge of Colorado ecology and basic cartography will assist the student in this course.</td>
</tr>
<tr>
<td><strong>LA. 700-5. Landscape Architecture Design V.</strong> An interdisciplinary studio involving teamwork with architects, planners, and interior designers. Projects are comprehensive case studies ranging from Center for Community Development and Design generated projects for small towns on the Western Slope to urban design projects on the Front Range. Projects</td>
</tr>
</tbody>
</table>

| COURSES |  
|------------------------|------------------------|
| **Spring Semester, Second Year** | **Semester Hours** |
| **LA. 701. Landscape Architecture Thesis** | **6** |
| **LA. 760. Landscape Architecture Professional Practice Seminar** | **3** |
| **Elective** | **3** |
| **Total hours required for the two-year M.L.A. degree** | **64** |
often include emphasis on community development processes as well as traditional design production.

**LA. 701-6. Landscape Architecture Thesis.** This final semester in design is spent in the preparation of an independent thesis. Opportunity for students to bring together in one comprehensive project all of the relevant design tools and theories learned during their M.L.A. studies. The student may pick a design, research, community development, or natural resource planning type thesis. Each thesis candidate is asked to develop an innovative hypothesis which expands the research base of his/her chosen thesis subject. A case study is then chosen to explore the application of the hypothesis. The thesis is evaluated by all LA. faculty.

**LA. 760-3. Professional Practice Seminar.** Two lecture periods per week. Business and professional relations, landscape architecture and its relations with government, the ASLA and other professional organizations, professional ethics, general business practices, contracts, and specifications will be covered.

**LA. 761-1, Synthecology Field Research III.** A continuation of LA. 561 and 661.

**LA. 790-4. Landscape Architecture Thesis Research.** This is the second course in the thesis sequence. Thesis students are asked to use methods and techniques learned in LA. 690 and apply them to their thesis topic. A complete research package is expected before entering the final course, LA. 701.

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**Independent Study**

**LA. 960 1-3, Independent Study.** Studies initiated by students or faculty and sponsored by a faculty member to investigate a special topic or problem related to landscape architecture.

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**URBAN AND REGIONAL PLANNING**

**Acting Program Director:** Yuk Lee

**Secretary:** Agnes Romero

**Department Office:** 1250 14th St., Second Floor

**Telephone:** 556-3479

**Faculty:** Professors: Yuk Lee, Hamid Shirvani

**Associate Professors:** Thomas A. Clark, David R. Hill, Bernie Jones

Urban and regional planning is a profession involved with a variety of activities aimed at shaping the pattern of human settlements and providing housing, public services, employment opportunities, and other crucial support systems that comprise a decent urban living environment. Such planning encompasses not only a concern for the structure and image of the built environment, but also a desire to harness the social, economic, political, and technological forces that give meaning to the everyday lives of men and women in residential, work, and recreational settings.

---

**Degree Offered**

The urban and regional planning program provides a nationally accredited graduate education for persons desiring to enter the professional field of planning. The degree of Master of Urban and Regional Planning is offered after successful completion of a course of study normally requiring two years of course work and thesis. The objectives of the urban and regional planning program are:

1. To clarify the behavioral and perceptual sources of urban and regional problems.
2. To foster appropriate policy, planning, legal devices, and resources for creating urban and regional environments responsive to human needs and ecological principles.
3. To develop methods for evaluating urban and regional programs, policies, and plans that have important human and natural environmental consequences.

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**Curriculum**

The planning curriculum reflects the objectives of the program and has three basic components:

1. Planning theory, methods and practice, the basis of the planning discipline — including courses in planning, implementation and administration, decision making, and the institutional planning environment.
2. The behavioral and social sciences, as needed to analyze the dynamics and forces shaping community and regional systems.
3. Specific problem-solving skills essential for effecting purposeful change and resolution of human, social, and physical problems of urban and regional systems.

Course work begins with intensive classroom instruction in the fundamentals of theory, methods, and practice of planning. It progresses into plan-making studios, emphasizing projects drawn from the real work problems of the Denver area, Colorado, and the Rocky Mountain Region. The program's location at the center of a capital city aids students in finding planning-related work experiences during their graduate education. Courses are scheduled during day-time and evening hours to provide considerable flexibility for both part- and full-time students.

An internship is required in which the student receives credit for working in one of many planning firms or agencies in the Denver area. During the final course of study, a thesis project provides an opportunity for in-depth study and mastery of a topic of special interest to the student. Throughout the program, the emphasis is on solving real world problems. The program is fully accredited by the Planning Accreditation Board, the Association of the Collegiate Schools of Planning and the American Institute of Certified Planners.

The two-year, 60-semester-hour curriculum consists of 36 hours of required core courses as well as 24 hours of electives which may be conveniently assembled from the elective courses in the program and School and from courses in other graduate programs at CU-Denver.
Students, in consultation with faculty advisers, identify one or more of the following areas of concentration and then select electives reflecting this focus:

- Community economic development
- Urban design and land use planning
- Natural resources and environmental planning
- Real estate development
- Regional analysis, planning, and administration
- Small town and neighborhood planning

The complexity of the environments in the area served by the program provides a challenge for high quality research and planning experiences. To meet this challenge and to provide students with enriched learning opportunities, the program draws on academic and professional resources and actively engages in research, policy making, and problem solving throughout the region. However, this valuable experience and constant emphasis on the fundamentals of planning enables graduates of the program to compete successfully for planning positions across the nation and in foreign countries.

Application and Admission

Applicants must submit complete application forms, two official transcripts from each institution the applicant has attended, three letters of recommendation, statement of purpose, and the nonrefundable application fee of $30. An Application Committee will review all materials and determine acceptance on the basis of academic performance, work experience, interest and motivation for study. International applicants see the School general information at the beginning of this section.

Students who wish to be admitted in the fall should submit their application by March 15. Applicants will be notified concerning their acceptance prior to May 1. On a space available basis, applications are accepted for individual semesters. Deadlines in these cases are July 10 for fall, December 1 for spring, and April 15 for summer.

For application forms and additional information please write to:

Office of the Dean
School of Architecture and Planning
University of Colorado at Denver
1100 Fourteenth Street
Campus Box 126
Denver, CO 80202
(303) 556-2755

The program is open to students with a bachelor's degree in architecture, landscape architecture, environmental design, arts and humanities, engineering, social and natural sciences with a grade-point average of 3.00. Students with a GPA of 2.75 will be included for admission but are required to submit GRE scores.

CORE COURSES

 Required Courses:  Semester Hours
Statistics and Computer Applications  2

Fundamentals of Planning and CD (2 courses)  6
Planning and CD Methodology (including Econ. Analysis)  4
Studio I (Graphics, Cartography, Communications, and Physical Planning Content)  5
Studio II (Plan making)  5
Legal Aspects of Planning  3
Environmental Form  3
Experiential Learning (Professional Practice Internship, and seminar covering the philosophy, values and ethics of Professional Practice)  3
Studio III: Thesis  5
Total  36

COURSES

URP. 500-3. Fundamentals of Planning/Policy. 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.

URP. 505-3. Fundamentals of Community Development. A basic course in the theory and methodology of community development practice, with emphasis on principles and techniques of community work. The course includes reviews of the community, community development, community organization, and action strategies literature.

URP. 518-2. Statistics and Computer Applications for Planners. Essential methods of statistical analysis for urban/regional planning and policy development. Major topics include types of data, sampling strategies, hypothesis testing, parametric and non-parametric techniques for studying relations among variables, and an introduction to multivariate methods and computer technology.

URP. 520-4. Planning/Community Development Methodology and Techniques I. 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.

URP. 521-3. Planning/Community Development Methodology and Techniques II. Advanced analytical methods and techniques. Includes physical, social, and economic models, urban development models, decision-making techniques, linear and nonlinear programming. Prez., URP 520.

URP. 530-3. Planning/Community Development Theory. 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 community development is and should be.

URP. 552-3. Transportation Planning. Principles of transportation planning. Regional and urban transportation problems and policy formation. Techniques and methods used in transportation planning. Prez., URP 520 or consent of instructor.

URP. 558-3. Community Economic Planning. Examines the process of community/urban economic development and revitalization. Explores the means by which both the public and private sectors can foster economic changes which promote social justice, ensure environmental integrity, and sustain the capacity of the community to support essential functions and services. Case studies address development issues in central cities, smaller municipalities, and neighborhoods.

URP. 560-3. Housing and the Social System. 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.

URP. 570-3. Development of Environmental Form. Describes and evaluates the history and present developments of the manmade 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.

URP. 578-3. Social Research Methods for Designers and Planners. Introduction to the knowledge and skills needed to conduct research relevant to the fields of planning and environmental design. Course content presentation parallels students' work in carrying out applied research projects.

URP. 580-3. Ethnicity and the City. 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.

URP. 590-3. The Modern Metropolis. 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.

URP. 600-3. Social Policy Analysis and Planning. 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.


URP. 620-3. Rural and Small Town Planning. Provides knowledge and perspective on global changes in rural areas, with particular reference to the United States. Examines the factors leading to the evolution of the metropolis, analyzes its economic, social, and political components; and considers the various interpretations of its role in modern society.

URP. 630-3. Regional Analysis. Analysis of spatial structure and location patterns of people and environment. Theory for location of economic activities, industrial and commercial site requirements, and supporting transportation systems. Techniques for analysis of economics in space. Formulation of regional policy. Prereq., URP. 520 or consent of instructor.

URP. 640-3. Regional Policy Administration. Regional policy administration. Critically examines the institutional legislative foundations for regional planning at the state, federal, and state (including metropolitan) level in the United States. Emphasizes regional policies regarding investment strategy, resource sharing, and economics development as well as those concerning land use, energy exploitation, and the environment.

URP. 650-3. Comparative International Planning. 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 availabilities.

URP. 660-3. Social Factors in Urban Design. 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.

URP. 672-3. Environmental Planning. A review of the basic principles of air, water, and energy systems and their political implications on relations to planning processes and aims.

URP. 676-3. Modern Environmental Thought. In-depth analyses and evaluation of contemporary classics in environmental argument. Design, normative, economic, behavioral, and other approaches will be analyzed. Prereq., URP. 570.

URP. 680-3. Urban Market Analysis and Planning. Considers the function, structure, and evolution of cities and settlement systems, as well as the economic foundations of key urban markets including those for residential, labor, housing, and public services. Procedures for market and economic impact analysis will be discussed.

URP. 686-3. Special Topics. Various topical courses are offered in planning and community development that relate theory and methods to specific problems/issues in communities, society, and/or the professions.

URP. 690-5. Planning Studio I. Includes fundamentals of graphics, mapping, and communication skills for planning: master plan projects aimed at expressing students' ability to apply the knowledge and experience gained in the program to specific problem areas and complex client situations; and, planning research, community relations, problem identification, program development, plan making, and plan evaluation.

URP. 700-5. Planning Studio II. 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.

URP. 710-3. Legal Aspects of Planning. A review of the legal framework within which planning operates and the current trends in the courts toward land-use regulations and housing law.

URP. 720-3. Practical Growth Management. An examination of zoning, subdivision, growth management systems, and environmental regulations in the context of the society in which they function and the needs of that society. Students learn to read and to challenge intelligently statutes and ordinances and to help design better regulatory systems.

URP. 730-3. Planning and Politics. A seminar designed to expose students to the realistic political facts and the practical aspects of the planning process and to help individuals to deal effectively with governmental operation at all levels of their professional careers.


URP. 740-3. Communities and the Federal System. This seminar is directed toward exploring the 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.
URP 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.

URP 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.

URP 770-3. Planning Practicum. This course is specifically designed to give experience to students interested in planning and community development. The emphasis is on actual work experience in community settings with client groups depending upon the students to assist them in determining solutions to their problems. Director's consent required.

URP 780-3. Planning Practice and Administration. Student exposure to the role of a professional planner in public agency, consulting office, private enterprise, community organization, and land development corporation planning. Relates the educational experience of the URP program to professional planning practice and administration.

URP 790-5. Planning/CD Thesis. This studio is used for the final individual project of the student for presentation to the faculty. This project should integrate the knowledge gained through the program, reflect the primary research, and advance a cohesive argument.

Independent Study

URP 970-variable credit. Independent Study. Permits the student to pursue independent research in a subject area of special interest, or engage in research efforts as a preface to or preparation of a thesis project. Advance approval by faculty adviser is required.

URBAN DESIGN

Coordinator: Harry L. Garnham
Secretary: Annette Korslund
Department Office: 1250 14th St., Second Floor
Telephone: 556-2877
Faculty: Professors: John M. Prosser, Hamid Shirvani
Associate Professors: Paul J. Foster, Harry L. Garnham

The urban design program is an advanced professional degree program designed for students who wish to specialize in urban design. The field of urban design is a complex, interdisciplinary area of study which encompasses architecture, landscape architecture, urban planning, real estate development, and several other support fields such as law, civil and transportation engineering, psychology, and other social sciences.

The objectives of the program are to develop:

- Awareness of and sensitivity to the urban form, structure, and function.
- Understanding of the complex nature and interdependence of the built, the human, and the natural environmental dimensions of urban design.

Understanding of the institutional framework within which urban design policies, plans, programs, and guidelines are evolved and implemented.

Analytic problem-solving competence for synthesis and urban design programming.

The program has three basic components:

1. Theories of urban form and structure.
2. Elements of urban design and its financial/institutional framework.
3. Methods of urban design programming and implementation.

Degrees Offered

The urban design program offers both a one-year post-professional Master of Architecture degree and a two-year program. The one-year Master of Architecture in Urban Design degree program is suited for students who have completed a five-year professional design degree, i.e., B.Arch., B.L.A., B.U.P., etc. The two-year Master of Architecture in Urban Design degree program is open to students with a four-year B.S. in architecture, environmental design, planning, landscape architecture, social and natural sciences, etc.

The one-year program requires completion of a minimum of 30 credit hours, and the two-year program, a minimum of 60 credit hours. A thesis is required of all M.A.U.D. candidates.

Application and Admission

In order for students to be considered for admission into the Master of Architecture in Urban Design program, they must submit application forms, two official transcripts from each institution the applicant has attended, three letters of recommendation, statement of purpose, a portfolio of academic, creative, and/or professional work and the nonrefundable admission fee of $30. All portfolio materials must be in 14 by 17 inch format or smaller. If slides are included, they must be in a loose-leaf slide holder and annotated. International applicants see the School general information at the beginning of this section.

The recommended minimum grade-point average for admission is 3.00 on a 4-point scale. If the student's grade-point average is below 3.00, the Graduate Record Examination (GRE) is recommended as part of the application materials. However, evaluation for admission will be on the basis of all application materials and not on grade-point average alone.

To be considered for fall admission, all application materials must be received by the previous March 15. Applicants will be notified concerning their acceptance prior to May 1. To be considered for spring admission, all application materials must be received by November 1. Applicants will be notified concerning their acceptance prior to December 15.

For application forms and additional information, please write to:
Office of the Dean  
School of Architecture and Planning  
University of Colorado at Denver  
1100 Fourteenth Street  
Campus Box 126  
Denver, CO 80202  
(303) 556-2755

COURSE REQUIREMENTS, ONE-YEAR PROGRAM

<table>
<thead>
<tr>
<th>Course</th>
<th>Semester Hours</th>
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<tbody>
<tr>
<td>Urban Design Studio</td>
<td>5</td>
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<tr>
<td>Thesis Preparation</td>
<td>2</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>
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<td>Urban Design Seminar</td>
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<td>Professional Electives</td>
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RECOMMENDED ORDER OF STUDIES, TWO-YEAR PROGRAM

Fall Semester, First Year

<table>
<thead>
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<th>Course</th>
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<tbody>
<tr>
<td>L.A. 510. Graphic Communication</td>
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<td>URP. 505. Fundamentals of Community Development</td>
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<td>URP. 570. Development of Environmental Form</td>
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<td>PAD. 532. Public Policy Analysis and Evaluation</td>
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Spring Semester, First Year

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<th>Course</th>
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<tr>
<td>BAD. 452. Small Business Strategy, Policy</td>
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<tr>
<td>and Entrepreneurship</td>
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<tr>
<td>UD. 684. Urban Development Economics</td>
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<tr>
<td>Electives</td>
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</tr>
<tr>
<td>UD. 601. Design Studio I</td>
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Fall Semester, Second Year

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<tr>
<td>PAD. 521. Organization Theory and Administrative Behavior</td>
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<td>UD. 722. Mainstreets Seminar</td>
<td>3</td>
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<tr>
<td>UD. 700. Interdisciplinary Design</td>
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<tr>
<td>UD. 712. Thesis Preparation</td>
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<tr>
<td>MK. 330. Marketing Research</td>
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Spring Semester, Second Year

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<tr>
<td>PAD. 598. Special Topics in Public Administration (Public/Private Sector Linkages)</td>
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<tr>
<td>ACCT. 480. Accounting for Government and Nonprofit Organizations</td>
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<tr>
<td>URP. 710. Legal Aspects of Planning</td>
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<tr>
<td>UD. 701. Thesis</td>
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</table>

Electives

The following courses will be considered as electives and will serve as substitutes for courses waived as a result of a student's prior education and/or experience.

Public Administration
PAD. 505. Economics of the Public Sector

Design Architecture
ARCH. 571. 19th and 20th Century Architectural History
ARCH. 670. American Architectural History
ARCH. 672. European, Japanese, South American Architecture Now

ARCH. 678. Architectural Preservation

Landscape Architecture
L.A. 570. Landscape Architecture History and Theory Seminar
L.A. 580. Rocky Mountain Plant Materials
L.A. 691. Ecological Systems Analysis and Adaptation

Urban and Regional Planning
URP. 520, 521. PCD Methodology and Techniques I and II
URP. 600. Social Policy Analysis and Planning
URP. 660. Social Factors in Urban Design
URP. 672. Environmental Planning

Business/Economics
PAD. 501. Fundamentals of Public Administration
BAD. 452. Small Business Strategy, Policy and Entrepreneurship
ECON. 521. Public Finance I Budgeting and Expenditures
ECON. 621. Public Finance I
ECON. 626. Seminar: Urban Land Economics

COURSES

UD. 601-3. Design and Planning I. A studio course which includes study and application of the basic planning, architecture, landscape, and urban design elements in the cityscape and streetscape. Problems will utilize actual locations for team research leading to individual student solutions of specific preservation, rehabilitation, development, infill, and revitalization problems. Special consideration will be given to the effects of historical, social, economic, and political factors on Mainstreet environments.


UD. 700-5. Interdisciplinary Design. Actual comprehensive Mainstreet problems from internship, School, or CCDD requests are studied in the studio by teams of three or more students from at least two different professional disciplines. Projects will be completed through schematic design and planning development and policy phases, including printed documentation for distribution and application of the proposal solution information to aid ongoing development efforts. Field involvement with the public is a primary part of the process.

UD. 701-5. Thesis. Each student completes a written paper and/or design solution to a compound, complex Mainstreet project that has been previously selected with the assistance of an advisor for research and evaluation during thesis preparation. The project can be theoretical or an actual problem, but must address significant multiple aspects of community mixed-use corridors and centers. The work should encompass major challenges in the definition and solution of Mainstreet environments.
UD. 710-5. Urban Design Studio. 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 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. (One year sequence.)

UD. 711-5. Urban Design Thesis. 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 revitalization design. (One year sequence.)

UD. 712-2. Thesis Proposal and Preparation. Selection and proposal of a real world problem which allows students to integrate skills acquired in the program or to focus on design, business, policy, public administration, or development issues including data and analytical information needed for decision-making purposes. Proposal must be submitted the first month of fall semester by all students planning on completing their thesis the coming spring.

UD. 722-3. Mainstreets Seminar. A case study course which focuses on the heart of communities and neighborhoods. The course includes a balance between classroom and field presentations which cover the individual and combination, design and planning, physical and psychological aspects of living, working, shopping, and recreating on mainstreets. Faculty, student, and guest lectures and discussions are all a major part of the course sequence.

UD. 784-3. Urban Design Seminar. A case study course with classroom and field presentation. 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.

UD. 795-3. Experiencing the Cityscape. Students explore 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 activities, circulation, climate, and landscape are analyzed from an aesthetic viewpoint.

CENTER FOR COMMUNITY DEVELOPMENT AND DESIGN

Director: T. Michael Smith
Office: 1250 14th St., Second Floor
Telephone: 556-2816
Staff: Thomas G. Edmiston, Robert D. Horn, Bernie Jones, James A. Laurie, Martin R. Salz, Jon Schler, George Weber

The Center for Community Development and Design is the research, community service, and student field studies division of the School of Architecture and Planning. Building upon two decades of experience, the Center believes that the creative, synthetic processes of design and planning can reach appropriate solutions to community and environmental problems through active involvement of citizens and applied research. As the outreach unit of the School, the Center responds to and initiates a variety of opportunities for research and educationally oriented public service projects for faculty, staff, and students.

In undertaking project work, the Center organizes interdisciplinary research and assistance teams, capable of addressing complex policy, planning, design, and development problems and needs of Colorado and the Rocky Mountain West. Over one hundred requests for assistance and new research projects are handled annually. Colorado and the Rocky Mountain West provide a dynamic learning laboratory for applied research and service in such areas as: economic development, housing policy, neighborhood and small town planning, participatory design, park and open space design, and urban design. The Center offers field study opportunities in both urban neighborhoods and in rural communities.

Scope of Work

Solving urban and rural problems in the Rocky Mountain West means confronting both high plains semi-arid conditions and the fragile alpine environment. The sensitive development of human settlements in harmony with this delicate natural environment is an overarching goal of the School. This goal is realized through pragmatic service and applied research projects. Faculty and student research and assistance teams have conducted projects in such areas as:

Commercial Revitalization. The Center assists small and medium size towns, urban neighborhoods, and municipal agencies in developing comprehensive economic development plans for older commercial districts and downtown business areas. Working with community and merchant organizations, the Center helps develop public-private resources to implement strategic plans for the long-term diversification of local economies. Center staff assist twelve to fifteen communities a year, identify their unique competitive opportunities, develop design guidelines, prepare financing packages, provide designs for strategic parcels of land, and evaluating the success of the projects.

Housing Policy. In an era of fundamental shifts policies have drastically reduced resources for housing, especially for low and moderate income citizens. The Center has undertaken several research initiatives, to affect housing policies for those groups. The Center works with housing agencies to assess current conditions and to conduct research on and development of new policies and programs. Based on its research and work with constituent groups, the Center was instrumental in convincing city leaders to develop an $11 million Housing Trust Fund for Denver, developing city
policies and plans to eliminate homelessness and is currently engaged in research to evaluate and modify private lending practices in inner-city neighborhoods, and housing needs assessment for the disabled.

**Rural Community Assistance.** The Rocky Mountain West is overwhelmingly rural in character and is often described as “the boom or bust” center of the United States, because of the historic instability of mineral and natural resources industries. Rural communities are pursuing opportunities for economic diversification in the hope of leveling out the “peaks and valleys” of their economies. In response to this need, the School of Architecture and Planning has teamed with the Colorado State Department of Local Affairs and with the Mountain Bell Corporation to form Colorado Initiatives. This program’s purpose is to assist rural Colorado counties and municipalities in developing sound community economic strategies that improve local conditions. Each year ten communities are selected for specialized technical research, and financial planning assistance. In addition to this targeted assistance, the School works with other rural communities in a more broad based, developmental way on a variety of local issues. For example, the town of Burlington, Colorado requested assistance with a site plan for an old town museum. This one project led to six other projects over a two-year period in the town of 3,500 people: a site design for a 190-acre industrial park, a market study for the Old Town, a design for town entrance and unified public signage system and a main street revitalization study. These projects have culminated in a regional economic base study for the surrounding four-county area.

**Minority Business Development.** In responding to one of Denver’s and Colorado Springs’ urgent inner-city needs, the Center has developed a program to strengthen minority and women-owned businesses. This program is designed to improve their access to capital and to provide better goods and services to inner-city neighborhoods. As these businesses become stronger, they hold the potential for creating new jobs for inner-city residents. Five corporations, three government agencies, two non-profit corporations, and the School provide support to this program which is operated and managed by the Center. Seventy-five individual businesses obtain management and technical assistance for building renovation each year.
"I like working at an urban business school. The city around us is like a laboratory where we can explore the issues and concepts of business today, and the students bring a lot of experience into the classroom. It's a good place to blend teaching and research."

— Professor Peter Bryant
College of Business
Administration and Graduate School of Business Administration

Dean: Donald L. Stevens
Associate Dean: James D. Suver
Assistant Dean: Linda S. Hull
College Office: 1475 Lawrence St., Third Floor
Telephone: 623-4436
Director of Undergraduate Programs: Edward J. Conry
Director of Graduate Programs: James R. Morris
Director of Health Administration Programs: Bruce R. Neumann

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Frank Taylor, Executive Director, Department of Institutions
Clyde E. Tucker, Director, Office of Educational Services, CU-Health Sciences Center

INFORMATION ABOUT THE COLLEGE

Located in the heart of the Rocky Mountain business community, the College of Business at the University of Colorado at Denver provides its students with the knowledge and skills necessary to become effective, responsible business professionals. This level of excellence in higher education is achieved by bringing together nationally recognized faculty and highly motivated, mature students in an intellectually challenging academic environment.

Our nation's business and corporate environment is experiencing dramatic and complex change. Your ability to understand these changes and function as a skilled manager in today's rapidly moving business world will depend to a great extent on the quality of your business education. Because of the dynamic changes in business trends and management, research in these areas is crucial to a successful transition. The business faculty of "research institutions" provide the most current knowledge, concepts, and advances in the field of business management. CU-Denver's College of Business is a "research institution," and our faculty are nationally recognized for their contributions to scholarly research.

The information contained in university textbooks is first conceived through faculty research and is usually published in textbooks about six years later. Thus, a research-oriented faculty is writing and teaching-concepts years before they are typically seen in textbooks. Our students have the opportunity to be on the leading edge of business management theory and practice.
Our class schedules offer flexibility to meet the needs of full- and part-time students, with both day and evening classes. Whether you are an experienced working professional seeking higher levels of achievement, or preparing for a new career in the business world, you will gain the knowledge necessary to succeed in today's challenging business environment.

At CU-Denver's College of Business, you can have the edge over your competition.

Faculty

Our nationally recognized faculty is vigorous and enthusiastic about their teaching and research. Recruited from the nation's leading business schools, such as Berkeley, Harvard, Princeton, Stanford, University of Chicago, University of Pennsylvania, UCLA, and Yale, many of them also bring years of valuable experience in private industry. Their interdisciplinary expertise, academic achievements, scholarly research, and business experience provide students with a dynamic learning environment, unequalled in the region.

Students

Unlike the students at a traditional college campus, a large majority of our students are adult, working professionals who maintain full-time employment. Their success and experiences enrich class discussions and interactions among students. Although a high percentage attend evening classes, a significant number are full-time students attending classes offered during the day. Following the current national trend, women constitute a very high percentage of the student body. Since admission standards are among the most stringent in the region, the student body is highly motivated and talented. This rich mix of backgrounds, experience, and perspectives, when coupled with the strengths of our excellent faculty, fosters stimulating classroom interaction and keen competition among the students.

Accreditation

While there are approximately 800 recognized schools of business nationwide, there are only 237 that are accredited by the national accreditation agency for university schools of business—the American Assembly of Collegiate Schools of Business (AACSB). CU-Denver's College of Business is one of the few schools in the State accredited by the AACSB. Business Week wrote recently "Today, just having the degree isn't as important as where you get it... As corporations become savvier buyers of... talent, they are giving more weight to the AACSB seal... Accreditation shows that a Business School cares about the quality of its program." In addition, many national fellowship programs accept only students from accredited programs.

In a similar manner, our program in health administration is the only such program in the region accredited by the Accrediting Commission on Education for Health Services Administration (ACEHSA). This agency ensures that health administration programs meet demanding requirements for quality education in the health administration area.

Academic Programs

A carefully designed curriculum to prepare students for success in business management is available for the student seeking either an undergraduate or graduate degree.

Career Opportunities

Graduates occupy positions and perform widely varied functions in:

- Adapting
- Auditing
- Banking
- Consumer credit
- Controllership
- Credit administration
- Entrepreneurship
- Financial accounting
- Financial management
- General management
- Health administration
- Industrial selling and purchasing
- Information systems
- Insurance
- International business
- Investments
- Management accounting
- Management consulting

Marketing management
- Marketing research
- Mortgage finance
- Operations research
- Organization management
- Personnel/human resources management
- Operations management
- Public accounting
- Public administration
- Real estate
- Retailing
- Selling and sales management
- Taxation
- Traffic and distribution 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.

Scholarships and Financial Aid

Many programs for financial aid are administered by the Office of Financial Aid. Call 556-2886 for detailed information. In addition, the College of Business awards some departmental and general scholarships. The amounts of the awards and the number of awards vary each year. For additional information, contact the College of Business office, 623-4436.

Each year, a number of students are awarded Dean's Scholarships, Colorado Scholarships, and Regents Scholarships. These provide financial support for a portion of the students' tuition and fees.

The Purchasing Management Association of Denver awards an annual scholarship to students interested in...
careers in purchasing and the Colorado Chapter of the American Production and Inventory Control Society awards up to two annual scholarships to students interested in careers in operations management. For information, contact the operations management faculty adviser in the College of Business.

The Colorado Venture Group, a non-profit Denver organization, periodically awards $1,000 scholarships to small business and entrepreneurship majors at CU-Denver.

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:

- Beta Gamma Sigma — national honorary scholastic fraternity in business
- CSPA — Colorado Society for Personnel Administration (student chapter) for students interested in personnel or industrial relations
- CUAMA — student chapter of the American Marketing Association
- HASO — Health Administration Student Organization
- ISC — Information Systems Club
- MBA Association — University of Colorado at Denver association of master's students in business
- Phi Chi Theta — national professional business and economics fraternity
- Sigma Iota Epsilon — professional and honorary management fraternity

GENERAL ACADEMIC POLICIES

Academic policies which apply to all CU-Denver students are described in the General Information section of this bulletin. The policies described below apply to both undergraduate students in the College of Business and Administration and graduate students in the Graduate School of Business Administration. Policies applying separately to undergraduate and graduate students are described under separate headings.

Each student is responsible for knowing and complying with the academic policies and regulations established for the College. The College cannot assume responsibility for problems resulting from a student's failure to follow the policies stated in the bulletin. Similarly, students are responsible for all deadlines, rules, and regulations stated in the Schedule of Classes.

Academic Ethics

Students are expected to conduct themselves in accordance with the highest standards of honesty and integrity. Cheating, plagiarism, illegitimate possession and disposition of examinations, alteration, forgery, or falsification of official records, and similar acts or the attempt to engage in such acts are grounds for suspension or expulsion from the University. Also, actions which disrupt the administrative process, such as misrepresentation of credentials or academic status, other forms of deception, or verbal abuse of College staff are grounds for suspension or probation. Any reported act of dishonesty may be referred to the College of Business Committee on Academic Policies and Procedures at the discretion of the dean, a member of the instructional staff, or other appropriate University representative. In particular, students are advised that plagiarism consists of any act involving the offering of the work of someone else as the student's own. It is recommended that students consult with their instructors as to the proper preparation of reports, papers, etc. in order to avoid this and similar offenses.

College Advising and Records

Students receive their academic counseling from a faculty member and a staff of advisers in the College of Business office. Advising is available throughout the semester by appointment, although individual appointments with the advisers are generally unavailable during registrations. Students are encouraged to discuss with the faculty of the College the various majors available as well as career opportunities.

Non-business and prospective students are encouraged to contact one of the advisers regarding admissions and academic information, requirements, transfer policies, and unofficial transcript evaluations. Please call the College of Business at 623-4436 for more complete information.

Career advising is available from the business faculty and through the Auraria Office of Career Planning and Placement Services, 556-3477.

Admission to Business Classes

Admission to business classes is limited to students who have been admitted to the business program, and to other students as described in the separate undergraduate and graduate policy sections. 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 non-degree students who have specific career or educational goals.

Attendance Regulations

Students are required to attend classes on a regular basis. Absences must be arranged with the instructor
and must conform with the instructor's policy on attendance.

**Adding and Dropping Courses**

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

**Withdrawal**

Students may withdraw without discredit within the first ten weeks of the semester. The signature of the instructor is required in addition to that of the dean. Withdrawals following the tenth week of the semester are permitted only for circumstances clearly beyond the student's control.

**Administrative Drop**

The College reserves the right to administratively drop students who are incorrectly enrolled in business courses. Instructors also may recommend to the College of Business and Administration office that students who fail to meet expected course attendance or course prerequisites be dropped from the course. Generally, students who are administratively dropped will not receive tuition refunds.

**Appeal Procedure**

Students should contact a business adviser in the College of Business and Administration office for appeal and petition procedures pertaining to rules and regulations of the College.

**General Grading Policies**

**Plus/Minus Grading.** College of Business faculty have the option to use plus/minus grading. For example, B+ corresponds to 3.3 credit points (for each semester hour), B – corresponds to 2.7 credit points.

**Incomplete Grades.** The only incomplete grade given in the College is IF. An IF grade is assigned only when documented circumstances clearly beyond the student's control prevent the student from completing course requirements (exams, papers, etc.). Generally, students must make up the missing work and may not retake the entire course. Students should not register for the class a second time but should make up the work with the instructor giving the IF. All IF grades must be made up within one year, or the IF will be changed to a grade of F.

All incomplete grades must be completed and recorded at the Office of Admissions and Records no later than four weeks prior to graduation. The student is responsible for contacting the instructor concerning the removal of incomplete grades.

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

**Academic Policies for Undergraduate Students**

**Advising.** To arrange an undergraduate advising appointment, call 623-4436.

**Admissions.** Admission requirements to the College of Business and Administration for new freshmen and for transfer students are described in the General Information section of this bulletin. Requirements for University of Colorado students seeking admissions to the College are in this section under Intra-University Transfer.

**Registration.** Instruction for registering for courses is contained in another publication called the Schedule of Classes. That publication lists the times when registration occurs, the place, and the courses offered.

**Scholastic Load.** The normal scholastic load of an undergraduate business student is 15 semester hours, with a maximum of 18 hours during the Fall/Spring Semesters and 12 hours during Summer Term. A maximum of 3 hours can be taken during the interim/vacation session. Hours carried concurrently in the Division of Continuing Education, whether in classes or through correspondence, are included in the student's load.

**Pass/Fail Option.** Students in the College of Business and Administration may not take required business or non-business courses, or business elective courses, on a pass/fail basis. Only non-business electives may be taken pass/fail. A maximum of 16 hours of 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 successfully completed at this institution. Pass/fail election must be made within the posted deadline and is irreversible. A maximum of 6 hours pass/fail may be taken in any one semester.

**Repeating Courses.** A failed course (grade of F) may be repeated, and the F will be included in the grade-point average and will appear on the transcript. A course in which a grade of D- or better is obtained may not be repeated without written approval from the business adviser. Courses repeated without an adviser's approval may not be computed in the grade-point average calculation.

**Undergraduate 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.

**Filing for Graduation.** Students must file an Undergraduate Candidacy form and Diploma Card, and request a graduation evaluation senior audit from a business adviser prior to registering for their final semester.
Failure to do so may delay graduation. Also, students desiring to change their area of emphasis after filing for graduation must have the change approved by the graduation supervisor prior to registering for their final semester. Changes after that time will delay graduation.

**Attendance by Non-business Majors.** Space in undergraduate business courses is reserved for students admitted to the College. Certain other students are admitted on a space available basis at the discretion of the Director of the Undergraduate Program and the instructor.

**Academic Policies for Graduate Students**

**Advising.** Prospective graduate students are encouraged to discuss admissions and program requirements with an advisor. In addition, as soon as possible after admission, students should schedule an appointment with a graduate advisor to discuss general degree requirements. Master of Science students should consult with the advisor to determine any background coursework that may be required. All graduate students need to prepare a formal degree plan during their first term in residence. This plan, with appropriate signatures, will be filed with the Graduate School of Business Administration.

**Admission to Graduate Business Courses.** Admission to graduate level courses is reserved for students admitted to the CU-Denver graduate program in business. Graduate students from other University of Colorado schools may be admitted on a space available basis. Non-degree students may be permitted to attend only with written permission of the Director of Graduate Programs.

**Course Load.** The normal course load for full-time graduate students is 9-15 semester hours. However, because many students also are pursuing a career, it is possible to attend classes on a part-time basis at times convenient to the individual's work schedule. Graduate courses are offered in the evening hours to accommodate the working student.

**Transfer of Credit.** A maximum of 6 semester hours of graduate work can be transferred from another AACSB-accredited master's program.

**Time Limit.** The student must complete the curriculum within five years from the date of first enrollment in the program. Courses older than 5 years generally will not be accepted for the degree without permission of the Director of Graduate Programs.

Students who have not been enrolled for three consecutive semesters must reapply for admission to the program. Readmitted students may be required to complete their degree requirements according to requirements in effect at the date of their readmission.

**Comprehensive Examinations.** A comprehensive examination is not required for students pursuing the M.B.A. degree. A comprehensive examination may be required of students pursuing an M.S. degree; the M.S. adviser should be contacted regarding this requirement. Students must be registered for the semester in which the comprehensive is taken, normally the last semester of attendance.

**Graduation.** Students must file an application for Admission to Candidacy and a Diploma Card with the Graduate School of Business Administration prior to registering for the term in which they intend to graduate.

**Minimum Grade-Point Average.** A minimum cumulative grade-point average of 3.0 must be achieved and maintained in courses taken for a graduate business degree. All graduate courses taken to meet the degree requirements and courses taken since admission to the program are included in the grade-point average. If the student's cumulative grade-point average falls below 3.0, the student will be placed on academic probation and given two semesters of attendance in which to achieve the required 3.0 cumulative average. Failure to achieve the required average within the allotted time period will result in suspension.

The grade of D is not a passing grade for graduate students. Graduate students can repeat a course for which they have received a grade of 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 student must be earning a grade of C or better in the course. Students will not be permitted to withdraw from courses after the tenth week of the semester without the approval of the dean.

**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. An understanding of the activities that constitute a business enterprise and the principles underlying administration of those activities.
2. The ability to think through logically and analytically the kind of complex problems encountered by management.
3. Facility in the arts of communication.
4. A comprehension of human relationships involved in an organization.
5. Awareness of the social and ethical responsibilities of those in administrative positions.
6. Skill in the art of learning that will help the student continue self-education after leaving the campus.

**Graduation Requirements**

The Bachelor of Science (Business) degree requires:

**Total Credits.** A total of 120 semester hours of credit.

**Area of Emphasis.** Completion of at least 12 semester hours of approved courses in the area of emphasis.

**Residence.** At least 30 semester hours of business courses must be complete after admission to the College. The 12 hours in the area of emphasis must also be completed after admission to the College.
Grade Average. A minimum cumulative scholastic grade-point average of 2.0 for all courses attempted at the University acceptable toward the B.S. (Business) degree, 2.0 for all business courses, and 2.0 for the student's area of emphasis must be maintained.

Area Requirements. Satisfaction of all of the following area requirements.

### Required Areas

<table>
<thead>
<tr>
<th>Area</th>
<th>Semester Hours</th>
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<tbody>
<tr>
<td>Mathematics</td>
<td>6</td>
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<tr>
<td>Principles of economics</td>
<td>6</td>
</tr>
<tr>
<td>Political science</td>
<td>6</td>
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<tr>
<td>Natural science</td>
<td>6</td>
</tr>
<tr>
<td>General psychology</td>
<td>3</td>
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<tr>
<td>Social-humanistic elective</td>
<td>3</td>
</tr>
<tr>
<td>Introductory sociology or cultural anthropology</td>
<td>3</td>
</tr>
<tr>
<td>Communications and composition</td>
<td>6</td>
</tr>
<tr>
<td>Business core requirements</td>
<td>30</td>
</tr>
<tr>
<td>Area of emphasis</td>
<td>12</td>
</tr>
</tbody>
</table>

### Electives

- Business [9 semester hours]
- Non business (to include 9 hours of upper division work) [15 semester hours]
- Free electives (either business or non-business electives) [15 semester hours]

Total Semester Hours [120 semester hours]

Detailed descriptions of courses which satisfy the area requirements are presented below.

### Courses Which Satisfy Area Requirements

#### Area Requirements

**Communication**

<table>
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<th>Semester Hours</th>
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Required: One English Composition (ENGL. 102 or 103) and one speech course (CMMU. 202 or 210)

**Mathematics**

<table>
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<th>Semester Hours</th>
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Required: Algebra for Business and Social Science (MATH. 107).

Note that college-level algebra will not satisfy this requirement. A college-level calculus course is required (MATH. 108 is recommended).

**Economics**

<table>
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<th>Semester Hours</th>
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Six hours of economics are required. When ECON. 201-202 are taken at CU-Denver for eight (8) hours, the additional two (2) hours apply as non-business electives.

**Political Science**

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<th>Semester Hours</th>
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Required: PSC. 100 and 110. The following courses also will fulfill the PSC. 100 requirement: PSC. 300, 304, 306, 310, 340, 353, 355, 365.

**Natural Science**

<table>
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<th>Semester Hours</th>
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Select courses such as biology, chemistry, or physics. Astrophysics, earth science, geography, and geological science are also acceptable. Mathematics and psychology are not appropriate courses for this requirement.

**Introductory Sociology or Cultural Anthropology**

<table>
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<th>Semester Hours</th>
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<td>3</td>
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</table>

Socio-humanistic elective [3 semester hours]

Select from the following courses:
- History course (100 or 200 level): a behavior psychology course (PSY. 315 or 499 are strongly recommended); PHIL. 101, 120, or 220; Cultural Anthropology or SOC. 100, 119, 250, 300, 301, 302, 303, 305, or 384 (Sociology and Cultural Anthropology courses are only acceptable if they are not used to fulfill the Introductory Sociology or Cultural Anthropology requirement.)

**General psychology**

<table>
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<th>Semester Hours</th>
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<td>3</td>
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</table>

PSY. 100 is recommended

**Electives**

- Free electives [15 semester hours]
  - (may be either business or non-business undergraduate academic courses)
- Business electives [9 semester hours]
  - (any undergraduate academic course offered by the College of Business)
- Non-business electives [15 semester hours]
  - (must include 9 hours of upper division (300- or 400-level work.)

Guidelines for Elective Credits. Elective credits should be selected carefully as not all classes are acceptable. Generally, to be acceptable, electives must be taught by regular University of Colorado faculty, must have a form of assessment such as a term paper and/or examinations, and must be regular classroom-type classes. Course coverage must be college level, not repetitious of other work applied toward the degree, must be academic as opposed to vocational/technical, and must be part of regular University offerings.

Specifically, the College will accept:

a. A maximum of 6 hours of the theory of physical education, recreation, and dance, and
b. A maximum of 6 hours of approved independent study, experimental studies, choir, band, music lessons, art lessons, and
   c. A maximum of 12 hours of advanced ROTC providing student is enrolled in the program and completes the total program.

The College will not accept:

Physical education, activity classes, recreation, workshops, internships, orientations, dance, teaching methods, practicums, and courses reviewing basic skills in computers, English composition, mathematics, and chemistry.

### Core Requirements

<table>
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<tr>
<th>Semester Hours</th>
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<td>30</td>
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Complete all of the following courses:

- ACCT. 200
- I S. 200
- Q M. 201
- B L. 300
- FIN. 305
- MK. 300
- MGT. 330
- O M. 300
B AD. 410 or 411
MGT. 450
Areas of Emphasis ............................................... 12
(See Areas of Emphasis in this section.)

Summary
Required Courses .................................................. 81
Elective Courses ................................................... 39
Total Required Semester Hours ....................... 120

Model Degree Program
The following sequence of courses is a guide to registration.

Freshman Year
ENGL. 102 or 103. English Composition .................. 3
CMMU. 202 or 210. Communication Theory or Public Speaking .................. 3
MATH. 107. Algebra for Social Science and Business ... 3
MATH. 108. Calculus for Social Science and Business ... 3
P SC. 100. Introduction to Political Science ............ 3
P SC. 110. American Political System .................. 3
SOC. 100. Introduction to Sociology .................. 3
B AD. ......................................................... 3
Natural Science ............................................. 6
Total ......................................................... 30

Sophomore Year
ECON. 201 and 202. Principles of Economics (macro/micro) .................. 6
PSY. 100. Introduction to Psychology .................. 3
Socio-humanistic elective .................................. 3
I S. 200. Business Information and the Computer .... 3
Q M. 201. Business Statistics ........................... 3
ACCT. 200. Introduction to Financial Accounting .... 3
Nonbusiness electives ..................................... 9
Total ......................................................... 30

Junior Year
MK. 300. Principles of Marketing .......................... 3
FIN. 305. Basic Finance .................................. 3
MGT. 330. Management and Organizational Behavior .. 3
Q M. 300. Operations Management .................. 3
B L. 300. Business Law .................................. 3
Business electives ......................................... 6
Nonbusiness elective ..................................... 6
Either business or nonbusiness electives ............ 6
Total ......................................................... 30

Senior Year
MGT. 450. Business Policy and Strategic Management .. 3
B AD. 411. Business and Society or B AD. 410. Business and Government ........ 3
Area of emphasis ............................................ 12
Business elective ......................................... 3
Either business or nonbusiness electives ............ 9
Total ......................................................... 30

Areas of Emphasis
Each candidate for the B.S. (Business) degree must complete the prescribed courses in an area of emphasis comprising a minimum of 12 semester hours taken at the University of Colorado at Denver. A 2.0 average is required for the four required area courses. Typically, students select an area of emphasis after taking several of the "core" courses. They then complete the hours required for their selected area.

Available areas of emphasis are:
Accounting
Entrepreneurship and new venture development
Finance
Human resources management
Information systems
International business
Management
Marketing
Operations management
Real estate
Transportation and distribution management

Students so desiring may complete a dual area of emphasis by careful selection of courses and use of elective hours for the second area. Information about each area of emphasis is given in this College of Business section of the bulletin.

Undergraduate Admissions

Admission of Freshman Students. See the General Information section of this bulletin for a description of freshman admission requirements.

Admission of Transfer Students. Applicants who have completed work at other collegiate institutions should review the discussions of transfer students in the General Information section of this bulletin. In addition to University policies, the College of Business and Administration evaluates course work to determine its appropriateness for the degree of Bachelor of Science (Business). For information about specific policies on transfer of credit, consult an undergraduate business adviser.

Intra-university Transfer. Students who want 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. A minimum grade-point average, and minimum number of academic hours (both established by the College) are required for consideration. Transfer deadlines are July 15 for Fall Semester, November 15 for Spring Semester, and April 15 for the Summer term.

The college will consider each application based upon the student's academic standing, the quality of the student's academic work and the courses completed.

To apply for an intra-university transfer, students must submit an Intra-University Transfer form and CU-Denver transcript to a business adviser. Forms are available at CU-Denver Admissions or the College of Business office; transcript request forms are available at CU-Denver Records. The transcript must include the student's most
recent semester at the University. Students with previous course work from other institutions are also required to submit a copy of their transfer credit evaluations (advanced standings).

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, if a student registered for a 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.

Applicants for the second undergraduate degree are required to have a personal interview with a business adviser. Eligible students will be notified when their admissions file is complete and interviews are desired.

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.

Double Degree 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. It may be arranged for other professional combinations as well. For additional information, contact an undergraduate business adviser at 623-4436.

GRADUATE DEGREE PROGRAMS

The Graduate School of Business Administration offers programs leading to the Master of Business Administration (M.B.A.), and the Master of Science (M.S.) in specific fields of business and health administration. In addition, the Master of Business Administration for Executives (Executive M.B.A.) is offered as a multi-campus program of the Graduate School of Business Administration, and the Executive Program in Health Administration (Executive M.S.H.A.) is offered through the Health Administration Program.

These programs are accredited by the American Assembly of Collegiate Schools of Business (AACSB); and the M.S. in Health Administration is additionally accredited by the Accrediting Commission on Education for Health Services Administration (A.C.E.H.S.A.).

Master of Science

Master of Science degrees (M.S.) are offered in the fields of accounting, accounting and information systems, management science and information systems, finance, health administration, marketing, and management.

The M.S. degree affords the opportunity for specialization and depth of training within a particular major field and, where allowed or required, a minor field. The specialization and expertise developed with the M.S. program prepares the student for more specialized staff positions in industry, the non-profit sector, and government.

The course requirements for the M.S. degree in each of the fields are divided into two components — common background and graduate core requirements. The common background requires at least 21 semester hours of business courses to develop general breadth and competence in the fields of business administration. These requirements may differ among degree programs. The common background requirements may be satisfied by equivalent graduate level work, or through undergraduate course work as approved by the adviser. Generally, an undergraduate degree in business administration from an AACSB accredited university will meet these requirements. The graduate core requires at least 30 semester hours of graduate level courses as prescribed by the different major programs.

Other Degree Programs

JOINT MBA/BA

This program enables qualified students to earn a bachelor's degree from the College of Liberal Arts and Sciences (CLAS), and a Master of Business Administration from the Graduate School of Business Administration in five years. The program combines undergraduate general education with the graduate business curriculum.

Bachelor's candidates may major in any CLAS field (English, political science, biology, or fine arts are examples), and they must fulfill all the requirements for graduation from CLAS. During the senior year, the student begins taking graduate level courses in the M.B.A. program; these courses count as electives in the bachelor's program.

For further information about this program and the admission requirements, contact the College of Liberal Arts and Sciences Advising Office, 556-2555.

JOINT MBA/MA — INDUSTRIAL AND ORGANIZATIONAL PSYCHOLOGY

This program enables the student to earn two degrees — an M.B.A. from the Graduate School of Business
Administration and a Master of Arts (M.A.) in psychology from the College of Liberal Arts and Sciences.

Requirements for Admission to the M.B.A. and M.S. Programs

Admission to a graduate program in business administration (M.B.A. and M.S.) is granted only to students showing high promise of success in graduate business study. Admission is based on the following indicators of the candidate's likelihood to succeed in the program.

Academic Record. The bachelor's degree must be from a regionally accredited university. The total academic record is considered, including the grade-point average, the course of study, and the quality of the program.

Testing. The candidate's performance on the Graduate Management Admission Test (GMAT). While other tests may be acceptable, the GMAT is strongly recommended since it is probably the best indicator of high promise of success in graduate schools of business. The GMAT test is given four times each year at numerous centers throughout the world. For information and to make application for the test, write to: Graduate Management Admission Test, Educational Testing Service, CN 6103, Princeton, New Jersey, 08541. The code number for CU-Denver's graduate business program is 4819.

Work-Experience. A record of appropriate employment at increasing levels of responsibility is considered a positive indicator of the likelihood of successful completion of graduate work.

Seniors in this University who have satisfied the undergraduate residence requirements, and who need no more than 6 semester hours overall 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 Programs. They must meet regular admission criteria and submit complete applications by deadlines listed below.

Background Requirements. Students applying for graduate programs in business do not have to have taken their undergraduate degrees in business. The M.B.A. program is specifically designed so that the required courses cover the material needed for completion of the degree. There are no prerequisites needed to enter the M.B.A. program, and there is every reason to believe that students with non-business backgrounds can complete the program successfully.

Applicants for the M.S. degree, however, may be required to take prerequisite courses, depending on the individual's academic and professional background. For more detailed information contact the graduate student adviser.

THE ADMISSION PROCESS

To be considered for admission, applicants for graduate programs other than health administration and the Executive M.B.A. must:

1. Submit a completed application along with the non-refundable application fee of $40 ($30 for M.S. applicants) prior to the application deadlines:
   - April 1 for Summer Term admission.
   - July 1 for Fall Semester admission.
   - November 1 for Spring Semester admission.
   Early applications are recommended; early applications can receive early priority in registration and class enrollment. Applications received after these dates may not be able to be processed in time for admission.

2. Have GMAT scores forwarded to the College by the Educational Testing Service. The code for CU-Denver's graduate business program is 4819.

3. Have two official transcripts (not student copies) sent from each college attended.

Personal interviews are not required except for applicants to the M.S. in health administration.

Students applying to the accelerated M.B.A. program may be required to submit an additional non-refundable deposit after they have been accepted into the graduate program. This deposit serves to request consideration for admission into the accelerated program for the student already admitted to the graduate program. The deposit is applied against regular tuition fees at the time of registration. The mailing address for applications is:

Graduate Admissions
Graduate School of Business Administration
University of Colorado at Denver
1475 Lawrence Street
Denver, CO 80202

Applicants for the Executive M.B.A. and health administration programs should consult the relevant sections for application information.

Programs of Study

ACCOUNTING

Adviser: Bruce R. Neumann
Office: 1475 Lawrence St., Third Floor
Telephone: 623-4436
Facility: Professors: Michael A. Firth, Bruce R. Neumann, James D. Suver
Associate Professors: Mark Hirschey, Dennis F. Murray
Assistant Professors: Jean C. Cooper, M. Virginia Parker
Instructors: Steven Cutler, Cindy Fischer

Undergraduate

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:

Accounting and management control systems
Auditing
Financial accounting
Managerial accounting
CU-Denver Business Dean Donald Stevens (right) talks with Anne Moeller, Assistant Professor of Management, and Steven Hartley, Assistant Professor of Marketing, on Denver's 16th Street Mall.
Tax accounting
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.

Courses in English composition, speech, ethics and logic are desirable. Courses in statistics and information systems, beyond the required College of Business core courses, are highly recommended.

The undergraduate area of emphasis in accounting consists of 15 hours beyond ACCT. 200. Accounting majors should not take ACCT. 202.

### Required Courses

<table>
<thead>
<tr>
<th>Course</th>
<th>Semester Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACCT. 323. Intermediate Financial Accounting II</td>
<td>3</td>
</tr>
<tr>
<td>ACCT. 331. Cost Accounting I</td>
<td>3</td>
</tr>
<tr>
<td>ACCT. 332. Cost Accounting II</td>
<td>3</td>
</tr>
<tr>
<td>Accounting elective (at the 400 level)</td>
<td>3</td>
</tr>
</tbody>
</table>

Students planning to pursue accounting as a career usually take more than the required 15 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 and business advisers in planning their accounting programs.

Accounting students often specialize in a particular topical area of accounting beyond the core. Examples of these specializations include the following recommended courses:

**Financial Accounting and Auditing**
- ACCT. 424. Advanced Financial Accounting
- ACCT. 441. Income Tax Accounting
- ACCT. 442. Advanced Income Tax Accounting
- ACCT. 462. Auditing

**Managerial Accounting and Systems**
- ACCT. 433. Managerial Accounting Problems and Cases
- ACCT. 441. Income Tax Accounting
- ACCT. 442. Advanced Income Tax Accounting
- ACCT. 454. Accounting Systems and Data Processing
- ACCT. 462. Auditing
- ACCT. 480. Accounting for Government and Nonprofit Organizations

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.

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### MASTERS OF SCIENCE IN ACCOUNTING

**Adviser:** Bruce Neumann  
**Telephone:** 623-4436

The Master of Science in Accounting is a flexible program that provides the student with a thorough understanding of both financial and managerial accounting. The combination of required and elective courses allows the student to design a course of study with the adviser's approval, leading to a successful career in either public accounting, governmental or non-profit accounting, or management accounting.

The M.S. in accounting requires the completion of components A, B and C as shown below:

#### A. Common Background Course Work

<table>
<thead>
<tr>
<th>Courses Required</th>
<th>Semester Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACCT. 200. Financial Accounting</td>
<td>3</td>
</tr>
<tr>
<td>BUS. 602. Quantitative Business Analysis</td>
<td>3</td>
</tr>
<tr>
<td>BUS. 600. Marketing Management</td>
<td>3</td>
</tr>
<tr>
<td>BUS. 300. Business Law</td>
<td>3</td>
</tr>
<tr>
<td>BUS. 604. Human Behavior in Organizations</td>
<td>3</td>
</tr>
<tr>
<td>BUS. 618. Financial Management</td>
<td>3</td>
</tr>
<tr>
<td>BUS. 614. Managerial Economics</td>
<td>3</td>
</tr>
<tr>
<td><strong>Total Semester Hours</strong></td>
<td>21</td>
</tr>
</tbody>
</table>

It may be possible to satisfy these requirements with other graduate or undergraduate course work with the approval of the adviser.

It is recommended that students should have minimal competency in mathematics and computer software applications. Possible courses at CU-Denver are MATH. 107, 108, and ACCT. 331/332. The required courses in Parts B and C (below) will also help meet these objectives. Self-study or review (workshops) also may be used to attain minimal competency levels.

#### B. Background Accounting Courses

<table>
<thead>
<tr>
<th>Courses Required</th>
<th>Semester Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>or ACCT. 331 and 332. Intermediate Managerial and Cost Accounting</td>
<td>6</td>
</tr>
<tr>
<td><strong>Total Background Accounting Semester Hours</strong></td>
<td>9 or 12</td>
</tr>
</tbody>
</table>

#### C. Graduate Core in Accounting

<table>
<thead>
<tr>
<th>Courses Required</th>
<th>Semester Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACCT. 625. Seminar: Accounting Theory</td>
<td>3</td>
</tr>
<tr>
<td>ACCT. 626. Seminar: Managerial Accounting</td>
<td>3</td>
</tr>
<tr>
<td>ACCT. “core” Any 2 advanced accounting courses (numbered higher than ACCT. 626)</td>
<td>6</td>
</tr>
<tr>
<td>MGT. 681. Personnel and Human Resource Management</td>
<td>3</td>
</tr>
<tr>
<td>BUS. 610. Management of Information Systems</td>
<td>3</td>
</tr>
<tr>
<td><strong>Sub total</strong></td>
<td>18</td>
</tr>
</tbody>
</table>

**Electives (4) Four elective courses may be selected**  
**Total Graduate Core Semester Hours**  30
• Of the 30 hours, a minimum of 18 hours must be at the 600 level.
• ACCT 625 and ACCT 626 are required courses.
• No comprehensive examinations are required in the major field of accounting.

Comprehensive examinations may be required for some minor areas.

Certain graduate courses in accounting are offered only in the Fall Semester or only in the Spring Semester or Summer Term. Consult a current Schedule for information about current course offerings. Note that ACCT 554, 625, and 643, are usually offered in the fall and other advanced courses are usually offered in the spring or summer.

COURSES


ACCT 202-3. Introduction to Managerial Accounting. Fall, Spring. The analysis of cost behavior and the role of accounting in the planning and control of business enterprises, with emphasis on management decision-making uses of accounting information. Note: Finance majors must take this course and accounting majors may not take this course to satisfy degree requirements. Prer., ACCT 200.


ACCT 442-3. Advanced Income Tax Accounting. Fall, Spring. Continuation of ACCT 441, with special emphasis on the income tax problems of partnerships and corporations. Prer., ACCT 441.

ACCT 495-3. Special Topics in Accounting. Research methods and results, special topics, and professional developments in accounting. Prerequisites vary according to topic and instructor requirements.

Upper Division/Graduate Level


ACCT 433/533-31. Managerial Accounting Problems and Cases. Spring or Summer. Critical analysis of advanced topics in managerial accounting. Considerable use of cases and current readings. Prer., for 400 level, ACCT 332; prer., for 500 level, ACCT 332 or 607 or equivalent.

ACCT 454/554-31. Accounting Systems and Data Processing. Fall. The design and analysis of accounting information systems, automated data processing methods with special emphasis on computers and computer programming, and the role of accounting in the management process. Prer., for 400 level, ACCT 331 and 6 additional semester hours of accounting; for 500 level, ACCT 331 or 607 and 6 additional semester hours of accounting.

ACCT 462/562-31. Auditing. Fall, Spring. Generally accepted auditing standards and the philosophy supporting them; auditing techniques available to the independent public accountant. Pertinent publications of the AICPA reviewed. Prer., for 400 level, ACCT 323; prer., for 500 level, ACCT 323 or 624.


600 Level

ACCT 607-3. Management Accounting and Control Systems. Fall, Spring. This course is designed to develop a conceptual foundation for the use of management accounting techniques in the management control process and for resource decisions. Management control systems, cost accounting systems, and account information requirements will be stressed through analysis of cases and classroom discussion. Prer., BUS. 606. Students who have taken cost accounting may take this course only with consent of instructor.


1Students enrolled at the 500 level may expect additional work and evaluation commensurate with graduate standards.
ACCT 626-3. Seminar in Managerial Accounting. Spring or Summer. This interdisciplinary course focuses upon the conceptual foundation of managerial accounting information in decision making, planning, control, and other issues. The role of managerial accounting information in decision support systems will be developed. Related behavioral concepts and quantitative approaches will be investigated. Appropriate case studies and software applications will be analyzed. Prereq., ACCT 607 or equivalent.


ACCT 635-3. Current Issues in Professional Accounting. In-depth analysis of current issues in the accounting profession, including ethics, development, and validity of standards and regulations. Prereq., ACCT 625 or consent of instructor.

ACCT 643-3. Survey of Income Tax Accounting. Fall. Federal income tax laws and requirements affecting individuals and corporations. Discussion of tax planning and compliance issues. Use of specialized tax software and decision models. Prereq., BUS 606 or equivalent. Students who have taken ACCT 442 may not take this course.


ACCT 645-3. Research Problems in Income Tax Accounting. Fall. 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 revision. Prereq., ACCT 441 or 643 or consent of instructor.

ACCT 662-3. Advanced Auditing Theory. Spring or Summer. Development of auditing as a profession, including evolution of standards and audit reports. Historical and contemporary literature in the field reviewed. Prereq., ACCT 462 or 562.

ACCT 695-3. Special Topics in Accounting. Research methods and results, special topics, and professional developments in accounting. Prerequisites vary according to topics and instructor requirements.

BUSINESS ADMINISTRATION COURSES

B AD. 100-3. Introduction to Business. Fall, Spring. Nature of business enterprise; role of business in our society; problems confronting business management. Career opportunities in business. Business students are advised to take this course during their freshman year. Open only to freshmen, sophomores, non-degree students, and music majors at all levels.

B AD. 401-3. Business and Society. Fall, Spring. An examination of interrelationships between business, society, and the environment. Topics will include perspectives on the socio-economic-business system, current public policy issues, and social responsibilities and ethics. Prereq., ECON 201 and 202. Completion of P SC 110 is recommended before taking this course. Open to senior business students only.

B AD. 495-variable credit. Topics in Business. Experimental course offered irregularly for the purpose of presenting new subject matter in a particular business field. Prerequisites will vary, depending upon topics covered.

MASTER OF BUSINESS ADMINISTRATION

The Master of Business Administration (M.B.A.) program provides the student a general background in management and administration that enables the student to have the breadth of exposure and depth of knowledge required for an advanced level in a management career. The program is devoted to developing the concepts, analytical tools, and communication skills required for competent and responsible administration of an enterprise viewed in its entirety, within its social, political, and economic environment.

The MBA program is available in three different configurations: the INDIVIDUALIZED M.B.A. program, the ACCELERATED M.B.A. program and the EXECUTIVE M.B.A. program. The INDIVIDUALIZED M.B.A. and the ACCELERATED M.B.A. both have the same curriculum requirements, they differ only in the flexibility of course scheduling and the time required to complete the program.

The INDIVIDUALIZED M.B.A. allows the scheduling of classes with maximum flexibility so the students can progress through the program at their own pace by taking as little as one class per semester, or as many as five classes per semester, at times that are convenient to their work schedule. The program can be completed in as little as 16 months, or as long as 5 years.

The ACCELERATED M.B.A. requires the student to attend prescribed classes two nights per week — taking three classes each regular semester and two in the summer term — enabling the student to complete the program in two years. Each group of students moves through the program together, sharing their educational and professional experience. Candidates for this program are selected on a rigorous basis that emphasizes more advanced work experience in addition to their academic background.

Candidates in both the individualized and the accelerated M.B.A. programs must complete specific requirements consisting of 16 courses (48 semester/hours) as follows:

Core Requirements

<table>
<thead>
<tr>
<th>Course Requirement</th>
<th>Semester Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>BUS. 600. Marketing Management</td>
<td>3</td>
</tr>
<tr>
<td>BUS. 602. Quantitative Business Analysis</td>
<td>3</td>
</tr>
<tr>
<td>BUS. 604. Human Behavior in Organizations</td>
<td>3</td>
</tr>
<tr>
<td>BUS. 606. Accounting for Managers</td>
<td>3</td>
</tr>
<tr>
<td>BUS. 608. Legal and Ethical Environment of Business</td>
<td>3</td>
</tr>
<tr>
<td>BUS. 610. Management Information Systems</td>
<td>3</td>
</tr>
<tr>
<td>BUS. 612. Management of Operations</td>
<td>3</td>
</tr>
<tr>
<td>BUS. 614. Managerial Economics</td>
<td>3</td>
</tr>
<tr>
<td>BUS. 616. Economic Environment of Business</td>
<td>3</td>
</tr>
<tr>
<td>BUS. 618. Financial Management</td>
<td>3</td>
</tr>
</tbody>
</table>
BUS. 620. Business Policy and Strategic Management ... 3
Total Required Core Semester Hours .................. 33

Electives:
One graduate course from each of three of the four following areas:
Accounting, Finance, Marketing, and Management ... 9
Free electives .................................. 6
Total Elective Semester Hours .................. 15
Total Required Semester Hours for M.B.A. degree .. 48

Notes and Restrictions
Core. Depending on demonstration of a strong background in one area, a maximum of one course may be waived in the core, reducing the total number of program hours to 45. A maximum of 6 hours may be transferred from another AACSB accredited graduate school, also reducing the number of hours required.
Electives. No more than nine hours of elective graduate courses may be taken in any one discipline or area of emphasis. Students may elect not to take any emphasis. Three hours maximum may be taken outside the Graduate School of Business Administration, but only with written approval of the Director of Graduate Programs.
Subject to the above distribution requirements, students have a wide range of options available in selecting the 15 hours of electives. No area of emphasis is required for the M.B.A. degree, permitting students to choose a combination of courses appropriate for their individual career needs. If a student wishes to pursue an area of emphasis, several are available including accounting, finance, management, marketing, information systems, and operations management. Areas of emphasis in accounting, finance, management, and marketing all require 9 semester hours of electives (500 or 600 level) in addition to the area core course. All other areas of emphasis require 6 semester hours of electives (500 or 600 level) in addition to the area core course. No thesis is required for the M.B.A. program.
For additional information about the M.B.A. program contact a graduate student adviser at 623-4436.

MASTER OF BUSINESS ADMINISTRATION FOR EXECUTIVES

The Executive M.B.A. Program is a multi-campus program of the Graduate School of Business Administration. It provides executive-level students with a broad, rigorous two-year academic experience leading to the Master of Business Administration degree. The program is designed for persons who hold managerial positions in the private and public sectors. It builds upon the knowledge and experience of these executives with a sophisticated, challenging curriculum which can be pursued simultaneously with a management career.
The Executive M.B.A. Program emphasizes corporate planning, the business/government interface, and the applied tools of management. Courses are taught through a variety of methods. Case studies, lectures, and computer simulation are combined with research projects and other teaching methods to provide students with tools useful in their present positions and applicable to more advanced responsibilities as they progress in their management careers.
The Executive Program comprises four semesters over a twenty-two month time period. It begins the last week of August and runs through mid-June for two years. Classes meet for a full day, once a week, on alternating Fridays and Saturdays, making it possible for those who live outside the Denver area to participate.
Two courses are taken simultaneously throughout the program. The program is supplemented by intensive in-residence orientation at the beginning, and a two-day retreat at the conclusion.

Faculty and Resources
The faculty for the program are members of the regular faculty of the Graduate School of Business Administration from all three of the University's campuses — Boulder, Colorado Springs, and Denver. They are selected to conduct these courses because their backgrounds enable them to make the strongest contribution to the program. Many of the faculty members are nationally recognized, and all possess both practical managerial experience and a demonstrated ability to work effectively with executive level students.

Admission Requirements
The Executive M.B.A. Program is designed for men and women who have ten years of business or administrative experience, including at least three years in a managerial position. They should be part of senior management in a small organization or senior or middle management in a larger one, hold at least a baccalaureate degree, and have the ability to do graduate work.
In the selection process, significant attention will be given to the depth and breadth of the candidate's managerial experience, progression in job responsibility, total work experience, and ability to benefit from this integrative classroom/work environment. The Admissions Committee will base its decision on the application, former academic record, relevant test scores, the employer's nominating letter, other letters of recommendation, and if deemed desirable, personal interviews with the committee.
For further information, contact the Program Director, Executive M.B.A. Program, Graduate School of Business Administration, University of Colorado, 7600 E. Orchard Dr., Suite 320, Englewood, CO, 80111-2521, telephone (303) 779-4488.

BUSINESS (MBA CORE) COURSES
The following graduate courses are open only to admitted graduate degree students.
BUS. 600-3. Marketing Management. Fall, Spring. The course has two major objectives for the students: (1) understanding basic marketing concepts involving buyer behavior, product planning, pricing, channels for distribution and promotion, and (2) developing marketing decision-making capabilities based on strategic management and analytical skills. The overall objective is to integrate all the functional aspects of marketing with other functional areas of the firm and with the environment, particularly consumption markets, competition, the economy, legal and regulatory environment, and social evolution. Prer., BUS. 606.

BUS. 602-3. Quantitative Business Analysis. Fall, Spring. This course will provide the student with basic quantitative analysis tools and techniques necessary for the analysis of business related problems. Topics covered include statistics, probability, sampling, regression, inference testing, and additional topics such as correlation, contingency tables, non-parametric techniques, and time series analysis.

BUS. 604-3. Human Behavior in Organizations. Fall, Spring. This course focuses on applications of behavioral science concepts to the management of organizations. This course emphasizes analysis and understanding of human behavior in organizations, and using the results of such analyses to select appropriate strategies for managing. The course includes topics such as motivation, leadership, power and conflict, group dynamics, technology, organizational design, and other factors affecting human performance. Special emphasis is placed on concepts used by managers in all functional areas of organization, including accounting, production, finance, marketing, engineering, and so on.

BUS. 606-3. Accounting for Managers. Fall, Spring. This course focuses on the use of accounting information in managerial decision making. Primary emphasis for the first half of the course will be on interpretation of financial statements, understanding accounting conventions and principles underlying the preparation of the statements, and current controversies regarding generally accepted accounting principles. The remainder of the course will stress managerial uses of accounting techniques such as budgeting, cost, volume, profit models, and performance measurement. Prer., BUS. 602.

BUS. 608-3. Legal and Ethical Environment of Business. Fall, Spring. This course focuses on public, administrative, and regulatory law; and on the relationship of business to the legal structure and ethical value systems which determine the parameters of business decisions. Topics include litigation, domestic and multinational trade regulation, the allocation of liability for products and environmental injuries, consumer and employee protection, regulation of capital markets, and business torts.

BUS. 610-3. Management Information Systems. Fall, Spring. This course provides an introduction to information systems from a managerial perspective. Topics include basic computer concepts such as hardware, software, data file design, structured computer languages, systems analysis and design, and decision support systems. Managerial, organizational, and decision-making implications are stressed. Prer., BUS. 604.

BUS. 612-3. Management of Operations. Fall, Spring. This course will study the tools and techniques of the management of the productive process of business organizations. Topics covered will include resource management, linear programming, decision trees, scheduling and control systems, quality assurance techniques, productivity measurement, simulation, and the international elements of the operations function. Significant attention will be devoted to the study of the application of these tools to service and institutional organizations. Prer., BUS. 602.

BUS. 614-3. Managerial Economics. Fall, Spring. This course has two objectives. A primary objective is to expose the student to the usefulness of microeconomic theory at the firm level. Through economic analysis, output demand and cost characteristics can be evaluated thereby allowing for production and marketing decisions consistent with overall firm goals. Topics in cost and price theory and estimation, forecasting, production theory, and pricing practices. The course is also designed to aid students' understanding of the business manager's role in light of organizational and societal objectives. Thus, we will consider the managerial implications of structure, regulation, antitrust policy, etc. Prer., BUS. 602 and 606.

BUS. 616-3. Economic Environment of Business. Fall, Spring. The objective of this course is to provide the student with an understanding of how economic policy affects and is affected by the national and international economic environment of business. As such, it focuses on the interaction of business and government as it relates to broader societal objectives. Measures of aggregate economic activity are introduced as a basis for discussion of monetary and fiscal policy. Concerns over economic growth, employment, prices, and interest rates are seen as motivations for stabilization and industrial policy. Market power, economic externalities, and other market failures are studied as motivations for antitrust policy and regulation of industry entry conditions, product pricing, and production methods.

BUS. 618-3. Financial Management. Fall, Spring. The purpose of this course is to introduce the student to the tools and techniques for making a firm's investment and financing decisions. These tools and techniques include the mathematics of interest, risk analysis, financial theory of valuation, capital budgeting, cost of capital, and financial analysis. The emphasis is on developing an analytic framework for financial decision making. The class utilizes current literature, text, and cases. Prer., BUS. 602, BUS. 606, BUS. 614.

BUS. 620-3. Business Policy and Strategic Management. Fall, Spring. The goal of this course is to develop a general management perspective on issues of management of the total enterprise. An important objective is the integration of knowledge acquired across functional area courses. Objectives of the course include the introduction of strategic concepts, analytical tools, and methodology. The primary focus is to provide the student with both strategy formulation and implementation skills. Prer., BUS. 600, BUS. 604, BUS. 606, BUS. 612, BUS. 614, BUS. 616, BUS. 618.

BUSINESS LAW COURSES

B L. 300-3. Business Law. Fall, Spring. Provides an understanding of basic areas of law important to business transactions and consumers. Topics include litigation, criminal law, torts, contracts, and sales with overviews of consumer and employment law, and government regulation, business organizations, and the ethical implications of business activities. Prer., junior standing.

ENTREPRENEURSHIP AND NEW VENTURE DEVELOPMENT

Adviser: John L. Young
Telephone: 623-4436

The entrepreneurship and new venture development major is designed for students who wish to pursue careers as either owners of independent businesses, work in small independent businesses, or work for corporations whose clients are primarily new businesses and entrepreneurs, such as CPA firms, underwriters, consultants, venture capitalists, and financial analysts. The program emphasizes understanding and acquiring skills in the broad range of activities required to become an effective entrepreneur in today's business environment.

It is highly recommended that students majoring in entrepreneurship and new venture development also pursue a second area of emphasis in accounting, finance, or marketing. Course requirements of the second area can be included as part of the student's business or free electives. Additional courses in accounting, finance, or marketing should be planned in consultation with the adviser to serve individual career needs.

Required Courses

<table>
<thead>
<tr>
<th>Course</th>
<th>Semester Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>MGT. 452. Entrepreneurship and Small Business Management</td>
<td>3</td>
</tr>
<tr>
<td>MGT. 470. New Venture Strategies</td>
<td>3</td>
</tr>
<tr>
<td>FIN. 401. Business Finance I</td>
<td>3</td>
</tr>
<tr>
<td>ACCT. 202. Introduction to Managerial Accounting</td>
<td>3</td>
</tr>
<tr>
<td>MGT. 438. Human Resources Management: Employment</td>
<td>3</td>
</tr>
<tr>
<td>MK. 480. Marketing Strategies and Policies</td>
<td>3</td>
</tr>
</tbody>
</table>

Recommended Electives

<table>
<thead>
<tr>
<th>Course</th>
<th>Semester Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACCT. 332. Intermediate Cost Accounting</td>
<td>3</td>
</tr>
<tr>
<td>FIN. 402. Business Finance II</td>
<td>3</td>
</tr>
<tr>
<td>MK. 310. Salesmanship</td>
<td>3</td>
</tr>
<tr>
<td>MK. 330. Marketing Research</td>
<td>3</td>
</tr>
<tr>
<td>MK. 350. Principles of Advertising</td>
<td>3</td>
</tr>
<tr>
<td>MGT. 412. Advanced Business Law</td>
<td>3</td>
</tr>
<tr>
<td>MGT. 434. Labor and Employee Relations</td>
<td>3</td>
</tr>
<tr>
<td>Q M. 440. Planning and Control System</td>
<td>3</td>
</tr>
</tbody>
</table>

FINANCE

Office: 1475 Lawrence Street, Third Floor
Telephone: 623-4436

Faculty: Professors: James R. Morris, Myron B. Slovin
Associate Professors: E. Woodrow Eckard, Jr., Gailen L. Hite
Assistant Professors: Jean-Claude Bosch, Richard W. Foster, Naim Sipra

Undergraduate

The principal areas of study in finance are financial management, monetary policy, banking and investments. 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. It is necessary to understand the importance of finance in the economy and the functions and purposes of monetary systems, credit, prices, money markets, and financial institutions. Emphasis is placed on financial policy, management, control, analysis, and decision making. Numerous opportunities are to be found with financial institutions and in the field of business finance. ACCT. 202 and FIN. 305 are prerequisites for this area.

Required Courses

<table>
<thead>
<tr>
<th>Course</th>
<th>Semester Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>FIN. 401. Business Finance I</td>
<td>3</td>
</tr>
<tr>
<td>FIN. 402. Business Finance II</td>
<td>3</td>
</tr>
<tr>
<td>FIN. 433. Investment and Portfolio Management</td>
<td>3</td>
</tr>
<tr>
<td>FIN. 455. Monetary and Fiscal Policy</td>
<td>3</td>
</tr>
</tbody>
</table>

Recommended Electives

<table>
<thead>
<tr>
<th>Course</th>
<th>Semester Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>FIN. 440. International Financial Management</td>
<td>3</td>
</tr>
<tr>
<td>FIN. 434. Security Analysis</td>
<td>3</td>
</tr>
<tr>
<td>FIN. 463. Bank Management</td>
<td>3</td>
</tr>
<tr>
<td>RES. 433 Real Estate Investments</td>
<td>3</td>
</tr>
<tr>
<td>RES. 454. Real Estate Finance</td>
<td>3</td>
</tr>
<tr>
<td>INS. 484. Principles of Insurance</td>
<td>3</td>
</tr>
</tbody>
</table>

Students should note that all finance courses are not offered every semester. Finance majors are encouraged to take additional accounting courses as business electives.

MASTER OF SCIENCE IN FINANCE

Telephone: 623-4436

The M.S. degree in finance provides the student with the necessary specialized expertise in the field to meet the need of businesses for staff specialists, and to prepare the student for further graduate work in the field of finance.

The M.S. program in finance consists of two components — the common background and the graduate core required courses.

A. Common Background Course Work

Courses Required

<table>
<thead>
<tr>
<th>Course</th>
<th>Semester Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>BUS. 600. Marketing Management</td>
<td>3</td>
</tr>
<tr>
<td>BUS. 602. Quantitative Business Analysis</td>
<td>3</td>
</tr>
<tr>
<td>BUS. 604. Human Behavior in Organizations</td>
<td>3</td>
</tr>
<tr>
<td>BUS. 606. Accounting for Managers</td>
<td>3</td>
</tr>
<tr>
<td>BUS. 608. Legal and Ethical Environment of Business</td>
<td>3</td>
</tr>
<tr>
<td>BUS. 614. Managerial Economics</td>
<td>3</td>
</tr>
<tr>
<td>BUS. 616. Economic Environment of Business</td>
<td>3</td>
</tr>
<tr>
<td>Total Semester Hours Required</td>
<td>21</td>
</tr>
</tbody>
</table>

It may be possible to satisfy the common background requirements by other graduate or undergraduate course work, with the approval of the adviser.

B. Graduate Core in Finance

The M.S. finance core will consist of 30 semester hours (10 courses) beyond the common background requirements. At
least six of these courses must be at the 600 level or higher. A minimum of 18 semester hours (6 courses) must be chosen from regularly scheduled graduate finance courses (excluding independent study); the remaining 12 semester hours (4 courses) may be in finance or in related fields, as approved by the student's M.S. adviser in finance. A student can elect to include a single minor field with at least 9 semester hours approved by a minor field adviser, but a minor is not required.

The 18 hour finance requirement is met by the following requirements and options:

1. **Required Courses**
   - BUS. 618. Financial Management
   - FIN. 639. Advanced Finance Seminar

2. Choose at least 4 courses in finance from:
   - FIN. 631. Decisions and Policies in Financial Management
   - FIN. 632. Special Topics in Finance
   - FIN. 633. Investment Management and Analysis
   - FIN. 635. The Financial System
   - FIN. 540. International Financial Management
   - FIN. 563. Bank Management

**Notes and Restrictions**

If a student has taken at least 9 semester hours of upper division finance courses within the last 5 years from an AACSB accredited university, those courses may be substituted for BUS. 618. However, the student must still take at least 18 hours in finance at the graduate level.

The 12 semester hour (4 course) requirement can include courses related to the finance major as approved by the M.S. adviser. Areas of study that normally would enhance the study of finance would include economics, mathematics, statistics, accounting, information systems, and computer science. Other fields could also be approved based on the student's needs and objectives.

All M.S. students in finance must pass a comprehensive examination in finance during the last semester of their program.

M.S. students may choose to complete a thesis that is original research as approved by a committee of faculty members appointed by the M.S. adviser. Up to 6 semester hours of credit of independent study could be earned from thesis work.

**COURSES**

**FIN. 305-3. Basic Finance.** *Fall, Spring.* 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; junior standing.


**FIN. 402-3. Business Finance II.** *Fall, Spring.* 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. 455-3. Financial Markets and Institutions.** *Fall, Spring.* This course focuses on the supply and demand for loanable funds, the process of money creation, the structure of interest rates, and the role of the central bank. Special attention is devoted to the impact of monetary and fiscal policies on interest rates, the flow of funds, and economic activity. Prer., FIN. 401.

**Upper Division/Graduate Level**


**FIN. 463/563-3. Bank Management.** *Spring.* An analysis of structure, markets, regulation, and chartering commercial banks. Problems and policies of the internal management of funds, loan practices and procedures, investment behavior, deposit and capital adequacy, liquidity, and solvency. Analytical methodology for these problems is developed. Prer., for 400 level, FIN. 401; prer., for 500 level, BUS. 618.

**600 Level**


**FIN. 632-3. Special Topics in Finance.** *(Formerly FIN. 602.) Fall, Spring.* This course will treat varying topics that are of special interest. Topics and emphasis could include subjects such as capital budgeting, capital structure theory, valuation of firms, mergers, bankruptcy, financial modeling, option valuation, etc. Prer., BUS. 618.

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1 Students enrolled at the 500 level may expect additional work and evaluation commensurate with graduate standards.
The typical course of study is 57 semester hours of graduate level course work. The curriculum is based on a series of structured learning sequences with M.B.A. courses comprising the majority of the first full year, supplemented by several core health administration courses.

The second academic year provides the student with advanced training in health administration. Within the 57 semester hours, the student must choose 9 semester hours of elective courses.

**Required Courses**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Semester Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>H A. 601.</td>
<td>Medical Care Organization</td>
<td>3</td>
</tr>
<tr>
<td>H A. 602.</td>
<td>Health Economics</td>
<td>3</td>
</tr>
<tr>
<td>H A. 620.</td>
<td>Health Sciences</td>
<td>3</td>
</tr>
<tr>
<td>H A. 621.</td>
<td>General Systems Theory</td>
<td>3</td>
</tr>
<tr>
<td>H A. 622.</td>
<td>Strategic Planning and Policy</td>
<td>3</td>
</tr>
</tbody>
</table>
| H A. 644.   | Legal and Ethical Problems in Health Care Adminis-
             | tration                                            | 3              |
| H A. 664.   | Health Care Management Accounting                 | 3              |
| H A. 670.   | Institutional Management I                        | 3              |
| H A. 671.   | Institutional Management II                       | 3              |
| BUS. 600.   | Marketing Management                              | 3              |
| BUS. 602.   | Quantitative Business Analysis                    | 3              |
| BUS. 606.   | Accounting                                       | 3              |
| BUS. 610.   | Management Information Systems                    | 3              |
| BUS. 612.   | Management of Operations                          | 3              |
| BUS. 614.   | Managerial Economics                              | 3              |
| BUS. 618.   | Financial Management                              | 3              |
| Electives   |                                                   | 9              |
| Total       | Semester Hours                                    | 57             |

**Electives.** Elective courses are available in the fields of accounting, finance, marketing, human resources management, organizational development, health policy and planning, and community health. In addition, elective courses are available that focus on practice settings such as hospital administration, ambulatory care administration, or long-term care administration.

**Management Residency.** A management residency is optional, but recommended for all students, especially those with limited health care experience. The faculty of the program provide assistance to students in securing the residency, as well as regular consultation during the residency period. Information on the full range of local, regional, and national residencies is available in the program office. Durations of 3 months to 2 years are offered, mostly on a competitive basis.

**Comprehensive Examinations.** Each candidate must pass a comprehensive examination covering the health administration field.

**Length of Program.** The didactic portion of the degree will take at least two academic years since H.A. courses are offered only once each year and many require prerequisites. Part-time study is facilitated by many courses being scheduled for late afternoon or evening hours.

**Requirements for Admission.** Selection of students is a multi-step process. When making application to the program for the M.S.H.A., candidates should send their applications to:
Graduate Program in Health Administration  
Graduate School of Business Administration  
University of Colorado at Denver  
1475 Lawrence Street  
Denver, CO 80202-2219

**Credentials or Requirements**

1. Completed Application for Graduate Admission (Parts I and II).
2. Four letters of recommendation from professional or academic acquaintances who are familiar with the applicant's academic/professional competence.
3. Satisfactory test score — Graduate Management Admission Test (GMAT) preferred. When registering for the GMAT, use code #4819 (Denver, MBA) to have score report sent to the University of Colorado at Denver Graduate School of Business Administration.
4. Application fee.
5. Two (2) official transcripts from each college or university attended. Minimum baccalaureate degree required.
6. A well formulated career plan articulated in a brief essay, and summarizing the applicant's reason(s) for seeking the degree.
7. A personal interview with members of the Health Administration Student Selection Committee may be scheduled.
8. Experience in the field of health services administration (preferred but not absolutely necessary).

Admission to the M.S.H.A. degree program is on a competitive basis. Therefore, these admission criteria represent minimum entrance qualifications expected of all students.

After the applications, recommendations, and essay have been evaluated, the candidate may be scheduled for a personal interview with the Student Selection Committee. The personal interview addresses motivation, potential leadership capacity, experience in the field, maturity, and judgement of each applicant. The applicant will be notified of the Student Selection Committee's decision after the interview.

**Deadlines.** All credentials should be submitted at the latest by April 1 for Fall Semester and October 1 for Spring Semester. Applications will be reviewed in the order they are received. Early application increases the probability of acceptance.

For further information, brochures, and application materials contact the Graduate Program in Health Administration, Graduate School of Business Administration, University of Colorado at Denver, 1475 Lawrence St., Denver, CO 80202-2219 (303) 623-4436.

**Scholarships/Loans**

Financial assistance is available for continuing students directly from the Graduate Program in Health Administration. Each year the following scholarships/loans are awarded:

- Eugene Sontag Award
- Kaiser-Permanente Scholarship
- Foster G. McGaw Scholarship Loan Fund
- Foster G. McGaw Scholarship
- Federation of American Hospitals' Foundation
- Colorado Health Administration Alumni Association Scholarship Fund
- Traineeships for Students in Graduate Health Administration Programs

**EXECUTIVE PROGRAM IN HEALTH ADMINISTRATION**

*Program Sponsors.* The Executive Program in Health Administration is a cooperative program of the University of Colorado at Denver and the Western Network for Education in Health Administration.

The University of Colorado at Denver serves as the degree-granting institution for the Executive Program. The University of Colorado's Graduate Program in Health Administration is located in the Graduate School of Business Administration.

The Western Network for Education in Health Administration is a regional educational consortium representing health care executives and academic faculty from major health administration graduate programs in the western United States, including the University of California at Berkeley, University of California at Los Angeles, San Diego State University, University of Washington, Arizona State University, and University of British Columbia.

Funding for the development of the Executive Program has been provided by grants from the W.K. Kellogg foundation of Battle Creek, Michigan.

**Distinctive Features of the Executive Program**

1. Drawing on the expertise represented by the faculties of consortium of western universities, the program offers the highest quality course content and instructors that typically is not available from a single university.
2. The Executive Program facilitates learning for professionals who have continuing career and family responsibilities. The program is especially tailored for working individuals, allowing students to remain on their jobs while completing their educational program.
3. The program employs innovation in the technology of educational delivery. Learning methods include:

   - Computer-assisted instruction and self-paced learning packages.
   - Computer conferencing and electronic case analyses.
   - On-campus sessions.
COURSES

H A. 601-3. Medical Care Organization. Fall. An introduction to the structure and function of the medical care delivery system. Includes basic concepts and measures of health, disease, quality, values, needs, and utilization; issues in health care manpower, institutions, and system organization; general issues in policy, reimbursement, and regulation; and broad community and organizational considerations in medical care organization.

H A. 602-3. Health Economics. Fall. An intensive analysis of issues in health economics. Particular attention is given to "market failure" in health insurance and alternative methods of containing health care costs, including both regulatory and market approaches. Pre., BUS. 614 or consent of the instructor.

H A. 620-3. Health Sciences. Fall. This course introduces the student to principles of epidemiology. The student will demonstrate the application of epidemiology analyses to the prediction of health care service needs of a population: to identify and integrate contemporary service delivery issues such as access, quality of care, cost of care, program and system development, and evaluation. The course will assist the student in the development of program planning and evaluation skills. Pre., H A. 601, BUS. 602.

H A. 621-3. General Systems Theory. Fall. General systems theory is presented as a conceptual tool in health administration. Health is viewed as a subsystem of society, and interfaces among health and other social subsystems are analyzed. Broad social and cultural issues form a context for meaningful discussion of health planning and administration in the current and future decades.

H A. 622-3. Strategic Planning and Policy. Spring. The primary focus of this course is on strategy formulation and implementation skills. Objectives include the introduction of strategic concepts, analytical tools, and methodology. Pre., H A. 601, 602, 620, 621, 664, 670.

H A. 644-3. Legal and Ethical Problems in Health Care Administration. Spring. Designed to acquaint the student with legal issues experienced by the health administrator. Special emphasis is placed on issues such as malpractice, informed consent, medical staff appointments, directors' and administrators' liability, medical records, and refusal of treatment. The course should make the student aware of the multitude of legal and ethical problems which confront the health administrator on a daily basis. Pre., H A. 601.

H A. 662-3. Financial Management for Non-Profit Organizations. An introduction to the financial management function in non-profit organizations. It includes a discussion of basic accounting requirements, managerial accounting techniques, working capital requirements, and capital investment. This survey course will primarily focus on non-profit organizations. Problems and cases will be used to emphasize the decision-making point of view.

H A. 663-3. Management Control in Non-profit Organizations. This course is designed to develop a basic understanding of the management control process and the unique characteristics of non-profit organizations. Topic areas include budgeting, programming, operational control, and pricing policies. Cases will be the primary means to integrate didactic materials with practical applications. Pre., H A. 664 or equivalent or consent of instructor.

H A. 664-3. Management Accounting for Health Care Organizations. Spring. Designed to build on the accounting concepts introduced in BUS. 606 and to develop proficiency in the decision-making process of health care providers. Problems, cases, and computer software programs will be used to develop the practical application of management accounting techniques such as cost/volume/profit and standard cost models, budgeting, and analysis of variances. Pre., BUS. 602 and 606 or consent of instructor.

H A. 665-3. Advanced Topics in Health Care Financial Management. The primary focus of this course will be an in-depth research report on a current problem. Students will be responsible for identifying their own research area and will brief both the client and the class on the interim progress and the final recommendations. A health care simulation exercise will be utilized to integrate the financial management concepts introduced in the preceding accounting and finance courses. Pre., H A. 664 or consent of instructor.

H A. 670-3. Institutional Management I. Fall. This course is the study of human actions in organizations. Emphasis is placed on the analysis of both individual and group processes and characteristics in organization settings. The course includes topics such as organization structure and culture; task and job design; individual behavior; motivation; stress; group formation, development, structure, and dynamics; communications; decision making; conflict; influence and power; leadership; and organizational change.

H A. 671-3. Institutional Management II. Spring. A colloquium designed to integrate major topics in the general management curriculum into relevant health administration issues. Current policies, problems, and issues across the broad spectrum of health service administration are covered. Pre., H A. 601, 602, 620, 621, and 670.

H A. 672-1. Ambulatory Care Administration. The health administration student is exposed to the rapidly developing field of ambulatory care and HMO management. By examination of various ambulatory care and HMO settings, problems in the planning, implementation, administration, and evaluation of ambulatory care are developed. Pre., H A. 601, 670 or consent of instructor.

H A. 674-1. Multi-institutional Management. Multi-institutional management is a developing trend in health administration. Students are exposed to both profit and non-profit hospital, nursing home, etc., networks. Shared services, mergers, management contracts, hospital acquisitions, and satellite clinics are studied and discussed. Pre., H A. 601, 670 or consent of instructor.

H A. 676-3. Rural Health Systems I. Introduces the student to the history and evolution of rural health care in the United States. Also to be examined are past attempts to improve rural health and the impact of past national programs affecting rural health. The present status of rural health in the U.S. will be explored. The course will end with a review of private, local, state, and federal programs directed toward solutions for rural health problems. Pre., consent of instructor.

H A. 678-2. Health Care Marketing. The application of marketing concepts and techniques to health care delivery. Discussion will focus on the implications of a changing regulatory/competitive environment for marketing health
services. The use of specific concepts and tools, and an understanding of the variety of marketing applications to the planning of health delivery systems. Prereq., BUS. 600 or consent of instructor.

**H A. 695-3. Special Topics in Health Administration.** Research methods and results, special topics, and professional developments in health administration. Offered irregularly. Prerequisites vary according to topics and instructor requirements.

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**HUMAN RESOURCES MANAGEMENT**

**Adviser:** Wayne F. Cascio  
**Telephone:** 623-4436

Human resources management offers opportunities for students to develop professional competence in the areas of personnel administration and labor relations. Students acquire an understanding of and skills in developing and implementing human resources systems including recruitment, selection, evaluation, training, motivation, 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>MGT. 434</td>
<td>Labor and Employee Relations</td>
<td>3</td>
</tr>
<tr>
<td>MGT. 438</td>
<td>Human Resources Management: Employment</td>
<td>3</td>
</tr>
<tr>
<td>MGT. 439</td>
<td>Human Resources Management: Legal and Social Issues</td>
<td>3</td>
</tr>
<tr>
<td>MGT. 441</td>
<td>Human Resources Management: Compensation Administration</td>
<td>3</td>
</tr>
</tbody>
</table>

**Recommended Electives**

- MGT. 335. Managing Work Groups
- MGT. 435. Conflict and Change in Organizations
- MGT. 437. Organization Design
- PSY. 485. Principles of Psychological Testing
- PSY. 487. Personality Assessment
- Q M. 444. Quality and Productivity
- ACCT. 202. Introduction to Managerial Accounting
- I S. 350. Logical Data Structures and Data Base Management Systems
- Q M. 300. Intermediate Statistics
- SOC. 305. Sociology of Work
- ECON. 461. Labor Economics

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**INFORMATION SYSTEMS**

**Adviser:** Peter G. Bryant  
**Office:** 1475 Lawrence Street, Third Floor  
**Telephone:** 623-4436

**Faculty:** Associate Professors: Peter G. Bryant, Richard D. Hackathorn  
**Assistant Professors:** James H. Gerlach, Jeff E. Heyl, Jahangir Karimi, Bob Kuo

The information systems 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 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. Students should note that not all courses are offered each semester.

**Required Prerequisite Courses**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Semester Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>I S. 200</td>
<td>Business Information Systems and the Computer (formerly B AD. 200)</td>
<td>3</td>
</tr>
<tr>
<td>Q M. 201</td>
<td>Business Statistics</td>
<td>3</td>
</tr>
<tr>
<td>I S. 220</td>
<td>Business Programming I: Structured COBOL</td>
<td>3</td>
</tr>
<tr>
<td>I S. 221</td>
<td>Business Programming II: Structured COBOL and Physical File Organization Techniques</td>
<td>3</td>
</tr>
</tbody>
</table>

**Required Courses**

(The following two courses)

- I S. 465. Systems Analysis and Design I
- I S. 466. Systems Analysis and Design II

(Two of the following five courses)

- Q M. 300. Intermediate Statistical Analysis for Decision Support (infrequently offered)
- I S. 350. Logical Data Structures and Database Management Systems
- I S. 470. Computer and Information Technology
- O M. 440. Planning and Control Systems

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**MASTER OF SCIENCE IN MANAGEMENT SCIENCE AND INFORMATION SYSTEMS**

**Adviser:** Professor Peter Bryant  
**Telephone:** 623-4436

The Master of Science degree in management science and information systems (M.S. in I S) prepares students for management roles in the information systems field and for such careers as systems analysts, software engineers, data base administrators, and data processing managers. The curriculum emphasizes the application of computer technology within the business context.

The M.S. in I S requires the student to complete the common background courses and the graduate core described below.

**A. Common Background Course Work**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Semester Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>BUS. 600</td>
<td>Marketing Management</td>
<td>3</td>
</tr>
<tr>
<td>BUS. 602</td>
<td>Quantitative Business Analysis</td>
<td>3</td>
</tr>
<tr>
<td>BUS. 604</td>
<td>Human Behavior in Organizations</td>
<td>3</td>
</tr>
<tr>
<td>BUS. 606</td>
<td>Accounting for Managers</td>
<td>3</td>
</tr>
<tr>
<td>BUS. 608</td>
<td>Legal and Ethical Environment of Business</td>
<td>3</td>
</tr>
<tr>
<td>BUS. 614</td>
<td>Managerial Economics</td>
<td>3</td>
</tr>
<tr>
<td>BUS. 618</td>
<td>Financial Management</td>
<td>3</td>
</tr>
</tbody>
</table>

**Total Semester Hours** 21
It may be possible to satisfy the common background requirements with other graduate or undergraduate course work, with the approval of the adviser.

B. Graduate Core in Information Systems

Thirty semester hours of approved graduate work are required. Each student's plan of study is developed by the student and the faculty adviser, considering the student's interests and background. The 30 semester hours may be taken entirely in information systems and closely related areas or may be divided between a major field (21 hours) and a minor field (9 hours). Courses available for the information systems major include:

I S. 602. Business Programming and Data Structures
I S. 604. Information Systems in Organizations
I S. 606. Systems Analysis
I S. 608. Data Base Management Systems
I S. 610. Computer Technology
I S. 612. Data Communication
I S. 614. Systems Design
I S. 618. Information Systems Policy
I S. 620. Special Projects
I S. 622. Independent Study/Thesis
I S. 680. Special topics

(All are 3 semester hours except I S. 622, which is variable credit.) Minor fields may be chosen from a variety of business and non-business areas, in consultation with the student's adviser. A maximum of 6 semester hours of approved graduate work at other institutions may be included in the 30 semester hours. For business-related courses, the program must be accredited by the AACSB. Candidates for the M.S. degree must pass a comprehensive examination over their entire program during the last semester of study.

COURSES

A study of business information systems focusing upon computer hardware and software as they relate to business information. Includes computer programming, computer systems, and computer applications. The purpose of the course is to introduce the students to the concepts, vocabulary, and function of business information systems and the computer. Prer., I S. 200 or consent of instructor.

An introductory course intended to provide the student with a thorough programming foundation in COBOL using structured programming concepts and techniques. The basic elements of the language are discussed and demonstrated through applications in a business environment. Prer., I S. 200 or consent of instructor.

This course is a continuation of I S. 220. The student is introduced to advanced topics in COBOL and their application in business. Special emphasis is placed upon alternative physical data and file structures, their implementation in COBOL, and their use in a business setting. The use of system software and utilities will be integrated with the topics. Case studies may be used to illustrate applications of the material. Prer., I S. 220 or consent of instructor; Q M. 201 is recommended.

This course emphasizes models and operations research and their application in a managerial setting. Includes topics such as inventory models and control, simulation, linear programming topics, network models. Prer., Q M. 201.

This course is an introduction to database management systems, on-line query, and management control systems. It is concerned with database structure and design and the integration of the logical view of the data with its physical storage. Extensive use may be made of a commercial DBMS in student projects to develop an appreciation of the use and organizational issues as well as the technical considerations. Prer., I S. 221 or consent of instructor.

This course introduces the student to basic system analysis tools and the procedures for conducting a system analysis. Topics to be covered may include system requirements, the initial analysis, the general feasibility study, structured analysis, detailed analysis, logical design, and general system proposal. The student will gain practical experience through projects and/or case studies. Prer., I S. 221 or consent of instructor.

This course is a continuation of I S. 465 and discusses topics such as structured design: physical system design; detailed feasibility analysis; specification of input-output methods and formats; design of files, programs, and procedures; system testing; implementation procedures; and system life cycle management. The student will implement these concepts through case studies and/or projects. Prer., I S. 465 or consent of instructor.

This course provides the IS student with a conceptual foundation in the areas of computer architecture, operating systems, programming translators, and telecommunications. It is intended to serve as a facilitating course to allow the IS student to more readily communicate with other technical members of the data processing community. Prer., I S. 221 or consent of instructor.

600 Level

An accelerated introductory course on programming business applications, with emphasis on file processing. Topics include the COBOL and PASCAL programming languages.

This course emphasizes information systems analysis and the logical specification of the system. The life cycle concept is used as the basic framework for development, but there is a recognition of alternatives in this development process. Management, organization, technology, and economic perspectives are considered. Prer. or coreq., I S. 602 and BUS. 610.

The database management course focuses on the analysis, design, and implementation of database systems to support today's business operations. Current database models and database administration issues will be discussed in detail. Prer. or coreq., I S. 602.

This course provides a conceptual foundation in the areas of computer architecture, operating systems, programming translators, and fourth-generation languages. Students will study various computer architectures ranging from microcomputers to minicomputers to mainframe computers and operating systems such as Unix, VMS, DOS, and OS/VS. Prer. or coreq., I S. 602.

I S. 614-3. Systems Design. Fall. This course integrates the areas of computer technology, systems analysis, and systems design in designing large-scale application or decision support systems. The course emphasizes modern techniques for the measurement, specification, design, implementation, and testing of information systems. Prer. I S. 606.

I S. 616-3. Decision Support Systems/Expert Systems. Fall. An introductory course in how to design and construct decision support systems and expert systems. Knowledge representation and decision-making techniques will be discussed along with artificial intelligence languages such as Lisp and Prolog. Prer. I S. 602.

I S. 618-3. Information Systems Policy. Spring. Capstone course to understand the overall information needs of an organization and the role of the computer-based information systems. Topics considered are strategic planning of information systems, management of computer center and technical personnel, systems development management, the information systems exclusive, and social and legal issues. Prer., BUS. 610.

I S. 620-3. I S Projects. Fall. Students work on particular projects in the information systems area. Typical projects include the design and implementation of an application program or surveys of the managerial, behavioral/technical issues in a particular area. Prer., consent of instructor.

I S. 680-3. Special Topics in Information Systems. A variety of advanced topics are offered in this course. Consult the area coordinator for current offerings.

INSURANCE COURSE
Upper Division/Graduate Level

INS. 484/584-3. 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. for 400 level, FIN. 305; for 500 level, BUS. 618.

INTERNATIONAL BUSINESS

Adviser: H. Michael Hayes
Telephone: 623-4436

Increasingly, businesses are reorienting their thinking, planning, and operations to capitalize on opportunities that exist in the world marketplace. Every phase of business is affected by this reorientation. For individuals with the appropriate skills, training, and interest, international business provides excellent career opportunities.

The international business curriculum is designed to enhance and build on thorough training in basic business skills and to provide students with additional skills and knowledge appropriate to international business.

Students electing this area of concentration must complete 15 semester hours as follows:

**Required Courses**

<table>
<thead>
<tr>
<th>Course</th>
<th>Semester Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>FIN. 440. International Financial Management</td>
<td>3</td>
</tr>
<tr>
<td>TRMG. 458. International Transportation</td>
<td>3</td>
</tr>
<tr>
<td>MK. 490. International Marketing</td>
<td>3</td>
</tr>
<tr>
<td>ECON. 441. International Trade and Finance (applies as a non-business elective)</td>
<td>3</td>
</tr>
</tbody>
</table>

Students should see an academic adviser for course scheduling.

A second area of emphasis in business is highly recommended. The course requirements for a second area can be included as part of the business and free elective hours. In addition, serious consideration should be given to either a minor or a certificate in international affairs, offered by the College of Liberal Arts and Sciences, and to the study of a foreign language.

**MANAGEMENT**

Adviser: Raymond F. Zammuto
Office: 1475 Lawrence St., Third Floor
Telephone: 623-4436

Faculty: Professor: Wayne F. Cascio,
Associate Professors: Edward J. Conry, Raymond F. Zammuto

Assistant Professors: Rajendra P. Khandekar, Anne Moeller, John D. Ruhnka, Marilyn Sargent, John E. Young

Undergraduate

The management curriculum provides the foundation for careers in supervision and general management in a wide variety of organizations. It develops skills in management practice through an understanding of general management principles, individual and group behavior, organizational change and design, and human resources management.

**Required Courses**

<table>
<thead>
<tr>
<th>Course</th>
<th>Semester Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>MGT. 335. Managing Work Groups</td>
<td>3</td>
</tr>
<tr>
<td>MGT. 435. Conflict and Change in Organizations</td>
<td>3</td>
</tr>
<tr>
<td>MGT. 437. Organization Design</td>
<td>3</td>
</tr>
<tr>
<td>MGT. 438. Human Resources Management: Employment</td>
<td>3</td>
</tr>
</tbody>
</table>

**Recommended Electives**

<table>
<thead>
<tr>
<th>Course</th>
<th>Semester Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>MGT. 434. Labor and Employee Relations</td>
<td>3</td>
</tr>
<tr>
<td>MGT. 439. Human Resources Management: Legal and Social Issues</td>
<td>3</td>
</tr>
<tr>
<td>MGT. 440. International Management</td>
<td>3</td>
</tr>
<tr>
<td>MGT. 452. Entrepreneurship and Small Business Management</td>
<td>3</td>
</tr>
</tbody>
</table>

1 Students enrolled at the 500 level may expect additional work and evaluation commensurate with graduate standards.
The objective of the Master of Science in management program is to prepare individuals with prior work experience for significant managerial responsibilities in private and public sector organizations. The degree is particularly appropriate for students having an undergraduate degree in a functional area of business, such as accounting, finance, information systems, or in a technical area, such as engineering or computer science.

The Master of Science in management consists of two components: the common background and the specialized courses that constitute the graduate core of the M.S. in management.

A. Common Background Course Work

Students in the M.S. in management program can satisfy the common background requirements by taking the following courses:

<table>
<thead>
<tr>
<th>Course</th>
<th>Semester Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>BUS. 600. Marketing Management</td>
<td>3</td>
</tr>
<tr>
<td>BUS. 602. Quantitative Business Analysis</td>
<td>3</td>
</tr>
<tr>
<td>BUS. 606. Accounting for Managers</td>
<td>3</td>
</tr>
<tr>
<td>BUS. 608. Legal and Ethical Environment</td>
<td>3</td>
</tr>
<tr>
<td>BUS. 610. Management Information Systems</td>
<td>3</td>
</tr>
<tr>
<td>BUS. 614. Managerial Economics</td>
<td>3</td>
</tr>
<tr>
<td>BUS. 618. Financial Management</td>
<td>3</td>
</tr>
<tr>
<td>Total Semester Hours</td>
<td>21</td>
</tr>
</tbody>
</table>

It may be possible to satisfy the common background requirements by other graduate or undergraduate course work, with the approval of the adviser.

B. Graduate Core in Management

The management core will consist of 30 semester hours (10 courses) beyond the common background requirements.

At least six of these courses must be 600-level courses. A minimum of 21 semester hours must be chosen from regularly scheduled management courses (excluding independent study).

The remaining 9 semester hours (3 courses) may be in management or in related fields, as approved by the student's M.S. adviser in management. A student can elect to include a single minor field with at least 9 semester hours approved by a minor field adviser, but a minor is not required.

The 21-hour management requirement is met by the following requirements and options:

<table>
<thead>
<tr>
<th>Course</th>
<th>Semester Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>BUS. 604. Human Behavior in Organizations</td>
<td>3</td>
</tr>
<tr>
<td>MGT. 632. Organizational Development</td>
<td>3</td>
</tr>
<tr>
<td>MGT. 636. Designing Effective Organizations</td>
<td>3</td>
</tr>
<tr>
<td>MGT. 681. Human Resources Management</td>
<td>3</td>
</tr>
</tbody>
</table>

C. Management Electives

Choose at least 9 hours of course work from the selections offered under the course designation MGT. 695, Special Topics in Management. Usually, two MGT. 695 sections will be offered each semester. Consult with the management area coordinator for the year's special offerings.

Students can substitute a 600-level MGT. course for BUS. 604 if they have taken an equivalent upper division organizational behavior course within the last five years from an AACSB accredited university. In that case, students must complete 21 hours of management courses.

The nine hour minor, if a student should choose to complete a minor, may be taken in another functional area of business, such as marketing, finance, or information systems or in another related discipline, such as psychology, sociology or public administration. Other fields or combinations of courses can be approved based on a student's needs and career objectives.

Students are not required to take a comprehensive examination or complete a thesis in the major field.

COURSES

MGT. 330-3. Management and Organizational Behavior. Fall, Spring. Emphasizes the application of behavioral science knowledge to understanding people and organizations. Motivation, authority, politics, and the role of groups in contemporary organizations are some of the topics covered. Students are urged to complete PSY. 203 and SOC. 100 before taking this course. Prer., junior standing.

MGT. 335-3. Managing Work Groups. Fall, Spring. Examines what makes small groups effective in organizations. Develops the ability to analyze interpersonal and group behavior, and improve group functioning. Builds interpersonal and small group leadership skills. Prer., MGT. 330.


MGT. 435-3. Conflict and Change in Organizations. Spring. This course is designed to help students understand common types of conflict within organizations and the strategies useful for resolving conflict. Techniques for managing change also are stressed. Prer., MGT. 330.


MGT. 439-3. Human Resources Management: Legal and Social Issues. Fall. Study of legal issues related to equal employment opportunity, 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 MGT. 434 and 438 before this course. Prer., MGT. 330.
MGT. 440-3. International Management. Spring. Examines the international business environment as it affects company policies and procedures. Integrates all the functions undertaken in international operations through in-depth analysis and comprehensive case studies. Prer., MGT. 450 and any two of the following: ECON. 441, FIN. 440, MK. 490, TRMG. 458.

MGT. 441-3. Human Resources Management: Compensation Administration. Spring. Study of planning and administration of compensation systems, including government, union, and labor market influences on pay; development of pay systems and employee benefits for non-managerial, managerial, and overseas employees. Prer., Q M. 201 and MGT. 438.

MGT. 450-3. Business Policy and Strategic Management. Fall, Spring. 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. Open only to students in their senior year. Prer., ACCT. 200, I S. 200, FIN. 305, MK. 300, MGT. 330, O M. 300, and Q M. 201.

MGT. 452-3. Entrepreneurship and Small Business Management. Fall, Spring. Utilizing theories and concepts developed in all functional areas, students will address the differences between small business management and large corporate management. Managerial problems of "lifestyle" as well as high potential growth-oriented firms will be examined. A major portion of the course includes the development of a business plan for an existing business or an actual new venture. Prer., ACCT. 200, FIN. 305, MK. 300; coreq., MGT. 450.

MGT. 470-3. New Venture Strategies. Fall. Examines both the personal and commercial strategies which can be used to effectively begin new business ventures. The course focuses upon the phase of entrepreneurship that occurs between the generation of the initial new venture idea through the entrepreneur's first commercial sale. Growth-oriented firms with high growth potential are the primary focus of attention as opposed to "lifestyle" businesses. Prer., B AD. 100, ACCT. 200.

MGT. 495-3. Topics in Management. Fall, Spring. A number of different current topics in management will be offered under this course number. Consult the Schedule of Classes or the area coordinator for each semester's topics.

600 Level

MGT. 632-3. Organizational Development. Introduction in the analysis, diagnosis, and resolution of problems in organizing people at work. Models of organizational change are examined. Group experiences, analyses of cases and readings are stressed. Prer., BUS. 604.

MGT. 636-3. Designing Effective Organizations. Examines how to design organizations within the context of environmental, technological, and task constraints. The emphasis is on learning how to recognize and correct structural problems through the analysis of existing organizations in which the students are involved. Prer., BUS. 604.

MGT. 681-3. Human Resources Management. This course focuses on the management of human resources in organized settings. It is oriented toward the practical application of human resources management principles in the following areas: equal employment opportunity/affirmative action, human resources planning, recruitment, managerial selection, compensation and benefits, labor relations, training, career management, performance appraisal, and occupational health and safety.

MGT. 695-3. Special Topics in Management. A number of different current topics in management will be offered each semester under this course number. The following topics have been scheduled for the 1987-88 year, and more topics will be added. Consult the Schedule of Classes for specific course offerings and times, or contact the area coordinator for further information.

Power and Politics in Organizations. Fall. Political processes are examined: how people in organizations get power, keep power, and use power. This course is designed to increase students' capacity to analyze, understand, and use power effectively in organizations. Participation of class member is stressed.

Turnaround Management. Fall. Examines why organizations experience performance downturns and how to reverse them. Topics include: causes of and strategies for reversing decline, improving decision making under crisis conditions, avoiding dysfunctional organizational and interpersonal dynamics, and techniques for managing cutbacks in operations and personnel.

Entrepreneurship and New Business Formation. Spring. This course examines characteristics of the successful entrepreneur, exploration of entrepreneurial opportunities within large organizations, training in the motives of successful entrepreneurs, exploring the decision to go into business for one's self, and development of a procedural system for establishing a new business.

MANAGEMENT SCIENCE COURSES


MGSC. 675-3. Seminar: Management Science. Application of operations research methods to problems of business and industry, with emphasis on the functional fields of marketing, financial management, and production. Prer., MGSC. 601 and 602 or consent of instructor. One of the prerequisite courses may be taken as a corequisite.

MARKETING

Adviser: H. Michael Hayes
Office: 1475 Lawrence St., Third Floor
Telephone: 623-4436

Faculty: Professors: Gordon G. Barnewall, H. Michael Hayes
Associate Professors: Rex O. Bennett, Lawrence F. Cunningham
Assistant Professors: Nancy L. Frontczak, Steven W. Hartley

Undergraduate

Marketing is concerned with directing the activities of the organization toward the satisfaction of customer
wants and needs. This involves understanding customers, identifying those wants and needs which the organization can best serve, guiding the development of specific products or services, planning and implementing ways to take products or services to the market, securing the customer's order, and, finally, monitoring customer response in order to guide future activities.

In most organizations, marketing is a major functional area that provides a wide variety of career opportunities in such fields as personal selling and sales management, advertising and sales promotion, public relations, marketing research, physical distribution, product management, market management, marketing information systems, and retail management. Increasingly, career opportunities exist in service businesses and not-for-profit organizations.

**Required Courses**

(Choose two of the following courses)

<table>
<thead>
<tr>
<th>Course</th>
<th>Semester Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>MK. 330. Market Research</td>
<td>3</td>
</tr>
<tr>
<td>MK. 480. Marketing Strategies and Policies</td>
<td>3</td>
</tr>
<tr>
<td>MK. 310. Personal Selling</td>
<td>3</td>
</tr>
<tr>
<td>MK. 320. Consumer Behavior</td>
<td>3</td>
</tr>
<tr>
<td>MK. 350. Principles of Advertising</td>
<td>3</td>
</tr>
<tr>
<td>MK. 450. Advertising Management</td>
<td>3</td>
</tr>
<tr>
<td>MK. 460. Business Marketing</td>
<td>3</td>
</tr>
<tr>
<td>MK. 470. Sales Force Management</td>
<td>3</td>
</tr>
<tr>
<td>MK. 485. Physical Distribution Management</td>
<td>3</td>
</tr>
<tr>
<td>MK. 490. International Marketing</td>
<td>3</td>
</tr>
</tbody>
</table>

In addition to the four required courses, students may select marketing electives, business electives, and non-business electives that support their particular career orientations. The marketing adviser can assist the student in choosing an appropriate set of electives to fit the career objectives.

**COURSES**

**Note:** MK. 300 or BUS. 600 or an equivalent course in basic marketing is a prerequisite for all marketing courses except MK. 310.

**MK. 300-3. Principles of Marketing.** Fall, Spring. Provides a marketing management approach to the consideration of product planning, pricing, promotion, and distribution of goods and services. Emphasizes the role of the consumer and the social responsibility of marketing. Prer., MK. 200 and junior standing.

**MK. 310-3. Personal Selling.** Fall, Spring. Principles and methods of personal selling, with attention to development and demonstration of effective sales presentation techniques. Prer., MK. 300.

**MK. 320-3. Consumer Behavior.** Fall, Spring. Focuses on improving the student's understanding and ability to predict consumer behavior. Studies research techniques and contributions from the behavioral sciences in the context of the marketer's efforts to satisfy customer wants and needs. Prer., MK. 300.

**MK. 330-3. Marketing Research.** Fall, Spring. Provides practical experience in research methodologies, planning the investigation, designing the questionnaire, selecting the sample, interpreting results, and making a report. Techniques focus on product analysis, motivation research, cost analysis, and advertising effectiveness. Students will incur project expenses. Prer., MK. 300.

**MK. 340-3. Marketing Institutions and Retailing.** Fall. A study of the macroeconomic foundations of marketing intermediaries, middlemen, and institutional alignments. Emphasis placed on development and change of institutional structures and functions and roles played by participants in moving goods to ultimate consumer, focusing on retailing functions and strategies. Prer., MK. 300.

**MK. 350-3. Principles of Advertising.** Fall, Spring. Analyzes principles and practices in advertising from a managerial viewpoint. Considers the reasons to advertise, product and market analysis as the planning phase of the advertising program, media selection, creation and production of advertisements, copy testing, and development of advertising budgets. Prer., MK. 300.

**MK. 460-3. Business Marketing.** Considers the problems of marketing goods and services to organizations buying for their own use or for incorporation in an end product. Focuses heavily on organizational buying behavior and analysis of demand for goods and services in both profit and not-for-profit organizations. Emphasizes development of marketing programs in the context of organizational demand for goods and services. Prer., MK. 300.

**MK. 470-3. Sales Force Management.** Spring. Focuses on issues in managing the field sales force. Deals with organizing the field sales force, sales analysis, forecasting, budgeting, and operating with particular emphasis on recruiting, selection, training, compensation, supervision, and motivation. Prer., MK. 300.

**MK. 480-3. Marketing Strategies and Policies.** Fall, Spring. Focuses on the process of formulating and implementing marketing channels and product analysis. A case approach is utilized to develop the student's analytical ability to integrate all major areas of marketing. Prer., MK. 300 and six 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.

**Upper Division/Graduate Level**

**MK. 450/550-3.1. Advertising Management.** Spring. Studies advertising problems from a management point of view. Consideration of stimulating primary and selective demand, media selection, developing the advertising program or campaign, establishing the advertising budget, evaluating results, and managing agency relations. Prer., for 400 level, MK. 350; prer., for 500 level, BUS. 600 or equivalent.

**MK. 490/590-3.1. International Marketing.** Fall. Studies managerial marketing policies and practices of firms marketing their products in foreign countries. Analytical survey of institutions, functions, policies, and practices in international marketing. Relates marketing activities to market structure and environment. Prer., for 400 level, MK. 300; prer., for 500 level, BUS. 600 or equivalent.

*Students enrolled at the 500 level may expect additional work and evaluation commensurate with graduate standards.*
600 Level

MK. 601-3. Marketing Strategy, Evaluation, and Development. Fall, Spring. Focuses on marketing strategy and marketing planning. Addresses the formulation and implementation of marketing plans within the context of the overall strategies and objectives of both profit and not-for-profit organizations. There is heavy emphasis on group projects and presentations. Prereq., BUS. 600.

MK. 603-3. Sales Force Management. Spring. Focuses on issues in managing the field sales force. Deals with organizing the field sales force, sales analysis, forecasting, budgeting and operating, with particular emphasis on recruiting, selection, training, compensation, supervision, and motivation. Prereq., BUS. 600.

MK. 605-3. Marketing Research. Fall. The objectives of this course relate to effective marketing information management. Objectives include: (1) developing an understanding of the techniques and procedures that can be used to generate timely and relevant marketing information; (2) gaining experience in developing and analyzing information that is decision oriented; and (3) gaining experience in making recommendations and decisions based on relevant and timely information. Computer analysis and projects are employed. Prereq., BUS. 600.

MK. 607-3. MBA Seminar in Marketing. Survey of current problems and issues in marketing and in-depth investigation of selected topics. Prereq. BUS. 600.

MK. 695-variable credit. Topics in Marketing. Experimental course offered irregularly for the purpose of presenting new subject matter in marketing. Prerequisites will vary depending upon the particular topic.

OPERATIONS MANAGEMENT

Adviser: Jeff E. Heyl
Telephone: 623-4436

Operations management studies are designed to prepare students 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, production planning and inventory control, scheduling labor and equipment, job design and labor standards, quality control, purchasing, and facilities location and layout.

The outlook for jobs in this area continues to be strong in the 1980s. This placement is aided by the student chapter of the American Production and Inventory Control Society and work intern programs provided to qualified students. Participation in live case research and consulting projects with local organizations is usually an integral part of this course of study.

Students whose major areas of emphasis are information systems, transportation management, or engineering will find the operations/management 400-level courses to be particularly well related to their courses of study. Students should plan their schedules carefully as required courses are not offered every semester.

Required Courses

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Name</th>
<th>Semester Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>I S. 330</td>
<td>Operations Research for Decision Support</td>
<td>3</td>
</tr>
<tr>
<td>O M. 440</td>
<td>Planning and Control Systems</td>
<td>3</td>
</tr>
<tr>
<td>O M. 447</td>
<td>Strategic Analysis in Operations Management</td>
<td>3</td>
</tr>
</tbody>
</table>

Recommended Electives

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Name</th>
<th>Semester Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>I S. 220</td>
<td>Business Programming I: Structured COBOL</td>
<td>3</td>
</tr>
<tr>
<td>MGT. 335</td>
<td>Managing Work Groups</td>
<td>3</td>
</tr>
<tr>
<td>MGT. 437</td>
<td>Organizational Design</td>
<td>3</td>
</tr>
<tr>
<td>MGT. 434</td>
<td>Labor and Employee Relations</td>
<td>3</td>
</tr>
<tr>
<td>MGT. 438</td>
<td>Human Resources Management: Employment</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>
<tr>
<td>GEOG. 341</td>
<td>Economic Geography: Manufacturing</td>
<td>3</td>
</tr>
<tr>
<td>GEOG. 465</td>
<td>Location Analysis</td>
<td>3</td>
</tr>
</tbody>
</table>

Students planning to take the APICS (American Production and Inventory Control Society) or NAPM (National Association for Purchasing Management) certification examinations should consult with an adviser to determine which elective should be taken.

COURSES

OM. 300-3. Operations Management. An introduction to the design and analysis of operating systems in manufacturing, service, and public sector organizations. Topics include facility layout and location, job design, work standards, quality and productivity, inventory planning and control, simulation, waiting line analysis, and linear programming. Prereq., ACCT. 200. Q M. 201. It is important to take this course in the junior year.

OM. 495-3. Special Topics in Operations Management. A number of different current topics in operations management will be discussed in this course. Consult the Schedule of Classes or contact the area coordinator for further information.

Upper Division/Graduate Level

OM. 440/540-3. Planning and Control Systems. Study of the design, implementation, and control of integrated operations, scheduling, and inventory planning and control systems. Topics include demand forecasting, aggregate planning, capacity planning, master scheduling, inventory management, material requirements planning, stockless systems, and operations

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1 Students enrolled at the 500 level may expect additional work and evaluation commensurate with graduate standards.
control. Organizations studied include manufacturing, service, and public sector. Prer., for 400 level, O M. 300; prer., for 500 level, BUS. 612.

O M. 444/544. Quality and Productivity. Study of the various techniques to measure quality and productivity in organizations and the practical management issues related to implementing quality and productivity systems. Topics include statistical quality control, total factor productivity, quality circles, total quality control, work design and measurement, and quality and productivity management systems. Prer., for 400 level, O M. 300, MGT. 330; prer., for 500 level, BUS. 612, MGT. 604.

O M. 447/547-31. Strategic Analysis in Operations Management. Study of the analysis and formulation of operations management strategy and policy. Emphasis will be on the role of the operations function in the strategic processes of the organization. Decision making will be stressed through the use of case studies and the analysis of actual business situations. Prer., for 400 level, O M. 440 and 444; prer., for 500 level, O M. 540 and 544.

O M. 460/560-31. Purchasing, Materials Management, and Negotiation. Study of the purchasing function in manufacturing, service, and public organizations. Topics include source selection, make-buy analysis, material quality standards and specifications, value analysis, negotiations, and legal aspects. Prer., for 400 level, O M. 300; prer., for 500 level, BUS. 612.

600 Level

O M. 695-variable credit. Topics in Operations Management. A number of different current topics in operations management will be discussed in this course. Consult the Schedule of Classes or contact the area coordinator for further information.

QUANTITATIVE METHODS COURSES


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. Prer., BUS. 602.

REAL ESTATE

Telephone: 623-4436

Real estate careers require knowledge of real estate investment, 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 persons to be their own boss whether as a broker, appraiser, developer, syndicator or property manager. R ES. 300 (Principles of Real Estate Practice) is a prerequisite for the area.

Required Courses

<table>
<thead>
<tr>
<th>Course Details</th>
<th>Semester Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>R ES. 430. Residential and Income Property Appraising</td>
<td>3</td>
</tr>
<tr>
<td>R ES. 454. Real Estate Financing</td>
<td>3</td>
</tr>
<tr>
<td>R ES. 473. Legal Aspects of Real Estate</td>
<td>3</td>
</tr>
<tr>
<td>R ES. 401. Real Estate Development</td>
<td>3</td>
</tr>
<tr>
<td>R ES. 433. Real Estate Investments</td>
<td>3</td>
</tr>
</tbody>
</table>

It is strongly recommended that any student planning to sit for the Colorado broker's examination take all six of the real estate courses. Additional preparatory courses for a real estate career are:

Suggested Courses

<table>
<thead>
<tr>
<th>Course Details</th>
<th>Semester Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACCT. 441. Income Tax Accounting</td>
<td>3</td>
</tr>
<tr>
<td>INS. 484. Principles of Insurance</td>
<td>3</td>
</tr>
<tr>
<td>FIN. 455. Financial Markets and Institutions</td>
<td>3</td>
</tr>
<tr>
<td>FIN. 433. Investment and Portfolio Management</td>
<td>3</td>
</tr>
<tr>
<td>MK. 310. Salesmanship</td>
<td>3</td>
</tr>
<tr>
<td>MK. 320. Consumer Behavior</td>
<td>3</td>
</tr>
<tr>
<td>MK. 470. Sales Management</td>
<td>3</td>
</tr>
</tbody>
</table>

COURSES


Upper Division/Graduate Level

R ES. 401/501-31. Real Estate Development. Fall. Methods of analyzing real estate investment opportunities are studied. These methods include urban economic, market, and location analyses. Local government controls are studied from the developer's viewpoint. Managerial methods of controlling development also are studied. Prer., for 400 level, R ES. 300; prer., for 500 level, R ES. 300.

R ES. 430/530-31. Residential and Income Property Appraising. Spring. Principles and techniques of estimating the value of land, residences, and income property are studied. Principles and techniques are applied by a field program in appraising. Prer., for 400 level, R ES. 300; prer., for 500 level, R ES. 300.

R ES. 433/533-31. Real Estate Investments. Spring. 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. Prer., for 400 level, R ES. 300 and FIN. 305 or consent of instructor; prer., for 500 level, R ES. 300 and BUS. 618.

R ES. 454/554-31. Real Estate Finance. Fall. 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., for 400 level, R ES. 300 and FIN. 305; prer., for 500 level, R ES. 300 and BUS. 618.

1Students enrolled at the 500 level may expect additional work and evaluation commensurate with graduate standards.

TRANSPORTATION AND DISTRIBUTION MANAGEMENT

Adviser: Lawrence F. Cunningham
Telephone: 623-4436

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 consent 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</th>
<th>Semester Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>TRMG. 450. Transportation Operation and Management</td>
<td>3</td>
</tr>
<tr>
<td>TRMG. 452. Problems in Surface Transportation Management</td>
<td>3</td>
</tr>
<tr>
<td>TRMG. 456. Air Transportation</td>
<td>3</td>
</tr>
<tr>
<td>TRMG. 457. Urban Transportation</td>
<td>3</td>
</tr>
<tr>
<td>TRMG. 458. International Transportation</td>
<td>3</td>
</tr>
<tr>
<td>MK. 485. Physical Distribution Management</td>
<td>3</td>
</tr>
</tbody>
</table>

Recommended Electives

<table>
<thead>
<tr>
<th>Course</th>
<th>Semester Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>MGT. 434. Labor and Employee Relations</td>
<td>3</td>
</tr>
<tr>
<td>TRMG. 451. Survey of Transportation: Law and Freight Claims</td>
<td>3</td>
</tr>
<tr>
<td>O M. 460. Purchasing, Materials Management and Negotiation</td>
<td>3</td>
</tr>
<tr>
<td>MK. 490. International Marketing</td>
<td>3</td>
</tr>
<tr>
<td>GEOG. 461. Urban Geography: Economic</td>
<td>3</td>
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<tr>
<td>GEOG. 463. Transportation Geography</td>
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COURSES

TRMG. 452-3. Problems in Surface Transportation Management. Spring. Analysis of surface modes with emphasis on the motor carrier industry. Topics include carrier operations, regulatory structure, pricing, market structure, design of services, routes and terminals, equipment, and private fleets. Case analyses and field studies will be used to develop decision-making skills. Prer., TRMG. 450 or consent of the instructor.


TRMG. 458-3. International Transportation. Fall. Analysis of international transportation (primarily sea and air) in world economy. Detailed study of cargo documentation and freight rate patterns. Included are liability patterns, logistics, economics, and national policies of transportation. Prer., senior standing.

Upper Division/Graduate Level

TRMG. 450/550-3. Transportation Operation and Management. Fall, Spring. Economics of transportation service and rates. History and patterns of regulation. Explanation 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., for 400 level, ECON. 201 and 202 or consent of instructor; prer., for 500 level, ECON. 201 and 202 or ECON. 300 or BUS. 616.

600 Level


1Students enrolled at the 500 level may expect additional work and evaluation commensurate with graduate standards.
Housed in the School of Education, the national You, Me and Technology project tests high school students after they have seen its video series.

"The melting pot is a myth. Today's teachers must be prepared to meet the challenges of a linguistically and culturally diverse society."

— Mark A. Clark
Associate Professor,
Language and Culture

A CU-Denver intern (left) in the infant intervention program at United Cerebral Palsy Center works with a mother and her son.
INFORMATION ABOUT THE SCHOOL

The primary goal of graduate programs in the School of Education at CU-Denver is to produce the best qualified and most effective personnel who can serve with distinction the nation's schools, businesses, governmental agencies, and industries.

Qualifications and effectiveness require appropriate knowledge, skills, and attitudes to fulfill the goals of the instructional process. Graduates should be knowledgeable in their chosen subject matter disciplines and possess accurate and current information on the psychology of learning, as well as various theories of learning.

Necessary skills include teaching methodologies and the ability to function effectively within an organizational system which includes students, parents, fellow teachers, and administrators. Appropriate attitudes include acceptance of learners from a wide spectrum of ethnic and socio-economic backgrounds, as well as those whose physical and mental abilities may vary across a broad range.

Quality graduate education includes enthusiasm for learning and the maintenance of high standards of excellence in one's chosen field. Graduate educators should be capable of conducting research to answer important educational questions. They also should possess valuable human qualities such as honesty and integrity, as well as the genuine desire to be of service to their students, their community, and mankind as a whole.

The School of Education at the University of Colorado at Denver is committed to finding the best candidates and designing experiences that will produce individuals who are committed to quality in the teaching-learning process at all levels.

The University of Colorado at Denver is fully accredited by the North Central Association of Colleges and Secondary Schools. The Teacher Education Program is fully accredited by the Colorado State Board of Education and the National Council for the Accreditation of Teacher Education.

The Teacher Certification Program is a graduate level program designed to prepare elementary and secondary teachers for urban school settings through academic work, professional studies, classroom teaching experiences, and community field experiences. Teacher Certification Programs are available at CU-Denver in:

- Elementary Education (Kindergarten-6th grade)
- Secondary Education (7th-12th grade) (English, German, French, Spanish, Mathematics, Science, Social Studies)
- Bilingual Education Endorsement
- English as a Second Language Endorsement

CU-Denver offers a certification program for students with a baccalaureate degree and for seniors earning degrees in the College of Liberal Arts and Sciences. All certification course work is at the graduate level. Much of the work is accepted toward a master's degree in education.

ADMISSION

A prospective master's candidate should request application forms from the dean's office, School of Education, University of Colorado at Denver. The completed
form should be returned to the Dean, School of Education, CU-Denver, together with a $30 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 dean. Four recommendations on the forms provided, or by letter, should be furnished. It is preferred that 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/she was or is associated. Application papers and all supporting documents (including GRE scores or MAT scores, see below) must be in the dean's office on March 1 for summer, May 1 for fall, and October 1 for spring 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/she 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, the Student Academic Services office at CU-Denver, the Educational Testing Service, 20 Nassau Street, Princeton, New Jersey 08540, or the graduate office of a university in the applicant's area.

DEGREE REQUIREMENTS

Two Master of Arts degree plans 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.

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, the reader 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.

Transfer Credit

Credit earned before formal admission is transfer credit. Nine transfer hours may be counted toward the M.A. degree.

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.

Degrees and Areas of Specialization

The following programs, offered by the School of Education, cover a wide range of professional and academic interests.

M.A.
Administration, curriculum, and supervision
Counseling and personnel services
(elementary, secondary, agency settings, and college student personnel services)
Early childhood education
Early childhood education/special education
(infant specialization track)
Educational psychology
(school psychology certification)
Elementary education
(bilingual education, English as a Second Language, language and culture)
Foundations
Instructional technology
(corporate instructional development and training, instructional computing specialist, instructional technologist, library media specialist)
Reading and writing
Secondary education
(bilingual education, English as a Second Language, English education, language and culture,
mathematics education, science education, social studies education, technology in education)
Special education
(educationally handicapped)
Ed.S.
Administration, curriculum, and supervision
Ph.D
Administration, curriculum, and supervision
Instructional technology

Outlines of each graduate program are listed in the following pages of the School of Education section. 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.

Programs of Study

TEACHER CERTIFICATION PROGRAMS

Elementary Education

The faculty of the School of Education at CU-Denver advocates that the most appropriate education for a professional educator is based upon the liberal arts tradition. They also believe that preparation for the teacher of young children must be conceptualized differently from the preparation for the subject specialist in the secondary school. The teacher in the elementary school is truly a generalist and must be aware of the basic structure of a wide variety of disciplines.

Students who seek elementary certification and do not have a baccalaureate degree should obtain a B.A. from the College of Liberal Arts and Sciences (CLAS) in a major of their choice. Some certification courses are accepted by CLAS. These courses may be taken in the senior year. Specific information can be obtained from the advisers in CLAS.

Program Coordinator: William A. Juraschek
Program Director: Royce Forsyth
Office: 1250 14th St., Second Floor
Telephone: 556-2717

REQUIREMENTS

General Education

1. B.A. or B.S. degree from an accredited institution of higher education.
2. Course work must include arts and humanities, science, mathematics, social science, health and physical education.

If students do not have a bachelor's degree from an accredited institution, they must be enrolled in a program leading to a B.A. degree in the College of Liberal Arts and Sciences.

Professional Sequence

MATH. 304. Mathematics for Elementary Teachers II.
TED. 575. Field Experience: Exploring Education
FNDS. 500. Teaching as a Profession
EPSY. 500. Psychological Foundations of Education
SPED. 500. Education of Exceptional Children
or
SPED 501. Mainstreaming the Exceptional Child in the Regular Classroom
ELED. 517. Community and Interpersonal Relations
ELED. 521. Models of Teaching
ELED. 513. Microteaching
ELED. 518. Instructional Technology
ELED. 514. Elementary Curriculum (Language Arts, Children's Literature)
RDG. 500. Effective Reading and Writing Instruction: Basal Reader Programs and Thematic Units.
ELED. 515. Elementary Curriculum (Science, Mathematics, Social Studies)
ELED. 516. Expressive Arts (Art, Music, Health, P.E.)
TED. 570. Student Teaching in the Elementary School

Secondary Education

Students preparing for certification in the secondary school should acquire a broad liberal arts background and specialize in the discipline area in which they plan to be endorsed. This specialization must meet the College of Liberal Arts and Sciences requirements for a major and may include additional requirements specified by state certification standards. Advisers in the College and in the School of Education should be consulted on a regular basis. Some certification courses, taken during the senior year, are accepted by CLAS toward the baccalaureate degree. Consult CLAS advisers for specific information. (For bilingual education and English as a Second Language requirements, see Language and Culture.)

REQUIREMENTS

1. B.A. or B.S. from accredited institution of higher education.
2. A major in the discipline of endorsement.
3. Additional courses as prescribed by state certification standards.

If students do not have a bachelor's degree from an accredited institution, they must be enrolled in a program leading to a B.A. degree in the College of Liberal Arts and Sciences.

REQUIREMENTS

1Subject to change to meet modifications in State standards.
2Includes extensive work in metropolitan schools.
**Professional Sequence**

TED. 575. Field Experience: Exploring Education
FNDS. 500. Teaching as a Profession
EPSY. 500. Psychological Foundations of Education
SPED. 500. Education of Exceptional Children
or
SPED. 501. Mainstreaming the Exceptional Child in the Regular Classroom
SECE. 517. Community and Interpersonal Relations
SECE. 521. Models of Teaching
SECE. 513. Microteaching
SECE. 518. Instructional Technology
A content-area methods course
TED. 571. Student Teaching in Secondary Schools

**ADMISSIONS PROCEDURES**

A check list that outlines the steps necessary for admission into the Teacher Certification Program is available in the Education office. Students must obtain and follow the procedures as listed. For further information contact the School of Education, 556-2717.

**COURSES**

These courses may not be applied toward a graduate degree.

TED. 570-B. Student Teaching-Elementary School. Kindergarten and grades one through six. Student teacher attends an elementary school in Denver metropolitan area.
TED. 571-B. Student Teaching-Secondary School. Student teacher attends a senior or junior high school in Denver metropolitan area.

**ADMINISTRATION, CURRICULUM, AND SUPERVISION**

Program Coordinator: Russell W. Meyers
Office: 1250 14th St., Second Floor
Telephone: 556-2717
Faculty: Professor: Bob L. Taylor
Associate Professors: W. Michael Martin, Russell W. Meyers
Assistant Professors: Jo Roberts, Lance V. Wright
Emeritus: Myrle Hemenway, Robert C. McKean, Hazlett H. Wubben

The major responsibility of the administration, curriculum, and supervision (ACS) program faculty is to prepare administrators for Colorado public schools. In addition, the ACS programs may help individuals prepare for other education related administrative and academic positions. Currently, the Type D Administrator Certificate is required for people seeking building-level and district-level administrative positions.

The School of Education offers three degree programs in ACS in addition to, or as a part of, the Type D certification program:

1. M.A. degree — designed for those with no graduate degree who seek administrator certification.
2. Ed.S. degree — available only to those who hold an M.A. but who now seek administrator certification.
3. Ph.D. degree — available to those holding a graduate degree and who wish to pursue further graduate study in educational leadership or instructional technology. This is not a certification program degree, although limited hours of such program courses may be included in the doctoral degree plan.

**Type D Administrator Certification Course Requirements**

The following courses, or equivalents, must be completed as a part of the certification process:

**FOUNDATIONS COURSES**

EPSY. 502. Advanced Psychological Foundations: Theory and Research in Education
FNDS. 541. History and Philosophy of Modern Education

**GENERAL ADMINISTRATION COURSES**

EDUC. 510. Curriculum and Program Development
EDUC. 585. Governance and Administration of Education
EDUC. 586. School Law
EDUC. 587. Individual and Group Behavior in Organizations

**ADMINISTRATIVE SKILLS AREAS**

EDUC. 505. Computer Applications to Educational Management
EDUC. 591. Educational Supervision
EDUC. 588. School Business Management
EDUC. 642. Personnel Management
EDUC. 643. School and Community Relations
EDUC. 589 Seminar in Administration (or other seminar)

**BUILDING LEVEL SPECIALIZATION**

**Senior High School**
EDUC. 509. Curriculum of the Senior High School
EDUC. 637. Administration and Supervision of the Senior High School
EDUC. 980. Internship

**Middle Level School**
EDUC. 612. Curriculum of the Middle Level School
EDUC. 650. Administration and Supervision of the Middle Level School
EDUC. 980. Internship

**Elementary School**
EDUC. 507. Curriculum of the Elementary School

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1Includes extensive work in metropolitan schools.
2Includes extensive field work in metropolitan schools.
EDUC. 635. Elementary Principalship Intensive
EDUC. 636. Administration and Supervision of the Elementary School
EDUC. 980. Internship

SUPERINTENDENT CERTIFICATION

In addition to holding or satisfying the requirements of a building-level certificate, the following are minimum additional requirements for recommendation for superintendent endorsement:

EDUC. 640. School Finance
EDUC. 641. Educational Facilities Planning
EDUC. 980. Internship

Doctoral Degree Program Requirements

Ph.D. programs tend to be highly individualized, developed by the student and the student's adviser. However, certain general guidelines do exist.

1. Three (3) research methodology and statistics courses.
2. Five specifically-doctoral courses and/or seminars in administration, curriculum, and supervision.
3. Thirty (30) dissertation hours are required.

Program Information

Individuals interested in any of the ACS programs are encouraged to contact program area faculty to discuss these programs. Conferences prior to application are encouraged and welcomed. Following admission, students are expected to maintain frequent conferences with assigned advisers to plan and develop programs of studies.

COURSES

EDUC. 505-3. Computer Applications to Educational Management. Microcomputer applications to educational management. Students should be familiar with basic micro commands and system operation.
EDUC. 507-3. Elementary School Curriculum. An integrating course dealing with the history, development, problems, and practices of the curriculum of the elementary school.
EDUC. 510-3. Curriculum/Program Development. Fundamentals of curriculum and program development, including theoretical foundations of U.S. curriculum, practical criteria to guide decision-making, specific models and processes for curriculum/program development and appraisal, emerging issues, problems and trends.
EDUC. 585-3. Governance and Administration of Education. Development of governance structures and of administration as a field of study in education. Influence of governance and views of administration on educational organizations' goals, functions, and personnel. Required for Masters and Type D Certification students.

EDUC. 586-3. School Law. Recent developments including administrative implications of significant court decisions pertaining to school operations. For superintendents, principals, school board members, prospective administrators, and teachers.
EDUC. 587-3. Group Development. Organizational theory and practice for school leadership personnel with emphasis on group development, group problem identification and solutions, and conflict management skills and processes.
EDUC. 589-2 Seminar: School Administration. Knowledge and insight into organizational behavior using case studies.
EDUC. 593-1-4. Administration Curriculum and Supervision.
EDUC. 612-3. Curriculum of Middle Level School. Development of knowledge, skills, and attitudes for youth enrolled in middle level school. Focus is on student characteristics — relationship to curriculum, guidance, instruction and student activities.
EDUC. 614-2. Student Activities Curriculum. Principles, problems, and procedures for improvement of extraclass activities, student councils, home rooms in the secondary school, etc.
EDUC. 616-3. Processes and Materials in Curriculum Appraisal. Designed to provide curriculum workers with skills in the process of assessment of curriculum programs and skill in the appraisal of curriculum materials. Includes work in the theory of evaluation, the methodology of evaluation, and practicum in evaluation of curricula. Pre: one course in curriculum.
EDUC. 634-2. 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.
EDUC. 635-2. Elementary Principalship Intensive. Offered summers only. Two-week in-depth examination of the elementary school principalship. Required for Type D administrative certification, elementary school. Consent of instructor required.
EDUC. 636-3. Administration and Supervision of the Elementary School. For administrators and teachers. Purposes, practices, and trends in administration and educational leadership.
EDUC. 637-3. Administration of Supervision of Senior High School. Current administrative principles and practices essential to effective organization and management. with emphasis on the educational leadership of the principal.
EDUC. 638-2. Theory of Educational Administration. Study of organizational models, theories, and communication patterns: leadership roles and behavior; and organizational change. Attention to recent research in administrative theory.
EDUC. 640-3. School Finance. For advanced graduate students. Problems of educational finance; theory, practice, and control; equalization funds, federal-state-local relations in finance, budgeting, salary schedules, retirement, and school bonds.
EDUC. 641-3. Educational Facilities Planning. Alternate years. Determination of school plant needs; relation of educational and architectural services; criteria of adequate school plants,
site development, building operation and management; financial problems.


EDUC. 643-3. School-Community Relations. Examines interactions of schools and their communities; citizen role/involvement in governance of education, internal and external communication concepts and practices, politics of education, and community power and pressure groups.

EDUC. 656-3. Administration and Supervision of the Junior High School/Middle School. Purposes, practices, and trends in administration of the middle level school. Current administrative principles and practices essential to effective organization and management. Emphasis is on leadership of the principal of the middle level school.

EDUC. 663-2. Seminar: Junior and Senior High School Education. For advanced students. Problems, theories, and trends in secondary education. Includes field work and individual projects.

EDUC. 680-3. Administration, Curriculum and Supervision. A required seminar in educational research for all Ed.D. and Ph.D. students in curriculum, administration, and supervision. The seminar focuses on doctoral research study in these areas of educational research.

EDUC. 681-3. Advanced Seminar: School Law. An in-depth examination of the American legal process as it pertains to administration, planning, and delivery of educational programs. Includes self-selected research followed by individual or group presentations.


EDUC. 684-2. Seminar: Educational Supervision. Students work on individual topics and report orally and in writing.

EDUC. 685-2. Seminar: Educational Leadership. Seminar dealing with processes and patterns of educational leadership in the schools. Various theories of leadership are considered in relation to students' leadership behaviors. May be taken more than one semester for credit with adviser's approval.


EDUC. 750-1 to 4. Administration, Curriculum, and Supervision.

EDUC. 755-1 to 4. Practicum in Administration, Supervision, and Curriculum.

EDUC. 800-1 to 10. Doctor's Thesis.


EDUC. 980-1 to 6. Internship in Administration and Supervision.

EDUC. 985-1 to 6. Internship in Curriculum.

EDUC. 999-0. Candidate for Degree.

Independent Study

EDUC. 951-1 to 4. Administration, Curriculum and Supervision — Master's.

EDUC. 961-1 to 4. Independent Study in Administration, Curriculum and Supervision — Doctor's.

INSTRUCTIONAL TECHNOLOGY PROGRAM

Program Coordinator: David H. Jonassen
Office: 1250 14th St., Second Floor
Telephone: 556-2717

Faculty: Professor: Minaruth Galey
Associate Professor: Duane Troxel
Assistant Professor: Martin Tessmer
Emeritus: Bettie R. Helser

The Ph.D. track in instructional technology is designed for advanced graduate study in this field. The program is intended for students who are professionally committed to the field, as evidenced by previous professional experience in public or higher education, corporate training and development, or educational technology. The program will stress collegial and collaborative relationships with faculty in designing and carrying out research and development programs. Graduates will assume leadership roles in business, universities, or other agencies committed to the meaningful application of various technologies to instruction.

Admission Requirements

These criteria will be used to evaluate your application. No single criterion is necessary or sufficient for admission.

1. At least three years of successful, relevant professional experience (teaching or other).

2. Master's degree in a related field from an accredited institution with a grade-point average of 3.2 or higher.

3. Graduate Record Examination completed within the past five years (verbal + quantitative) with a combined score of 1000 or higher.


5. Grade-point average of 2.9 in last 60 hours of the bachelor's degree.

6. Evidence of scholarly writing ability to be submitted with the application (for example, master's thesis, project report, published article(s), or technical report).

7. Three letters of recommendation from individuals capable of evaluating your potential for graduate study.

PROGRAM REQUIREMENTS

Course Work

66 or more semester hours beyond the master's minimum
36-48 hours of course work
30 hours or more of dissertation credit

Residency

Enrollment in 8 or more semester hours for three consecutive semesters OR
Enrollment in 24 semester hours within any 18-month period.
Additional residency experiences will be defined for the individual by his/her committee. Examples include graduate/teaching assistantships and internships.

Language

Proposed substitutes for foreign language competence:
1. Proficiency in two or more computer languages OR
2. Proficiency in research techniques, including multivariate statistical techniques and advanced measurement and evaluation design.

Preliminary Qualifying Examination. Taken after 8-12 semester hours of course work: written paper plus oral examination.

Comprehensive Examination. After 40 semester hours of course work.

Dissertation Study and Oral Examination of Dissertation Study.

Program of Study

GENERAL EDUCATION TECHNOLOGY CORE
EPSY. 524-3. Cognition and Instruction
IT. 511-3. Instructional Design: Front End Analysis
IT. 512-3. Instructional Development: Strategy Selection and Development
IT. 513-3. Instructional Message Design
REM. 530-3. Introduction to Measurement
REM. 540-3. Introduction to Evaluation of Programs and Persons
REM. 510-3. Basic Statistics
REM. 610-3. Intermediate Statistics
IT. 692-3. Research in Instructional Technology

INSTRUCTIONAL DEVELOPMENT TRACK
IT. 611-2. Managing Instructional Development
IT. 612-2. Instructional Development Consultation
IT. 619-3. Advanced Seminar in Instructional Design/Development
IT. 795-2 to 6. Internship in Instructional Development/Training
PSY. 515-3. Seminar in Organizational Psychology

INSTRUCTIONAL COMPUTING TRACK
IT. 561-3. Developing Interactive Computer-Based Instructional Programs
IT. 662-3. Intelligent Computer-Based Instruction
IT. 661-3. Advanced Courseware Design Seminar
Competence in 3 computer languages

HIGHER EDUCATION TRACK
PSY. 671-3. Quantitative Methods II
Two or more from:
EPSY. 502-3. Advanced Psychological Foundations: Theory and Research in Education
EPSY. 512-3. Behavior Analysis
EPSY. 511-3. Human Learning
EPSY. 600-3. Proseminar in Educational Psychology
IT. 691-3. Theoretical Bases for Instructional Technology Teaching assistant in two or more courses
Refer to the Instructional Technology section for IT course descriptions.

The popular Storytelling Conference is held annually.

COUNSELING AND PERSONNEL SERVICE
Program Coordinator: Mark A. Clarke
Office: 1250 14th St., Second Floor
Telephone: 556-2717
Faculty: Associate Professors: Andrew Helwig, William A. Sease
Assistant Professors: Lynette Allen, Walter L. Strandburg

CU-Denver offers an M.A. program appropriate for school and college counseling, work in community agencies, and other areas of personnel service where professional counselors are employed. Candidates seeking certification for school counseling (K-12) as a separate credential beyond the master's degree are urged to obtain faculty advising relevant to those requirements.

The program consists of 42 semester hours, including core requirements, major field sequence, and added electives where chosen. The work is spread over four semesters, and one summer term culminating in a supervised practicum in the field.

Core Requirements

A minimum of nine hours of foundation level core course work is required of all graduate degree students
in the School of Education. Students should select from the following courses and fit them into the schedule as available.

REM. 510-3. Data Analysis I (Required in the counseling program)
CURR. 504-3. Multicultural Education
EPSY 502-3. Advanced Psychological Foundations of Education (Theory-Research)

or
EPSY. 520-3. Social Psychology of Learning (Agency)
FNDS. Any course at the 500 level, except specifically FNDS. 500 (for teachers)

Since REM. 510 is required of counseling majors, and is also a prerequisite for REM. 530 which follows, students should register for that course and later select two from the remaining three core areas above.

Major Field

Since major field courses are normally offered only once per year, and each is a prerequisite to the following courses in the sequence, it is important that these courses be scheduled first with other requirements fitted around them. Students who get out of sequence in the major field will find their programs delayed by a year. All major field courses are prefixed CPS., core and related courses with other prefixes may require consent of the program area designated by the prefix.

Fall
CPS. 501-3. Foundations (501 and 502 are offered together in a lecture-lab format and must be taken concurrently)

#1 CPS. 502-3. Lab in Personal Appraisal
REM. 510-3. Data Analysis I

Spring
CPS. 533-3. Professional Seminar (pick up Practicum Manual in the Book Center)

#1 CPS. 510-3. Theory and Techniques of Counseling
CPS. 503-3. Pre-Practicum Laboratory (this course may by taken either Spring #1, Summer #1, or Fall #2, but must be completed prior to Field Practicum)
REM. 530-3. Introduction to Measurement

Students may include a core or elective course if schedule permits.

Summer
CPS. 511-3. Advanced Theory and Techniques: Group Process

#1 CPS. 503-3. Pre-Practicum Laboratory (if not taken previously)
Core or elective course

Fall
CPS. 540-3. Career Development

#2 CPS. 542-3. Organizational Development in Counseling Practice

CPS. 503-3. Pre-Practicum Laboratory (if not taken previously)
CPS. 570-6. Practicum (designate elementary, secondary, college, or agency)

Spring
#1 File application for graduation
Register for Graduate Comprehensive Examination
CPS. 570-6. Practicum (practicum placement is by advance application. It consists of a minimum of 300 supervised clock hours in an approved setting and includes a class meeting)
Core requirement or elective

COURSES

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. Special service sections may be offered from time to time and are indicated as open. Non-degree students may be admitted with permission. See the current Schedule of Classes.

CPS. 502-3. Personal Appraisal. Personal appraisal taken concurrently with CPS. 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 or B as the expected maximum grade.
CPS. 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.
CPS. 515-3. Marital and Family Counseling. Marital and family conflicts and counseling intervention strategies. (Open.)
CPS. 533-3. Professional Seminar in Counseling. An in-depth examination of special problems and topics in the field with

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1The Practicum is offered either fall or spring of the second year.
emphasis upon individual project investigation and reporting. Prereq. CPS. 501 and 502.


CPS. 542-3. Organizational Development. Organizational development and theory. The development and implementation of counseling and human resource development programs in various settings. Individual projects required for course completion. Prereq., CPS. 501, 502, or consent of instructor.

CPS. 570-6. Practicum in Counseling. Supervised practice counseling in elementary and secondary schools, college student personnel, and agency setting. By advance application and arrangements. Application should be made during the preceding semester. Obtain materials and instructions from the Book Center. Prereq., all required CPS courses. Section subtitles indicate school or community service placement.


CPS. 584-3. Readings in Counseling and Personnel Services Development. Focus on special problems in development and delivery of personnel services. Directed readings and small group activities.

CPS. 585-3. Counseling Strategies. Individually directed investigation of trends and contemporary problems and issues in the field. Oriented to the field practitioner and special needs of differential work settings. (Open.)

CPS. 586-589-3. Special Topics in Counseling and Personnel Services. Specific topics vary from semester to semester. Intervention strategies with children; issues in violence — incest, battering, and abuse; sex equality in education; problems and issues — depression and learned helplessness; counseling and corrections; aging, dying, and grief. (Open.)

CPS. 678-3 to 6. Advanced Practicum in Counseling.


Independent Study

CPS. 950-1 to 4. 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.

The early childhood education program is a graduate program leading to a master's degree or certification in early childhood special education, or a master's degree in early childhood/regular education. Students may choose to emphasize either alternative in their course work and field experiences, in order to prepare for careers working with either young handicapped children birth to five years or young normally developing children birth to eight years. Program graduates are currently employed throughout Colorado and the Rocky Mountain region in teaching or administrative positions in public schools, private preschools, community colleges, hospitals, community agency programs, Child Find, and Head Start.

The program is interdisciplinary in focus, drawing upon university resources in educational psychology, special education, communication disorders, and multicultural education as well as early childhood education, and community resources for occupational/physical therapy, pediatrics, and social work. There is a strong emphasis on field experiences in both regular and special education concentrations.

The program also offers a specialization in infants birth to three for students who wish to work in hospitals, center-or home-based programs with at-risk or handicapped infants and their families. The specialization, funded through a grant from the U.S. Office of Education, is jointly offered on the CU-Denver campus and the University of Colorado Health Sciences Center.

Curriculum

The master's degree in early childhood/special education requires 39 semester hours of course work and 4 hours of practicum. Thirty-one semester hours are required for certification only. The master's degree in early childhood/regular education typically requires 32 semester hours of course work and 4 semester hours of practicum.

The two programs share course content in:

- Normal child growth and development
- Learning theory
- Measurement and evaluation
- Basic statistics
- Multicultural education
- Research and current issues
- Early childhood curriculum models
- Working with parents and families

The early childhood/special education program provides specialized training in:

- Developmental disorders birth to five
- Screening and assessment of young children
- Intervention strategies with infants and preschool handicapped children
- Behavior management
- Working as a member of the transdisciplinary team
- Language development and language disorders
- Treatment of neurologically impaired children

Early Childhood Education and Early Childhood Special Education

Program Coordinator: Laura D. Goodwin
Office: 1250 14th St., Second Floor
Telephone: 356-2717
Faculty: Professor: William L. Goodwin
Associate Professor: Anne H. Widerstrom
The early childhood/regular education program provides specialized training in:

- Language acquisition and development
- Reading and writing instruction
- Early childhood administration

**Infant Specialization Track**

Coordinator: Laura D. Goodwin  
Faculty: Associate Professors: Barbara A. Mowder, Anne H. Winderstrom  
Assistant Professor: Susan Sandall

The program is designed to provide students with the background and skills necessary for working with handicapped or at-risk infants and their families. The specialization is available to students in the early childhood/special education certification and master's degree programs, and the school psychology certification and master's degree programs. It is also available to interested graduate students in related fields, such as nursing, occupational and physical therapy, and social work.

The program is interdisciplinary in focus. University and community resources in communication disorders, counseling, nursing, occupational and physical therapy, pediatrics, school psychology, social work, and special education are utilized. Field work and site visits are planned in both medical and educational settings.

The specialization consists of four courses and two practica:

- Medical aspects of developmental disabilities
- Assessment of handicapped and at-risk infants
- Intervention strategies for handicapped and at-risk infants
- Family dynamics
- Medical and educational practica

Students in the early childhood/special education master's degree program would take these courses by advisement as part of their program requirements of 37 semester hours of course work and 6 hours of practicum.

Students in the school psychology certification would take these courses by advisement, primarily as their electives. The certification program in school psychology requires 60 semester hours of course work, including 8 hours of field work.

**COURSES**

**ECE. 501-3. Curriculum and Program Development in Early Childhood Education.** Principles of early childhood program development are reviewed in the areas of curriculum, staff development, and parent involvement. Topics include physical space, environments, materials and methods from a developmental perspective. Curriculum areas considered include language, preacademics, motor, social-emotional, science, social studies, and creativity.

**ECE. 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 (1) their differing views of intellectual, social, and physical development of young children; (2) their operation as program activities and procedures; and (3) their effects on children's learning.

**ECE. 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 feedback.

**ECE. 504-3. Administrative Seminar: Selected Topics in Early Childhood Education.** Emphasis on those topics required of administrators in 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.

**ECE. 506-3. Working with Parents and Families.** Review of historical factors and research related to current trends in working with parents in the regular classroom and with parents and families of exceptional children. The course presents content concerning family systems theory, various community services available to families, abused and neglected children, and an overview of successful programs that serve parents and families in the educational setting.

**ECE. 507-3. Cognitive/Emotional Development and Disorders in Young Children.** The primary focus of this course is the cognitive and social development of infants and young children, and problems that may occur during the process. Equally emphasized are intervention approaches for preschool children with cognitive and social/emotional handicaps. Implications for intervention from current research are considered.

**ECE. 508-3. Language Development and Disorders in Young Children.** Overview of normal language development, language components, and pertinent research relating to language acquisition. Emphasis is placed on language problems commonly demonstrated by young exceptional children and intervention strategies.

**ECE. 509-3. Neuromotor Development and Disorders.** This course provides an overview of normal and abnormal motor and neurological development in the infant and young child. Current treatment approaches for children with neuromotor disorders are examined, with emphasis on sensory integration and neurodevelopmental treatment. Also reviewed are sensory deficits: hearing and visual impairment.

**ECE. 514-3. Measurement and Evaluation in Early Childhood Education.** This course provides classroom and field-based experience in basic measurement concepts and in the screening and assessment of young children's cognitive, affective, language and psychomotor capabilities and characteristics. Traditional measurement techniques as well as nonreactive measures, human and video-observational methods are included. Evaluation of programs and persons in early childhood education settings is examined.

**ECE. 520-3. Screening and Assessment of Young Children.** A field-based course providing experience in the administration and scoring of a sampling of the most widely used screening and assessment instruments designed for use in preschool classrooms. Students will have the opportunity to administer a variety of formal and informal tests including the Bayley and McCarthy Scales.
ECE. 570-3. Educational and Observational Practicum in Early Childhood Education. Includes planned experiences built around the clinic 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.

ECE. 591-4. Readings in Early Childhood Education.

ECE. 610-3. Medical Aspect of Developmental Disabilities: Birth to Three. A review of the major risk factors and developmental disabilities encountered in young children birth through three years. Medical, educational, genetic, and environmental factors are discussed. Special attention is given to recent innovations in identification and treatment of young children.

ECE. 611-3. Intervention Strategies for Handicapped and At-Risk Infants. In-depth study of intervention strategies, curricula, and program models for young children birth to three years. Topics include selection, implementation, and evaluation of the different techniques. The course will have an interdisciplinary focus.

ECE. 669-3. Seminar in Research and Current Issues in Early Childhood Education. Selected topics with emphasis on research findings and current issues of importance to teachers, administrators, specialists, and researchers in early childhood and early childhood special education.


ECE. 678-2 to 4. Practicum in Early Childhood Education. Field-based experiences in settings for young children (pre-school administration, day-care center management, parent program directorship, etc.) that are closely linked to the student's professional goals. Requires a minimum of 110, 165, or 220 clock hours under supervision (2.3, or 4 credit hours, respectively).


Independent Study

ECE. 950-1 to 4. Independent Study in Early Childhood Education.

EDUCATIONAL PSYCHOLOGY

Program Coordinator: Laura D. Goodwin
Office: 1250 14th St., Second Floor
Telephone: 556-2717
Faculty: Professor: William L. Goodwin
Associate Professors: Laura D. Goodwin, Barbara A. Mowder, Anne H. Widerstrom
Assistant Professor: W. Grant Willis

The M.A. program in educational psychology prepares students to facilitate the teaching/learning process. Thus, many students pursue the degree to enhance their skills as professional classroom teachers. The degree also provides skills necessary for a variety of roles where knowledge of learning, development, and research is essential. Other students seek the M.A. as preparation for certification in school psychology or for doctoral study in education. (Students planning to continue graduate work beyond the M.A. level should become familiar, before enrolling, with certificate, specialist, or doctoral degree program prerequisites and requirements so that their master's program can be tailored to assure a smooth transition to such advanced work.)

Because the field of educational psychology and the course of study are broad, the M.A. degree program is not focused on the preparation of students for specific jobs. At the same time, it may qualify the student to teach at the junior college level, to engage in consulting, evaluation, data analysis, and teaching in occupations which require specialized training, or to undertake advanced job-related study. However, the impact of the M.A. program is to provide insight and understanding of the teaching/learning process in its broadest sense.

Areas of Concentration

Five major areas of concentration are available — human learning, child growth and development, research and evaluation, preparation for school psychology, and individualized programs (such as adult learning). Regardless of the concentration area selected, all students must:

1. Take 9 hours of core courses required by the School of Education.
2. Demonstrate competence in educational psychology by successfully completing a minimum of 36 hours of relevant course work (9 of which are the core).
3. Complete either a master's thesis (4 semester hours, M.A. Plan I) or an independent study project (3 to 4 semester hours, M.A. Plan II), the latter involving the collection of data bearing on a given problem and its analysis and interpretation in writing.
4. Perform satisfactorily on a four-hour written comprehensive examination (typically taken during the last term enrolled in regular courses).
5. Complete the degree on a timely basis, usually within three years.

COURSES

EPSY. 500-3. Psychological Foundation 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.

EPSY. 502-3. Advanced Psychological Foundations of Education. An examination of selected topics in the field of educational psychology; theoretical issues and current research assume the primary emphasis. The course is intended primarily for students who have had prior professional experiences in teaching and psychoeducational settings. Topic areas
addressed include research on intelligence and child development, motivation, objective analyses of behavior, and learning.

EPSY. 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.

EPSY. 510-3. Advanced Child Growth and Development. A systematic study of the major theories of child growth and development. The course focuses on current research regarding children and the implications of research for education.

EPSY. 511-3. Human Learning. A review of the research methods and results of the study of human learning, including related topics such as memory, retention, and transfer. Various theories of learning are examined in depth, and their applications to teaching and practices in schools (and in other educational settings) are considered.


EPSY. 514-3. Advanced Adolescent Growth and Development. A systematic study of the major theories of adolescent growth and development. The course focuses on current research regarding adolescents and the implications of research for education.

EPSY. 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, non-educational intervention, parent programming, and evaluation. Special attention is given to current research and its application for education.

EPSY. 518-3. Psychology of Gifted, Talented, and Creative Children. An examination of the nature of gifted, talented, and creative children from an educational psychology perspective. Topics addressed include historical antecedents, identification, and characteristics of such children, research efforts and measurement issues, and relevant programs and teaching strategies.

EPSY. 520-3. Social Psychology of Learning. Analysis of social-psychological concepts, such as self-concept, attitude development, person perception, group processes, and related phenomena. Applications to education and other settings are considered.

EPSY. 522-3. Adult Learning and Education. Survey of theories and principles of adult learning and adult education with emphasis on practical applications and design of programs of instruction for adult learners.

EPSY. 524-3. Cognition and Instruction. Exploration of recent developments in cognition and the implications for instructional practices. Includes theory and research in cognitive psychology and educational practices resulting from it.

EPSY. 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.

EPSY. 591-1 to 4. Readings 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.

EPSY. 610-3. School Psychology Seminar. An introductory seminar in school psychology. The seminar covers theories and models of school psychological services, legal, legislative, and ethical concerns, as well as other current topics in the field.

EPSY. 612-3. Family Dynamics. Review and analysis of issues related to families with handicapped or at-risk infants. Topics include coping skills, family involvement, parent-child interaction, and sources of support. Special attention is given to current research and its application to early intervention.

EPSY. 615-4. Psychoeducational Assessment I. This course focuses on the assessment of child and adolescent psychoeducational skills. Primary emphasis is directed toward cognitive/intellectual evaluation in clinical and school settings. Topics include selection, administration, and interpretation of individual intelligence tests; an introduction to psychological report writing and historical, theoretical, and psychometric issues associated with intelligence. Test administration is required. Prer., EPSY. 502, REM. 530.

EPSY. 616-4. Psychoeducational Assessment II. In-depth study of the major techniques of psychodiagnosis and achievement assessment and their applicability to problems found in psychoeducational settings. Administration and interpretation of individual intelligence, special ability, personality, and achievement tests with attention to case study integration is required. Prer., EPSY. 502, REM. 530, EPSY. 615.

EPSY. 617-3. Assessment of Handicapped and At-Risk Infants. This course provides classroom and field-based experience in the assessment of young children birth to three years. Topics include selection, administration, and interpretation of a variety of tests. Norm-referenced and criterion-referenced tests and observational methods will be included.

EPSY. 620-4. School Psychology Practicum. The practicum allows students to integrate theory with school psychology practice. Consultation, psychoeducational assessment, and other school psychological services are stressed. Prer., admission to school psychology program.

EPSY. 621-4. School Psychology Internship. The internship stresses the professional practice of school psychology in a psychoeducational facility. Field experiences will encompass an array of school psychological services. Prer., admission to school psychology program.


Independent Study

EPSY. 950-1 to 4. Independent Study in Educational Psychology.

ELEMENTARY EDUCATION

Program Coordinator: William A. Juraschek
Office: 1250 14th St., Second Floor
Telephone: 556-2717

Faculty: Professors: Norma J. Livo, Glenn E. McGlathery
Associate Professors: William A. Juraschek, Milton Kleg

Two master's degrees in elementary education are offered.

1. Master of Arts (M.A.), Plan I, requiring a minimum of 36 semester hours including 4 hours for a thesis and 4 to 8 semester hours in a minor field.

2. Master of Arts (M.A.), Plan II, requiring a minimum of 36 semester hours with or without a minor (most popular plan).

(For bilingual education and English as a Second Language requirements see Language and Culture.)

Core Courses — 12 Semester Hours

ELED. 521-3. Models of Teaching and Observation (cross-listed with SECE. 521-3)
Area Courses — 15 Semester Hours

One course in each of the following areas:

**LANGUAGE ARTS**

ELED. 532-3. Advanced Language Arts in the Elementary School  
ELED. 534-3. Language Arts in Urban Schools

**SOCIAL STUDIES**

ELED. 545-3. Social Studies in the Elementary School

**SCIENCE EDUCATION**


**CHILDREN'S LITERATURE**

ELED. 531-3. Children's Literature  
ELED. 533-3. Current Literature for Children  
ELED. 573-3. Creative Experience in Literature

**MATHEMATICS EDUCATION**

ELED. 540-3. Contemporary Mathematics in Elementary Schools  
ELED. 544-3. Problem Solving and Geometry in Elementary Schools

Electives — 9 Semester Hours

*Note:* Electives may be any graduate education courses and/or undergraduate courses outside the School of Education that are graduate rank. (An upper division course is graduate rank if it is taught by a member of the graduate faculty.) All courses offered toward a master's degree must be taken within five years of one's graduation date.

**COURSES**

**ELED. 505-3. Mastery Learning.** (SECE. 505.) Stresses the theory and research that support the concept of mastery learning and assists the professional educator in developing the skills necessary for implementation of the theory into classroom practice.

**ELED. 506-3. Improvement of Instruction.** (SECE. 506.) Designed to assist the educator in the systematic improvement of instruction. Emphasis will be on emergent knowledge related to successful classroom practices, techniques of assessment, analysis, and action related to the improvement of professional skills.

**ELED. 508-3. Alternative Teaching Strategies: Varied Goal Structures.** (SECE. 508.) Designed to explore the research as it relates to competitive, cooperative, and individualistic goal structures and to assist the teacher in selecting and implementing the appropriate structure in the classroom.

**ELED. 511-3. Supervision of Student Teachers.** (SECE. 511.) Designed to develop competency in the supervision of student teachers, including building a theoretical framework and developing skills in practical application.

**ELED. 512-3. Microteaching.** (SECE. 512.) Taken after or concurrently with **ELED./SECE. 521, Models of Teaching.** Cannot be taken during first semester in program. Provides extensive clinical supervision through analysis of peer teaching and videotaped presentations in schools. Extensive field placement required.

**ELED. 514-3. Elementary Curriculum: Integrating the Language Arts with Literature.** Integrating the language arts (reading, writing, listening, speaking) with children's literature. Selection of materials and development and presentation of ways to use children's literature in teaching the language arts. Required for post-baccalaureate pre-service teacher.

**ELED. 515-6. Elementary Curriculum: Teaching Mathematics, Science, and Social Studies.** Emphasis will be on the role of the classroom teacher in development, implementation, and evaluation of contemporary curricula. The course will demonstrate the relationship between educational theory and classroom pedagogy and is required for the post-baccalaureate pre-service teacher.

**ELED. 517-3. Community and Interpersonal Relations.** (SECE. 517.) Provides an opportunity for students to develop communication, and interpersonal skills that will enable them to facilitate positive student self-concept and interaction among professional educators, the community and social groups. Exposes students to urban environment.

**ELED. 518-3. Instructional Technology.** (SECE. 518.) Designed to acquaint students with basic procedures to selecting, producing, evaluating, and utilizing instructional media/technology, including microcomputers and television, in the instructional process.

**ELED. 520-3. Classroom Management.** (SECE. 520.) Instructional management, physical management, and behavior management are studied as interactive components in the establishment and maintenance of an effective learning environment.

**ELED. 521-3. Models of Teaching.** (SECE. 521.) Designed for elementary and secondary teachers. Teachers are given oral and descriptive introduction to social, academic, and personal models of teaching.

**ELED. 531-3. Children's Literature.** Reading and evaluation of books for children, information about children's books, children's interest in reading, important authors and illustrators, and problems in the guidance of reading.

**ELED. 532-3. Advanced Language Arts in Elementary School.** Current thought, as determined by research and practice in the various areas of the language arts: listening, speaking, reading, and writing. Issues, trends, and innovative practices are examined.

**ELED. 533-3. 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. Prereq. ELED. 531 or survey course in children's literature.

ELED. 540-3. Contemporary Mathematics for Elementary Schools. Survey of contemporary content and methodology with emphasis on interrelations between topics and techniques of providing active learning.

ELED. 543-3. Topics in Mathematics Education. An in-depth study of topics such as mathematics and learning, geometry, testing, arithmetic, mathematics labs, calculators, and computers. May be repeated as topics vary.

ELED. 544-3. Problem Solving and Geometry in the Elementary School. Covers problem solving, spatial visualization, informal geometry, and turtle geometry with emphasis on incorporating these topics into the elementary curriculum.


ELED. 547-3. Introduction to the Middle School. (SECE. 547.) Covers history and philosophy of the middle school, organization plans, team teaching, integrating content areas, characteristics of the early adolescent, and classroom management.

ELED. 548-3. Museums in Education. (SECE. 548.) For elementary and secondary teachers, this course acquaints teachers with the educational resources extant in public institutions such as museums, zoos, historical societies, etc.

ELED. 549-3. The Middle School Curriculum. This course will explore the unique curriculum requirements of transescent youth. Topics to be addressed include team teaching, interdisciplinary curricula, flexible scheduling, basic skills development, guidance functions, fine arts, practical arts, industrial arts, career education, teaching strategies, and management techniques.


ELED. 566-3. Energy Education. (SECE. 566.) Explores current energy problems. Students will examine such topics as fission for plants, fuels from wastes, fossil fuels, nuclear energy, wind energy, geothermal energy, solar energy, and energy conservation. Included will be a demonstration of available educational resources for grades K-12. The purpose of the course is to make technical aspects of energy accessible to the lay person.

ELED. 570-1 to 4. Advanced Practicum in Teaching. (SECE. 570.) This course is not to be used as independent study, but is to be used by students approved in advance by the dean of the School of Education. Prer., consent of instructor.

ELED. 571-1 to 8. Internship in Elementary Education.

ELED. 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: ELED. 531, 532, 533, or consent of instructor.

ELED. 574-3. Newspaper in Curriculum. Designed to simulate the purposeful use of newspapers to enrich the instructional program in all of the content areas of the school curriculum. The course will include an in-depth study of selection, development, and presentation of newspaper material with implications for teaching methods and techniques.

ELED. 580-1 to 4. Curriculum Workshop for Elementary School Teachers. Opportunity to work on projects and problems in the school in which the student in employed: conferences, study groups, discussion, and work in curriculum construction. Topics vary. Prer., 18 semester hours in education and teaching experience or consent of instructor.

ELED. 591-1 to 4. Readings in Elementary Education.

ELED. 610-3. Seminar: Elementary Education. Students work on individual topics and report orally and in writing.

ELED. 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.


Independent Study

ELED. 950-1 to 4. Independent Study in Elementary Education.

FOUNDATIONS

Program Coordinator: William A. Juraschek
Faculty: Professor: Marie E. Wirsing
Office: 1250 14th St., Second Floor
Telephone: 556-2717

The program in foundations consists of interpretive study of educational beliefs and practices. It combines the scholarly traditions of academic disciplines with the study of educational institutions and problems. Courses are offered in the historical, philosophical, sociological, economic, political, religious, and comparative foundations of education.

Program Requirements

The total minimum preparation for an M.A. degree in foundations of education is 36 semester hours of course work (30 semester hours with thesis). Programs are mutually determined by adviser and student, and each course of study differs as a whole from others.

COURSES

FNDS. 500-3. Teaching as a Profession (Foundations of American Education). A general foundations of education course for preservice candidates. Provides a broad overview of the historical, sociological, philosophical and legal foundations of education. Includes an examination of contemporary issues in schooling, schooling organizational patterns, and the professional rights and responsibilities of the teacher. (Graduate credit, but does not apply toward master's degrees.)

FNDS. 505-3. Critical Issues in American 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.

FNDS. 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.
FNDs. 520-3. Economics of Education. An examination of sources of economic support for education and the impact of education on the national economy.
FNDs. 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.
FNDs. 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.
FNDs. 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.
FNDs. 550-3. Contemporary Philosophies of Education. An examination of selected contemporary philosophies and their impact on educational thought and practice.
FNDs. 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.
FNDs. 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.
FNDs. 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. Prer., at least one graduate level course in foundations and consent of instructor.
FNDs. 590-3. Readings in Foundations of Education. A critical examination of very recent publications in the field of foundations: books and professional journal publications. Prer., at least one graduate level course in foundations and consent of instructor.
FNDs. 595 to 598, 1-3. Special Topics in Contemporary Education. Variable credit courses designed to deal with specific areas of content not covered in depth in other program offerings, e.g., the social structure of the classroom.
FNDs. 637-1. Dissertation Seminar.
FNDs. 670-3. Teaching Internship in Foundations of Education.
FNDs. 693-3. Readings in Foundations of Education.
FNDs. 700-4. Master's Thesis in Foundations of Education.
FNDs. 800-3 to 10. Doctor of Philosophy Dissertation.
FNDs. 801-3 to 10. Doctor of Education Dissertation.

Independent Study
FNDs. 950-1 to 4. Independent Study in Foundations of Education.
FNDs. 960-1 to 12. Independent Study in Foundations of Education.

INSTRUCTIONAL TECHNOLOGY

Program Coordinator: David H. Jonassen
Office: 1250 14th St., Second Floor
Telephone: 556-2717
Faculty: Professor: Minaruth Galey
Associate Professor: Duane Troxel
Assistant Professor: Martin Tessmer
Emeritus: Bettie R. Helser

The library media degree is currently awarded for study in the area of instructional technology (change in degree title being sought). There are four program tracks under this degree program. The Library Media Specialist Certification track is designed to prepare library media specialists (school librarians) for elementary and secondary school library media centers. Upon completion of the program, graduates meet the requirements for K-12 endorsement as library media specialists by the Colorado Department of Education. In addition, an 18-hour program of study meets the requirements for endorsement as an elementary library media specialist. The Corporate Training/Development track is designed to prepare trainers in corporate, agency, and military settings. The program of study is based upon nationally defined competencies and a regional needs assessment. This program track requires study in the College of Business in addition to education. The Instructional Computing Specialist track is designed to prepare instructional computing specialists in schools. These individuals will consult with schools and teachers in the utilization of computer technologies and their meaningful integration into the educational process as well as designing and producing computer-based instruction. The Instructional Technology track provides the opportunity for students to work with a faculty committee in defining an individual program of study in the area of instructional technology. The student needs to have a clear purpose and direction before electing this track. Consultation with a committee is essential.

Curriculum¹

The M.A. degree in education is conferred upon completion of a minimum of 36 semester hours of course work and successful completion of a written four-hour comprehensive examination.

COURSES REQUIRED FOR STATE ENDORSEMENT
IT. 501-3. Instructional Role of Library Media Specialist
IT. 502-3. Selection/Evaluation of Educational Media

¹Program requirements are under revision and are expected to be finalized by fall 1987. Contact the School of Education office for further information.
Corporate Instructional Development and Training Track

This program has been designed to meet the specific instructional needs of trainers in corporate settings. The competencies taught are based upon three separate needs assessments conducted by and with three major professional associations in the field. The program leads to a Master of Arts degree in instructional technology and is designed to prepare graduates for working in the corporate or agency training environment as a trainer or instructional developer. In addition to traditional admission requirements, we intend to accept only outstanding individuals with a professional commitment and outstanding written and interpersonal communication skills.

Graduates of this program will be prepared to assume positions as trainers and/or instructional developers in business, industry, government agencies, military, or other training facilities.

Admission Requirements

In order to be admitted to this program you need to provide evidence of each of the following:

1. Bachelor's degree in a relevant field from an accredited institution of higher education with a grade-point average of 2.85 or higher.
2. Graduate Record Examination score (combined verbal + quantitative) of 950 or higher OR Miller Analogies Test score of 50 or higher.
3. Three letters of recommendation from individuals who are in a position to evaluate your professional competence as well as your potential for graduate study.
4. Test of Written Comprehension from the Educational Testing Service with an acceptable score.
5. A letter of application detailing your educational and professional experiences, your reasons for pursuing graduate study, and the professional contributions which you believe that you will be able to make after completing the degree. There is no interview requirement for this program, so this may be your only opportunity to convince the faculty of your commitment.
6. After admission you will be asked to complete the Survey of Interpersonal Values and the Hill Interaction Matrix-B. This test will not be used in making the admission decision, but rather is intended to assist the faculty in advising you.

Program Requirements

PROFESSIONAL ORIENTATION CORE

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<tr>
<th>Course Code</th>
<th>Course Name</th>
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<tr>
<td>MGT. 681</td>
<td>Human Resource Management</td>
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<tr>
<td>BUS. 604</td>
<td>Human Behavior in Organizations</td>
<td>3</td>
</tr>
<tr>
<td>MGT. 632</td>
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LEARNING FOUNDATIONS CORE

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<thead>
<tr>
<th>Course Code</th>
<th>Course Name</th>
<th>Semester Hours</th>
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</thead>
<tbody>
<tr>
<td>EPSY. 524</td>
<td>Cognition and Instruction</td>
<td>3</td>
</tr>
<tr>
<td>EPSY. 522</td>
<td>Adult Learning and Education</td>
<td>3</td>
</tr>
<tr>
<td>REM. 530</td>
<td>Introduction to Measurement</td>
<td>3</td>
</tr>
<tr>
<td>REM. 540</td>
<td>Introduction to Evaluation of Programs</td>
<td>3</td>
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</tbody>
</table>

INSTRUCTIONAL DEVELOPMENT CORE

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Name</th>
<th>Semester Hours</th>
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<tbody>
<tr>
<td>IT. 511</td>
<td>Instructional Design: Front End Analysis</td>
<td>3</td>
</tr>
<tr>
<td>IT. 512</td>
<td>Instructional Development: Strategy Selection and Development</td>
<td>3</td>
</tr>
<tr>
<td>IT. 515</td>
<td>Analyzing Learner Characteristics</td>
<td>1</td>
</tr>
<tr>
<td>IT. 611</td>
<td>Managing Instructional Development</td>
<td>2</td>
</tr>
<tr>
<td>IT. 612</td>
<td>Instructional Development Consultation</td>
<td>2</td>
</tr>
<tr>
<td>IT. 613</td>
<td>Formative Evaluation of Instructional Materials</td>
<td>2</td>
</tr>
</tbody>
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PRODUCTION CORE (8-9 SEMESTER HOURS)

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Name</th>
<th>Semester Hours</th>
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</thead>
<tbody>
<tr>
<td>IT. 541</td>
<td>Designing Instructional Textual Materials</td>
<td>3</td>
</tr>
<tr>
<td>IT. 561</td>
<td>Developing Interactive Computer Based Programs</td>
<td>3</td>
</tr>
<tr>
<td>IT. 531</td>
<td>Production of Instructional Media Materials</td>
<td>3</td>
</tr>
<tr>
<td>IT. 537</td>
<td>Portable Video Production for Instruction/Training</td>
<td>2</td>
</tr>
<tr>
<td>IT. 532</td>
<td>Audio Production for Instruction</td>
<td>1</td>
</tr>
<tr>
<td>IT. 533</td>
<td>Developing Slide Tape Presentation</td>
<td>2</td>
</tr>
</tbody>
</table>

Total Semester Hours — 42-43
Internship

The internship is the culmination of your program and is completed in lieu of a comprehensive examination and a thesis. It is designed to provide you with the opportunity to apply what you have learned and to develop a portfolio of relevant experience and products that should assist you in placement.

Instructional Computing Specialist Track

This track is intended to develop personnel in schools who are able to administer and meaningfully apply microcomputer technology in various schooling processes. The specialist has responsibilities that include computer skills; curriculum planning and implementation; staff development; hardware and software selection, evaluation, and integration; design, production, and evaluation of courseware; and management of personnel and facilities.

Admission Requirements

1. Bachelor's degree from an accredited institution of higher education with a grade-point average of 2.85, or higher.
2. Graduate Record Examination score (combined verbal + quantitative) of 950 or higher OR Miller Analogies Test score of 45 or higher.
3. Three letters of recommendation from individuals who are in a position to evaluate your professional competence as well as your potential for graduate study.
4. A letter accompanying your application which details your educational and professional experiences, your reasons for pursuing graduate study, and the professional contribution which you hope to make after completing the degree. There is no interview requirement so this may be your only opportunity to convince the faculty of your verbal fluency and your professional commitment.

Note: If you are seeking a position in the public schools, a Colorado Type A teaching certificate is required. A teaching certificate from another state may be accepted, but the Colorado certificate must be acquired prior to completing 12 semester hours of instruction.

Program Requirements

1. 36 semester hours from the following program of study. Instructional Development and Foundations (12 semester hours from courses below)
   - IT. 511-3. Instructional Design: Front End Analysis
   - IT. 512-3. Instructional Development: Strategy Selection and Development
   - REM. 540-3. Introduction to Evaluation of Programs and Persons
   - EPSY. 524-3. Cognition and Instruction
   - EDUC. 585-3. Governance and Administration of Education
   - LC. 504-3. Multicultural Education OR Foundations course

   ELECTIVES (6-9 SEMESTER HOURS SELECTED FROM BELOW)
   - IT. 531-3. Production of Instructional Materials
   - IT. 534-3. Photography in Education
   - IT. 562-3. Authoring Systems and Languages
   - IT. 563-2. Designing Computer-Based Simulations
   - EDUC. 636-3. Administration and Supervision of Elementary School
   - EDUC. 637-3. Administration and Supervision of Secondary School
   - IT. 653-3. Microcomputer Interactive Video Technologies
   - IT. 661-1 to 3. Advanced Courseware Design Seminar
   - IT. 662-3. Intelligent Computer-Based Instruction

   Comprehensive Research Project

   In order to fulfill the comprehensive examination requirement, students will be required to fulfill a Comprehensive Research Project. During the final semester of instruction, you will design, develop, and evaluate alternative versions of a computer-based instructional system. This might entail developing courseware, a support system, computer concept instruction, or another topic. With the assistance and approval of your project adviser, you will identify a problem, two or more solutions to that problem, and systems for solving the problem. You will implement each version and evaluate its effectiveness. You will report the results of your study in a standard research report format. The faculty will emphasize the dissemination of this report in a journal or local, regional, or national conference.

   Instructional Technologist Track

   This track is provided to permit students to specialize in an area of instructional technology not described in the other three tracks. Possible specializations include:
   - Instructional television production
   - Instructional materials production
   - Computer-based instructional system design
   - Health sciences education

   Admission Requirements

   1. Bachelor's degree from an accredited institution with a grade-point average of 2.85 or higher.
2. Graduate Record Examination scores (verbal + quantitative) of 950 or higher OR Miller Analogies Test score of 45 or higher. Note: This requirement may be waived if you have completed a master's degree in a related field prior to application to the program.

3. Three letters of recommendation from individuals who are in a position to evaluate your professional competence as well as your potential for graduate study.

4. A letter accompanying your application which details your educational and professional experiences, your reasons for pursuing graduate study, and the professional contributions which you hope to make after completing the degree. There is no interview requirement, so this may be your only opportunity to convince the faculty of your verbal fluency and your professional commitment.

Program Requirements

Before taking any courses, the student must consult with an adviser, who will identify career aspirations of the student. Based upon those aspirations, the student and adviser will identify a program committee of two faculty members specializing in the area of the aspirations, then design a program of course work.

1. 36 semester hours of course work:

CORE REQUIREMENTS (15 SEMESTER HOURS)

EPSY. 524-3. Cognition and Instruction
IT. 511-3. Instructional Design: Front End Analysis
IT. 512-3. Instructional Development: Strategy Selection and Development
REM. 530-3. Introduction to Measurement
REM. 540-3. Introduction to Evaluation of Programs and Persons
L. C. 504-3. Multicultural Education or Foundations course

Total Semester Hours — 15

ELECTIVES

21 semester hours of course work selected by the student in consultation with the student's committee.

2. Comprehensive Examination. During the final year of enrollment, the student will complete a four-hour written examination covering the curriculum studied. The comprehensive examination may be repeated once.

3. Master's Research Project. During the final semester the student will design, develop, and evaluate an instructional system which reflects the student's specialization. This might entail developing instructional materials, a support system, instruction/training, or another project. With the assistance and approval of the program committee, the student will identify a problem, two or more solutions to that problem, and systems for solving the problem. The faculty will emphasize the dissemination of this report in a journal or local, regional, or national conference.

Library Media Specialist Track

This track is designed to prepare library media specialists (school librarians) for elementary and secondary school media centers (libraries). On completion of this program, graduates meet the requirements for endorsement as media specialists by the Colorado Department of Education. This program is accredited by the North Central Association and the National Council for Accreditation of Teacher Education.

To be endorsed as a library media specialist, an applicant shall hold or be eligible for a Type P or equivalent certificate and shall have completed the following requirements:

1. Hold a master's or higher degree from an accredited institution of higher education and have completed an approved graduate program in educational media in an accepted institution of higher education.

2. Have completed three years of teaching experience and/or school media experience while holding a valid Colorado Type P or equivalent certificate.

3. Have knowledge and skills in the following areas:
   - Administration of a media program
   - Media cataloging and classification
   - Media selection, evaluation, and utilization
   - Media production and design
   - Reference services
   - Research and evaluation
   - Media materials for children and youth
   - Curriculum development and instruction design

4. Have completed a supervised practicum or internship in an elementary and/or secondary school at the appropriate grade level(s) for endorsement (elementary, secondary, or K-12). The practicum or internship may be waived upon comparable media experience.

Admission Requirements

1. Bachelor's degree from an accredited institution with a grade-point average of 2.75 or higher.

2. A Colorado Type P teaching certificate. A teaching certificate from another state may be accepted for admission, but the Colorado certificate must be acquired prior to completing 12 hours of instruction.

3. Graduate Record Examination scores (verbal and quantitative) of 950 or higher OR Miller Analogies Test score of 45 or higher. Note: This requirement may be waived if you have completed a master's degree in a related field prior to application to this program.

4. Three letters of recommendation from individuals who are in a position to evaluate your professional competence as well as your potential for graduate study.

5. A letter accompanying your application which details your educational and professional experiences, your reasons for pursuing graduate study, and the professional contribution which you hope to make after completing the degree. There is no interview requirement, so this may be your only opportunity to convince the faculty of your verbal fluency and your professional commitment.
Program Requirements

1. 37 semester hours of course work:

COURSES REQUIRED FOR K-12 STATE ENDORSEMENT

IT. 501-3. Instructional Role of the Media Specialist
IT. 502-3. Selection/Evaluation of Educational Media
IT. 503-3. School Reference Service
IT. 504-3. Cataloging/Classification of Educational Media
IT. 505-3. Administration of Library Media Programs
IT. 531-3. Production of Instructional Media Materials
ELED. 531-3. Children’s Literature
SECE. 538-3. Adolescent Literature
IT. 601-2. Field Experience in Library Media — Elementary
IT. 602-2. Field Experience in Library Media — Secondary

Total Semester Hours — 28

IT. 552-3. Educational Application of Computer-Based Utility Programs (or equivalent experience)
Education Core Requirement (6-9 semester hours may be required)
REM. 520-3. Introduction to Research Methods
LC. 504-3. Multicultural Education
Course from Foundations area

2. Comprehensive Examination. During the final semester of enrollment, you will complete a four-hour written examination covering the curriculum. The examination may be repeated once.

COURSES

IT. 501-1. Instructional Role of the Media Specialist. Analysis of the instructional and curricular role of the media specialist in selecting, identifying, and producing instructional resources and interacting with faculty. Emphasis on instructional design and curriculum development.
IT. 502-3. Selection/Evaluation of Educational Media. Policies, procedures, selection aids, and evaluation criteria needed to develop and maintain a school library media collection are studied.
IT. 504-3. Cataloging-Classification of Educational Media. Terminology, philosophy, and practice in the application of cataloging, classification, and filing pertaining to various types of media.
IT. 505-3. Administration of Library Media Programs. Problems in the organization and administration of educational media programs that are an integral part of the teaching and learning process in the public schools.
IT. 511-3. Instructional Design: Front End Analysis. Instructional design principles and procedures, including performance analysis, needs assessment, objectives, task analysis, and criterion test design. Required for all instructional technology students.

IT. 513-3. Instructional Message Design. Principles and practices for designing textual, visual, and auditory instructional messages based upon the behavioral sciences.
IT. 515-1. Analyzing Learner Characteristics. An introduction to the analysis of learner characteristics and styles and how they impact on learning, with emphasis on instructional design implications. For students in the corporate training and instructional technologist tracks.
IT. 532-1. Audio Production for Instruction. An introduction to sounding recording, reproduction, editing, and mixing to support audiovisual productions.
IT. 533-2. Developing Slide Tape Programs. Design, script, and develop an instructional slide/tape presentation with an emphasis on the visualization of instructional content.
IT. 536-1. Evaluating and Utilizing Instructional Television. Principles and procedures in evaluating, utilizing, and integrating instructional television into the instructional process.
IT. 538-2. Instructional Video Editing. Fundamentals of and practice in editing instructional television programs.
IT. 541-3. Designing Instructional Textual Materials. Instructional, structural, and typographic principles and techniques for designing print instructional materials, including programmed instruction, job aids, diagrams, documents, electronic text, and information mapping.
IT. 551-1. Selection, Evaluation, and Integration of Microcomputer Courseware. Principles for evaluating and selecting instructional microcomputer software and meaningfully integrating it into the curriculum as well as utilization of procedures for locating and processing the software.
IT. 552-3. Educational Applications of Computer-Based Utility Programs. Utilizing word processing, database management systems, and spread sheets to facilitate learning and managing the instructional process.
IT. 555-2. Information Storage and Retrieval. Examination of the various types of retrieval systems for use in a media program. Several approaches to information retrieval include (1) manual information retrieval systems, (2) whole document retrieval systems, and (3) computer-based retrieval systems.
IT. 557-3. BASIC for Educators. How to design and write BASIC programs to facilitate instruction as well as how to teach BASIC to students.
IT. 558-3. Pascal for Educators. How to design and write Pascal programs on microcomputers to facilitate learning and instruction and how to teach Pascal to students.
IT. 559-3. Logo: Logic, Programming and Instructional Techniques. Principles and powerful ideas of logo, programming in the language, and how to use logo effectively with children.
IT. 561-3. Developing Computer-Based Instruction. Principles of instructional design applied to designing computer-based instruction. Programs may be developed in an authoring system or programming language.
IT. 562-3. Authoring Systems and Languages. Hands-on comparison of various authoring systems and languages for creating interactive, microcomputer-based courseware and interactive videodisc instruction.
IT. 612-2. Instructional Development Consultation. Interpersonal skills used when working with clients, subject matter experts, or teams during instructional development.
IT. 619-1 to 4. Advanced Seminar in Instructional Design/Development. Topical seminars to investigate issues, new models, or techniques in the field of instructional design and development.
IT. 651-3. Computer Graphic Systems. Introduction to electronic graphics technology for educators and instructional designers. Emphasis upon recent advances in computerized processing of imaging data including video capture, image scanning and processing, graphics workstations, computer-aided design (CAD), computer-assisted animation, and desktop publishing as they apply to solving problems in education, business, and industry.
IT. 653-3. Microcomputer Interactive Video Technologies. Study and application of systems combining the unique instructional advantages of video and of microcomputers emphasizing levels of interactivity, program design, hardware/software configurations, data collection, and types of authoring systems and programs.
IT. 661-1 to 3. Advanced Courseware Design Seminar. Exploration of selected topics, issues, and techniques in designing interactive, microcomputer-based instruction and implementation using those techniques.
IT. 662-3. Intelligent Computer-Based Instruction. Application of artificial intelligence principles to the design of computer-based instructional systems.
IT. 691-3. Theoretical Bases for Instructional Technology. Seminar on the theoretical foundations of the field of instructional technology, including behavioral, cognitive, and systems theories. For doctoral students.
IT. 695-3. Learner Based Technologies. Analysis, design, utilization, and implementation of learner oriented instructional activities (soft design technologies), such as study and cognitive learning strategies, neuro-linguistic programming, suggestopedia, and others.
IT. 795-2 to 4. Internship in Instructional Development and Training. Placement in an agency or business where you will function in a consultative relationship with the agency to assess needs, design, develop, and evaluate an instructional system to solve some performance problem.

Independent Study
IT. 950-1 to 4. Independent Study in Educational Media/Technology.

LANGUAGE AND CULTURE

Program Coordinator: Mark A. Clarke
Office: 1250 14th St., Second Floor
Telephone: 556-2717
Faculty: Associate Professor: Mark A. Clarke
Assistant Professor: Ana Maria Villegas

CU-Denver offers a 36-unit program leading to an M.A. in elementary or secondary education with an emphasis in bilingual education or English as a second language.

The program provides theoretical and practical foundation for individuals interested in teaching in bilingual education or ESL programs in the U.S. or abroad, with course work in language teaching methodology, language acquisition, applied linguistics, cross-cultural education, curriculum development, and other areas.

Course Work

Course work is required in three areas:
1. School of Education Core Courses (9 hours minimum)
2. Bilingual Education or English as a Second Language (15 hours minimum)
3. Cognate Courses (12 hours minimum)

Field Experience

The program has been developed as an advanced course of study for practicing teachers or individuals with some teaching experience, whether in BE/ESL or in other areas. All candidates are required to complete some form of field experience. This may take the form of practice teaching, curriculum and materials development, test development, etc. Each person's field experience will be developed individually with an adviser.

Final Project

Plan I: Thirty-six hours plus thesis. The thesis option requires 4 hours of thesis credit in the semester in which the candidate finishes the thesis. Students interested in following this option should begin to identify potential topics and research questions about mid-way in their program.

Plan II: Thirty-six hours plus comprehensive examination. This plan contains two options:
1. A two-hour examination coupled with a research paper or take-home examination. Potential areas to be covered include all course work. Preliminary topics and sample questions are negotiated between the candidate and the adviser.
2. Master's Paper. A scholarly paper of sufficient quality to be submitted to a professional journal. This option includes an oral defense of the paper.
A sampling of current course offerings which may be applied toward the M.A. degree follow.

Core Courses (9 hours minimum)

L C. 504. Multicultural Education
EPSY. 502. Advanced Psychological Foundations of Education
REM. 500. Orientation to Research, Evaluation and Measurement
REM. 520. Introduction to Research Methods
FNDS. 505. Critical Issues in American Education
FNDS. 530. Sociology of Education
FNDS. 541. History and Philosophy of Modern Education
FNDS. 550. Contemporary Philosophies of Education

Bilingual Education/English as a Second Language (15 hours minimum)

L C. 501. Bilingual Multicultural Curriculum Development
L C. 503. Bilingual Bicultural Education
L C. 505. Linguistic and Cultural Issues in Testing and Measurement
L C. 506. Seminar: Bilingual Multicultural Education
L C. 507. Linguistic Analysis of English: Implications for Teaching
L C. 508. Community and Interpersonal Relations
L C. 509. Introduction to Linguistics and Language Learning
L C. 510. Theories and Methods of Second Language Teaching
L C. 511. Second Language Acquisition
L C. 525. Seminar: Teaching English as a Second Language
L C. 580. Sociolinguistics: Language Variations and Its Implications for Teachers
L C. 581. Workshop in Language Acquisition and Development
L C. 582. Techniques in Teaching English as a Second Language
L C. 584. Teaching Reading and Writing in Second Languages
L C. 590. Field Experience in BE/ESL
L C. 609. Research Seminar in Child Language Acquisition

Cognate Courses (12 hours minimum)

A minimum of 12 semester hours is developed around a cognate area. The purpose of the cognate is to give students an opportunity to enlarge their personal and professional scope. The details of each student's cognate field will be developed in consultation with an adviser and a faculty member from the cognate field.

COURSES

L C. 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.

L C. 503-3. Bilingual-Bicultural Education. This survey course provides students with a broad understanding of bilingual-bicultural education. Important issues in the instruction of students of limited English proficiency will be analyzed. Topics to be studied include the theoretical foundations of bilingual-bicultural education, the relationship between language and cognition, literacy in bilingual classes, the organization of instructions in dual language settings, and assessment practices.

L C. 504-3. Multicultural Education. Provides education with an understanding of the pluralistic nature of the U.S., and the role of schools within this societal context. The course will assist educators to work effectively with the heterogeneous student populations found in schools.

L C. 505-3. Linguistic and Cultural Issues in Testing and Assessment. Provides a general orientation to testing and assessment of students. The course will analyze important linguistics and cultural considerations regarding assessment instruments and procedures. Topics to be studied include the history of testing, types of tests, administration of tests, and interpretation of results, current testing trends and implications for the classroom.

L C. 506-3. Seminar: Bilingual-Multicultural Education. Provides advanced students with the opportunity to do comprehensive evaluation of current research, issues, and trends relevant to bilingual-multicultural education.

L C. 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 student's use of linguistic skills to solve teaching problems.

L C. 508-3. Community and Interpersonal Relations. Provides an opportunity for students to develop communication, interpersonal, and human relations skills which will enable them to facilitate positive student self-concept, parent-teacher cooperation, interaction among professional educators, the community, and social groups.

L C. 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 learners, including second-language/dialect speakers. Topics to be covered include nature of language, the structure of English, language variation, language acquisition, language in society, and conversational interaction.


L C. 511-3. Second Language Acquisition. This course provides students with an opportunity to examine the major variables in second language acquisition by children and adults. Both informal and school environments will be studied. The class serves as a foundation for individuals interested in either research or teaching.

L C. 515-3. Interpersonal Competence in the Classroom. Provides educators with an opportunity to examine classroom communication from a sociolinguistic viewpoint. The course focuses on the verbal and non-verbal interaction of teachers.
and pupils. Emphasis is placed on developing an understanding of the interactional demands inherent in recurrent instructional events.

L C. 525-3. Seminar: Teaching English as a Second Language. An issues course for experienced teachers or neophytes who have the prerequisite number of preparatory courses, this seminar is intended as a forum for the discussion and analysis of the important research and pedagogical trends in the field. Students will be provided with the opportunity to research and analyze topics of interest to them.


L C. 581-3. Workshop in Language Acquisition and Development. Provides students with an opportunity to examine current research on language acquisition and development and to apply their knowledge to their own teaching situation. The course focuses on language development and use in educational settings and includes a focus on second-language learners, nonstandard speakers, and bilingual children. Students collect and analyze language samples, evaluate teaching materials, and examine teaching techniques in light of the material covered in the course.

L C. 582-1 to 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 on adult education.

L C. 583-1 to 4. Workshop in Multicultural Education. Provides students with experiences in training in multicultural methodology. How to utilize community members, para-professionals, and peers to facilitate learning in a multicultural environment.

L C. 593-2 to 4. Reading 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.

L C. 609-3 Research Seminar. An advanced course which focuses on specific issues in language, language acquisition, and language teaching.

Independent Study

L C. 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.

READING AND WRITING

Program Coordinator: Mark A. Clarke
Office: 1250 14th St., Second Floor
Telephone: 556-2717
Faculty: Associate Professor: Lynn K. Rhodes
Assistant Professor: Nancy L. Shanklin

The master's program is designed to prepare teachers K-6, 7-12, or K-12. Reading is a credentialed program

meeting the Colorado Department of Education requirements for Reading Teacher Endorsement. Therefore, students who obtain a master's degree in reading education from CU-Denver are certified to hold positions in public and private schools as special developmental and remedial reading teachers K-6, 7-12, or K-12. Additionally, this degree is valuable for elementary and secondary teachers who wish to enhance reading and writing instruction in their classrooms.

By placing emphasis on both reading and writing in the preparation of teachers, the master's program is at the forefront of the field. Both processes are approached from a sociopsycholinguistic perspective that emphasizes children's construction of meaning rather than the learning of isolated skills. Importance is placed on using theory, research, and personal reflection to inform classroom practice. The program prepares teachers to become decision makers capable of developing child-centered curriculums where each student's reading and writing abilities are assessed in order to address developmental or special needs. Special consideration is given to working with diverse ethnic populations.

Curriculum

Course offerings lead to an M.A. degree with a Reading Teacher Endorsement at one of three levels: K-6, 7-12, or K-12. The following core curriculum is required of all students seeking a master's degree regardless of level emphasized.

SCHOOL OF EDUCATION CORE CURRICULUM (9 HOURS)

REM. 500-3. Orientation to research and measurement in education

Two of the following courses under advisement:

EPSY. 510-3. Advanced child growth and educational development or
EPSY. 514-3. Advanced child growth and development
L C. 501-3. Bilingual multicultural curriculum development or
L C. 504-3. Multicultural education
FNDS. Any course, FNDS. 505. or above

READING AND WRITING CURRICULUM K-6 ENDORSEMENT (28 HOURS)

RDG. 500-3. Effective reading and writing instruction: Basal reader programs and thematic units
RDG. 503-3. Reading and writing: Early childhood
RDG. 511-3. Reading: Process, development, and teaching
RDG. 520-3. Writing: Process, development, and teaching
RDG. 540-3. Observing and assessing reading and writing
RDG. 550-3. Reading and writing instruction: Remedial and exceptional students
RDG. 600-4. Seminar and practicum in reading and writing: K-6
L. C. 581-3. Workshop in language acquisition and development
ELED. 531-3. Children's literature
or
ELED. 533-3. Current literature for children
An elective, chosen under advisement

READING AND WRITING CURRICULUM
7-12 ENDORSEMENT (28 HOURS)

RDG. 502-3. Reading and writing strategies: Secondary content areas
RDG. 511-3. Reading: Process, development, and teaching
RDG. 520-3. Writing: Process, development, and teaching
RDG. 540-3. Observing and assessing reading and writing
RDG. 550-3. Reading and writing instruction: Remedial and exceptional students
RDG. 601-4. Seminar and practicum in reading and writing: 7-12
L. C. 581-3. Workshop in language acquisition and development
SECE. 533-3. Seminar in current adolescent literature
or
SECE. 538-3. Adolescent literature
An elective, chosen under advisement

READING AND WRITING CURRICULUM
K-12 ENDORSEMENT (38 HOURS)

RDG. 500-3. Effective reading and writing instruction: Basal reader programs and thematic units
or
RDG. 503-3. Reading and writing: Early childhood
RDG. 502-3. Reading and writing strategies: Secondary content areas
RDG. 511-3. Reading: Process, development, and teaching
RDG. 520-3. Writing: Process, development, and teaching
RDG. 540-3. Observing and assessing reading and writing
RDG. 550-3. Reading and writing instruction: Remedial and exceptional students
RDG. 600-4. Seminar and practicum in reading and writing: K-6
RDG. 601-4. Seminar and practicum in reading and writing: 7-12
L/C. 581-3. Workshop in language acquisition and development
ELED. 531-3. Children's literature
or
ELED. 533-3. Current literature for children
SECE. 533-3. Seminar in current adolescent literature
or
SECE. 538-3. Adolescent literature
An elective, chosen under advisement

Those teachers who want to add a Reading Teacher Endorsement to an already earned master's degree may do so by taking those courses with an RDG. prefix listed under the chosen endorsement level. Also, two additional courses must be taken in other areas specified by the Colorado Department of Education. In many cases, previous master's degree courses will satisfy this requirement.

COURSES

RDG. 500-3. Effective Reading and Writing Instruction: Basal Reader Programs and Thematic Units. Critically examines current basal reader programs and uses and assists teachers in the development of an effective basal reader program. Thematic units are considered and developed as a means of integrating reading, writing, and elementary content areas.
RDG. 502-3. Reading and Writing Strategies: Secondary Content Areas. Explores the value and use of reading and writing in learning in content areas. Provides specific strategies for helping content area teachers integrate the learning of their students through reading and writing.
RDG. 503-3. Reading and Writing: Early Childhood. Provides teachers with a basic understanding of reading and writing development in preschool and early primary grades. Specific strategies are considered for using and teaching reading and writing in early primary grades.
RDG. 511-3. Reading: Process, Development, and Teaching. A variety of reading process theories are examined with a focus on those which are socio-psycholinguistic. The relationship between those process theories and reading development is considered as well as what is known about aspects of reading development. Finally, the relationship between process, development, and teaching is examined in detail.
RDG. 520-2. Writing: Process, Development, and Teaching. A variety of writing process theories are examined with a focus on those which are socio-psycholinguistic. The relationship between process theories and writing development is considered as well as what is known about aspects of writing development. Finally, the relationship between process, development, and teaching is considered in detail.
RDG. 540-3. Observing and Assessing Reading and Writing. Both formal and naturalistic observation and assessment principles are explored in relation to reading and writing. How to give specific tests is covered in detail. The uses of tests in both classroom and pull-out programs are explored. Prereq., RDG. 511, 520, L. C. 581.
RDG. 550-3. Reading and Writing Instruction: Remedial and Exceptional Students. Assists teachers in the discovery and development of current research-based reading and writing instructional strategies designed to help students who are not achieving as expected. Prereq., RDG. 500 or 503 or 502 or 584; RDG. 511, 520, 540.
RDG. 580, 581, 582, 583-1 to 4. Special Topics in Literacy Development and Instruction. Specific topics vary but will include the exploration of literacy development and instruction in particular populations or with specific focuses.
RDG. 591-1 to 3. Selected Readings. Selected readings for advanced study in a specific area of reading/writing instruction or research. Prereq., written consent of instructor.
RDG. 600-4. Seminar and Practicum in Reading and Writing: K-6. Supervised practicum in the evaluation and teaching of reading and writing, grades K-6. Seminar focuses on instructional problems and research-based solutions. Prereq., RDG. 500 or equivalent. RDG. 511, 520, 540, 550, ELED. 531 or equivalent, or consent of instructor.
RDG. 601-4. Seminar and Practicum in Reading and Writing: 7-12. Supervised practicum in the evaluation and teaching of
reading and writing, grades 7-12. Seminar focuses on instructional problems and research-based solutions. Prereq., RDG 502 or equivalent, RDG 511, 520, 540, 550, SECE 538 or equivalent, or consent of instructor.

Independent Study

RDG 950-1 to 4. Independent Study: Reading/Writing. Intended only for those who wish to study along lines not followed by courses. Prereq., written consent of instructor.

RESEARCH AND EVALUATION METHODOLOGY

Coordinator: Laura D. Goodwin
Office: 1250 14th St., Second Floor
Telephone: 556-2717
Faculty: Professor: William L. Goodwin
Associate Professor: Laura D. Goodwin

This area provides a service to all education master's programs, offering courses in research methods, evaluation, and measurement. There is also a REM emphasis within the educational psychology master's degree program.

COURSES

REM 500-3. Orientation to Research and Measurement in Education. A survey-type course that provides an overview to the research process and to various types of research, and to major concepts and techniques in educational measurement. The emphases are on: 1) critiquing in educational research studies; and 2) critiquing tests and other measures used in educational research as well as for other assessment purposes. A limited coverage of statistics is included.
REM 510-3. Basic Statistics. A first-level course that is oriented to the use and interpretation of descriptive and inferential statistics. Topics covered include frequency distribution, measures of central tendency, measures of variability; contingency tables, chi square; scattergrams, correlation and regression; t-test and analysis of variance.
REM 520-3. Introduction to Research Methods. A survey-type course that examines the purposes of research, the methods and designs of quantitative and qualitative research, and the processes involved in research studies. The methods of research examined include experimental designs, quasi-experimental designs, descriptive surveys, case studies, ethnographies, and correlational designs. Designing a research study is part of the course activities.
REM 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, norms, interpretation of scores, response sets, fairness in testing, and norm-referenced vs. criterion-referenced tests. A variety of instruments that are used to measure human attributes and behaviors are studied. Prereq., REM 500, 510, or consent of instructor.
REM 535-3. Workshop in Instrument Development. Oriented toward providing an opportunity to learn the art and technology of developing different measurement tools in education. Students will develop an instrument of their own design. Topics vary.
REM 540-3. Introduction to Evaluation of Programs and Persons. A first-level course that examines the models and methods of evaluating programs and persons in education and related fields, such as business and nursing. Particular emphasis is given to the topics of formative and summative evaluation, frameworks for program evaluation, teacher evaluation, merit pay, and the measurement and design problems associated with each topic.
REM 570-1 to 3. Practicum in Research and Evaluation Methodology. Supervised work in projects that would provide for experience in data analysis, research, measurement, or evaluation.
REM 591-1 to 3. Readings in Educational Statistics.
REM 592-1 to 3. Readings in Educational Research.
REM 593-1 to 3. Readings in Educational Measurement.
REM 594-1 to 3. Readings in Program Evaluation.
REM 613-3. Intermediate Statistics. A continuation of REM 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, multiple comparisons, partial correlation, multiple correlation and regression, analysis of covariance, and selected use of packaged statistical programs. Prereq., REM 510 or equivalent.

Independent Study

REM 950-1 to 4. Independent Study in Research and Evaluation Methodology.

SECONDARY EDUCATION

Program Coordinator: William A. Juraschek
Office: 1250 14th St., Second Floor
Telephone: 556-2717
Faculty: Professors: Norma J. Livo, Glenn E. McGlathery
Associate Professors: William Juraschek, Milton Kleg
Assistant Professor: John Lofty

Two master's degrees are offered in secondary education.
1. Master of Arts (M.A.), Plan I, requiring a minimum of 36 semester hours including 4 hours for a thesis and 4 to 8 hours in a minor field.
2. Master of Arts (M.A.), Plan II, requiring a minimum of 36 semester hours with or without a minor (most popular plan).

Core Courses (12 Semester Hours)

SECE 521-3. Models of Teaching and Observation (cross-listed with ELED. 521-3)
REM 500-3. Orientation to Research and Measurement in Education
Two of the following three courses:
L C. 504-3. Multicultural Education
FNDS. Any foundations course is acceptable except
FNDS. 500

The remainder of the hours can be taken from among
graduate offerings within the School of Education or
within other departments at CU-Denver. Within this
framework, there is flexibility for individualized pro-
grams for teachers of social studies, language, sciences,
and mathematics. Those courses in departments other
than education may be upper division undergraduate if
they are taught by a member of the graduate faculty. The
candidate's adviser must approve such courses if they are
to be included as part of the program.

Minor Requirement

The purpose of a minor in the M.A. program is to
expand the candidate's background in a specific area of
interest. The minor is to be in a field other than second-
ary education and must have the approval of the minor
department.

COURSES

SECE. 505-3. Mastery Learning. (ELED. 505.) Stresses the
theory and research that support the concept of mastery learn-
ing and assists the professional education or in developing
the skills necessary for implementation of the theory into class-
room practice.

SECE. 506-3. Improvement of Instruction. (ELED. 506.)
Designed to assist the educator in the systematic improve-
m ent of instruction. Emphasis will be on emergent knowledge
related to successful classroom practices, techniques of assess-
ment, analysis and action related to the improvement of pro-
fessional skills.

SECE. 508-3. Alternative Teaching Strategies: Varied Goal
Structures. (ELED. 508.) Designed to explore the research as
it relates to competitive, cooperative, and individualistic goal
structures and to assist the teacher in selecting and imple-
menting the appropriate structure in the classroom.

SECE. 510-3. Individual Education in Secondary Schools. An
individualized course which aids teachers in individualizing
programs in their schools.

SECE. 511-3. Supervision of Student Teachers. (ELED. 511.)
Designed to develop competency in the supervision of student
teachers including building a theoretical framework and
developing skill in practical application.

SECE. 513-2. Microteaching. (ELED. 513.) Taken after or con-
currently with ELED./SECE. 521-3. Models of Teaching. Can-
ot be taken first semester in program. Provides extensive
clinical supervision through analysis of peer teaching and
videotaped presentations in schools. Extensive field place-
ment required.

SECE. 517-3. Community and Interpersonal Relations.
(ELED. 517.) Provides an opportunity for students to develop
communication, interpersonal, and human relations skills
which will enable them to facilitate positive student self-
concept, parent-teacher cooperation, interaction among pro-
fessional educators, the community, and social groups.

SECE. 518-3. Instructional Technology. (ELED. 518.)
Designed to acquaint students with the basic procedures for
selecting, producing, evaluating, and utilizing instructional
media/technology including microcomputer and television in
the instructional process.

SECE. 520-3. Classroom Management. (ELED. 520.) Instruc-
tional management, physical management, and behavior
management are studied as interactive components in
the establishment and maintenance of an effective learning
environment.

SECE. 521-3. Models of Teaching. (ELED. 521.) Designed for
elementary and secondary teachers. Teachers are given oral
and descriptive introduction to social, academic, and personal
models of teaching.

SECE. 525-3. Theory and Practice in Teaching English. Curricu-
ulum, materials, methods, evaluation, and related aspects of
instruction. This course is designed to integrate content and
methodology.

SECE. 533-3. Seminar in Current Adolescent Literature. In-
depth study and evaluation of books and films that can be
used successfully with junior and senior high school students.
Emphasis on materials published during the past two years.

SECE. 535-3. Issues and Problems in Science Education.
Recent developments in theory, curriculum, methods, and
materials in secondary science, examined for their contribu-
tion to the objectives of science education.

SECE. 536-3. Supervision of Science Curriculum. Workshop
for supervisors of science in city school systems; basic content
in science fields.

SECE. 538-3. Adolescent Literature. Reading and evaluation
of books for junior and senior high school pupils. Emphasis
on modern literature.

SECE. 540-3. Curriculum in Secondary Mathematics. Investi-
gation of curriculum in middle and high school mathemat-
ics, development, history and trends, and pertinent
research. Participants construct and share curriculum relevant
to their interest.

SECE. 541-3. Advanced Methods and Strategies in Secondary
Mathematics. In-depth investigation of specific methods and
strategies suitable for teaching mathematics for middle and
senior high schools. Participants model and share various
strategies including the expository, discovery, laboratory, and
Socratic methods.

SECE. 542-3. Teaching Mathematics to Low Achievers.
Problems and characteristics of low achievers, motivation,
atitudes, use of materials, what materials are available, pro-
grams for low achievers, mathematics laboratory, activity
approach to teaching mathematics. Emphasis on middle
school (5-9).

SECE. 543-3. Teaching Aids in Mathematics Education. Exami-
nation, production, and use of manipulative aids, audiovisual
aids, and other materials for teaching mathematics. Open to
elementary and secondary teachers.

SECE. 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.

SECE. 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 present
practices analyzed for their contribution to general goals of
social studies education. Appropriate for teachers in grades
7-12, but also profitable of elementary teachers with a spe-
cialization in social studies.
SECE. 547-3. Introduction to the Middle School. (ELED. 547.) Covers history and philosophy of the middle school, organization plans, team teaching, integrating content areas, characteristics of the early adolescent, and classroom management.

SECE. 548-3. Museums in Education. (ELED. 548.) For elementary and secondary teachers, this course acquaints teachers with the educational resources extant in public institutions such as museums, zoos, historical societies, etc.

SECE. 549-3. The Middle School Curriculum. (ELED. 549.) This course will explore the unique curriculum requirements of transescent youth. Topics to be addressed include team teaching, interdisciplinary curricula, flexible scheduling, basic skills development, guidance functions, fine arts, practical arts, industrial arts, career education, teaching strategies, and management techniques.

SECE. 559-3. Design and Analysis of Instructional Systems. Covers the theoretical rationale underlying recent advances in instructional design. Students are also expected to develop and assess materials in their own area of specialization.


SECE. 566-3. Energy Education. (ELED. 566.) Explores current energy problems. Students will examine such topics as fuels from plants, fuels from wastes, fossil fuels, nuclear energy, wind energy, geothermal energy, solar energy, and energy conservation. Included will be a demonstration of available educational resources for grades K-12. The purpose of the course is to make technical aspects of energy accessible to the lay person.

SECE. 570-1 to 4. Advanced Practicum in Teaching. This course is not to be used as independent study but is to be used by students approved in advance by the dean of the School of Education. Prer., consent of instructor.

SECE. 571-3. Internship in Secondary Education.

SECE. 574-3. Newspaper in the Curriculum. Designed to stimulate the purposeful use of newspapers to enrich the instructional program in all of the content areas of the school curricula. The course will include an in-depth study of selection, development, and presentation of newspaper material with implications for teaching methods and techniques.


SECE. 591-1 to 4. Readings in Secondary Education.


SECE. 700-4 Master's Thesis.


Independent Study

SECE. 950-1 to 4. Independent Study in Secondary Education.

SPECIAL EDUCATION/EDUCATIONALLY HANDICAPPED

Program Coordinator: Laura D. Goodwin
Office: 1250 14th St., Second Floor
Telephone: 556-2717
Faculty: Associate Professor: Anne H. Widerstrom

CU-Denver offers a master's degree (or endorsement only) program in the area of the educationally handicapped (EH). Students completing the master's degree or endorsement programs will be certified to teach both perceptually-communicatively disordered (PCD) and severely impaired emotionally or behaviorally disordered (SIEBD) children, grades K-12, in the state of Colorado.

The EH program is a comprehensive course of study emphasizing both theoretical knowledge and practical skills. The program is interdisciplinary in nature, drawing from the fields of special education, educational psychology, reading, and curriculum. Course work entails 48 semester hours of classroom and field experiences, including 3 semester hours of practicum in PCD classrooms and 3 semester hours of practicum in SIEBD classrooms at both the elementary and secondary levels. Each practicum requires at least 180 clock hours of field-based experience. Students should arrange to have one semester available for full-time practicum after most course work has been completed.

EH Endorsement Only Program

Applicants to the EH endorsement only program must already possess a master's degree in a related field, have a Type A or B certificate, and meet all of the general requirements for admission to the master's degree program. However, in most cases, endorsement only applicants will not be required to submit GRE scores.

Required Courses

PREREQUISITE — 3 HOURS

SPED. 500. Education of the Exceptional Child

CORE REQUIREMENTS — 9 HOURS

REM. 510. Basic Statistics

EPSY. 510. Child Development

or

EPSY. 514. Adolescent Psychology

L.C. 504. Multicultural Education

BACKGROUND COURSES — 12 HOURS

L.C. 581. Language Acquisition and Development

REM. 530. Introduction to Measurement

EPSY. 502. Advanced Psychological Foundations: Theory and Research Education

EPSY. 512. Behavioral Analysis

SPECIAL EDUCATION COURSES — 21 HOURS

EPSY. 516. Behavior Disorders

1Course requirements for students seeking EH endorsement only will be determined on an individual basis.
COURSES

SPED. 500-3. Education of Exceptional Children. This course provides an overview of all of the major categories of exceptionality. Emphasis is on historical perspectives, definitions, major theoretical viewpoints, and service delivery models within each category.

SPED. 501-3. Mainstreaming the Exceptional Child in the Regular Classroom. A review of the major handicapping conditions. Emphasis is on theory and specific practices to assist regular classroom teachers to accommodate handicapped learners in their classroom.

SPED. 510-3. Introduction to Language and Learning Disabilities. An introduction to the field of learning disabilities. A historical framework and definitional issues will be considered. Most of the course will focus on current research issues of special interest to the practitioner in the field of learning disabilities and related fields.

SPED. 514-3. Advanced Assessment of Educationally Handicapped Students. A review of principles and practices of assessment. Both formal and informal procedures will be covered with emphasis on their use with special education populations at the elementary and secondary levels.


SPED. 540-3. Seminar in Special Education. Current issues in the field of special education are discussed each term. They include innovations in assessment and intervention, community liaison, interdisciplinary teams, legal issues involved in service delivery, consultation with parents, theoretical and research issues, and topics relative to minority children. Prer., SPED. 510, 514, 520; EPSY. 516.


SPED. 569-3. Practicum in Emotional Disturbances. Consists of 3 semester hours of credit in an ED/BD classroom.

SPED. 580-3 to 4. Workshop: Topics in Special Education. Topics vary from semester to semester. Prer., consent of instructor.

SPED. 700-4 Master's Thesis.

Independent Study

SPED. 950-1 to 4. Independent Study in Special Education.
"You are the cause of everything that happens to you. Be proud of what you cause."

— Resident Dean Paul E. Bartlett
College of Engineering
and Applied Science

Civil engineering students acquire valuable skills in CU-Denver's earthquake lab that tests different soils under varying pressures.
The College of Engineering and Applied Science at the University of Colorado at Denver, continuing a sixty-year tradition, is meeting this need by providing nationally accredited engineering education to the urban community at times (evening and daytime) convenient to both students and employers.

CU-Denver is the only institution in the Denver metropolitan area where the working individual can earn both undergraduate and graduate degrees in engineering entirely through evening studies. The College offers degree programs in civil engineering, mechanical engineering, applied mathematics, electrical engineering, and computer science. The programs are attractive to those students who recognize the tremendous value of simultaneous professional studies and related employment. The urban setting also attracts those students who, for economic reasons, are living at home while they earn their degrees.

Practicing engineers, through evening studies at CU-Denver, can improve and update their professional capabilities as well as earn graduate degrees in the above programs. Technical updating, with or without pursuing an advanced degree, becomes more and more critical each year for changing job responsibilities and future opportunities.

Engineers also can obtain graduate education in management, computer science, behavioral science, or other areas, together with new engineering skills in their field through the special interdisciplinary Master of Engineering degree program. In addition, an interdisciplinary Master of Science in environmental science is offered.

The expertise of the growing faculty of the College includes soil dynamics, dynamic behavior of structures, transportation, language-based computer architecture, highly parallel computer systems, communications and signal processing, computer graphics, computer-aided design, alternative energy sources, robotics, and biomechanics, in addition to the traditional areas in civil, electrical, computer, and mechanical engineering.

The College is pleased to have the executive offices of the Colorado Minority Engineering Association (CMEA) located in engineering at CU-Denver. The College is committed to supporting this state-wide CMEA program which is designed to help prepare minorities and women in local junior and senior high schools for entry into university engineering programs.

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.

A listing of the fields in which engineers work would have many hundreds of entries. The following list gives only a brief summary of the fields available at CU-Denver.

**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.

**Civil Engineering** offers an interesting and challenging career 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 regulation 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 mankind's physical environment and the growth of cities.

**Computer science and engineering** involves work in the theory, design, and application of computers and computational methods. It includes design and construction of efficient software systems as well as hardware design and manufacture. The application of microprocessors to many areas of engineering has opened new opportunities in computer engineering and computer science.

**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 products for private industry or government; and sales or management for a private firm or branch of government. There are numerous specialties within electrical engineering. Among them are the design and application of computer systems; electromagnetic fields, which are basic to radio, television, and related systems; communication theory and signal processing; electrical machinery; solid-state, integrated-circuit, and electron devices; energy and power control systems; and others.

**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. Typical starting assignments for the graduating senior include positions with oil, construction, and automotive industries, or in computer-aided design/computer-aided manufacturing (CAD/CAM).

### Undergraduate Degree Programs

The College of Engineering at the University of Colorado at Denver offers the following engineering bachelor degree programs.

- Applied Mathematics
- Civil Engineering
- Computer Science and Engineering
- Electrical Engineering
- Mechanical Engineering

The civil, electrical, and mechanical engineering programs are currently accredited by the Engineering Accreditation Commission (EAC) of the Accreditation Board for Engineering and Technology (ABET).

### Availability of Degree Programs

The University of Colorado at Denver will accept for matriculation only those prospective engineering students who designate a degree program awarded by the CU-Denver College of Engineering and Applied Science. For 1987-88, the following engineering degrees are awarded by CU-Denver: civil engineering, computer science and engineering, mechanical engineering, electrical engineering, and applied mathematics. **Students desiring degree programs other than those named above must apply to the campus awarding the degree.** In some cases, the University campus accepting the student may grant permission to take courses on another CU campus, subject to enrollment limitations. In such cases, the engineering department of the admitting campus will counsel the student in the preparation of course schedules.

At CU-Denver 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. Students interested in combinations of degree programs, or any other variation of a typical degree program, should see a counselor promptly upon acceptance into the college. Such programs usually require students to begin their degree plans very early.

A second bachelor's degree may be of interest to some students. 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.

### Graduate Degree Programs

CU-Denver offers graduate degree programs in civil engineering, computer science, electrical engineering, mechanical engineering, and applied mathematics. Information on courses and requirements is found under the discipline heading in this section of the bulletin.

### Summer Courses

Summer term courses are planned for regular students and those who must clear deficiencies. Courses also are offered for high school graduates who wish to enter as freshmen and for those who need to remove subject
deficiencies. Students should write to the CU-Denver Office of Admissions and Records for the Schedule of Summer Classes.

For some students there are advantages in starting their college careers during the summer term. Most required freshman and sophomore courses and many elective courses are offered at CU-Denver during the summer. 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.

Cooperative Education

Many students who need or prefer to work while completing their degrees are exploring cooperative education offered through the Center for Internships and Cooperative Education. This program is available to students who have completed their freshman year and have maintained a grade-point average of at least 2.5. See the General Information section of this bulletin.

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. Applications are available in October or November for the following academic year.

A limited number of partial tuition scholarships are available for new engineering freshman and transfer students. The application deadlines for these scholarships are July 15 for the Fall Semester and December 15 for the Spring Semester. Contact the dean's office, UA 516.

Student Organizations

A general student organization, known as the Associated Engineering Students (AES), of which all students in the College are members, has supervision of matters of interest to the whole group.

Student chapters of the following professional societies are well established at CU-Denver:

- American Society of Civil Engineers (ASCE)
- American Society of Mechanical Engineers (ASME)
- Institute of Electrical and Electronic Engineers (IEEE)
- Society of Women Engineers (SWE)

These societies meet frequently to present papers, speakers, films, and other programs of technical interest.

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

Center for Urban Transportation Studies

The Center for Urban Transportation Studies (CUTS), operating under the Department of Civil 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. Degree programs are available through the College of Engineering and Applied Science, College of Liberal Arts and Sciences, Graduate School of Public Affairs, Graduate School of Business Administration, and School of Architecture and Planning. For more information call (303) 556-2914, or write to CUTS, University of Colorado at Denver, 1100 14th Street, Denver, CO 80202.

OTHER UNIVERSITY CAMPUSES

University of Colorado at Boulder

Six departments of the College of Engineering and Applied Science are located on the campus of the University of Colorado at Boulder. Complete B.S., M.S., and Ph.D. degree programs are offered by the Department of Aerospace Engineering Sciences, the Department of Chemical Engineering, the Department of Civil, Environmental, and Architectural Engineering, the Department of Computer Science, the Department of Electrical Engineering, and the Department of Mechanical Engineering. Undergraduate and graduate degrees also are offered in applied mathematics and engineering physics. The programs at the Boulder campus are primarily oriented to the full-time student who can attend day classes.

University of Colorado at Colorado Springs

Three departments of the College of Engineering are located on the campus of the University of Colorado at Colorado Springs (UCCS). Complete B.S. degree programs are offered in electrical engineering and computer science, and the M.S. degree is awarded in electrical engineering. Students may complete work for the Ph.D. degree through the University-wide Graduate School.
The UCCS Department of Mathematics also is a department of the College of Engineering and offers the B.S. and M.S. degrees in applied mathematics.

**Requirements for Admission**

The student must meet the admission requirements described in the General Information section of this bulletin and of the College of Engineering at which the degree program selected by the student is offered. CU-Denver currently offers the following programs: civil engineering, computer science and engineering, electrical engineering, mechanical engineering, and applied mathematics. Persons of sufficient maturity and experience who do not meet the prescribed requirements for admission may be admitted upon approval of the resident dean.

Beginning students in engineering should be prepared to start analytic geometry-calculus. No credit toward any degree in engineering will be given for algebra, trigonometry, or precalculus mathematics (Math.101,111,112,and 113), but these courses will be offered to allow a student to make up deficiencies. Any student who questions the adequacy of his or her precollege background in mathematics should contact the College office. Diagnostic tests covering precalculus mathematics are at the Auraria Book Center 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.

**Freshmen**

<table>
<thead>
<tr>
<th>High School Subjects</th>
<th>Required</th>
</tr>
</thead>
<tbody>
<tr>
<td>Required for Admission¹</td>
<td>Units²</td>
</tr>
<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 (trigonometry recommended)</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>3</td>
</tr>
<tr>
<td>(Foreign languages and additional units of English, history, and literature are included)</td>
<td>3</td>
</tr>
<tr>
<td>Electives³</td>
<td>3</td>
</tr>
<tr>
<td>Total</td>
<td>16</td>
</tr>
</tbody>
</table>

¹Applicants not meeting these requirements will be considered on an individual basis. A student who is not prepared should expect to make up deficiencies.

²A unit of work in high school is defined as a course covering a school year of not fewer than 36 weeks, with five periods of at least 40 minutes per week. (Two periods of manual training, domestic science, drawing, or laboratory work are equivalent to one period of classroom work.) This is equivalent to 180 actual periods per unit. Fractional credits of value less than one-half unit will not be accepted. Not less than one unit of work will be accepted in a foreign language, elementary algebra, geometry, physics, chemistry, or biology.

³Electives may be chosen from any of the high school subjects (except physical education) which are accepted by an accredited school for its diploma and which meet the standards as defined by the North Central Association. However, not more than two units will be considered from drawing, shop, or other vocational work; courses that have descriptive geometry features may be considered for elective units beyond the recommended units.

**Former Students**

Former students must meet the readmission requirements outlined in the General Information section of this bulletin.

Students who interrupt their course of study for an extended period may be required to take any preparatory courses which have been added during their absence or to repeat courses in which their retention is dated.
TRANSFER STUDENTS

Students transferring from other accredited collegiate institutions will be considered for admission on an individual basis if they meet the requirements outlined in the General Information section of this bulletin and have successfully completed a year each of calculus and physics (calculus based).

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 of the following conditions are fulfilled:

1. Enrollment limitations permit.
2. The student's prior academic record includes successful completion of a year each of calculus and physics (calculus based).

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 toward 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 2.0 cumulative grade-point average for all courses attempted, for all courses taken from the student's major department, and for all courses that count toward graduation requirements. If not an engineering student, the student's academic record fulfills the transfer admission requirements of the College of Engineering and Applied Science.

Interdepartmental transfers, whether on the same campus or from one campus to another within the College of Engineering, require the approval of both the gaining and losing departments in addition to the intercampus and intrauniversity transfer requirements listed above.

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 advisers on both campuses 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 official transcripts to the University of Colorado, Office of Admissions and Records, that office 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 sent to the student and to the resident dean's office 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 128-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 should be aware 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 transfer students, after having completed the 30 semester credit hours at the University of Colorado, to request final validation of the credits by their department and to have this validation noted on the Statement of Advanced Standing kept in the resident 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 advisor and complete a petition to the resident 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. This is insufficient proof that the courses are equivalent to engineering courses because of emphasis that is nonmathematical or otherwise divergent emphasis.

In order to assist engineering technology students with transfer planning, 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 requirement for 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 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 at Denver 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. 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 will be limited to not more than 4 hours each.

**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. Student who, for illness or other good reason, misses a final examination must notify the instructor or the resident 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. (See also discussion of interdepartmental transfer requirements under Transfer Students.)

**College-Level Examination (CLEP) Credit**

Prospective students may earn college-level credit through the College-Level Examination Program (CLEP) subject examinations, provided that they score at the 67th percentile or above. Departments will advise students of the credits accepted for such courses. A list of subjects in which CLEP examination credit will be accepted may be obtained from the College of Engineering and Applied Science office. (See also College-Level Examination Program in the General Information section of this bulletin.) (CLEP general examinations are not acceptable.)

**Counseling**

Freshman students are counseled by the resident 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 contact the departmental office for advising appointments.

**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 the student has the capability to handle the added load. Permission to take more than 21 hours may be granted only after written petition and approval of the departmental chairman and the resident dean.

**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 hours per week — three courses (maximum of 12 semester hours)
- Employed 20 hours per week — four courses (maximum of 15 semester hours)
- Employed 10 hours per week — five courses (maximum of 18 semester hours)

**Freshman Year**

Fundamentals taught in the freshman year are of critical 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**

Students are expected to successfully complete (C or higher) their courses in a timely manner (first attempt). Students may not register for credit in a course in which they already have received a grade of C- or higher. Students must repeat a course in which a grade of D+ or lower was earned if that course is a prerequisite to another required course. An F grade in a required course necessitates a subsequent satisfactory completion of the course. If a student does not successfully complete (i.e.
receive a grade of C- or higher) an engineering class on the second attempt, the student will need, via a petition, written approval from his/her major department to enroll for the course for the third time.

No Credit

An engineering student must petition for approval before enrolling no credit (NC) for any course. Required courses may not be taken for no credit. Once a course has been taken NC, the course cannot be repeated for 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 hours required for an engineering degree.

College Policy on Academic Progress

An engineering student must maintain a cumulative grade-point average of 2.0 or better, in all hours attempted at the University of Colorado, in those courses required toward graduation requirements, and in all courses taken from the student’s major department in order 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 or lack of progress toward the Bachelor of Science degree in the College of Engineering and Applied Science.

Students whose average falls below 2.0 in any of the three categories listed above will be placed on probation for the next semester in which they are enrolled in the College and will be so notified. If, after the probationary 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 readmission during the second semester following their suspension if they bring their University of Colorado cumulative average up to a 2.0 through summer session, and/or correspondence work applying to engineering degree requirements as approved by a member of the Academic Progress Committee.

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

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 (see employed student suggested course load) 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 the required 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. (No additional probationary semester is permitted).

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 Resident Dean, Room UA 516.

In addition to College policies, departments within the College may set standards of progress within their department and students should make a point of knowing what they are through their adviser.

Academic Ethics (Dishonesty, Cheating)

Students are expected to conduct themselves in accordance with the highest standards of honesty and integrity. Cheating, plagiarism, illegitimate possession and disposition of examination, alteration, forgery, or falsification of official records, and similar acts or attempts to engage in such acts are grounds for suspension or expulsion from the University.

In particular, students are advised that plagiarism consists of any act involving the offering of the work of someone else as the student’s own. It is recommended that students consult with their instructors as to the proper preparation of reports, papers, etc., in order to avoid this and similar offenses.

At CU-Denver there is a code of Student Standards of Conduct. A copy of the code and information regarding all student grievance procedures may be obtained in the Student Academic Services office.

In addition, the College has a Committee on Discipline which hears cases of alleged violations of academic ethics and recommends disciplinary action when and if appropriate. Students who suspect or observe violations of academic ethics should report them to their instructor, the department chairman, or the office of the dean.

Grading System, Incompletes, 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 Classes.

**GRADING SYSTEM**

It is particularly important to note that in the College of Engineering and Applied Science courses to be counted toward fulfilling the graduation requirements cannot be taken no credit (NC).

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

**INCOMPLETES**

An incomplete may be given by the instructor for circumstances beyond the student's control, such as a documented medical or personal emergency. When it is given, the student, the resident dean's office, and the departmental office are informed, in writing, by the instructor who states what the student is to do in order to remove the incomplete and when the tasks are to be completed. The instructor may assign only the I/F grade. The student is expected to complete the course requirements, e.g., the final examination or term paper, within the established deadline and not to retake the entire course. The grade will be converted automatically to a grade of F after one year unless the specified work is completed.

**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 upper division social-humanistic elective courses without serious risk to their academic records. In general pass/fail should be limited to 300- or 400-level social-humanistic courses. Students must process the pass/fail form during the first two weeks of the semester. Engineering students cannot take required courses pass/fail. 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. An engineering student who has not designated a major field will not be allowed the pass/fail option without approval through the resident dean's office.

3. A transfer student may count toward graduation one 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 may not enroll for pass/fail courses.

**DROP/ADD**

See the General Information section of this bulletin for drop/add procedures and deadlines. 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.

The course requirements during the freshman year are detailed within the curriculum given under each department.

Some 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 qualified students of more than usual ability who feel they can profit from additional study.

Students who receive a grade of D + or lower 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 admitted to double degree programs.

**Graduation with Honors**

In recognition of high scholarship and professional attainments, Honors, Special Honors, or With Distinction may be awarded at graduation (at the discretion of the Engineering Honors and Recognition Committee). These honors are recorded on the diploma of the graduate and indicated in the commencement program. Grades earned during the semester preceding graduation will not be considered.

For Special Honors, a student must have a cumulative grade-point average of at least 3.80 and for Honors an average between 3.60 and 3.79. With Distinction is awarded at the discretion of the committee.

Transfer students to be considered for honors will be expected to complete a minimum of one-half of their work at the University of Colorado. Grades earned at other institutions will not be considered. Transfer students must have completed at least 50 hours at CU before their last semester.
Social-Humanistic Content of the Engineering Curriculum

The faculty of the College of Engineering and Applied Science requires that 18 semester hours shall be considered the minimum of social-humanistic content of the degree-granting departments. However, some departments require 24 semester hours and some departments may specify particular courses that must be taken.

Six hours of social-humanistic subjects should be taken at the junior level and 6 at the senior level. These subjects should be taken from the following categories, with no more than half from any one of the three categories listed below:

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

Courses such as accounting, contracts, management, elementary foreign languages, public speaking, and technical writing should be used as technical electives where applicable. (Elective courses are to be coordinated with the faculty adviser.) Qualified students are encouraged to take appropriate honors courses for social-humanistic electives.

The Humanities and Literature Program is designed to develop communication and analytical skills which are essential for every professional person. Engineering students may select courses from the three components of the program:

1. Hum. 101, an interdisciplinary, team-taught class, is a core course in the Honors in Humanities Program offered by the College of Liberal Arts and Sciences.
2. A sequence of seven Great Books courses. This series, chronologically arranged, begins with the Classical Heritage and ends with Contemporary World Literature. Students may take any of these courses. They need not be taken in order; rather, students should choose those historical periods of most interest to them. (The sequence is ENGL 251, 252, 253, 254, 256, 257, 258, — see the English course descriptions for details.)
3. ENGL 120, Introduction to Fiction, and ENGL 130, Introduction to Poetry and Drama, focus on methodology more than the Great Books sequence, dealing with analyses of literary forms and structures. Students must determine through their major department adviser the specific requirements of their particular degree programs with respect to humanities and literature.

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 128 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-engineering program vary by departments; as a guide, 158 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, for all required courses, and for all courses taken from the student's major department. 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.

Incompletes and Correspondence Courses. It is the student's responsibility to ensure 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-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 are held in May. Students finishing in December and August may attend commencement the following May or receive diplomas by mail.

UNDERGRADUATE DEGREES

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

Business and Engineering

Undergraduates in the College of Engineering and Applied Science with career interests in administration may complete all of the requirements for both 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 by the College of Business and Administration...
may be started in the second, third, or fourth year, depending upon the curriculum plan for the particular field of engineering in which the student is enrolled.

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 and have approval 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.

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-B.S. engineering curricula, the degree program of the Graduate School of Business Administration, and the Master of Science or the Master of Engineering degree program in the student's own engineering discipline.

The required non-business courses are listed in the College of Business and Administration section of this bulletin. The business course requirements for this program are as follows:

**Required Business Courses**

<table>
<thead>
<tr>
<th>Required Business Courses</th>
<th>Semester Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACCT. 200 Introduction to Financial Accounting</td>
<td>3</td>
</tr>
<tr>
<td>I S. 200. Business Information Systems 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>MK. 300. Principles of Marketing</td>
<td>3</td>
</tr>
<tr>
<td>MGT. 330. Organizational Behavior</td>
<td>3</td>
</tr>
<tr>
<td>B L. 30. 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>O M. 300. Operations Management</td>
<td>3</td>
</tr>
<tr>
<td>MGT. 450. Business Policy and Strategic Management</td>
<td>3</td>
</tr>
</tbody>
</table>

Specified courses in an area of emphasis in one of the following fields: accounting, entrepreneurship and new venture development, finance, human resources management, information systems, international business, management, marketing, operations management, real estate, or transportation and distribution management. All course work in the area of emphasis must be taken in the University of Colorado College of Business and Administration. 12

**Total** 42

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 158 semester hours; however, most students will require more.

**Joint Engineering Degrees**

A student may obtain two engineering degrees by meeting the requirements and, by petition, 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. Of the 30 additional hours for the second degree, a minimum of 24 hours shall be in courses in the department concerned or in courses approved in writing in advance by the department as substitutes.

**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. Bio-engineering, 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.)
**Literature** 2 sem. (6 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 program 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 CU-Denver premedical advising is available through the Health Careers Adviser, Science Bldg., Room 223C, 556-2689.

GRADUATE STUDY IN ENGINEERING

The College of Engineering and Applied Science at CU-Denver offers graduate programs in civil engineering, computer science, electrical engineering, mechanical engineering, and applied mathematics.

For information regarding courses and requirements leading to the degrees Master of Engineering, Master of Environmental Science or to the Ph.D. degree, see the appropriate discipline heading in this section. For graduate admission information and policies see 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. The Master of Engineering degree permits graduate students more flexibility in defining specialized interdisciplinary fields that meet their professional needs. This degree has standards full 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 80 semester hours). Requirements are the same as for the two degrees taken separately: 128 credit hours for the B.S. degree and 30 credit hours for the M.S. degree. Socio-humanistic requirements must be completed within the first 128 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/her 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 only 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 a 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 122 of the 128 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 any of the graduate fundamentals courses which are designed to provide qualified students with needed background preparation in business. Students should see an adviser from the College of Business for approval.

Applied Mathematics

Coordinators: Weldon A. Lodwick, Charles I. Sherrill III
Administrative Officer: Max Morstad
Office: UA Building, Room 516
Telephone: 556-2870

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 an approved minor from a CU-Denver
engineering department. In Option II, the student takes distributed course work in engineering departments, including a solid grounding in mechanics, circuits, and materials. 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 computers is included.

Nontechnical electives should be broadening and have cultural value. Courses in the humanities and the social sciences (social-humanistic electives) are required and must be approved by the student's adviser and should include 6 semester hours of upper division (junior or senior) level courses. Some 300-and 400-level language courses may be counted as Socio-humanistic electives. Under all circumstances, a student must plan a complete program and obtain the approval of a departmental coordinator and the engineering dean's office at the beginning of the sophomore year.

The B.S. degree in applied mathematics requires the completion of a minimum of 128 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.

## Curriculum for B.S. (Applied Mathematics)

### Freshman Year

<table>
<thead>
<tr>
<th>Semester</th>
<th>Course Code</th>
<th>Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fall Semester</td>
<td>MATH. 140. Analytic Geometry and Calculus I</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>CHEM. 113. General Chemistry or Chem. 203 and 204</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td>Great Books (see note 1)</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>CS. 141. Fundamentals of Computing (see note 5)</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td><strong>Total</strong></td>
<td><strong>15</strong></td>
</tr>
<tr>
<td></td>
<td><strong>Spring Semester</strong></td>
<td></td>
</tr>
<tr>
<td></td>
<td>MATH. 241. Analytic Geometry and Calculus II</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>ENGR. 101. Engineering Drawing</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>Great Books (see note 1)</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>Social-humanistic elective (see note 1)</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td><strong>Total</strong></td>
<td><strong>17</strong></td>
</tr>
</tbody>
</table>

### Sophomore Year

<table>
<thead>
<tr>
<th>Semester</th>
<th>Course Code</th>
<th>Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fall Semester</td>
<td>MATH. 242. Analytic Geometry and Calculus III</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>PHYS. 233. General Physics II</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>PHYS. 234. General Physics Lab. II</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>Approved electives (see notes 3 and 4)</td>
<td>7</td>
</tr>
<tr>
<td></td>
<td><strong>Total</strong></td>
<td><strong>16</strong></td>
</tr>
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</table>

### Spring Semester

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>MATH. 319. Applied Linear Algebra</td>
<td>3</td>
</tr>
<tr>
<td>Approved electives (see notes 3 and 4)</td>
<td>10</td>
</tr>
<tr>
<td>Social-humanistic elective (see note 1)</td>
<td>3</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>16</strong></td>
</tr>
</tbody>
</table>

### Junior Year

<table>
<thead>
<tr>
<th>Semester</th>
<th>Course Code</th>
<th>Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fall Semester</td>
<td>MATH. 320. Elementary Differential Equations</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>MATH. 381 or 481. Probability Theory</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>ENGR. 301. Thermodynamics</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Approved electives (see notes 3 and 4)</td>
<td>8</td>
</tr>
<tr>
<td></td>
<td><strong>Total</strong></td>
<td><strong>17</strong></td>
</tr>
</tbody>
</table>

### Spring Semester

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>MATH. 431. Advanced Calculus I and/or MATH. 413. Advanced Finite Mathematics I (see note 3)</td>
<td>3</td>
</tr>
<tr>
<td>Approved electives (see notes 3 and 4)</td>
<td>11</td>
</tr>
<tr>
<td>Social-humanistic elective (see notes 1 and 2)</td>
<td>3</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>17</strong></td>
</tr>
</tbody>
</table>

### Senior Year

<table>
<thead>
<tr>
<th>Semester</th>
<th>Course Code</th>
<th>Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fall Semester</td>
<td>Approved electives (see notes 3 and 4)</td>
<td>12</td>
</tr>
<tr>
<td></td>
<td>Social-humanistic elective (see notes 1 and 2)</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td><strong>Total</strong></td>
<td><strong>15</strong></td>
</tr>
</tbody>
</table>

### Spring Semester

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>Approved electives (see notes 3 and 4)</td>
<td>15</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>15</strong></td>
</tr>
</tbody>
</table>

Requirements under each option are as follows:

### Option I (Specialty engineering)

<table>
<thead>
<tr>
<th>Semester</th>
<th>Course Code</th>
<th>Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fall Semester</td>
<td>Speciality in a specific engineering department</td>
<td>18-30</td>
</tr>
<tr>
<td></td>
<td>Upper division mathematics electives (see note 3)</td>
<td>24</td>
</tr>
<tr>
<td></td>
<td>Other electives</td>
<td>9-28</td>
</tr>
<tr>
<td></td>
<td><strong>Required Social-humanistic electives (see notes 1 and 2)</strong></td>
<td>12-28</td>
</tr>
</tbody>
</table>

### Option II (Distributed engineering)

<table>
<thead>
<tr>
<th>Semester</th>
<th>Course Code</th>
<th>Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fall Semester</td>
<td><strong>Distributed engineering courses in the engineering college</strong></td>
<td>22-30</td>
</tr>
<tr>
<td></td>
<td>(A minimal program would consist of the following courses: CE. 212, CE. 311, EE. 213, EE. 214, EE. 313, ME. 301, ME. 385, or CE. 331 or their equivalents.)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Upper division mathematics electives (see note 3)</td>
<td>24</td>
</tr>
<tr>
<td></td>
<td>Other electives</td>
<td>9-28</td>
</tr>
<tr>
<td></td>
<td><strong>Required Social-humanistic electives (see notes 1 and 2)</strong></td>
<td>12-18</td>
</tr>
</tbody>
</table>

### Option III (Computer science)

Specific courses required under Option III:

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>CS. 151</td>
<td>3</td>
</tr>
<tr>
<td>CS. 242</td>
<td>3</td>
</tr>
<tr>
<td>CS. 252</td>
<td>3</td>
</tr>
<tr>
<td>CS. 340</td>
<td>3</td>
</tr>
</tbody>
</table>
CS. 341. ................................................. 3
CS. electives .......................................... 5
MATH. 413. ............................................. 3
MATH. 465 or 476. ..................................... 3
Upper division mathematics electives (see note 3) ........ 18
Other electives (CE. 212 or 313, EE. 303 or 213, ME 301 or 312 recommended) .......... 9-28
Required Social-humanistic electives
(seenotes 1 and 2) ..................................... 12-28

Notes for B.S. (Applied Mathematics)
1. Six semester hours of literature are required and 12-18 semester hours of approved Social-humanistic electives are required.
2. Students may take upper division Social-humanistic electives pass/fail, subject to the regulations of the College of Engineering and Applied Science.
3. A minimum of 45 semester hours of course work in mathematics is required beginning with MATH. 140. Students considering an advanced degree should definitely take both MATH. 431 and 432, Advanced Calculus I and II. A twosemester sequence from either MATH. 413,414, or MATH. 465-466, or MATH. 476-477 is required for option 3. One or both of the following courses is strongly recommended for all options: MATH 491, Math Modeling or MATH 499 Math Clinic.
4. In addition to CS.141, ENGR.101 and 301, the student must take a minimum of 18 hours of approved 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.
5. Students in either option 1 or 2 may take CS. 110 or 141.

CIVIL ENGINEERING
Chair: David W. Hubly
Staff Assistant: Jean Smith
Department Office: UA Building, Room 403
Telephone: 556-2871
Associate Professors: Charles Bartholomew, David W. Hubly, Lynn E. Johnson, Oren G. Strom
Assistant Professors: James C. Y. Guo, Joseph F. Labuz, Judith J. Stalnaker, Andreas S. Vlahinos, Tzong H. Wu
Adjunct: Yeuang-Dong (John) Liou, Chih Ted Yang
Emeritus: Ernest C. Harris, Martin L. Moody

Undergraduate
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, pipelines, 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 regulation of water quality through water purification and proper waste treatment; in the construction industry; and in general in the rapidly expanding problems concerned with mankind's physical environment and the growth of cities. The breadth of the civil engineering undergraduate program provides an excellent educational background for many fields of endeavor, and 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, and in business management, law or medicine (after appropriate additional education).

The curriculum is designed to give the student a broad knowledge of the basic engineering sciences of chemistry, mathematics (including differential equations), physics, mechanics (including fluid mechanics and soil mechanics), electrical circuits, and thermodynamics. In addition, it includes 18-24 semester hours in Social-humanistic studies.

Specialized training is achieved through certain required courses, followed by more advanced civil engineering 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. To be awarded the B.S. degree, a student must have at least a 2.0 average in all CE. courses applied to the degree.

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 128. A typical program is:

<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>4</td>
</tr>
<tr>
<td>Social-humanistic elective (see note 1)</td>
<td>3</td>
</tr>
<tr>
<td>CS. 110. Introduction to Computing</td>
<td>3</td>
</tr>
<tr>
<td>CHEM. 113. Engineering General Chemistry</td>
<td>5</td>
</tr>
<tr>
<td>Total</td>
<td>15</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>4</td>
</tr>
<tr>
<td>PHYS. 231. General Physics I</td>
<td>4</td>
</tr>
<tr>
<td>CE. 221. Plane Surveying</td>
<td>3</td>
</tr>
<tr>
<td>ENGR. 101. Engineering Drawing</td>
<td>2</td>
</tr>
<tr>
<td>Elective (see note 4)</td>
<td>3</td>
</tr>
<tr>
<td>Total</td>
<td>16</td>
</tr>
</tbody>
</table>
**Sophomore Year**

**Fall Semester**

- MATH. 242. Analytical Geometry and Calculus III ............................................. 4
- PHYS. 233. General Physics II ................................................................. 4
- Communications elective (see note 6) .................................................. 3
- Social-humanistic elective (see note 1) ........................................... 3
- CE. 212. Analytical Mechanics I .......................................................... 3

**Total** 17

**Spring Semester**

- MATH. 302. Elementary Differential Equations and Linear Algebra .................. 4
- Social-humanistic elective (see note 1) ........................................... 3
- CE. 312. Mechanics of Materials .......................................................... 3
- CE. 314. Materials Testing Laboratory .................................................. 2
- GEOL. 201. Introduction to Geomorphology (see note 3) .......................... 4

**Total** 16

**Junior Year**

**Fall Semester**

- CE. 311. Analytical Mechanics II .......................................................... 3
- CE. 331. Theoretical Fluid Mechanics .................................................. 3
- CE. 350. Structural Analysis ................................................................. 3
- CE. 360. Transportation Engineering .................................................... 3
- Social-humanistic elective (see note 1) ........................................... 3

**Total** 15

**Spring Semester**

- CE. 332. Applied Fluid Mechanics .......................................................... 3
- CE. 380. Soils and Foundation Engineering ............................................. 3
- CE. 315. Water Quality Laboratory ....................................................... 2
- CE. 481. Intermediate Soil Mechanics .................................................... 2
- ENGR. 301. Thermodynamics .................................................................. 3
- Communications elective (see note 6) .................................................. 3

**Total** 16

**Senior Year**

**Fall Semester**

- EE. 303. Electric Circuits and Systems .................................................... 3
- CE. 457. Design of Steel Structures or CE. 458. Reinforced Concrete .......... 3
- Civil engineering electives (see note 5) ............................................. 6
- Electives (see note 4) ............................................................................. 3
- Social-humanistic elective (see note 1) ........................................... 3

**Total** 18

**Spring Semester**

- CE. 341. Water Quality Engineering ....................................................... 3
- CE. 442. Municipal Design Projects or CE. 460. Highway Engineering .... 3
- Civil engineering electives (see note 5) ............................................. 6
- Social-humanistic elective (see note 1) ........................................... 3

**Total** 15

(Notes for B.S. Civil Engineering)

1. 18 hours of Social-humanistic electives, which includes 6 hours of literature and at least 6 hours of upper division course work, shall be selected from a list of Social-humanistic courses approved by the civil engineering department.

2. Or CHEM. 203-4 and 204-1. CHEM. 203 is required for students wishing to take CHEM. 206 as a science elective.

3. Or GEOL. 207-4. GEOL. 207 is required for students wishing to take 208 as a science elective.

4. These courses shall be selected from current lists of elective courses approved by the Department of Civil Engineering. No more than 6 semester hours of Social-humanistic courses may be applied to the B.S. degree in this category.

5. Any upper division or higher civil engineering course which is not required may be used as a civil engineering elective. These courses should be chosen to form an integrated program.

6. Civil Engineering students must either receive a C grade or better in ENGL. 102-3 or pass an equivalency test administered by the English department, and must complete 6 hours of communication courses selected from the following: ENGL. 102-3, ENGL. 315-3, or CMMU. 210-3.

**Graduate**

Civil engineering graduate programs at CU-Denver leading to a Master of Science degree are available in four specialty areas: geotechnical engineering, structural engineering, transportation engineering, and water resources engineering. In addition, programs leading to the Master of Engineering degree and the Ph.D. degree in civil engineering are offered through the combined departments of Civil, Environmental and Architectural Engineering (Boulder campus) and Civil Engineering (Denver campus). All requirements for the Master of Engineering and a large part of those for the Ph.D. may be completed at CU-Denver. The Master of Engineering degree is described under a separate listing. Admission and degree requirements for the Ph.D. are published in the University of Colorado at Boulder catalog.

**Requirements for Admission**

In addition to the admission requirements of The Graduate School, applicants should have an undergraduate degree in civil engineering from an ABET accredited institution and should have earned a grade-point average of 3.0 (B) or better.

Applicants whose previous work was in a field other than civil engineering also may be admitted. Usually such applicants must remove engineering deficiencies by taking additional undergraduate civil engineering courses.

**Degree Requirements**

Both the Plan I (thesis option) and Plan II (non-thesis option) M.S. degree programs are available in civil engineering. Degree requirements will vary according to the student's background and area of interest, and are established by agreement between the student and the student's advisory committee. The M.S. degree requirements of The Graduate School and the College of Engineering and Applied Science must be fulfilled in all cases.

**Courses**

- CE. 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. Prerc. or coreq., MATH 242. Prerc. PHYS. 231.

CE. 221-3. Plane Surveying. Observation, analysis, and presentations of basic linear, angular, area, and volume field measurements common to civil engineering endeavor. Prerc. or coreq., MATH 140.


CE. 311-3. Analytical Mechanics II. A vector treatment of dynamics of particles and rigid bodies including rectilinear translation, central-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. Prerc. CE. 212.

CE. 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. Prerc. CE. 212.

CE. 313-3. Applied Mechanics. A limited study of particle and rigid body mechanics. Subject coverage introduces vector concepts of force, moment, and equilibrium, then concentrates on kinematics and kinetics of particles in motion, including oscillatory and orbital, and finally discusses rigid body motion with emphasis on energy and momentum methods. Prerc. MATH. 242 and PHYS. 231. (not for CE or ME majors.)

CE. 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. Prerc. or coreq., CE. 312.

CE. 315-2. Water Quality Laboratory. Lect. and lab. weekly, discussing techniques and making measurements of water purity parameters. Prerc. CHEM 113 or 203 and 204. Prerc. or coreq., MATH. 241.


CE. 341-3. Water Quality Engineering. Elements of public water supplied 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. Prerc. or coreq., CE. 332, CE. 315, or consent of instructor.


CE. 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. Prerc. Junior standing or consent of instructor.

CE. 380-3. Soils and Foundations Engineering. Introduction to physical and mechanical properties of soils; seepage, consolidation, shear strength, bearing capacity, lateral earth pressure, stability, and pile behavior, with preliminary analysis of structures affected by soil properties. Prerc. CE. 312; prerc. or coreq., CE. 331.

CE. 395-3. 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. Prerc. Junior standing.


CE. 442-3. 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. Prerc. CE. 360; prerc. or coreq., CE. 341.

CE. 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. Prerc. upper division standing.


CE. 453-3. Computer Techniques in Engineering. (EE. 455.) Introduction to the use of numerical methods in engineering and science. Those methods suitable for solution by high speed digital computers are emphasized. Prerc. CS. 110 or 141 and MATH. 302.


CE. 483-3. Intermediate Foundation Engineering. Application of principles of soil mechanics to the analysis and design of foundations and embankments. Theories of consolidation, earth pressure, slope stability, and bearing capacity. Study of
CE. 495-1 to 6. Special Topics for Seniors. Supervised study of special topics of interest to students under guidance of instructor. Prer., consent of instructor.


CE. 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 courses are offered each year.


CE. 534-3. Hydraulics of Open Channels. Flow in natural and artificial channels, water surface profiles, critical depth, hydraulic jump, applications of energy and momentum principles. Prer., CE. 332, or consent of instructor.

CE. 539-3. Water Resources Development and Management. (ECON. 691.) A multidisciplinary exploration of the principles governing water resources planning and development. Emphasis is on the sciences of water—physical, engineering, chemical, biological, and social—and their interrelationships.


CE. 543-3. Advanced Waste Water Treatment. Advanced studies on theory and operation of waste water treatment works. Prer., CE. 341, graduate standing, or consent of instructor.

CE. 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.

CE. 550-3. Public Health Engineering. Environmental engineering methods used in the protection of public health and the management of our environment. Topics include water pollution control, air pollution control, rabid and hazardous waste management, health effects, and public health protection.

CE. 551-3. Introduction to Finite Element Analysis. Systematic formulation of finite element approximation and isoparametric interpolation(weighted residual and energy methods, triangular and quadrilateral elements). Computation applications to the solution of one- and two-dimensional stress-deformation problems, steady and transient heat condition as well as viscous flow. Prer., graduate standing or consent of instructor.


CE. 557-3. Advanced Topics in Structural Steel Design. Plate buckling, plate girder design, yield-line analysis, and other topics determined by class interest. Prer., CE. 497.


CE. 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, CBD transportation planning. Prer., consent of instructor.

CE. 563-3. Airport Planning and Design. National Airport System Plan, air travel demand, geometric design of airport facilities, design of airport pavement and drainage structures, and airport environmental impact. Prer., CE. 360.

CE. 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., CE. 360 or consent of instructor.


CE. 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., CE. 360 and 481.
Staff Assistant: Vikki Windmiller
Department Office: UA Building, Room 402
Telephone: 556-2872
Faculty: Professors: John R. Clark, Jochen Edrich, Donald S. Gage, Paul F. Hultquist, James E. Lindsay, Arun K. Majumdar, William D. Murray, Edward T. Wall
Associate Professors: Marvin F. Anderson, Jan Bialasiewicz, Hans Gethofer, A. Gayler Harford, Daniel F. Michaels, Herbert Reno, Douglas A. Ross, Pankaj K. Sen, Lloyd G. Williams
Assistant Professors: Sanaa A. Azim, Rodney A. Schmidt
Senior Instructors: Valentine E. Riegert, Richard O. Taylor
Instructors: Brian Atkinson, Paul C. Novak, Julio Proano

Undergraduate

COMPUTER SCIENCE AND ENGINEERING PROGRAM

The Bachelor of Science in computer science and engineering prepares students for creative work and graduate study in computer science, software engineering, and computer engineering. The emphasis is on fundamental concepts and basic principles with a long useful life (10-20 years). This distinguishes the program from more vocationally oriented programs which emphasize current technology. In this rapidly changing field, current technology is obsolete after only a few years, after which the vocational graduate is ill prepared to grow technically. Graduates of this program will be able to keep abreast of current technology as it evolves over the years, due to their strong grounding in fundamentals.

Early in the program, emphasis is placed on development of the conceptual foundations of computer science. Topics such as algorithm development, programming language concepts, information representation, and the structure of computers are presented from both a practical and conceptual standpoint. Later portions of the program focus on computer architecture and the inter-relationship of hardware and software.

The program also provides a strong experiential component. Hands-on learning of software and hardware is initially provided through programming and logic laboratories, continues through design and architecture labs, and concludes with senior projects. The intent of the program is to prepare the student for life long learning in computer science and engineering. Current tools and techniques are used in the presentation of the program, with the emphasis on mastery of the underlying concepts.

Faculty in the program are experienced professionals in the design and application of computer hardware and software. Members of the department have strong research and development backgrounds in such diverse areas as software engineering, artificial intelligence, and computer systems design. Their skills in these areas are kept strong and current through research programs and graduate education. Opportunities are available for students to participate in these activities through senior projects, independent study, and assistantships.

COMPUTER SCIENCE AND ENGINEERING CURRICULUM

The curriculum in computer science and engineering is planned to give breadth of background in computer science and engineering after establishing a solid foundation in mathematics and science. Each student will take electives emphasizing computer-related areas. Those who wish to study computers with a heavier emphasis on electrical engineering should consider the electrical engineering program with electives from computer science, or consider a second degree in electrical engineering.

To be awarded the B.S. in computer science and engineering, a student must have at least a 2.0 average in all computer science and electrical engineering courses applied to the degree. To be in good standing in the program (see Policy on Academic Progress in the Office of Engineering introductory section of this bulletin) a student must maintain a 2.0 average in all computer science and electrical engineering courses attempted.

CURRICULUM FOR B.S. (COMPUTER SCIENCE AND ENGINEERING)

The minimum number of hours for the degree is 128. A typical program is:

**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>4</td>
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<tr>
<td>CS. 151. Logic Design</td>
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<tr>
<td>ENGL. 102. Writing Workshop II (see note 1)</td>
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<td>CHEM. 113. Engineering General Chemistry (see note 2)</td>
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<th>Spring Semester</th>
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<tbody>
<tr>
<td>MATH. 241. Analytic Geometry and Calculus II</td>
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<tr>
<td>PHYS. 231. General Physics I</td>
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<tr>
<td>PHYS. 232. General Physics Lab I</td>
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<tr>
<td>CS. 141. Fundamental of Computing I</td>
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<tr>
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**SOPHOMORE YEAR**

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<tr>
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<tr>
<td>MATH. 242. Analytic Geometry and Calculus III</td>
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<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>CS. 252. Assembly Language and Computer Organization</td>
<td>3</td>
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<td>CMMU. 210. Speech Making (see note 1)</td>
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<tr>
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<tbody>
<tr>
<td>MATH. 302. Elementary Differential Equations and Linear Algebra</td>
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<tr>
<td>MATH. 301. Applied Algebra for Computer Science</td>
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### Junior Year

#### Fall Semester

<table>
<thead>
<tr>
<th>Course</th>
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<tbody>
<tr>
<td>CS. 341. Principles of Programming Languages</td>
<td>3</td>
</tr>
<tr>
<td>CS. 350. Introduction to Software Engineering</td>
<td>3</td>
</tr>
<tr>
<td>Area elective (see note 3)</td>
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<tr>
<td>Social-humanistic elective (see note 1)</td>
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<tr>
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#### Spring Semester

<table>
<thead>
<tr>
<th>Course</th>
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<tbody>
<tr>
<td>MATH. 381. Probability Theory (EE. 381.)</td>
<td>3</td>
</tr>
<tr>
<td>CS. 340. Algorithms and Data Structures</td>
<td>3</td>
</tr>
<tr>
<td>CS. 345. Operating System Concepts</td>
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</tr>
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<td>CS. 360. Computer Laboratory</td>
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### Senior Year

#### Fall Semester

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
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<tbody>
<tr>
<td>MATH. 465. Numerical Analysis I (CS. 465)</td>
<td>3</td>
</tr>
<tr>
<td>CS. 403. Theoretical Foundations of Computer Science</td>
<td>3</td>
</tr>
<tr>
<td>CS. 471. Computer Science Design Project I</td>
<td>2</td>
</tr>
<tr>
<td>Area electives (see note 3)</td>
<td>6</td>
</tr>
<tr>
<td>Social-humanistic elective (see note 1)</td>
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#### Spring Semester

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
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<tbody>
<tr>
<td>CS. 472. Computer Science Design Project II</td>
<td>2</td>
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<tr>
<td>Area electives (see note 3)</td>
<td>6</td>
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<tr>
<td>General electives (see note 4)</td>
<td>6</td>
</tr>
<tr>
<td>Social-humanistic electives (see note 1)</td>
<td>3</td>
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<tr>
<td><strong>Total</strong></td>
<td><strong>17</strong></td>
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</table>

### Notes for B.S. (Computer Science and Engineering)

Students should refer to the section on Academic Policies of the College of Engineering and Applied Science. In addition to planning for sequences of courses based on prerequisites, students should plan to complete all courses at a given level (freshman, sophomore, etc.) before taking those at the next level.

1. Of the 24 hours of required Social-humanistic electives, a student must have 6 hours of communications, a minimum of 6 hours in literature and a minimum of 6 hours in social sciences. At least two courses must be upper division courses. Independent study is allowed for no more than one Social-humanistic elective course. Students must pass ENGL. 102 with a C or better, or must pass an equivalency test. If students pass the equivalency test, they may complete their communication requirement by taking ENGL. 315 or other approved communication course. (A list of approved Social-humanistic courses is available in the EE./CS. office, UA 402.)

2. Or CHEM. 203 and 204.

3. Area electives (21 semester hours) are to form a coherent group of courses that will give the student a comprehensive introduction to an area closely related to computers or computing. Twelve (12) of the hours must be taken from CE., EE., or ME. courses. The remaining nine (9) of the twenty one (21) hours must be upper division courses. The list of area electives must be approved in advance by the student's adviser.

4. General electives are selected from any courses acceptable for credit in the College of Engineering and Applied Science (e.g., skills courses, performance courses, and remedial courses are not acceptable).

### Electrical Engineering Program

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

The electrical engineering course of study begins with principles of physics, chemistry, mathematics, and computers, then follows with an intensive training in the theory and laboratory application of logic and electrical circuits, electromagnetic fields, transmission theory, linear systems, electrical machines and transformers, and electronics and microprocessors. Throughout the entire course of study, students 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 future 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 (antennas, communication systems, computer design, controls, digital system design, electronics, electro-optics, microwaves, power, signal processing), it is impossible for the undergraduate training to cover them in detail. Intense specialization may be left to additional training that graduates may receive when they assume positions with industrial firms, or acquire by specialization through graduate work beyond the bachelor's degree.

Undergraduate students who work and who have elected courses in their senior year that strengthen their mathematical background may decide to undertake graduate study. 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

To be awarded the B.S. in E.E. a student must have at least a 2.0 average in all E.E. and C.S. courses applied
toward the degree. To be in good standing in the program (see Policy on Academic Progress in the College of Engineering introductory section of this bulletin), a student must maintain at least a 2.0 grade-point average in all E.E. and C.S. courses attempted.

**B.S. E.E. AND B.S. BUSINESS**

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.

**PREMEDICAL 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 Adviser at CU-Denver.

**Curriculum for B.S. (Electrical Engineering)**

The minimum total number of hours for the degree is 128. A typical program is:

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<thead>
<tr>
<th><strong>Freshman Year</strong></th>
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<tbody>
<tr>
<td><strong>Fall Semester</strong></td>
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<tr>
<td>MATH. 140. Analytic Geometry and Calculus I</td>
</tr>
<tr>
<td>CHEM. 113. Engineering General Chemistry (see note 2)</td>
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<tr>
<td>CS. 151. Logic Design</td>
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<tr>
<td>ENGL. 102. Writing Workshop II (see note 1)</td>
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<td><strong>Total</strong></td>
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<tr>
<th><strong>Spring Semester</strong></th>
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<tbody>
<tr>
<td>MATH. 241. Analytic Geometry and Calculus II</td>
</tr>
<tr>
<td>PHYS. 231. General Physics I</td>
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<tr>
<td>PHYS. 232. General Physics Lab. I</td>
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<tr>
<td>CS. 141. Fundamentals of Computing I</td>
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<tr>
<td>Social-humanistic elective (see note 1)</td>
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<tr>
<th><strong>Sophomore Year</strong></th>
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<tr>
<td><strong>Fall Semester</strong></td>
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<tr>
<td>PHYS. 233. General Physics II</td>
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<tr>
<td>PHYS. 234. General Physics Lab. II</td>
</tr>
<tr>
<td>MATH. 242. Analytic Geometry and Calculus III</td>
</tr>
<tr>
<td>EE. 213. Circuit Analysis I</td>
</tr>
<tr>
<td>EE. 253. Sophomore Lab. I</td>
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<tr>
<td>CMMU. 210. Speech Making (see note 1)</td>
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<tr>
<th><strong>Spring Semester</strong></th>
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<tbody>
<tr>
<td>MATH. 302. Elementary Differential Equations and Linear Algebra</td>
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<tr>
<td>PHYS. 281. Modern Physics</td>
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<tr>
<td>EE. 214. Circuit Analysis II</td>
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<td>EE. 254. Sophomore Lab. II</td>
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<td>EE. 265. Introduction to Computer Engineering</td>
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<th><strong>Junior Year</strong></th>
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<tbody>
<tr>
<td><strong>Fall Semester</strong></td>
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<tr>
<td>EE. 313. Electromagnetic Fields I</td>
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<tr>
<td>EE. 321. Electronics I</td>
</tr>
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<td>EE. 371. Electronics Lab.</td>
</tr>
<tr>
<td>EE. 372. Power Lab.</td>
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<tr>
<td>CE. 313. Applied Mechanics (see note 3)</td>
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<tr>
<td>EE. 316. Energy Conversion</td>
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<tbody>
<tr>
<td>EE. 314. Electromagnetic Fields II</td>
</tr>
<tr>
<td>EE. 322. Electronics II</td>
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<tr>
<td>EE. 331. Linear Systems Theory</td>
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<td>EE. 373. Junior Lab.</td>
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<tr>
<td>EE. 381. Probability Theory</td>
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<tr>
<td><strong>Fall Semester</strong></td>
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<tr>
<td>EE. Speciality (see note 4)</td>
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<tr>
<td>Senior Design Laboratory (see note 6)</td>
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<td>Professional elective (see note 5)</td>
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<td>ENGR. 301. Thermodynamics</td>
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**Notes for B.S. (Electrical Engineering)**

Students should refer to the section on Academic Policies of the College of Engineering and Applied Science. 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 EE. courses before starting their 400-level EE. electives.

1. Of the 24 hours of required Social-humanistic electives, a student must have a minimum of 6 hours in communications, 6 hours in literature, and a minimum of 6 hours in social
sciences. At least two courses must be upper division courses. Independent study is allowed for no more than one Social-humaneastic elective course. Students must also pass ENGL 102 with a C or better, or must pass the equivalency test. If students pass the equivalency test, they may complete their communication requirement by taking Engl 315 or other approved communication course. (A list of Social-humanistic courses is available in the EE. office, UA 402.)

2. Or CHEM 203 and 204.

3. The mechanics requirement may be satisfied by the 3-hour course, CE 313, or the 6-hour sequence of CE 212 and CE 311.

4. For the EE. Specialty courses a student must take 3 of: EE. 413-3, Control Systems; EE. 418-3, Power Systems Analysis; EE. 422-3, Electronics III; EE. 424-3, Communication Theory; EE. 459-3, Computer Organization.

5. Professional electives are to be selected from approved upper division courses in business, computer science, engineering, mathematics, or physics.

6. The senior design laboratory requirement may be satisfied by taking three of the following labs, but do not take two in the same area: EE. 451-2(P), EE. 454-2(S), EE. 460-2(D) or EE. 466-3(D), EE. 461-2(E), EE. 463-2(F), or EE. 464-3(F), EE. 465-2(C).

Graduate

Electrical engineering graduate programs at CU-Denver are offered through the combined Departments of Electrical Engineering and Computer Science(Denver) and Electrical and Computer Engineering(Boulder).

Students can undertake studies toward the Master of Science and Ph.D. degrees at CU-Denver in the areas of communication and information systems, computer hardware and software, control systems, electro-optics and laser circuits and electronics, fields and propagation, power systems, and machines.

Requirements for Admission

A student wishing to pursue graduate work in electrical engineering should read carefully the Requirements for Advanced Degrees section in this bulletin, and also should obtain a copy of the specific electrical engineering requirements by writing to Graduate Admissions, Department of Electrical Engineering and Computer Science, University of Colorado at Denver, 1100 14th Street, Denver, CO 80202. Non-degree students and those intending to pursue a graduate program at CU-Denver are urged to consult the departmental representatives as part of their application procedure.

Degree Requirements

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 and power Systems

Mathematics

Physical and semiconductor electronics

Students must complete two sections, mathematics and the area in which they plan to specialize, and must present an acceptable master's thesis or the equivalent as an indication of ability to perform independent research.

Courses

CS 110-3. Introduction to Computing. An introductory course in computer science covering computer programming methods. FORTRAN programming, numerical applications, and non-numerical applications. Prer., MATH. 112 or equivalent. (Credit toward a degree not allowed for both EE./CS. 110 and EE./CS. 141.

CS 141-3. Fundamentals of Computing. 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. or coreq., MATH. 140.(Credit toward a degree not allowed for both EE./CS. 110 and EE./CS. 141.)

CS 151-3. Logic Design. The design of combinatorial and sequential switching circuits. Includes a study of Boolean algebra, minimization techniques, circuit analysis and synthesis, state transition tables, and race conditions. Prer., MATH. 112 or equivalent.


CS 252-3. Assembly Language and Computer Organization. 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. Some discussion of operating systems and input-output. Prer., CS. 141 and 151.


CS 345-3. Operating System/Concepts. A review of the principles of computer operating systems and the essential components of an operating system. Interfaces with compilers, interpreters, hardware and user programs will be considered. Prer., CS. 242 and 252.

CS 350-3. Introduction to Software Engineering. Introduction to the software development process, software specification and design, validation, verification, and testing. Techniques for structured analysis, design, and functional testing.
are presented and used in a team project. Prere., CS. 242 and 340.

**CS. 360-2. Computer Laboratory.** This course will provide computer science students a laboratory experience with digital computer subsystems and with complete computer subsystems. Prere., CS. 358 and 359, EE. 343, ENGL. 102.

**CS. 403-3. Theoretical Foundations of Computer Science.** An introduction to abstract models for computation, formal languages, and machines. Topics also include formal methods for describing syntax and semantics. Prere., CS. 340, CS. 341, and MATH. 413.

**CS. 413-3. Advanced Finite Mathematics I.** (MATH. 413.) An introduction to discrete structures and their applications. Major emphasis is on applications of graph theory to computer science, engineering, and operations research. Prere., MATH. 140.


**CS. 471-2. Computer Science Design Project.** A project laboratory in which students undertake a significant hardware design, software design, or simulation. The objective is the understanding of the specification-design-test cycle. Prere., senior standing in computer science, ENGL. 102.


**GRADUATE COURSES**

Graduate courses are offered by the Department of Electrical Engineering and Computer Science and by the Department of Mathematics. The courses listed are not offered each semester. Check the department offices for tentative listings for future semesters.

**CS. 514-3 Advanced Finite Mathematics II.** (MATH. 509.) Major emphasis is on applied combinatorics and graph and combinatoric algorithms. Topics include general counting methods, generating functions, recurrence relations, inclusion-exclusion, Polya's enumeration theory, and network algorithms. Prere., graduate standing.


**CS. 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., CS. 413.

**CS. 553-3. Fundamental Concepts in Programming Languages.** (EE. 553.) A study of the concepts which underlie the design of a programming language. Basic operations, formation rules, mode and type, scope and extent procedures. Informal and operational, axiomatic and denotational approaches to formal semantics are considered. Prere., CS. 341.

**CS. 554-3. Seminumerical Methods for Digital Computers.** (EE. 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., assembly language, and an upper division course in probability or statistics.

**CS. 555-3. Nonnumerical Techniques for Digital Computers.** A study of the methods used for implementing processors for numerical problems such as artificial intelligence, dynamic storage allocation, list processing, recursive programming, and search. Special purpose languages such as LISP and Prolog will be studied along with their implementations. Prere., CS. 341.

**CS. 556-3. Translation of Programming Languages.** (EE. 556.) A study of techniques for translating text generated by humans into programs understood by machines: lexical, syntactic, and semantic analysis, code generation, assembly and optimization, error reporting and recovery. Prere., CS. 553.

**CS. 557-3. Operating Systems.** (EE. 557.) A study of the means by which programming systems are integrated into the overall operation of a computer system. Program segmentation and loading, filing systems, resource allocation, process scheduling, conflicts. Prere., CS. 340 and 341.

**CS. 558-3. Artificial Intelligence.** (EE. 558.) The design of machines and systems that have been created to perform tasks that are considered to require intelligence. Prere., CS. 555.


**CS. 582-3. Software Engineering.** First-hand study of problems connected with the development of large programs. Small groups of students will be involved in the actual design and development of modules for a large software system. Prere., graduate standing or consent of instructor.

**CS. 590. Special Topics.** From time to time courses are offered covering recent developments in an area of computer science. For graduate students only.

**CS. 611-3. Topics in Computer Graphics.** Computer graphics hardware: printers, incremental plotters, microfilm, storage CRTs, and refreshed CRTs. Computer graphics software: special and general purpose subroutine packages, graphics languages, and data structures. Special problems: perspective viewing, hidden lines, windowing, and man-machine engineering. Prere., consent of instructor.

**CS. 612-3. Topics in Operating Systems.** Topics to be selected by instructor. Possible topics are system design, measurement and evaluation, simulation, mathematical modeling, and parallelism. Prere., consent of instructor.
CS. 613-3. Topics in Programming Languages. Topics to be selected by instructor. Possible topics are syntax, semantics, metacompilers, compiler design, and translator writing systems. Prer., consent of instructor.

CS. 614-3. Topics in Computer Systems. Topics to be selected by instructor. Possible topics are on-line systems, multi-processing microprogramming, architecture, data communications, and computing networks. Prer., consent of instructor.

CS. 615-3. Topics in Formal Systems. Topics to be selected by instructor. Possible topics are formal languages, abstract machines, analysis of algorithms, and computational complexity. Prer., consent of instructor.

CS. 617-3. Topics in Numerical Mathematics. Topics to be selected by instructor. Possible topics are numerical linear algebra, solution of differential equations, nonlinear algebra and optimization, data fitting, linear and nonlinear programming, solution of large problems. Prer., consent of instructor.


CS. 700-variable credit. Master's Thesis.

CS. 701-3. Master's Reading Option.

CS. 800-variable credit. Doctoral Research.

Independent Study

CS. 940-variable credit. Independent Study (Undergraduate). For seniors majoring in computer science.

CS. 950-variable credit. Independent Study (Graduate).

ELECTRICAL ENGINEERING

EE. 110-3. Introduction to Computing. (CS. 110.) An elementary course in computing, covering computer programming methods, FORTRAN programming, numerical applications, and nonnumerical applications. Prer., MATH 112 or equivalent. (Credit toward a degree not allowed for both EE./CS. 110 and EE./CS. 141.)

EE. 141-3. Fundamentals of Computing I. (CS. 141.) 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. or coreq., MATH 140. (Credit toward a degree not allowed for both EE./CS. 110 and EE./CS. 141.)

EE. 151-3. Logic Design. (CS. 151.) The design of combinatorial and sequential switching circuits. Includes a study of Boolean algebra, minimization techniques, circuit analysis and synthesis, state transition tables, and race conditions. Prer., MATH 112 or equivalent.


EE. 253-1. Sophomore Laboratory I. Electric circuits and measurements: cathode-ray oscilloscope; electrical instruments, transients in circuits involving resistance, inductance, and capacitance; and resistance measurements. Basic digital logic analysis and design. Prer. or coreq., EE. 213; prer., EE. 151.

EE. 254-1. Sophomore Laboratory II. Impedance measurements, resonance, Fourier series, introduction to analog computer, filter design and additional analysis of logic circuits. Prer., EE. 253 and ENGL. 102; prer. or coreq., EE. 214.


EE. 322-3. Electronics II. Transistor model at high frequencies, multistage amplifiers; frequency response of amplifiers; feedback: operational amplifiers; large signal amplifiers and distortion. Prer., EE. 321.

EE. 331-3. Linear System Theory. Analysis of linear systems by the use of transfer functions, impulse response, step-function response, and convolution. Consideration of both continuous and discrete systems using linear differential equations and linear difference equations as models. Applications to electric circuits and systems. Transform techniques including the bilateral Laplace transform, Fourier transform, and Z-transform. Introduction to state variable methods for both continuous and discrete systems. Prer., EE. 214, MATH. 302 (or MATH 319 and 320).

EE. 343-1. Electrical Laboratory. For students not majoring in electrical engineering. Cathode-ray oscilloscope, electric circuits and measurements, electrical transients, introduction to the transformer and rotating electrical machinery. Coreq., EE. 303 or 213.

EE. 371-1. Electronics Laboratory. Experimental investigation of the characteristics of semiconductor devices and their applications. Prer. or coreq., EE. 321; prer., EE. 254.

EE. 372-1. Power Laboratory I. Basic electro-mechanical energy conversion concepts as applied to the synchronous machine, induction machine and d.c. machine; the transformer; applications. Prer., EE. 254. Prer. or coreq., EE. 316. EE. 373-2. Junior Laboratory. Continuation of EE. 371. Prer. or coreq., EE. 371 and CMMU. 210; prer. or coreq., EE. 322.


EE. 417-3. (PE) Industrial Power Electronics and Applications. Power electronics fundamentals and applications in power systems; SCR; power diodes; JFET, FET and GTO; converter design; FHP motors; motor speed control and applications. Prereq., EE. 316, 322, 372, and 373.


EE. 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., EE. 331 and 381 (or MATH 381).

EE. 451-2. (P) Power Laboratory II. Experimental investigations of the design and operating characteristics of synchronous machines, induction machines, transformers, power rectifiers, design of electric power systems. Prereq., or coreq., EE. 417 or EE. 418.

EE. 454-2. (S) Controls Laboratory. Introductory experiments on response of control components; open- and closed-loop response of servo-systems, simulation of systems on analog computers; design of compensating networks. Prereq., EE. 373 and 413.

EE. 459-3. (D) Computer Organization. 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., EE. 214 (or 303) and 265.

EE. 460-2. (D) Computer Laboratory. This course will provide laboratory experience both with digital computer subsystems and with complete computer systems. The student will design and construct subsystems and work with actual subsystems of a small computer. Prereq., EE. 373 and 459.

EE. 461-2. (E) Electronics Laboratory III. Experimental work with oscillators, counters, switching circuits, r-f amplifiers, and digital integrated circuits. Prereq., EE. 373 and 422.

EE. 463-2. (F) Transmission Laboratory. Experiments with transmission line and waveguide systems, slotted line, bolometer power bridge, cavity frequency meter, and crystal detector. The artificial line, time-domain reflectometer, directional coupler, hybrid tee, stub impedance matching, antenna patterns, microwave superheterodyne receiver. Transmission at low frequencies, including 60 Hz. Prereq., EE. 314 and 373.

EE. 464-3. (F) Electro-Optics Laboratory. Lasers, light emitters, detectors, polarization effects upon reflection and refraction. Diffraction, interference, imaging, spatial filtering. Optical modulation, detection. Longer projects are selected from holography, pattern recognition, optical communications, acousto-optical effects. Prereq., EE. 314, 331, and 373. (Can be used as a theory or lab course.)

EE. 465-2. (C) Communications Laboratory. Laboratory experiments demonstrating and verifying material taught in EE. 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., EE. 322, 373. Prereq. or coreq., EE. 424.

EE. 466-3. (D) Microprocessor Laboratory. This laboratory introduces students to the use of the microprocessor as a component in larger systems. The course entails an average of two hours of lecture and three hours of lab per week. Topics include microprocessor logical organization, microcoding, interfacing, timing, and programming. Prereq., EE. 265 and 373. EE. 491-499-1 to 3. Special Topics. Credit and subject matter to be arranged. Prereq., variable.

GRADUATE COURSES

The department offers between 10 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 to meet the requirements for technical or professional electives under the prior curriculum.

To register for 500-level courses, an undergraduate must be a senior with a B average or have consent of the department.


EE. 505-3. (M) Principles of Electronic Devices. A course relating performance and limitations of solid state devices to their

EE. 511-3. (F) Waveguides and Transmission Lines. An intermediate-level fields course dealing with guided-wave systems at HF, microwave, and optical frequencies. Modern waveguiding structures, including circular metallic waveguides, and microstrip transmission lines are treated. Additional material may include waveguide losses, and excitation of waveguides, microwave network theory, coupled-mode theory, resonators. Prer., EE. 314 or equivalent.

EE. 513-3. (F) Electromagnetic Radiation. Incoherent radiation, including the black body radiation law, is studied first. concluding with derivation of some of the fundamental antenna laws. Radiation from electrical charge in motion is considered next. Then these concepts are specialized to broadly applicable formulations for radiation from coherent current sources. Concludes with a study of the radiation and impedance characteristics of several types of antennas and antenna systems. Prer., EE. 314 or equivalent.

EE. 514-3. (F) Electromagnetic Boundary Problems. Mathematical theories and physical concepts related to Maxwell's equations. Potential representations, scalar and vector Green's function, eigenfunction expansions. Green's theorem, reciprocity, equivalence principle and image theorem, etc. will be treated. The second part of the course involves application such as radiation from apertures in cylindrical surfaces, scattering by cylinders and wedges, dipole radiation over a half-space, general mode theory of metallic and surface-wave waveguides, excitations, discontinuities and bends in waveguides. Prer., EE. 513 or equivalent.

EE. 521-3. Applied Mathematics for Engineers and Scientists. Analytical methods which are applicable to many areas of engineering are developed or expanded upon. Topic areas include linear operator theory as applied to the solution of matrix, integral differential and difference equations, transform methods, complex variables, variational calculus, and selected boundary value problems of engineering and physics. Prer., EE. 331 and 381.

EE. 535-3. (E) Network Synthesis I. The complex frequency variable, one-and-two-port network realization techniques using pole-zero approach to produce specified behavior approximation methods, use of the potential analog, introduction to active synthesis. Prer., EE. 322 and 413.


EE. 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., EE. 413.

EE. 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., EE. 413.

EE. 548-3. (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., EE. 413 or equivalent.

EE. 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., CS. 341.


EE. 553-3. (D) Fundamental Concepts in Programming Languages. (CS. 553.) A study of the concepts which underlie the design of a programming language. Basic operations, formation rules, mode and type, scope and extent, procedures. Informal and operational, axiomatic and denotational approaches to formal semantics are considered. Prer., CS. 341.

EE. 554-3. (D) Semi-Numerical Methods for Digital Computers. (CS. 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. Prer., EE. 381. CS. 341 and MATH. 465.

EE. 556-3. (D) Translation of Programming Languages. (CS. 556.) A study of techniques for translating text generated by humans into programs understood by machines: lexical, syntactic, and semantic analysis, code generation, assembly and optimization, error reporting and recovery. Prer., EE. 553.

EE. 557-3. (D) Operating Systems. (CS. 557.) A study of the means by which programming systems are integrated into the overall operation of a computer system. Program segmentation and loading, filing systems, resource allocation, process scheduling, conflicts. Prer., CS. 340 and 341.

EE. 558-3. (D) Artificial Intelligence. (CS. 558.) The design of machines and systems created to perform tasks that are considered to require intelligence. Languages for artificial intelligence programming, expert systems, sensors and patterns, and applications are considered. Prer., CS. 403 or 341.

EE. 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 computers will be studied in depth. Prer., EE. 459.


EE. 562-3. (C) Information Theory. Information and entropy. Markov chains, combined systems, continuous systems, coding theory, channel capacity, modulation, applications to communication engineering. Prer., EE. 424.

EE. 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 receiver design and evaluation, estimation theory, estimation of parameters. Wiener filtering, Kalman-Bucy filtering, applications to problems in communication theory. Prer., EE. 561.

EE. 566-3. (C) Stochastic Systems and Optimization. An introduction and survey of methods of 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., EE. 561.

EE. 567-3. (C) Reliability and Queuing Theory. Component reliability, environmental reliability, system reliability, standby redundancy, parallel redundancy, repair and preventive maintenance, queuing theory, system availability. Prer., EE. 381.

EE. 568-3. (C) Optical Communication Systems. Systems aspects of optical communication system design. Basic principles of sources, channels, detectors, amplifiers, and modulation and coding with regard to the performance limitations they place on the communication system. Prer., EE. 314, 424; EE. 561 recommended.


EE. 572-3. (P) Energy Systems Analysis II. Application of symmetrical components to faults on transmission systems, determination of system constants, measurement of sequence quantities, relaying philosophies, power-flow studies; computer methods in power systems. Prer., EE. 418.


EE. 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. Special topics courses offered over the past two years included: EE. 593. (D) Computational Methods. (CE. 553.) Brief, intensive review of necessary background in numerical methods, including solution of linear systems and of systems of ordinary differential equations. Classification of partial differential equations arising in fluid dynamics, heat conduction, flow in porous media, and electromagnetic fields. Solution methods by finite differences and finite elements. Stability, convergence, and treatment of discontinuities. Emphasis will be placed on existing software wherever possible. Prer., MATH. 302, CS. 110 or 141.

EE. 594. (F) Microwave Devices and Systems. Circuit theory is applied to waveguide systems containing filters and other passive devices for micro- and millimeter waves. Non-reciprocal ferromagnetic devices like circulators and isolators are treated. Non-linear microwave components include Schottky barriers, avalanching, and tunneling in semiconductors and superconductors. Manley Rowe equations are solved for active varactor devices like paramps and converters. Design concepts of microwave systems for bioelectromagnetics, satellite communications, radar and radiometry. Prer., EE. 314.


EE. 601-3. (M) Solid State Electronics I. Introduction to the quantum theory of solids; free electron theory of metals; crystal lattices; energy band theory of crystals (particularly semiconductors); electron dynamics in perfect crystals (including tunneling); Fermi statistics; electron-photon interactions; lattice vibrations; electron transport in real crystals; elementary theories of ferromagnetism and of superconductivity. Prer., EE. 501, PHYS. 465.

EE. 606-3. (E, M) 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. Prer., EE. 505.

EE. 627-3. (F) Mathematical Methods of Field Theory I. Study and application of some of the mathematical methods needed in solving certain boundary-value problems in electromagnetic field theory. The material will be chosen from a wide area including the following: Wiener-Hopf and other transform methods; singular integral equations; variational calculus; mode expansions; Green's theorem; quasi-static methods; asymptotic, steepestdescent, and WKGB techniques, linear vector spaces, and matrices. The methods will be illustrated by physical examples taken from waveguide diaphrags; junctions and other discontinuities; linear antennas and antenna arrays; diffraction and scattering; wave propagation at surface and in homogeneous media. Prer., an introduction to complex variables and EE. 511.

EE. 628-3. (F) Mathematical Methods of Field Theory II. Continuation of EE. 627. Prer., EE. 627.


EE. 641-3. (S) Advanced Theory of Control I. Optimal control theory; Pontryagin's maximum principle; discrete maximum principle; stochastic optimal control; computational methods. Prer., EE. 544.

EE. 642-3. (S) 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. Prer., EE. 544.
MECHANICAL ENGINEERING

Chair: R. Wayne Adkins
Staff Assistant: Faye Waitman
Department Office: UA Building, Room 502
Telephone: 556-8516
Faculty: Professors: R. Wayne Adkins, William H. Clohessy
Associate Professors: B. Thomas Arnberg, John A. Trapp
Assistant Professors: Chi Tsuen Lin, J. Kenneth Ortega, Steven W. Peterson

Undergraduate

The mechanical engineer is a professional person concerned with satisfying the needs of society using a combination of material, human, and economic resources. Mechanical engineering covers a very wide spectrum of activities in the engineering profession. These activities include the conversion and transmission of energy and associated power processes; the kinematic, dynamic, strength, and wear considerations as well as economic aspects of the development, design and use of machines and processes; the analysis, synthesis, and control of entire engineering systems.

The mechanical engineering curriculum begins with a strong emphasis on mathematics, physics, and chemistry. It continues with a concentration in engineering sciences including solid and fluid mechanics; thermodynamics, heat and mass transport; materials; and systems analysis and control. It concludes with laboratory and design courses which demonstrate the ways in which scientific knowledge is applied in the design and development of useful devices and processes.

The mechanical engineering program may be roughly sub-divided 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. In the last two years of the program, the department provides technical electives for professional concentrations in the following areas:

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

To be awarded the B.S. (M.E.) a student must maintain at least a 2.0 in all mechanical engineering courses.

Curriculum for B.S.
(Mechanical Engineering)

The minimum total number of hours for the degree is 128. A typical program is:

**FRESHMAN YEAR**

**Fall Semester**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Semester Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>MATH. 140</td>
<td>Analytic Geometry and Calculus I</td>
<td>4</td>
</tr>
<tr>
<td>CHEM. 113</td>
<td>Engineering General Chemistry (see note 1)</td>
<td>5</td>
</tr>
<tr>
<td>CS. 110</td>
<td>Introduction to Computing</td>
<td>3</td>
</tr>
<tr>
<td>Social-humanistic elective (see note 2)</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td></td>
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**Spring Semester**

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<tr>
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<th>Course Title</th>
<th>Semester Hours</th>
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</thead>
<tbody>
<tr>
<td>MATH. 241</td>
<td>Analytical Geometry and Calculus II</td>
<td>4</td>
</tr>
<tr>
<td>PHYS. 231</td>
<td>General Physics I</td>
<td>4</td>
</tr>
<tr>
<td>PHYS. 232</td>
<td>General Physics Lab I</td>
<td>1</td>
</tr>
<tr>
<td>ENGR. 101</td>
<td>Engineering Drawing</td>
<td>2</td>
</tr>
<tr>
<td>ENGL. 102</td>
<td>Writing Workshop II (see note 5)</td>
<td>3</td>
</tr>
<tr>
<td>Literature elective</td>
<td>3</td>
<td></td>
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<tr>
<td><strong>Total</strong></td>
<td></td>
<td><strong>17</strong></td>
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**SOPHOMORE YEAR**

**Fall Semester**

<table>
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<th>Course Title</th>
<th>Semester Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>MATH. 242</td>
<td>Analytic Geometry and Calculus III</td>
<td>4</td>
</tr>
<tr>
<td>PHYS. 233</td>
<td>General Physics II</td>
<td>4</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td></td>
<td><strong>8</strong></td>
</tr>
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</table>
PHYS. 234. General Physics Lab II .......................... 1
Social-humanistic elective (see Note 2) ...................... 3
ME. 281. Mechanics I (see note 3) .......................... 3
Total ................................................. 15

Spring Semester
MATH. 302. Elementary Differential Equations and
Linear Algebra .......................................... 4
ME. 282. Mechanics II (see note 3) .......................... 3
EE. 303. Electric Circuits and Systems ........................ 3
ENGR. 301. Thermodynamics .................................. 3
Social-humanistic elective (see note 2) ...................... 3
Total ................................................... 16

JUNIOR YEAR
Fall Semester
ME. 301. Introduction to Materials Science I .................. 3
ME. 312. Thermodynamics II ................................... 3
ME. 314. Measurements I ...................................... 2
ME. 371. Systems Analysis I ................................... 3
ME. 384. Mechanics IV — Solid ................................ 3
ME. 385. Mechanics V — Fluid .................................. 3
Social-humanistic elective (see note 2) ...................... 3
Total ................................................... 17

Spring Semester
ME. 316. Measurements II ..................................... 2
ME. 362. Heat Transfer ........................................ 3
ME. 372. Systems Analysis II ................................... 3
ME. 386. Mechanics VI — Continuum ......................... 3
ME. 285. Mechanisms ......................................... 3
Social-humanistic elective (see note 2) ...................... 3
Total ................................................... 17

SENIOR YEAR
Fall Semester
ME. 401. Mechanical Behavior of Materials .................... 3
ME. 414. Mechanical Engineering Design I ................. 3
ME. 442. Mechanical Engineering Lab ........................ 3
ME. Design elective (see note 4) ............................... 3
Social-humanistic elective (see note 2) ...................... 3
Total ................................................... 16

Spring Semester
ME. 416. Mechanical Engineering Design II .................. 3
ME. Engineering science electives (see note 4) ............ 6
ME. Design elective (see note 4) ............................... 4
Technical elective (see note 4) ................................. 3
Total ................................................... 16

Notes for B.S.
(Mechanical Engineering)

1. CHEM. 203 and 204 may be substituted.
2. A total of 18 hours of Social-humanistic electives is required. These must include 3 hours of literature. At least 6 units must be upper division courses. An approved list of Social-humanistic electives and additional details can be obtained from the Mechanical Engineering office.
3. CE. 212 and 311 may be substituted for ME. 281 and 282.
4. A list of electives is available in the department office. All electives should be coordinated through an adviser.
5. A student must pass ENGL. 102 with a C or better, or pass the equivalency test. If the student passes the equivalency test, then ENGL. 315 or CMMU 210 must be taken to complete the communication requirement.

Graduate

The Mechanical Engineering Department offers graduate courses and a Master of Science degree program. The degrees of Master of Engineering, and Ph.D. in Mechanical Engineering are offered through a coordinated program with the Department of Mechanical Engineering, University of Colorado at Boulder. The areas of research interest in which a student may undertake studies at CU-Denver include robotics, fluid mechanics, solid mechanics, heat transfer, bioengineering, thermodynamics, and mechanical design.

DEGREE REQUIREMENTS

At the M.S. degree level, students following Plan I (24 hours of formal course work plus 6 hours of thesis) are required to take 9 hours of core courses which include engineering analysis and a selection from thermodynamics, mechanics, design, and mechanisms. Students following Plan II (30 hours of formal course work) are required to take 15 hours of core courses in thermodynamics, continuum mechanics, dynamics, and engineering mathematics. The remainder of the program is developed by the student in consultation with the adviser.

For admission to Ph.D. candidacy the student must pass a comprehensive examination to demonstrate a general competence in mechanical engineering at an advanced level. In addition, second-year, college-level reading proficiency must be demonstrated in scientific French, German, Russian, or other foreign language approved by the department upon petition by the student.

COURSES

ME. 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.
ME. 203-3. Introduction to Computer-Aided Design. Review of computer languages, programming and special requirements. Linear and non-linear programming; matrix methods and numerical techniques including constraints; simulation and graphical displays; optimization methods. Applications to mechanical and thermal systems. Prer., C S. 110.
Procedures for determining position, velocity, acceleration, force, and mechanical advantage of a linkage will be discussed. Gear and cam systems also are covered. Prer., ME.281, MATH 302, and C S. 110 or 141.

ME. 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. Prer., consent of instructor.

ME. 301-3. Introduction to Materials Science I. The development of the physical principles relating the structural features of materials to their observed properties. Prer., PHYS. 213 or 233.

ME. 312-3. Thermodynamics II. General thermodynamic cycle considerations, compressor, expander and heat exchanger processes, power and refrigeration cycles. Prer., ENGR. 301.


ME. 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., ME. 314.


ME. 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.


ME. 414-3. Mechanical Engineering Design I. Review of mechanics of materials and stress analysis; detailed design of various machine elements such as screws, springs, brakes and gears. Prer., ME. 384.
ME. 416-3. Mechanical Engineering Design II. Individual device 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. Preq., ME. 285 and 414.

ME. 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. Preq., ME. 362.


ME. 431-3. Introduction to Operations Research. Introduction to operations research including mathematical programming models, models for decision alternatives and for procurement and inventory and also for queuing operations. Preq., MATH. 302.

ME. 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 on an individual, 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. Preq., ME. 312 and 316.


ME. 455-3. Energy Conversion I. Thermodynamics of thermochemical, thermo-electric, thermionic, and chemical-electric conversion systems. Preq., ME. 312.

ME. 457-3. 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. Preq., ME. 312 and 383.

ME. 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. Preq., ME. 312 and 362.

ME. 461-4. Analytical Methods of Engineering I. Solutions of linear algebraic equations and applications to theory. Topics include matrix analysis, eigenvalue problems, bilinear and quadratic 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. Preq., MATH 302, or MATH 319 and 320, or consent of instructor.

ME. 462-4. Analytical Methods of Engineering II. Boundary and initial value problems of physics. Topics include solution of partial differential equations of physics by the method of separation of variables; Sturm-Liouville theory; variational principles and applications; Green's functions and applications. Preq., MATH. 302.

ME. 471-4. Fluid Mechanics. Viscous incompressible and compressible fluid flows. Topics include derivation of equation governing viscous compressible fluid motion; specializations to simple flows; boundary-layer theory; nozzles and diffusers; transition. Preq., ME. 385.


ME. 487-4. Rigid-Body Dynamics. Kinematics of a rigid body, moments of inertia, and principal axes, angular momentum of a rigid body. Euler equations. Applications include topics such as motion of a rigid body with a fixed point under no forces, the spinning top, stability of a sleeping top, the gyroscope, motion of a billiard ball, rotating machinery, etc. Preq., ME. 282 or equivalent and MATH. 302.

ME. 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. Preq., senior standing.


ME. 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. Prq., consent of instructor.

Note: Courses at the 500 level are open to qualified seniors subject to departmental approval. Not all graduate courses are offered each year.

ME. 501-3. Yield-Limited Behavior of Materials. Analysis of material behavior within the "elastic range" with emphasis on the phenomenon of yield and factors that influence it. Introduction to the theory of elasticity; examination of the theory of dislocations; study of strengthening mechanisms in solids. Consideration of various time-dependent but reversible (inelastic) deformation phenomena. Presentation of appropriate engineering case studies to augment various topics. Preq., ME. 401 or equivalent.

ME. 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. Preq., ME. 401 or equivalent.


ME. 514-3. Statistical Thermodynamics. Introduction to the molecular interpretation and calculation of thermodynamic
properties of matter, thermodynamic probability, distribution functions, Schrodinger wave equation and solutions, ensemble theory. Applications to ideal and real gases, solids, liquids, radiation, conduction electrons, and chemical equilibrium. Prep., undergraduate thermodynamics.

**ME. 521-3. Methods of Engineering Analysis I.** Selected topics from linear algebra, complex variable theory, and ordinary differential equations. The presentation is correlated with other analysis topics included in mechanical engineering courses and emphasizes application. Prep., graduate standing or consent of instructor.

**ME. 522-3. Methods of Engineering Analysis II.** Selected topics from integral transform methods, partial differential equations, perturbation theory, and probability and statistics. The presentation is correlated with other analysis topics included in mechanical engineering courses and emphasizes application. Prep., graduate standing or consent of instructor.

**ME. 532-3. Introduction to Fluid Dynamics.** Physical properties of gases and liquids; kinematics of flow fields; equations describing viscous, heat conducting Newtonian fluids. Exact solutions and rational approximations for low and high speed dissipative flows, surface and internal waves, acoustics, stability, and potential flows. Coreq., ME. 521 and 575, or equivalent.

**ME. 534-3. Viscous Flow.** Low Reynolds number flows, incompressible and compressible laminar boundary layer theory. Similarity theory. Separation, transition, and turbulent boundary layers. Prep., ME. 532, or equivalent.

**ME. 536-3. Compressible Flow.** Energy, continuity, and momentum principles applied to compressible flow; one-, two-, and three-dimensional subsonic, supersonic, and hypersonic flows. Normal and oblique shocks, method of characteristics. Prep., ME. 532 or equivalent.


**ME. 581-3. Dynamics.** Elements of vector analysis, particle motion, kinematics of a rigid body, rotating axes, rigid body motion, and Euler's equations and applications. Introduction to analytical mechanics. Hamilton's principle, Lagrange's equations for holonomic and non-holonomic systems. Prep., graduate standing or consent of instructor.


**ME. 695 to 699-1 to 4. Selected Topics.** Credit and subject matter to be arranged. Advanced graduate-level courses are available upon demand in the following subjects: theory of plates, theory of shells, theory of hydrodynamic stability, advanced continuum mechanics. Outlines of these courses are available in the departmental office.

**Independent Study**

**ME. 940-1 to 3. 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.

**ME. 950-1 to 6. Independent Study (Master's Level).** Available only through approval of the graduate adviser. Subjects arranged to fit needs of the particular student. Prep., graduate standing.

**ENGINEERING — NON-DEPARTMENTAL**

**Undergraduate**

The following courses are offered as required for the various degree programs (see the typical curricula for degree programs as listed in previous College of Engineering sections).

**ENGR. 101-2. Engineering Drawing.** Introduction to the engineering design process and application of orderly graphical solutions to engineering problems with an introduction to computer graphics. Prep., geometry.

**ENGR. 195-2. Computer Minds Tools I.** A project/lab course covering fundamental operations and features of the Apple Macintosh (MacPlus) workstation and several useful applications. Exercises and projects in word processing, free-form and structured graphics, spreadsheet, business graphics, database management, task scheduling, and information organization and representation. For non-engineering majors. **ENGR. 196-1 to 3. Special Topics in Engineering.** Subject matter to be selected. Credit to be arranged. Prep., geometry, algebra, and trigonometry.
ENGR. 291-299-1 to 3. Special Topics. Credit and subject matter to be arranged. Prer., variable.

Graduate

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 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 or in engineering and allied subjects related to the individual student's professional work. Examples of such interdisciplinary programs include engineering and business administration, engineering and social sciences, engineering and biological sciences, engineering and behavioral sciences, engineering and public administration. Appropriate non-engineering course work must be available on the campus where the student attends.

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 can include courses which are made available on video tape or on live television.

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 admission of students to graduate study, the approval of their degree programs, 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 Master of Science program. An advisory committee, including not fewer than three faculty members, will be appointed for each student by his or her 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.

Degree Requirements

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 Master of Science thesis and must be defended orally. 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.

Additional information about the degree may be obtained from the College of Engineering and Applied Science department offices.
"CU-Denver’s liberal arts and sciences offer an education that lasts — solid skills, a sound knowledge base, and the ability to continue to learn throughout life. All the student needs is energy and curiosity."

— Dean John Ostheimer
College of Liberal Arts and Sciences
Dean: John Ostheimer  
College Administrative Office: 1015 9th St.  
Administrative Office Telephone: 556-2557  
College Advising Office: East Classroom Building, Room 47  
Advising Office Telephone: 556-2555

INFORMATION ABOUT THE COLLEGE

It is ironic that this modern world that needs technical trained people who can master some specific computer program and delicate surgical operation has, in fact, increased the relevance of general, liberal education. Reports from the business world indicate that the long-run earning power of liberal arts graduates is often higher than that of professional school graduates. For example, human resources analyses for major corporations recognize that a liberal arts background leads to the strongest interpersonal skills and likelihood of managerial success. For good reason, the liberal arts are of central importance as our society grasps the need for sophisticated thinking in an increasingly complex world.

The combination of a liberal arts undergraduate major and a professional graduate degree is widely regarded as an unbeatable preparation. The College of Liberal Arts and Sciences has coordinated programs with CU-Denver's professional schools that encourage the student to pursue this approach. For the working individual whose previous education was narrow and specialized, liberal arts graduate degrees offer the chance to obtain needed breadth at any time during one's career.

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 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-education program, the core curriculum, that also prepares students for subsequent professional and graduate study. At the graduate level, the College offers students disciplinary and broad interdisciplinary degree programs.

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.

The liberal arts disciplines strive to remain close to the needs of the community. Advisory Committees from the community work with the faculty to strengthen these specific ties. In the humanities, cultural and historical efforts in Denver are supported by programs at CU-Denver that link our high quality academic disciplines to the world of humanities outside the academia. Social science disciplines also apply their knowledge to practical problems to help the surrounding population. The science programs, particularly in studies of environmental problems, also are resources for the community.

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. After 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 a professional school such as business, education, law, or medicine.

The faculty of the College provide instruction at the undergraduate level through three broad areas of knowledge: arts and humanities, natural and physical sciences, and social sciences. Each area of study offers a wide variety of curricula including traditional undergraduate
major programs, interdisciplinary studies, and pre-professional 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.

Programs

Students can earn the Bachelor of Arts (B.A.) degree in the following areas:
- Anthropology
- Biology
- Chemistry
- Communication and theatre
- Economics
- English
- Fine arts (students may study for either a B.A. or B.F.A. degree)
- French
- Geography
- Geology

Special majors are available for those students who would like to propose a unique program tailored to meet a specific objective (individually structured major).

The College also provides the necessary course work to prepare students for careers in the following health science fields: child health associate, dental hygiene, dentistry, medical technology, medicine, nursing, optometry, osteopathy, pharmacy, physical therapy, podiatry, and veterinary medicine.

Minor Programs

Many CU-Denver departments have developed minor programs. A minor program is not required for graduation. Students interested in completing a minor should contact the individual departments regarding requirements or the College Advising Office at 556-2555.

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 that 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 two different schools or colleges of the University of Colorado simultaneously by fulfilling all requirements for both degrees.

For example, the College of Business and the College of Liberal Arts and Sciences have a double-degree program leading to a B.S. in business and a B.A. in the student's chosen major. 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.

Students planning one of these multiple programs should consult with the College Advising Office at the earliest possible date in order to get approval for a double-degree program.

Graduate Programs

Graduate degree programs offered by the faculty of the College through The Graduate School are described in The Graduate School section of this bulletin.

CU-Denver/MSC Poolled Courses

Courses offered by the School of Letters, Arts, and Sciences at Metropolitan State College and by the College of Liberal Arts and Sciences at the University of Colorado at Denver form a common pool of resources available to students at both institutions. University of Colorado at Denver students may register through CU-Denver for any course in the pool offered by Metropolitan State College, and MSC students may register through MSC for any course in this pool offered by the University of Colorado at Denver. Credits earned in common pool courses that meet appropriate academic criteria will apply to the total number of credits required for a bachelor's degree from either institution. Students should check with the appropriate academic adviser and department faculty member to make sure a particular course will count toward the specific requirements for a degree major and/or minor.

Policy affecting residency requirements and transfer of credit is under review. Students should check with the College Advising Office for current policy on these issues. Also, at least 50 percent of the credit hours for which a CU-Denver student is registered must be in courses taught by University of Colorado faculty.

In order to fulfill the College's residency requirements, students must take approximately 25 percent of their course work from University of Colorado faculty. These requirements are described in full under Residency Requirements in this section.

Requirements for Admission

Entering First-Year Students

Students planning to enter the College of Liberal Arts and Sciences must meet the requirements described in the General Information section of this bulletin under Admission Policies and Procedures. Applicants to the
College are considered for admission according to the following schedule.\(^1\)

<table>
<thead>
<tr>
<th>If:</th>
<th>And:</th>
<th>Then:</th>
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<tbody>
<tr>
<td>Your Rank in High School</td>
<td>Your ACT Combined SAT</td>
<td>Your Status for Admission Is</td>
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<tr>
<td>Class Is</td>
<td>Score Is</td>
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</tr>
<tr>
<td>Upper 1/2</td>
<td>23 or higher</td>
<td>Assured admission</td>
</tr>
<tr>
<td>Upper 2/3</td>
<td>18-23</td>
<td>Considered on an individual basis</td>
</tr>
<tr>
<td>Lower 1/2</td>
<td>Below 18</td>
<td>Considered by Admissions Committee</td>
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TRANSFER STUDENTS

Students who have attended another college or university are expected to meet 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.

**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 CU-Denver. 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 of 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 ensure due process.

**ACADEMIC ADVICE AND INFORMATION**

Students in the College are expected to assume responsibility for planning their academic programs in accordance with College rules and policies and major requirements. To assist students, the College maintains a College Advising Office, telephone 556-2555. Students are urged to consult with the staff of this office concerning individual academic problems and progress toward their degrees.

As soon as students have determined a major, they must declare the major to a department adviser. The department adviser will be responsible for the student's major advising and for 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 the Health Careers Adviser during their first year in the College. For further information contact 556-2689.

The College has a prelaw adviser for CU-Denver students who are interested in careers in law. This adviser has a library of law school catalogues, prelaw 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 prelaw students is shared. Students may contact the prelaw adviser through the College Advising Office, 556-3396.

CU-Denver also has a counseling service available through the Office of the Dean of Student Academic Services to which a student may go for assistance with personal problems.

Career counseling is available to all students in the College. Assistance in skills analysis, resume preparation, and career exploration is available through the College Advising Office, 556-3396.

**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

\(^1\)This schedule corresponds to the general requirements described in the General Information section, but more detail is provided here for prospective College of Liberal Arts and Sciences students.
institutions are not used in calculating the grade-point average at the University of Colorado.

Academic Probation

Students whose cumulative grade-point average falls 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 minimum 2.2 grade-point requirement which must be met by the end of the succeeding semester. Students must continue to meet the required grade-point average of 2.2 each semester until their cumulative grade-point average is a 2.0. At that time students will be removed from probation.

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 GPA to 2.0 (C). For example, if the student has attempted 24 semester hours and has earned 42 grade points, the GPA is 1.75. The student needs 6 semester hours of B to raise the GPA 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 \( \times 2 = 48; 48 - 42 \) 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 \textit{summer term} on any campus, for \textit{correspondence study} through the University, or for \textit{credit courses} offered through the Division of Continuing Education.

Scholastic Suspension

Students on academic probation who do not meet the 2.2 minimum 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 \textit{in writing} of scholastic suspension. Students need to consult with a College adviser for readmission.

First Suspension

The normal period of suspension is two regular semesters (one academic year, excluding summer term), after which the student must reapply and will be readmitted on probation to the College of Liberal Arts and Sciences. The student then will be expected to meet the minimum 2.2 GPA each semester (based on the student's University of Colorado record only) until the cumulative GPA 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 \textit{summer term} on any campus, through \textit{correspondence work}, or through \textit{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 through course work at another institution, that is, by combining the University of Colorado cumulative grade-point average with course work taken at another institution. (Upon return to the University, however, the student's previous grade-point average is retained; the GPA from other institutions does not transfer to the permanent GPA record at 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 credit 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. The student 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 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 the 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.

Procedures for appealing a grade before the Academic Standards Committee are available for review in the College Advising Office.
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 are employed full time 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 — 9 to 12 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: Eight semester hours is considered a full load in the summer term. Maximum course load is 12 semester hours. Students wishing to register for 13 hours or more must obtain approval from the dean. Since the summer term is only 10 weeks long, the recommended course load is less than in the fall and spring.

- Employed 15 to 30 hours per week — 6 to 8 semester hours, or two courses.
- Employed over 30 hours per week — 3 to 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 or CCD, are included in the total load.

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, design and planning, journalism, music and education). College of Liberal Arts and Sciences students desiring elementary or secondary school certification will be allowed to apply up to 15 graduate credits from the certification program of the School of Education as part of their total required hours for the Bachelor of Arts degree. 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 who are sophomores, juniors, seniors, or graduates may register for independent study with the written approval of the appropriate faculty member and associate 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 core curriculum requirements.

Independent study courses are numbered as follows:

- 920-929 Sophomore level course
- 930-939 Junior level course
- 940-949 Senior level course
- 950-999 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:

- American government
- American history
- American literature
- Analyses and interpretation of literature
- Biology
- Calculus with elementary function
- English literature
- General chemistry
- Introductory psychology
- Micro and macro economics
- Western civilization I and II

These hours are acceptable for elective credit only and will not fulfill the core curriculum requirements. For credit in your major, consult your major department adviser.

Students should contact the Office of Student Academic Services, 556-2861, 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.
Maximum Credit Hours Allowed Toward the B.A. Degree

Types of Credit
Advanced Placement Credit (CEEB) No limit
College-Level Examination Program (CLEP) 30 semester hours
Correspondence study 30 semester hours
Credit by examination No limit
Independent study 12 semester hours
Internship/cooperative education 12 semester hours

Graduation Requirements

STUDENT RESPONSIBILITIES

Students are responsible for knowing the requirements for their degree and for fulfilling these requirements. Upon completion of the requirements (including those of a major), the student will be awarded the appropriate degree.

LIBERAL EDUCATION PROGRAM: THE CORE CURRICULUM

Beginning Spring Semester 1982, the College established new graduation requirements, called the core curriculum. Students who have been admitted and taken courses in the College prior to spring 1982 will have a choice of completing their degree programs with either the new requirements or those in effect at the time they were admitted.

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 core curriculum requirements, writing and computation proficiencies, and a foreign language requirement.

1. Core Curriculum. The College requires course work in each of three broad areas of knowledge: arts and humanities, natural and physical sciences, and social sciences. The courses must be selected from lists of courses specially designed by the faculty for this purpose and printed in each Schedule of Classes. Students are required to take at least 12 semester hours of core courses in the two broad areas which do not contain the department of their major or minor field. In the area which does contain the department of their major field, students are required to take only 6 semester hours of core course work, but these 6 hours cannot be in the department of the student’s major or minor. The total course work required is 30 semester hours distributed as follows:

<table>
<thead>
<tr>
<th>Semester Hours</th>
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<tbody>
<tr>
<td>A. Major area (but not in major or minor department)</td>
</tr>
<tr>
<td>B. Nonmajor area of knowledge</td>
</tr>
<tr>
<td>C. Nonmajor area of knowledge</td>
</tr>
<tr>
<td>Total core courses required</td>
</tr>
</tbody>
</table>

2. Writing. The College requires that students either complete ENGL 102 taken at the University of Colorado with a grade of C or higher, or that they pass an examination demonstrating that they have mastered the elements of writing at this level. Examinations are offered by the Department of English and if failed may be repeated twice more for a total of three times. Students are expected to have completed this requirement by the time they have passed 90 semester hours, i.e., before they begin their last year of college work. No transfer course will substitute for this requirement.

3. Computation. The College requires that students satisfy a computation requirement. There are three ways to do this: (a) by passing an examination (CU-Denver MATH. 100); (b) by completing any 3-hour mathematics course at CU-Denver numbered higher than 101, with a grade of C or better (or transfer an equivalent course from another school); (c) by completing with a grade of C or better the course in computer application (MATH. 135). Examinations are offered by the Department of Mathematics and may be repeated, if failed, twice more for a total of three times. Students are expected to have completed this requirement by the time they have passed 90 semester hours, i.e., before they begin their last year of college work. No transfer course will substitute for this requirement.

4. Foreign Language. The College requires elementary proficiency in a foreign language. This requirement is met if a student has completed the last high-school term at Level III in any classical or modern foreign language. (One full year at the high school level is equivalent to one semester of foreign language study at the college level.) Students who have not met the requirement prior to
admission to the College may do so either by completion of a third-semester course in the College, or by demonstration of a third-semester proficiency by examination.

MAJOR REQUIREMENTS

In addition to completing the above 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 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 department 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 is responsible for determining when a student has completed the requirements for the major and for certifying the completion to the dean of the College.

The minimum number of semester hours for the B.F.A. is 54; the maximum is 72. Special consideration may be necessary for interdisciplinary 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 generally carry lower division credit. Agreements between the University and community colleges in the state of Colorado, however, have resulted in some upper division transfer possibilities. See the transfer guides in the College Advising Office.

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 REQUIREMENTS

A certain minimum number of credit hours must be earned in residence in the College of Liberal Arts and Sciences for a student to qualify for award of a degree from the College. The following general statement of residency applies fully to any student who is admitted to CU-Denver as a first-term freshman and completes all course work on the Auraria campus.

To qualify for award of a baccalaureate degree, a student must earn the last 30 credit hours while enrolled as a degree student in the College of Liberal Arts and Sciences. Further, the student must have completed:

1. Among the last 60 credit hours, at least 30 in courses taught by the University of Colorado faculty.
2. Of these 30 residence credit hours, at least 21 in courses numbered 300 or above.
3. At least 15 credit hours in fulfillment of the core curriculum requirement for the B.A. degree in courses taught by University of Colorado faculty.

Provisions for Transfer Students

The following interpretations apply to students who do not begin as CU-Denver students.

1. Students transferring from other institutions of higher education will in general be evaluated in accordance with established guidelines governing transfer of credit.
2. As with any academic regulation, students with compelling reasons to justify an exception may petition to the Academic Standards Committee.
3. Interpretations will be made by the Academic Advising Office in consultation, as appropriate, with the Academic Standards Committee.
4. It is not the intent of the residence requirements to impede the academic progress of any student enrolled in the College.
5. All courses taken in the common pool in the 1980-81 academic year and Summer 1981 were taken prior to implementation of residence requirements. Therefore, these 1980-1981 courses will be treated for

1See CU-Denver/MSC Pooled Courses in the beginning of the College general information in this section of the bulletin.
purposes of residency as if they were courses taught by University of Colorado faculty.

Residence Requirements for Major Programs. Each department within the College may have a residence requirement for its majors. Students should check with their major departments in order to ascertain these requirements.

SENIOR PROGRESS REPORT AND DIPLOMA CARD

Upon completion of 90 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.

When their registration is confirmed for the 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. The essential requirements for a degree from the College are established in five separate categories. These are (1) core curriculum, (2) writing, (3) computation, (4) foreign language, and (5) major requirements.

Major Requirements

1. Thirty to 48 semester hours in the major field.
2. A minimum of 30 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 cumulative grade-point average of 2.0 (C).
3. A total of 45 semester hours of upper division work (courses numbered in the 300s and 400s).
4. The last 30 semester hours while registered as a student in the College of Liberal Arts and Sciences.
5. Transfer students please note: the last 30 semester hours must be letter-graded (as opposed to pass/fail option) course work completed at CU if these hours are being used to fulfill the minimum 30-hour residence requirement.

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 B.A. degree, except that ENGL 100, 101, and 102 do not count toward the 48 hour limit.

Special Academic Programs

HONORS PROGRAMS

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 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 must be completed 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 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. 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.
2. All credit courses which are completed through the Division of Continuing Education may be included in the 45 semester hours.
3. 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.

Departmental Honors

Most departments in the College offer programs through which students can qualify for Latin honors: *cum laude*, *magna cum laude*, or *summa cum laude*. Determination of the level of honors is made by the department. Detailed information can be obtained from the College Advising Office or from an individual department.

Dean's List

The College publishes and displays each semester a Dean's List, honoring students who receive a 3.75 or better grade-point average. To earn a place on the list, students must achieve the 3.75 GPA for the semester, in minimum of 6 hours in CU-Denver courses, while taking a load that consists of a maximum of 6 nongraded hours (P, W, I). For details, consult the College Advising Office.
Honors in Humanities

Students may enroll in a cocurricular program that leads to graduation with "Honors in Humanities" for those students who complete it with a 3.0 GPA or better. The program is open to all CU-Denver students, but it is specially designed for students majoring in non-humanities disciplines (such as business, engineering, the sciences, and social sciences). This interdisciplinary program acquaints students with the methodologies and knowledge of humanistic studies (art, drama, history, literature, philosophy) and it provides advanced training in writing. The program is intended for students interested in the study of the development of human values and their relationship to human experience at large and to scientific and technological knowledge specifically. For detailed information, contact the director of Honors in Humanities, 556-2557.

CENTER FOR INTERNSHIPS AND COOPERATIVE EDUCATION

Based on the precept that employment experiences can often contribute to liberal education, the Center for Internships and Cooperative Education 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 interns choose to contract with a professor in their major fields to receive academic credit for their work experiences. An internship 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 internship courses offered at the 398 level in each department. Students placed by the Center 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 have attained junior standing.
2. The participant must have at least a 2.75 grade-point average.
3. A contract for internship 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 dean.
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 3 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. Nine hours of internship credit is the maximum number that a student can apply toward the bachelor's degree. Departments may decide whether or not internship hours will count toward requirements for the major. Internship hours may not count toward the core curriculum requirement.
8. The internship project may not be used simultaneously for academic credit in other programs such as independent study.

Students should contact the Center for further information and forms for placement and credit, 1047 9th Street, 556-2892.

ACADEMIC CENTER FOR ENRICHMENT

The purpose of the Center is to help CU-Denver 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. The Center is located in Room 237, East Classroom Building, telephone 556-2802.

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. 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 knowing one’s way around, organizing one’s time, knowledge of the library, recognizing sentence errors, prereading and translation reading, listening and note-taking, building a vocabulary, writing the four-paragraph essay, taking examinations, and believing in oneself.

The Center has available a collection of books, including a number by minority authors about minorities, which may be utilized for research assignments as well as for improvement of general knowledge.

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, 556-3396.

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 pre-law 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 ensure 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 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 Law School Admission Services, Box 2000, Newtown, Pennsylvania 18940.

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, CO 80309.
Prelaw students are urged to participate in the regularly scheduled College prelaw activities, such as the prelaw orientations, LSAT preparation seminars, and meetings with law school recruiters. Prelaw students should contact the College prelaw adviser for information on these activities as well as for general prelaw advising, telephone 556-3396.

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 University of Colorado at Boulder. However, the first two years of the journalism curriculum may be completed at CU-Denver within the College. Students pursuing the journalism B.S. degree normally transfer into the School of Journalism at the beginning of the junior year. To be considered for a 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. For further information and advising, call the Department of Journalism on the Boulder campus, 492-5007.

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 Adviser at 556-2689 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 35 to 45 semester hours of professional education work in the School of Education. Students completing all requirements will receive a Bachelor of Arts degree before completing certification requirements.

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 should consult the School during their first semester on campus concerning the requirements for the Teacher Education Program, 556-2717.

Students pursuing teacher certification should so indicate on all application and registration materials so that they may be advised by the School of Education faculty members. Application for admission to the Teacher Certification Program should be made during the last semester of the junior year. The minimum requirements for acceptance are:

1. Completion of at least 90 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 teach at the secondary or elementary school level are available in 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 psychobiology. 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 is 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.

For information on the Master of Basic Science and Environmental Science degrees see the appropriate heading in this section of the 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 some time after the first year in the College with a committee of College faculty members. The major becomes the student's official program upon final approval by the faculty committee and the dean of the College. 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 College Advising Office, 556-3396.

ETHNIC STUDIES

This interdisciplinary program, housed in the social sciences, provides a minor. For a complete description see Ethnic Studies in this section of the bulletin.

INTERDISCIPLINARY PROGRAMS IN THE HUMANITIES

Undergraduate. Honors in Humanities is a co-curricular program designed for students whose academic major lies outside of the humanities, although anyone interested in a structured curriculum in humanistic studies is invited to participate. In particular, students in business, engineering, and the sciences will find this program valuable in deepening their undergraduate education. Students in the program must complete 21 semester hours, distributed as follows: HUM 101 (3 hours); Course Clusters, subject-oriented courses arranged each semester around specific themes or subjects appropriate to humanistic approaches (12 hours, also applicable to the socio-humanistic electives and to CLAS core curriculum requirements); an upper division Writing Seminar (3 hours); and a Senior Seminar (3 hours). Students successfully completing the program will graduate with Honors in Humanities. For details, contact the program director, 556-2558.

Graduate. A complete interdisciplinary program leading to the Master of Humanities is available at CU-Denver. This curriculum combines the arts, communication, literature, philosophy, and theater, and is especially attractive to public school teachers who teach in several areas and also to working professionals seeking intellectual enrichment or making mid-career changes. For details on this program, see Humanities, Master of, in this section of the bulletin.


The College of Liberal Arts and Sciences, in cooperation with the College of Business and Administration and the Graduate School of Public Affairs, offers students the opportunity to complete a bachelor's degree and master's degree in five years rather than the usual six years. The programs combine undergraduate general education and major studies with a specialized curriculum in business or public affairs, and strive to develop intellectual and professional skills in a coordinated manner.

Students in the B.A./M.B.A. or B.A./M.P.A. programs must fulfill all of the graduation requirements from the College of Liberal Arts and Sciences (CLAS); maintain a 3.5 undergraduate grade-point average in CLAS and complete 75 percent of their undergraduate program to be eligible for admission; and enroll formally in the programs through the CLAS Advising Office. Students admitted into either of the programs begin taking 600-level courses in business or public administration during their senior year. These courses will count toward the bachelor's degree as electives. For further information, contact the CLAS Advising Office, 556-2555.

INTERNATIONAL AFFAIRS, MINOR AND CERTIFICATE

Co-Directors: Stephen C. Thomas, Political Science, and James B. Wolf, History. Steering committee: Mary Conrov, History; Jane Everett, Political Science; Dan Hagen, Economics; Michael Hayes, Business; John Ostheimer, Dean of the College of Liberal Arts and Sciences; Donald Schmidt, Modern Languages.

International affairs is a new CU-Denver interdisciplinary minor and certificate program. It combines the expertise of faculty in the Colleges of Liberal Arts and Sciences and Business, and the Schools of Education and Public Affairs.

We are living in an increasingly interdependent world, where international affairs is of growing importance. An increased knowledge of the world and a sensitivity to differing perspectives and cultures is necessary in much of our decision making in private service, public service, and business activity.

The international affairs program is open to all undergraduate CU-Denver students. The international affairs minor can be combined with a major in any undergraduate major within CU-Denver. A certificate in international affairs may be earned by students who prefer to focus on international studies without taking a foreign language.

Students electing to minor or to earn a certificate in international affairs are given the maximum opportunity to design their own personalized course of study in cooperation with an international affairs faculty adviser.

Requirements for a Minor

1. Undergraduate student at CU-Denver.
2. Fourth semester of a foreign language.
3. 16 hours in at least 3 disciplines.
4. Develop your study focus with the help of an adviser.

Requirements for a Certificate

1. Undergraduate student at CU-Denver.
2. 19 hours in at least 3 disciplines.
3. Develop your study focus with the help of an adviser.

For further information contact the Office of International Affairs, 556-3489.
Programs of Study

ANTHROPOLOGY

Associate Chair: Duane Quiatt
Department Office: UA Building, Room 610
Telephone: 556-3557
Faculty: Professor: Duane Quiatt
Associate Professors: Janet R. Moone, Lorna G. Moore
Assistant Professor: Craig R. Janes
Adjunct: Richard G. Conn, Jane S. Day, Colby Ray Hatfield
Adjoint: Jack E. Smith
Emeritus: Robert A. Aldrich

Undergraduate

Anthropology is the study of human origins and evolution, present conditions of human life, and future prospects. It considers human beings as biological and as social entities and seeks to explain both diversities and commonalities of peoples and cultures. For undergraduates, anthropology provides a rich overview of human life. It also introduces them to a variety of skills and practical research methods which anthropologists apply in laboratory and field studies of the ecological constraints on human existence, the cultural bases of individual and organizational behavior, and, in general, problems and circumstances relating to the maintenance of healthy, productive human action in the world today.

Anthropological training provides entry to a variety of careers in archaeology, museology, education, community service, public administration, and international affairs and business. The specific skills which it provides are useful to students of environmental design, city planning, community development, the medical and nursing professions and allied health sciences, law, public affairs, and secondary education.

Requirements for the Major. 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:

1. ANTH. 103-3. Introduction to Anthropology I: Human Ancestors
   ANTH. 104-3. Introduction to Anthropology II: Human Cultural Diversity
2. Two of the following:
   ANTH. 200-3. Cultural Anthropology
   ANTH. 201-4. Biological Anthropology
   ANTH. 202-3. Archaeology
   ANTH. 203-3. Nature of Language
3. ANTH. 453-3. History of Anthropology

Requirements for the Minor. For an undergraduate minor in anthropology, a minimum of 12 semester hours in anthropology must be completed with an average grade of C or better. Three of the 12 hours must be upper division. Courses taken must include the following:

ANTH. 103-3. Introduction to Anthropology I: Human Ancestors
or
ANTH. 201-4. Biological Anthropology
ANTH. 104-3. Introduction to Anthropology II: Human Cultural Diversity
or
ANTH. 200-3. Cultural Anthropology

Area Requirements. Anthropology courses may satisfy humanities, natural and physical sciences, and social sciences area requirements, depending on course content. When in doubt, students should check with the department secretary.

Graduate

The unique intellectual challenge of anthropology is to integrate diverse practical study approaches and to synthesize knowledge from both biological and socio-cultural research domains in seeking solutions to problems faced by human societies in today's world. Individual courses in biological and cultural
anthropology, archaeology, primatology, and linguistics cut across lines which traditionally have separated the humanities, the social sciences, and the natural sciences. Because of this integrative perspective on the human condition and the training provided in objectively assessing cultural patterning and social interaction, an anthropology M.A. provides a versatile base for professional career development.

The M.A. program at CU-Denver affords training in the traditional subfields of biological and cultural anthropology, archaeology, and linguistics along with the opportunity to specialize in two interdisciplinary, applied programs — medical anthropology, and community and urban anthropology. An internship is required within the applied programs and is an option within the more general programs. Training in archaeology and primatology is offered within the framework of a general degree program, in which students also are encouraged (as in the two specialty tracks) to emphasize applied studies and practical research.

Applied Programs. Medical anthropology emphasizes the importance of biological and cultural factors in the determination of health and sickness. The approach is biocultural, integrating knowledge from the health sciences and the social sciences concerning causes of sickness and sources of treatment for restoring health. Courses in the department are complemented by electives in other departments (biology, psychology, sociology) and programs on this campus (health administration, education, design and planning) and at the CU-Health Sciences Center (Schools of Medicine and Nursing).

Community and urban anthropology offers training toward the application of anthropological concepts and methods of analyses of community or neighborhood culture, social organization, environment and their interrelations. An emphasis is placed on the relevance of such applications for community action, problem-solving, and planning and policy decisions. The CU-Denver sociology department is closely allied with the anthropology department through a common chairperson. Internships are jointly administered, and curricula in urban anthropology and sociology are integrated.

REQUIREMENTS FOR ADMISSION

Application is open to holders of a B.A., B.S., or higher degree in any field. Acceptance is competitive. It is based on an undergraduate record of good quality (2.75 or better grade-point average for all undergraduate studies), prior training in anthropology (18 semesters minimum), GRE verbal and quantitative scores, 3 letters of recommendation, and the applicant’s purpose in pursuing the degree. Two copies of transcripts from all undergraduate institutions attended are also required. A student without prior anthropology training may be admitted to the program but may be required to make up deficiencies without graduate credit or may choose to gain the necessary background as a non-degree student before beginning the graduate program. With this flexibility in mind, applications are welcome from individuals pursuing particular interests and careers, especially in fields pertaining to the medical anthropology and community and urban anthropology areas. Departmental deadlines for receipt of all application materials is April 15 for fall entrance and October 15 for spring admission.

PLAN OF STUDY

Students are required to take 30 semester hours of graduate study to complete the M.A. degree. All coursework in anthropology must be at the 500 level or above. Students pursuing training in the traditional subfields may elect to write either a thesis (and allocate 6 of the required 30 hours to the thesis project) or a master’s paper, more limited in scope than a thesis, in conjunction with 6 hours of the required course work.

For the applied programs, the required 30 semester hours’ course of study consists of:

- 6 hours of theory courses
- 9 hours of methods courses
- 6 hours of internship practicum
- 9 hours of electives in anthropology or allied fields

In lieu of a thesis, an internship research report is included within the 6 internship hours. The student is responsible for assisting faculty in arranging an appropriate internship.

All students are required to pass a 4-hour comprehensive examination taken ordinarily in the fourth semester and no later than the fifth semester after admission. A minimum of two full semesters devoted to advanced study is required by The Graduate School; no more than three years for attaining the M.A. degree is strongly encouraged. Ordinarily, two years of full-time participation are required to complete the M.A. degree.

Further information concerning admission, programs for study, or other items of interest may be obtained by writing the Director of Graduate Studies, Department of Anthropology, University of Colorado at Denver, 1100 14th Street, Denver, CO 80202. For general Graduate School requirements and application information, see The Graduate School section of this bulletin.

COURSES

ANTH. 103-3. Introduction to Anthropology I: Human Ancestors. We are descendents and survivors of the human species. Where did we come from? How did we get here? Are we still evolving as a species? The primary goal of this course is to transmit and discuss the major principles of anthropology as they apply to the remains left and the legacy established by our prehuman and early human ancestors. Cultural processes in action in recent and contemporary human societies are the domain of ANTH. 104; ANTH. 103 and ANTH. 104 form a natural sequence and may be taken in either order.

ANTH. 104-3. Introduction to Anthropology II: Human Cultural Diversity. Study of human lifeways across cultures and through time. Survey of relationships between environment, technology, social organization, language, and ideology.
Nature of anthropology and its analysis of the similarities and differences in human cultural adaptations.

ANTH. 200-3. Cultural Anthropology. A research methods course providing an introduction to the study of the cultures through review and practice of ethnographic methods. An emphasis is placed on field work, participant observation techniques and their results. Knowledge of cultural patterns in thought, symbol, and behavior becomes heightened by practice in applying data gathering and analysis techniques used by anthropologists.

ANTH. 201-4. Biological Anthropology. Human biological evolution from primate ancestors and fossil hominids to modern H. sapiens; genetic mechanisms of evolution; genetic and physiological variation in contemporary human populations. Three hours of lecture and one 2-hour lab. each week.

ANTH. 202-3. Archaeology and Prehistory. 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 hunters to 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. 230-3. U.S. Anthropology. America: a near continental country with citizens in significant numbers from all corners of the earth. Is this country composed of one culture or many? Are contemporary media at last giving truth to the idea of a melting pot by leveling regional values and traditions? This course examines broad cultural themes in America, both past and present, and analyzes them from the perspective of traditional anthropology.

ANTH. 300 to 309-3. Topics in Anthropology. A flexible format for dealing with specific topics of special interest in anthropology on an introductory level, such as aging, race and ethnic prejudice; science and human values, warfare and aggression, food and nutrition, cultural diversity through film, myth and folklore, Colorado prehistory. The specific topic explored in a given semester will be announced in the Schedule of Classes.

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. (HIST. 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 CU-Denver faculty who will also evaluate written reports by the students.

ANTH. 398-variable credit. Internship/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. 400-variable credit. Special Anthropological Problems. For majors in anthropology; others by consent of instructor. Designed to give advanced 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.

ANTH. 499-3. Organizational Culture. Examination of concepts of culture fundamental to anthropological research in human organization and to current theories of organizational management. This course is designed for the professional student, to provide an appropriate study base for those engaged in and affected by day-to-day administrative application of ideas drawn from anthropological theory and research.

**Upper Division/Graduate Level**

**ANTH. 402/502-3.1 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. 405/505-3.1 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. Prereq., for 400 level, college algebra or its equivalent or consent of instructor.

**ANTH. 408/508-3.1 Anthropological Genetics.** A consideration of the data and theory of human genetics. Emphasis on analytical techniques relating to a genetic analysis of the individual, family, and populations.


**ANTH. 414/514-3.1 Primate Behavior.** Examination of morphology and behavior of selected primate species from a comparative evolutionary point of view, with emphasis on social behavior, ecology, and issues relating to human evolution.

**ANTH. 415/515-3.1 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. 416/516-3.1 Cultural Ecology.** The chief concern of this course is the relationship between ourselves and our surroundings, the very immediate ways in which the environments in which we live affect us. The view is of ourselves as a part of, not apart from, those environments. That view involves examination of the effects of temperature, solar radiation, oxygen availability, and nutrient type and availability on ourselves and other recent or contemporary human populations around the world.

**ANTH. 417/517-3.1 Human Ethology.** Ethological principles and their application to anthropological investigations. Methods and techniques of data collection. Practice in assessment of behavior in natural settings.

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1 Students enrolled at the 500 level may expect additional work and evaluation commensurate with graduate standards.

ANTH. 421/521-3.1 Archaeology of the American Southwest. Prehistoric cultures of the Southwestern U.S. and adjacent Mexico, their origins, characteristics, and interrelationships.

ANTH. 422/522-3.1 Archaeology of Mesoamerica. Prehistoric and protohistoric cultures of Mexico and northern Central America, including the Aztec and the Mayan.

ANTH. 425/525-3.1 Anthropology and History. An anthropological approach to historical research and writing. Ethnohistory, social history, life history, and local history are traditional methods in anthropology. This course offers evaluation of exemplary works and provides practical experience in the construction of small histories.

ANTH. 439/539-3.1 Research Methods in Archaeology. Methods and theories of archaeology are used to scrutinize the collection and interpretation of data and the relationships of archaeology to other disciplines. Course content will vary slightly each time, offered in response to student needs and the availability of projects, for example, laboratory work, urban excavation, survey and mapping, etc., but the core material will be learning and criticizing basic archaeological assumptions.

ANTH. 444/544-3.1 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. 447/547-3.1 Historical Archaeology. Exploration of our own historical past, from Plymouth Colony to Western ghost towns, using traditional and not-so-traditional archaeological techniques.

ANTH. 448/548-3.1 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. 450/550-3.1 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. 451/551-3.1 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. 453/553-3.1 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 socio-cultural contexts on individual experience.

ANTH. 454/554-3.1 Psychological Anthropology. Old and new interests at the interface of personality and culture, from the influence of Freud, through configurational, modal personality and national character theories, to reformulation of culture and personality into psychological anthropology with its diverse interests.

ANTH. 455/555-3.1 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 socio-cultural development.

ANTH. 456/556-3.1 Contemporary American Indian Cultures. Beginning with the historical background of 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 Southwest generally.

ANTH. 458/558-3.1 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. 459/559-3.1 Comparative Social Organization. Principles in the comparative study of human social systems, types of social structure, social control, sociocultural integration, and processes of social change and societal development. Focus on the analysis of ethnographies. Prerequisite, one course in cultural anthropology or sociology.

ANTH. 462/562-3.1 Ethnography of the American Southwest. Geographic affiliations, culture, history, traditional ways of life, and culture change in the American Southwest.

ANTH. 463/563-3.1 Ethnography of Mexico and Central America. Geographic affiliations, culture-history, traditional ways of life, and culture change in Mexico and Central America.


ANTH. 481/581-3.1 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.

Graduate Level


ANTH. 600-1 to 3. Seminar in Current Research Topics. An inquiry into current research of critical and general interest to anthropologists. Variable format.

ANTH. 609-3. Seminar: Comparative Social Systems. Inquiry into current cross-cultural research on the structure and function of social units, overall societal integration, and processes of change in social organization. The emphasis will be on contemporary complex societies, urban, industrial, and alternative systems.

ANTH. 613-3. Interdisciplinary Seminar. A consideration of interdisciplinary problems that involve anthropology and related fields such as history, the behavioral disciplines, and the natural sciences.

1Students enrolled at the 500 level may expect additional work and evaluation commensurate with graduate standards.
ANTH. 614-3. Seminar: Archaeology of Selected Areas. Consideration of archaeology of a specific area, either geographical or topical. Areas to be selected in terms of current research interests.


ANTH. 650-3. Seminar: Contemporary Culture Theory. The role and application of theory in cultural and social anthropology. An in-depth inquiry into important theories and their operational methods. Practice in model building, research designing, appropriate measures, and other methodology. Exercises in inductive and deductive generation of theory. Pr., consent of instructor, upper division or graduate standing.

ANTH. 651-3. Research Techniques in Cultural Anthropology. An introduction to the methods and techniques used in cultural anthropological field work along with the logic, assumptions, implication of theory-building and hypothesis-testing in comparative research in cultural anthropology. Special attention is given to a field work project as a practical training experience and as an application of the established anthropological methods. Pr., consent of instructor, upper division or graduate standing.


ANTH. 940-variable credit. Guided Study. Directed individual study based on a specific subfield of anthropology. Consent of instructor required.

ANTH. 950-variable credit. Guided Study. Directed individual study based on a specific subfield of anthropology. Consent of instructor required.

ANTH. 960-variable credit. Guided Research. Directed individual research, field or library, employing specific anthropological theories, methods, and techniques, any subfield. Consent of instructor is required.

BASIC SCIENCE, MASTER OF

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/or broaden their training in computer science, mathematics and the biological and physical sciences. Professionals such as public school teachers, industrial scientists, engineers, business persons, and others find that such a degree may lead to pay raises, promotions, and new job opportunities. The student may elect the mathematics or science option. Flexibility in the design of a degree plan is made possible so that students 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.

With few exceptions, courses credited toward the degree must be taken through the University of Colorado at Denver, over a period of five years or six successive summers.

The Master of Basic Science degree is supervised by an executive committee, which includes faculty representatives from mathematics and the science disciplines.

Application should be made to Master of Basic Science, the Graduate School, University of Colorado at Denver, 1100 14th St., Campus Box 163, Denver, CO 80202.

Requirements for Admission

1. General regulations for admission to The Graduate School apply (see The Graduate School section of this bulletin).

2. A student must present at least 40 semester hours in the physical and biological sciences and mathematics, preferably including one year of calculus. Students may be admitted to the program with a deficiency in calculus, but must remedy the deficiency within one year after admission, with grades 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 except as modified below.

2. The student is required to complete 24 semester hours of course work 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. At least 12 of these hours shall be 500 or higher. Thesis and independent study credit do not count toward the 12 hours.

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 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 student's faculty committee which also must approve the candidate's performance.

There are two basic options within the program: mathematics and science. A Plan I (thesis) option is available only in the science option.

Mathematics Option

1. A reasonable degree of competence is required in the fields of analysis, algebra, and geometry. A minimum of 15 semester hours of courses at the 300 level or above in mathematics must be completed for the degree, including at least 3 hours of analysis, 6 hours of algebra, 3 hours of geometry, and a two-course sequence at the 500 level.

2. 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.

3. Upper division electives in science, mathematics, or computer science, 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 teaching, history of science, or philosophy of science.

Science Option

Within the science option there are two choices: 1) the non-thesis option, or 2) the thesis option.

1. In either option the student must take an upper division sequence (300 level or above) of at least 6 semester hours in each of two of the physical and 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. For the non-thesis option, upper-division electives in science, mathematics, or computer science to complete an approved 30-semester-hour degree plan. Of the required hours for either option, 12 hours or more must be from courses numbered 500 and above, not to include thesis credit or independent study. The required hours may also include 3 semester hours of upper division courses or seminars in secondary school teaching, history of science, or philosophy of science.

3. Thesis Option. The student who plans to present a thesis for the M.B.S. degree must report this to the Executive Committee of the program not later than the second semester and must include the names of three faculty willing to serve on the committee they are proposing.

BIOLOGY

Chair: Linda K. Dixon
Department Office: Science Building, Room 333
Telephone: 556-2689
Faculty: Professors: Alan P. Brockway, Linda K. Dixon, Janis W. Driscoll, David W. Greenfield, Emily L. Hartman
Associate Professors: Gerald J. Audesirk, Teresa E. Audesirk, Diana F. Tombback
Instructor: David L. Shugarts
Adjunct: Daniel D. Chiras
Emeritus Professors: Phyllis W. Schultz, George J. Siemens

Undergraduate

The study of biology introduces the student to the diversity of life, the chemical processes and adaptations shared by species and the interaction of species with their environment. By studying the differing fields of biology, the student begins to appreciate the characteristics of life and the remarkable evolutionary history leading to the present forms, and to understand the advances in biological technology that are transforming our society. Knowledge of the interrelationships between populations and their habitats leads to respect, concern, and a sense of responsibility for our environment.

The biology major prepares a student for graduate study in biology, for professional schools in the health sciences, for a variety of biologically oriented jobs in government and industry, for teaching at various educational levels, or, as with any liberal arts major, for life itself. Students planning on a teaching career should consult with the School of Education for information on teacher certification.
Requirements for the Major. Biology majors must complete a minimum of 36 hours of biology, 16 hours of which are to be at the upper division level. Fifteen of the 36 hours are to be taken in residence with CU-Denver biology faculty. Included in the 36 hours are 20-21 hours of biology core courses required of all majors. At least 4 other courses in biology beyond the core courses are required to fulfill the rest of the hours. To ensure a proper background for the study of biology, majors are required to take 37 hours of course work in ancillary disciplines. The following biology and ancillary courses are required:

Biology Core Courses

<table>
<thead>
<tr>
<th>Course</th>
<th>Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Biology I and II (BIOL. 205, 206, 207, 208)</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>
<tr>
<td>Total biology core</td>
<td>20-21</td>
</tr>
</tbody>
</table>

Ancillary Core Courses

<table>
<thead>
<tr>
<th>Course</th>
<th>Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Chemistry, two semesters (CHEM. 103-106)</td>
<td>10</td>
</tr>
<tr>
<td>Organic Chemistry, two semesters (CHEM. 341-344)</td>
<td>8</td>
</tr>
<tr>
<td>University Mathematics I and II (MATH. 111-112)</td>
<td>6</td>
</tr>
<tr>
<td>Physics (PHYS. 201-202)</td>
<td>10</td>
</tr>
<tr>
<td>Introductory Statistics (MATH. 383 or PSY. 310)</td>
<td>3</td>
</tr>
<tr>
<td>Total ancillary core</td>
<td>37</td>
</tr>
</tbody>
</table>

At the upper division level, in courses beyond the core requirements, a student may concentrate course work in one of three major areas: ecology, genetics, or organismic and population biology. If students choose to specialize, then they should consult with the appropriate adviser to structure individually a course of study to meet their needs.

Departmental Honors. To qualify for departmental honors a major must have a minimum GPA of 3.2, take at least 6 hours of independent study over two semesters, and pass an oral examination administered by the Biology Honors Committee. For high departmental honors, a major must have a GPA above 3.5, take at least 6 hours of independent study over two semesters, pass an oral examination, and present to and defend before the Biology Honors Committee a thesis based on the independent study work. Any major desiring to pursue departmental honors should consult the chairperson of the Biology Honors Committee during the junior year.

Requirements for the Minor. Students interested in a minor in biology should contact the department office for specific requirements.

Graduate

The master’s program in biology is designed to prepare graduates for research and teaching positions, employment in business and industry, advanced training as secondary school science teachers, and for advanced graduate work at the doctoral level. The M.A. in biology may be obtained with an emphasis in ecology, genetics, plant science, and organismic biology (including anatomy, physiology, development, and neurobiology).

Two principles have guided the development of the graduate program in biology. These are (1) the belief that a student's program should be tailored to meet the student's specific needs or personal goals and (2) the utilization of all the University's resource facilities, regardless of the campus on which they are located, in order to provide greater opportunity and exposure for the student.

Requirements for Admission

Applicants must hold a baccalaureate degree from an accredited college or university earned with an overall grade-point average of 3.0 or better. (Exceptions to this grade-point average are made, dependent upon the letters of recommendation made on the student's behalf.) Most applicants have an undergraduate major in biology or its equivalent. Students who do not meet the minimum requirements set by the department or The Graduate School may be admitted on a provisional basis as detailed in The Graduate School general information section in this bulletin. The GRE is required of all applicants. Applications are submitted directly to the biology graduate coordinator at CU-Denver.

Degree Requirements

All course work taken within the department and applied toward the degree must be 500 level or above. With the adviser's and/or graduate committee's approval course work at the 400 level taken outside the department may be applied toward the degree. Two types of degree plans are offered:

Plan I (with thesis) requires 24 semester hours including 4-6 hours of thesis; at least 12 of the total semester hours must be 500 level or above.

Plan II (without thesis) requires 30 semester hours of which 16 hours must be 500 level or above.

There is no core of required courses structured into the master's degree program; however, one seminar (1 or 2 hours credit) is required. A course plan is developed by the student and major professor and approved by the student's graduate committee.

Additional Information

The student is referred to the biology graduate coordinator and to the Department of Biology's Master of Arts in Biology brochure which is available in The Graduate School office or the biology department. Specific questions relating to the student's background and specific program needs should be directed to the biology graduate coordinator.

Courses

BIOL. 104-3. Basic Biology for the Nonmajor. Lect. This one-semester survey course is designed to present basic information and concepts of biology as they relate to everyday life. The emphasis is on humans and their relationship to the world. This course will not count toward a major in biology.

BIOL. 133-1. Topics in Biology. Five-week courses dealing with topics in biology. See Schedule of Classes for current topics.
For nonscience majors to fulfill the natural science requirements.

**BIOL. 134-3. Humans and Ecosystems.** Lect. For nonbiology majors, this course will introduce principles of ecology and explore human activities from an ecological perspective. Topics will include ecosystem structure and agriculture, human and nonhuman population dynamics, energy flow in ecosystems and human energy consumption, material cycling in ecosystems and pollution.

**BIOL. 205-3. General Biology I.** Lect.1 Introduction to five major areas of study: (1) the chemistry of biological systems; (2) the structure and function of the cell; (3) cellular energy transformations (photosynthesis and respiration); (4) genetics (mitosis, meiosis, patterns of inheritance, molecular genetics); and (5) evolution.

**BIOL. 206-3. General Biology II.** Lect.1 Continuation of BIOL. 205. Introduction to three major areas of study: (1) animal structure and function, (2) plant structure and function, and (3) ecology (emphasizes Colorado ecosystems).

**BIOL. 207-1. General Biology Laboratory I.** Laboratory exercises corresponding to topics covered in BIOL. 205, emphasizing data collection and analysis, and experimental design. May be taken independently.

**BIOL. 208-1. General Biology Laboratory II.** Laboratory exercises corresponding to topics covered in BIOL. 206, emphasizing data collection and analysis, and experimental design. May be taken independently.

**BIOL. 310-4. 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. Lect., lab., and some field trips. A semester project is part of required lab. work. Prer., one year of general biology.

**BIOL. 311-3. Biology of Women.** A survey of women from a biological perspective, encompassing the anatomical, physiological, genetic, and behavioral aspects of women. This course cannot be used to fulfill biology major requirements.

**BIOL. 312-3. Natural History of Colorado.** Lect. Introduction to the plains and mountain ecosystems of Colorado — from grassland to tundra. The topographic features, climate, habitats, plants, and animals of each ecosystem are considered. From a geological standpoint, the glacial history and geomorphic processes which have shaped the present Rocky Mountains of Colorado are overviewed. Both plant and animal adaptations to mountain environments are studied. Lecture material is supplemented with slide presentations. Course is intended for nonmajors.

**BIOL. 322-4. Essentials of Human Physiology.** Lect., lab. The basic orientation of the course is toward understanding the functioning of the body as a set of homeostatic mechanisms. Particular emphasis is placed on membrane potentials, muscle, circulation, respiration, digestion, the kidney, the control of metabolism, and acid-base balance. Prer., one year of general biology and one year of general chemistry.

**BIOL. 325-3. Introduction to Animal Behavior.** (PSY. 325.) Lect. An introductory survey of the study of the behavior of nonhuman animals. An evolutionary perspective is used to examine the mechanisms of behavioral control in individuals and groups of animals and how animal species adapt to their environment. Prer., one semester of psychology or biology.

**BIOL. 331-3 Field Botany.** A study of the native Colorado mountain and plains vascular flora. Student learns 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

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1Biology and health science (premed, vet, nursing, etc.) majors must also take the accompanying laboratories, i.e., BIOL. 207 and 208.
sheets are produced by students. Lect., lab., some field trips. 

BIOL. 341-3. Principles of Ecology. A lecture course that deals with interrelationships between organisms and their environments. Subject matter includes population, community, and ecosystem levels of study. The emphasis is on the underlying principles of ecology that involve all types of organisms. Prereq., one year of general biology.


BIOL. 380-4. Developmental Biology. A survey of developing systems including insects, echinoderms, amphibians, birds, mammals, and selected plant types. Content will include gametogenesis, embryogenesis, and a survey of differentiating systems. Prereq., one year of general biology.


BIOL. 384-2. Laboratory in General Genetics. Lab. To acquaint students with techniques used in the study of genetics. Independent study projects and general laboratory exercises included. Prereq., BIOL. 383.

BIOL. 390-variable credit. Advanced Topics. Periodic examination of current topics in the field of biology.

BIOL. 398-variable credit. Internship/Cooperative Education. Designed experience involving application of specific, relevant concepts and skills in supervised employment situations. Prereq., sophomore standing and 2.5 grade-point average.

BIOL. 400-3. Advanced Cell Biology. Lect. This course builds on the foundations laid in the prerequisite courses. Major topics include the functions of cell membranes, energy transduction, and regulation of metabolic pathways. A major emphasis is the control and integration of cellular activities. Prereq., BIOL. 361 and CHEM. 203 and 206.


BIOL. 427-3. Environmental Physiology. Lect. and lab. A look at the physiological mechanisms used by animals and plants in reaction to adapting to changes in such natural environmental parameters as temperature, light, and water availability. The intent is to lay the groundwork for understanding how to approach the study of the effects of changing environments on organisms. Prereq., one year of chemistry and one course in either plant or animal physiology.

BIOL. 439-2. Laboratory in Animal Behavior. (PSY. 439.)

BIOL. 441-4. Mountain Ecology. In-depth study of mountain plant communities: structure, characteristics, dynamic processes, and interactions with environmental factors. Mountains of Colorado and Rocky Mountains in general are emphasized. Communities are oriented into major mountain ecosystems according to Marr. Some discussion of autecological factors and their influence on plant communities is included. Field and lab. studies emphasize techniques in vegetation analysis (descriptive and quantitative), dendrochronology, vegetation mapping, and use of data analysis systems including statistics. Current survey of literature throughout course is required. Lect., lab., weekly field trips during class time. Prereq., one year of general biology.

BIOL. 447-4. Ecological Methods. Lect. and lab. This course deals with the empirical aspects of an ecological study. Students will learn sampling techniques that are used in plant and animal ecology. Emphasis is placed on hypothesis testing, data analysis, and experimental field designs. Prereq., BIOL. 341.


BIOL. 461-5. Vertebrate Embryology. Introduction to fundamental developmental anatomy including gametogenesis, fertilization, gastrulation, and early organogenesis. The comparative developmental anatomy of the echinoderms, amphibians, birds, and mammals, including the human, is examined.

BIOL. 467-3. Mammalian Endocrinology. This systematic survey of the endocrine system looks at the cellular basis and biochemical characteristics of individual endocrine tissues. Their function in the regulation of other endocrinological, physiological, and behavioral events is analyzed. The course emphasizes the human system and complements studies in physiology, behavior, and neurobiology. Prereq., BIOL. 322.

Upper Division/Graduate Level

BIOL. 410/510-3.1 Behavioral Genetics. (PSY. 410.) Lect. Interdisciplinary course on relationships between behavior and heredity. Prereq., for 400 level, general biology or general psychology.

BIOL. 412/512-3.1 Quantitative Genetics. (PSY. 412/512.)

BIOL. 415/515-3.1 Vertebrate Ecology. Lect. Topics in population biology and behavioral ecology will be addressed at an advanced level. Material includes such subjects as population growth, demographics, competition, optimal foraging theory, territoriality, and the evolution of social systems. Prereq., BIOL. 341 or consent of instructor.

BIOL. 416/516-4.1 Neurobiology. Lect. An introduction to basic neuroscience, covering the cellular basis of neural functioning, including the structure of nervous systems, neural physiology, and neurochemistry. The human nervous system is emphasized. Current topics in neurobiology, such as brain/hormone interactions will be included. Prereq., BIOL. 206 or PSY. 203. BIOL. 322 recommended.

BIOL. 425/525-3.1 Advanced Animal Behavior. Lect. An advanced course emphasizing the behavioral similarities and differences among animals. Principles of behavior are discussed in a variety of species. Prereq., upper-division standing in biology or psychology. If the latter, one year of general biology is required. BIOL./PSY. 325 is recommended.

BIOL. 440/540-4.1 The Plant Kingdom. Lect. and lab. Evolution in the plant kingdom will be traced by the study of the structure, function, and ecology of each major plant group — algae through gymnosperms. Angiosperms (flowering plants) are covered in Plant Science. Local Colorado examples will be emphasized in the lab and field.

BIOL. 470/570-4.1 Biometry. Lect. and lab. An intensive course in intermediate statistics with emphasis on experimental design and analysis. Includes statistical design of repeated measures, analysis of variance, correlation, regression, and

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1 Students enrolled at the 500 level may expect additional work and evaluation commensurate with graduate standards.
nonparametric tests. Prer., one year of general biology, statistics, and two other biology courses.

**BIOL. 495/595-3.** Evolution. Lect. The course explores the historical development of the modern evolutionary synthesis, the principles and mechanisms of evolution, and the current controversy between punctualism and gradualism.

**Graduate Level**

**BIOL. 505-variable credit. Advanced Biology.** This course is reserved to offer formal courses for which seniors as well as graduate students can enroll without resorting to Independent Study.

**BIOL. 519-4. Mountain Ecology.** Graduate level option for BIOL. 441. 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. 427. Prer., one year of biology and minimum of 15 semester hours in biology.

**BIOL. 528-3. Environmental Physiology.** Lect. A look at the physiological mechanisms used by animals and plants in reacting to and adapting to changes in such natural environmental parameters as temperature, light, and water availability. The intent is to lay the groundwork for understanding how to approach the study of the effects of changing environments on organisms. Not open to students who have had BIOL. 427. Prer., one year of chemistry and one course in either plant or animal physiology.

**BIOL. 530-3. Human Genetics.** Lect. Heredity of man's normal and defective traits. Modes of inheritance, pedigree analysis, consanguinity, sex-associated traits, chromosomal aberrations, mutations and causes, karyotyping, multiple births, gene linkage studies, histocompatibilities, and metabolic disorders. Not open to students who have had BIOL. 452. Prer., BIOL. 383.

**BIOL. 538-4. Ecological Methods.** Lect. and lab. Deals with the empirical aspects of an ecological study. Students will learn sampling techniques that are used in plant and animal ecology. Emphasis is on hypothesis testing, data analysis, and experimental field designs. Not open to students who have had BIOL. 447. Prer., BIOL. 341.

**BIOL. 550-3. Microcomputers in Biology.** Lect. An overview of the various uses of microcomputers in biology including word processing, data bases, data analysis (including statistical analysis), spread sheets, simulations, and instructional uses. Includes an introduction to BASIC programming. There will be both lecture/discussions and individual exercises on a microcomputer. Prer., graduate standing.

**BIOL. 567-4. Vertebrate Embryology.** Introduction to fundamental developmental anatomy including gametogenesis, fertilization, gastrulation, and early organogenesis. The comparative developmental anatomy of the echinoderms, amphibians, birds, and mammals, including human, is examined. Not open to students who have had BIOL. 461.

**BIOL. 587-3. Mammalian Endocrinology.** This systematic survey of the endocrine system looks at the cellular basis and biochemical characteristics of individual endocrine tissues. Their function in the regulation of other endocrinological, physiological, and behavioral events is analyzed. The course emphasizes the human system and complements studies in physiology, behavior, and neurobiology. Not open to students who have had BIOL. 467. Prer., BIOL. 322.

**BIOL. 633-1. Environmental Biology Seminar.** A discussion of advanced topics in environmental biology.

**BIOL. 665-variable credit. Advanced Organismic Biology.** A discussion of advanced topics in organismic biology.

**BIOL. 695-variable credit. Advanced Population Studies.** A discussion of advanced methods in genetics.

**BIOL. 700-variable credit. Master's Thesis.**

**Independent Study**

**BIOL. 940-variable credit. Independent Study (Undergraduate).** Prer., written consent of instructor.

**BIOL. 960-variable credit. Independent Study (Graduate).** Prer., written consent of instructor.

**CHEMISTRY**

**Chair:** John A. Lanning

**Department Office:** Science Building, Room 333

**Telephone:** 356-2689

**Faculty:** Professors: Robert Damrauer, Sandra S. Eaton

**Associate Professors:** Larry G. Anderson, John A. Lanning

**Assistant Professors:** Annamarie T. Drotar, Doris Kimbrough, Michael A. Mikita

**Undergraduate**

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) postbaccalaureate programs in chemistry, biology, biochemistry, medicine, and dentistry. At the graduate level, an M.S. degree program is offered. Students with 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., biology, environmental science, or geology).

**Requirements for the Major.** For graduation at the bachelor's level, students majoring in chemistry must present a minimum of 39 credits in the following courses or their equivalents: CHEM. 203, 204, 206, 207, 311, 313, 341, 342, 343, 349, 412, 413, 451, 452, 455; PHYS. 231, 232, 233, 234; MATH. 140, 241, 242. At least 14 hours of the required upper division chemistry course work (including CHEM. 413 or 455) must be taken at CU-Denver. Students interested in the chemistry major should consult regularly with a member of the chemistry faculty. A complete description of the chemistry major's program may be obtained in the Chemistry office, Science Building, Room 333.
Qualified majors are strongly urged to participate in the independent study or departmental honors programs.

Students planning chemistry as a career should be familiar with the recommendations of the American Chemical Society (ACS) for the professional training of chemists. Among these recommendations are two semesters of inorganic chemistry (CHEM, 301 and 401) and one additional semester of advanced work (see graduate chemistry offerings and 400-level biochemistry courses). Three hours of independent study will satisfy the advanced course requirement. These additional courses lead to a bachelor's degree certified by the American Chemical Society. CU-Denver maintains an ACS chapter of student affiliates.

Departmental Honors. Students wishing to graduate with departmental honors in chemistry should plan to do a minimum of two semesters (6 credit hours) of research (CHEM, 940), ordinarily starting in the junior year. A detailed description of the Honors Program in chemistry is available in the Chemistry office, Science Building, Room 333.

Chemistry Minor. The objective of the chemistry minor is to provide broad introductory course work and laboratory experience to science majors without the more technical mathematical and chemical prerequisites required of the chemistry major. The chemistry minor is open to all CLAS students and should prove beneficial for science majors, pre-professional health science majors, and students seeking science education certification.

There are course work and grade requirements that must be satisfied to obtain a chemistry minor. Students must take a minimum of 20 semester hours of chemistry courses with a minimum of 10 upper division chemistry hours. Upper division course work must be obtained in three of the five disciplines that comprise chemistry: analytical, bio-, inorganic, organic, and physical. All chemistry minor courses must be taken for a letter grade rather than on the Pass/Fail grading option. To satisfy the department residency requirement, a minimum of 7 upper division hours of chemistry must be taken at CU-Denver.

The chemistry department has established a series of new courses specifically for the chemistry minor. A complete description of the chemistry minor may be obtained in the Chemistry office (Science Building, Room 333, 556-2689).

Graduate

The M.S. degree is offered at CU-Denver in any of the following basic fields: analytical, biochemistry, inorganic, organic, or physical chemistry. Additionally, research programs involving environmental and geo-chemical problems are being offered.

The M.S. program is available to both full- and part-time students. The chemistry faculty at CU-Denver strive to ensure that students receive excellent advising and supervision of work. Students enrolled in the program have an opportunity to be appointed as laboratory teaching assistants. Research activities on the part of the chemistry faculty provide opportunities for graduate students to obtain research assistantships.

REQUIREMENTS FOR ADMISSION

Students must meet The Graduate School admission requirements. International students may have additional admission requirements concerning immigration status, proof of financial responsibility, and minimum TOEFL scores. An undergraduate major in chemistry, including two semesters of physical chemistry, is desirable as all entering students are required to take qualifying examinations covering the major fields of chemistry. The GRE examination is suggested as is the advanced chemistry GRE examination. Failure to meet the full admission standards may lead to a provisional admission.

DEGREE REQUIREMENTS

There are two methods of obtaining a master's degree from the Department of Chemistry:

Plan I is a research-oriented plan requiring 17 to 22 credit hours of formal course work, 4 to 9 credit hours in research courses, and the successful oral presentation of a written thesis covering the research project.

Plan II is a course work-oriented plan without a thesis requiring 26 credit hours of formal course work, 6 credit
hours in research courses, and the successful oral presentation of a written report covering the research project.

Examinations. Qualifying preliminary examinations are given to all entering students in the five basic fields of chemistry. After completion of the student's research project, a final oral examination is given to cover the thesis (Plan I) or research report (Plan II).

Prospective students are encouraged to contact the graduate advisor for additional details concerning the chemistry program, admission procedures, financial assistance, and faculty research interests.

COURSES

CHEM. 100-3. Preparation for General Chemistry. Spring and Summer. Lect. For students with no previous chemistry or with inadequate background. This course is in preparation for CHEM. 203 and 113. Prer., working knowledge of high school algebra.

CHEM. 101-5. Introduction to General Chemistry. Fall. Lect., rec., and lab. A beginning course intended primarily for prenursing, physical education, physical therapy, child health associates, minerals land management, 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. 113-5. Engineering General Chemistry. Fall and Spring. A one semester non-laboratory version of general chemistry for engineers and those science majors who do not require laboratory credit and do not plan to take a second semester of chemistry. Prer., one year of high school chemistry, CHEM. 100 or CHEM. 101, 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 Classes. Designed for nonscience majors to fulfill the natural science requirement.

CHEM. 203-4. General Chemistry I. Fall. Spring. A beginning lecture course for science majors, medical technologists, premedical, and preental students. Topics include chemical structure, atomic and molecular properties, and thermodynamics. Prepares students to take upper division chemistry courses. CHEM. 204 laboratory to be taken concurrently. Prer., one year of high school chemistry, CHEM. 100 or CHEM. 101, and working knowledge of high school algebra.

CHEM. 204-1. General Chemistry I Laboratory. Fall. Spring. Laboratory to accompany CHEM. 203. Students perform laboratory experiments on topics covered in CHEM. 203 lecture and gain experience in observing, recording, and interpreting physical and chemical phenomena. Coreq., CHEM. 203.

CHEM. 206-3. General Chemistry II. Spring. Summer. Continuation of CHEM. 203. Topics include kinetics, equilibria, and thermodynamics. CHEM. 207 laboratory to be taken concurrently. Prer., CHEM. 203.

CHEM. 207-2. General Chemistry II Laboratory. Spring, Summer. Laboratory to accompany CHEM. 206 and a continuation of CHEM. 204 laboratory. Students gain experience with laboratory technique and elementary chemical instrumentation. Coreq., CHEM. 206.

CHEM. 301-3. Applications of Modern Inorganic Chemistry. Fall. An application of the principles learned in general chemistry. The course surveys the chemistry of the elements with an emphasis on periodic properties and applications to everyday problems. Prer., CHEM. 206.

CHEM. 311-3. Analytical Chemistry. Spring. A lecture course for chemistry, biology, medical technology, and environmental students. Topics include sampling, volumetric analyses, instrumental analyses, and statistical treatment of data. Prer., CHEM. 206.

CHEM. 313-1. Analytical Chemistry Laboratory. Spring. A laboratory course to be taken concurrently with CHEM. 311. Students gain laboratory experience with sampling techniques, volumetric analyses, and instrumental methods of analysis. Prer., CHEM. 206; coreq., CHEM. 311.

CHEM. 341. Organic Chemistry I. Fall, Spring, Summer. 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. Prer., CHEM. 106.

CHEM. 342-4. Organic Chemistry II. Spring and Summer. A continuation of CHEM. 341. A lecture course designed as an introduction to the study of structure, reactions, properties, and mechanisms of organic molecules. CHEM. 344 lab. or CHEM. 349 lab. to be taken concurrently. Prer., CHEM. 341.

CHEM. 343-1. Organic Chemistry I Laboratory. Fall, Spring, and Summer. A laboratory course to be taken concurrently with CHEM. 341 illustrating the practical aspects of organic chemistry. Prer., CHEM. 206; coreq., CHEM. 341.

CHEM. 344-1. Organic Chemistry II Laboratory. Spring and Summer. A laboratory course to be taken concurrently with CHEM. 342 illustrating the practical aspects of organic chemistry. Prer., CHEM. 343; coreq., CHEM. 342.

CHEM. 349-2. Honors Organic Chemistry II Laboratory. Spring. A laboratory course open to all students in CHEM. 342 and required of chemistry majors. In small groups, students will use the chemical literature to devise multistep syntheses or isolate and identify organic compounds in natural products. Prer., CHEM. 343; coreq. CHEM. 342.

CHEM. 351-4. Physical Chemistry: Biological Applications. Fall. A general course in physical chemistry that examines the principles of thermodynamics, equilibrium solutions, and kinetics as they apply to biological systems. Calculus required to learn the principles is presented in the course. Prer., CHEM. 206, MATH. 112, and PHYS. 202.


CHEM. 398-Variable credit. Internship/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. Spring. Introduction to bonding and symmetry and the reactions of selected main group or transition metal compounds. Prer., CHEM. 452 or consent of instructor.


CHEM. 413-2. Instrumental Analysis Laboratory. Fall. Laboratory practice to accompany CHEM. 412. Emphasis placed on writing scientific reports. Required of chemistry majors and open to other students in CHEM. 412. Coreq., CHEM. 412.

CHEM. 441-3. Organic Geochemistry. (GEOL. 441.)


CHEM. 455-3. Physical Chemistry Laboratory. Spring. Instruction in the experimental techniques of modern physical chemistry with emphasis on the fundamental principles of thermodynamics, quantum chemistry, statistical mechanics, and chemical kinetics. For chemistry majors. Coreq., CHEM. 452.

CHEM. 481-3. General Biochemistry. Fall. Topics include structure, conformation, and properties of proteins; enzymes; mechanisms and kinetics; intermediate metabolism; carbohydrates, lipids; energetics and metabolic control; and an introduction to electron transport and photosynthesis. Prer., CHEM. 342 and BIOL. 206.

CHEM. 482-3. General Biochemistry. Spring. 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.

Graduate Level

CHEM. 501-3. Advanced Inorganic Chemistry I. Spring. 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. 511-3. Advanced Analytical Chemistry. Advanced analytical theories and practices in electrochemistry and separation techniques. Prer., one year of analytical chemistry.

CHEM. 512-3. Selected Topics in Analytical Chemistry. Topics vary from year to year with emphasis on automation using small computers, spectroscopy, and recent analytical developments. Prer., one year of analytical chemistry.

CHEM. 514-3. Analytical Separations.

CHEM. 521-3. Topics in Industrial Chemistry.

CHEM. 531-3. Advanced Organic Chemistry I. Survey of types of chemical bonds, resonance, hydrogen bonding, free radicals, and reactions and preparations of some of the more important types of organic compounds. Prer., CHEM. 342 and 451.


CHEM. 541-3. Organic Geochemistry. (GEOL. 541.)


CHEM. 571-3. Air Pollution Chemistry. A discussion of air pollution problems including stratospheric pollution, global chemical cycles, air quality standards, urban pollution, acid deposition, and visibility problems. Prer., CHEM. 452.

CHEM. 581-3. General Biochemistry. Fall. 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. Prer., CHEM. 342, BIOL. 207, and graduate standing.

CHEM. 582-3. General Biochemistry. Spring. A continuation of CHEM. 581. Topics are similar to CHEM. 482, but emphasis is similar to that detailed for CHEM. 581.

CHEM. 590-1. Chemistry Seminar. Faculty and student presentations of CU-Denver research projects and other current chemistry topics. All chemistry students are encouraged to attend, but credit is given only to students who present seminars. Prer., graduate standing or consent of instructor.

CHEM. 593-3. Topics in Chemistry.

CHEM. 700-1 to 3. Master's Thesis.

Independent Study

CHEM. 940-1 to 3. Independent Study (Undergraduate). Consent of instructor required.

CHEM. 960-1 to 3. Independent Study (Graduate).

COMMUNICATION AND THEATRE

Co-Chairs: J. Brad Bowles, Robley D. Rhine
Communication Office: Arts Building, Room 274E
Theatre Office: Arts Building, Room 185
Communication Telephone: 556-2591
Theatre Telephone: 556-4891
Fall.

Faculty: Professor: Robley D. Rhine
Associate Professors: Samuel A. Betty, J. Brad Bowles, Laura Cuetara, Jon A. Winterton
Instructor: Jacques Atman Hutchinson
Adjunct: J. Joseph Craft, Ila M. Warner

Undergraduate

An undergraduate wishing to major in communication and theatre may choose one of two areas of emphasis: communication or theatre. An emphasis in radio-television is available, but a substantial portion of 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 ensure 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 two areas of emphasis may be obtained from the department office.

COMMUNICATION EMPHASIS

Students with an interest in management and administration, training, writing and copy preparation, public
relations, information services, telecommunications, and a variety of occupations focusing on communication will find in the communication emphasis a curriculum directed to their employment and personal development needs. The objective of this series of courses 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 choice of communication strategies so that they may react effectively to various situations.

The program offers two types of courses to the student: (1) theory-oriented courses which examine the rich empirical and critical literature in communication studies; and (2) performance-oriented courses designed to promote the students' confidence in their abilities to communicate effectively in many contexts.

The communication emphasis requires that students take a total of 36 hours of course work (usually 12 courses) in communication and theatre. Ten courses (30 hours) are required. Two courses (6 hours) are chosen from a list of specified alternatives.

Students with this emphasis are particularly encouraged to enroll in internships made available through the Center for Internships and Cooperative Education. In the past, students in this program have worked with the metropolitan area's major television and radio stations, with many general distribution and specialty publications, and with corporate and governmental offices of public information.

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.

A total of 34 semester hours — in acting, directing, oral interpretation, theory, and history — are required for this emphasis. Up to 14 additional hours of courses in theatre and communication are recommended in special topics courses, independent study, and communication theory.

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.

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 (co-curricular 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 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).

Graduate

COMMUNICATION EMPHASIS

Applicants are admitted to the graduate program in communication and theatre on the basis of their academic records, recommendations, and the GRE scores. A GPA of 3.0 is normally expected. Students admitted who are unable to offer a substantial number of semester hours of work in the area of their intended specialization or in 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.

DEGREE REQUIREMENTS

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 CMMU. 601 or its equivalent. At least two courses (6 to 9 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. Students planning to pursue doctoral or professional degrees should expect to follow Plan I. At least two courses (6 to 9 hours) must be taken outside the department.

Plan II Option, Without Thesis. After any undergraduate deficiencies have been removed, students under Plan II must normally earn 30 semester hours of which a minimum of 19 must be earned in one major area. At least two additional courses (6 to 9 hours) must
Confession (left) and Penance (right) listen as Everyman attempts to redeem himself in the medieval morality play "Everyman."
be taken outside the department. The student will submit at least one major paper which has been revised under faculty supervision. Plan II is available to those who do not plan to pursue doctoral or professional degrees.

Courses at the 500 level or above may be applied toward the graduate degree by graduate students in communication.

The graduate courses in communication and theatre are also applicable to the Master of Humanities program at CU-Denver.

For more information, students should contact the graduate adviser at 556-2609 or 556-2591.

THEATRE EMPHASIS

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.

DEGREE REQUIREMENTS

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.

At least two courses (4 to 8 hours) may 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. At least two courses (4 to 8 hours) must be taken outside the department. Four to 6 thesis credit hours may be counted toward the 27-hour requirement.

The Plan II Option, Without Thesis. Available at CU-Denver only upon application.

Courses at the 500 level or above may be applied toward the graduate degree by graduate students in theatre. Some courses are available 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 CU-Denver.

For more information, students should contact the graduate adviser at 556-4899 or 556-4891.

COURSES

CMMU. 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.

CMMU. 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.

CMMU 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.

CMMU. 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.

CMMU. 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., CMMU. 202.

CMMU. 204-3. Interpersonal Communication. A lecture-recitation course focusing on the theory and development of interpersonal relationships. Issues covered include the communication process, self versus others, self esteem, person perception, the attraction process, nonverbal communication, relationship development, and family communicators.


THTR. 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.

THTR. 270-3. Introduction to Theatre. Discussion, 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.

THTR. 273-2. Stage Movement. Analysis and practice of stage movement, including basic techniques in gesture and mime as related to proscenium, thrust, and arena staging.


CMMU. 301-3. Research Methods. This course examines techniques used by researchers in communication. Communication studies have used a wide variety of approaches. These include laboratory research, field and survey research, and special techniques such as content analysis and interaction
analysis. The objective of the course is to give students enough background to read critically in the social sciences.

CMMU. 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.

THTR. 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.


CMMU. 361-3. Radio Programming and Production. Introduction to basic elements of radio including the audio console, microphone, turntables, tape recorders, tape editing, timing, and combo operation. Emphasis on applying the basic principles and practices through professional production of live and taped radio programs. Prereq., CMMU. 360.

CMMU. 362-3. Television Production. Introduction to basic television production principles, practices, techniques, facilities, and equipment, including cameras, audio equipment, lighting, films, videotape, graphics, sets, etc. Prereq., CMMU. 360.

CMMU. 371-3. The Film Idea. (ETST. 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 KCNC and KUSA. Prereq., junior or senior standing.

THTR. 373-3. Beginning Acting. Study and workshop experience in basic techniques of stage movements 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.

THTR. 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 proscenium, thrust, and arena staging. Prereq., THTR. 373 or equivalent.

THTR. 390-1 to 4. Topics in Communication and Theatre. Various topics such as problems in creativity, communication, counseling, and theatre for adolescents will be offered at regular intervals.

CMMU./THTR. 398-variable credit. Internship/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.

THTR. 399/499-variable credit. Problems in Communication and Theatre. Study in problem areas in the field of communication and theatre. Prereq., consent of supervising instructor.

CMMU. 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.

CMMU. 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., CMMU. 315 or consent of instructor.


CMMU. 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. Prereq., CMMU. 202.

CMMU. 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. Prereq., CMMU. 202.

CMMU. 422-3. Information Analysis. Analysis of complex systems such as organizations, with theoretical and applied information exchange and decision-making tools. Study of the applications and misapplications of the mathematical theory of communication. Prereq., consent of instructor.


CMMU. 428-3. Communication of Directed Change. Examination of the communication process underlying the diffusion of new ideas, processes, or things. A theoretical and applied analysis of social, economic, and technological change.


CMMU. 460-3. Radio-TV Station Organization and Operation. Procedures, organization, and problems of management and operation of radio and television broadcast stations. Prereq., CMMU. 360 or consent of instructor.

THTR. 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 playscripts will receive particular emphasis. Prereq., THTR. 373.

THTR. 474-4. Advanced Directing. Directing II is designed to present more complex, analytical, production design and rehearsal process problems for the advanced directing student. Included in the courses are concentrations in the history of directing, contemporary directing practice, working with non-realistic theatrical dynamics, experimental rehearsal strategies and experimental sound and lighting design. The final project will focus on the relationship between the playwright and the director and will culminate in the presentation
of original plays for the bi-annual CU-Denver One Act Play Festival.

THTR. 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.

THTR. 485-3. Playwriting: The Long Form. Writing workshop in full-length plays with special emphasis on production demands. Prer., THTR. 475 or consent of instructor.


Upper Division/Graduate Level

CMMU. 414/514-3.1 Theories of Argumentation. Examination of theories from classical through contemporary ones. Special attention to types of proposition, burden of proof, analysis of issues, evidence, reasoning, fallacies, case construction, refutation, ethics, and forms of debate.

CMMU. 423/523-3.1 Nonverbal Communication. Study of nonverbal behaviors that accompany verbal communication or replace it: nacrospace, proxemics, kinesics, facial expression, eye contact, gestures, vocal characteristics, touch, personal adornment. Specific attention to deception and interviewing. Current theory, research, application.

CMMU. 424/524-3.1 Organizational Communication. Relationships between such communication factors as flow, media, density, channel, saturation, information-delivery and organization functioning, morale, and productivity. Lecture, theory, case observation, and analysis. Prer., consent of instructor.

THTR. 435/535-3.1 Creative Dramatics. The study of creativity, its role and application in dramatics, and the manner in which creative dramatics assists in the growth and development of children and youth.

THTR. 461/561-3.1 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 children's play to be performed by members of the class before audiences of children. Prer., THTR. 270 or consent of instructor.

CMMU. 465/565-3 to 4.1 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., CMMU. 360 or consent of instructor.

THTR. 470/570-3.1 American Theatre History. An investigation of American theatres, methods of presentation, audiences, actors, 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., THTR. 270 or 478 or consent of instructor.

THTR. 475/575-3.1 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.

THTR. 478/578-3.1 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.

THTR. 480/580-3.1 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., THTR. 270 or 478 or consent of instructor.

Graduate Level

CMMU. 511-3. Theories of Leadership. A course examining the thought, research, and applications related to the major theories of leadership. Emphasizes a critical reading of research confirming or denying various theories, and stresses the historical development of mid-range theories of leadership behavior and characteristics. Prer., CMMU. 202 or 315 or consent of instructor. Not open to students who have taken CMMU. 411.

CMMU. 519-variable credit. Problems in Communication. Opportunity for students to explore, upon consultation with the instructor, areas in communication which the normal sequence of offerings will not allow. Prer., consent of instructor.

CMMU. 520-3. Seminar: Persuasion. The theory of motivation and change as it operates in individuals and groups. Consideration of attitudes, beliefs, values, credibility, message variables, ethics, and effects. Analysis of persuasive campaigns. Not open to students who have had CMMU. 420.

CMMU. 521-3. Psychology of Communication. An examination of psychological factors affecting comprehension and retention of speech and formation of linguistic habits, set, attitude formation and change, perception, values, and meaning. Not open to students who have had CMMU. 421. Prer., CMMU. 202, for majors.

CMMU. 526-3. Communication and Conflict: Interpersonal and Intergroup. A study of the influence of communication on intrapersonal, interpersonal, intragroup, and intergroup conflict situations. Advanced level registration. Involves examination of selected research studies and a major paper. Not open to students who have had CMMU. 426.

CMMU. 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 customers in selected cultures. Not open to students who have had CMMU. 427.

CMMU. 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 CMMU. 428.

CMMU. 539-variable credit. Problems in Communication Education. Opportunity for students to explore, upon consultation with the instructor, areas in communication and theatre education. Prer., consent of instructor.

CMMU. 560-2. International Patterns of Broadcasting. Comparison of the philosophies, practices, and organizational structures of broadcasting throughout the world. Prer., consent of instructor.

1Students enrolled at the 500 level may expect additional work and evaluation commensurate with graduate standards.
CMMU. 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 offering will not allow. Prer., consent of instructor.


THTR. 580-3. Theatre: Historical Perspectives. An investigation of theatrical, 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., THTR. 270 or 478 or consent of instructor.

CMMU. 601-3. Introduction to Graduate Work in Communication. (T C. 620.) Intended to familiarize students with the philosophical, ideological, and methodological bases of study in communication. Required of all departmental graduate students.

CMMU. 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.

CMMU. 606-3. Management Communication Systems. (P AD. 606.) The responsibilities of complex public agencies in maintaining effective communication systems, internal and external; the nature of the systems and problem areas.

CMMU. 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.

CMMU. 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., CMMU. 315 or equivalent or consent of instructor.

CMMU. 619-variable credit. Problems in Communication. Opportunity for students to explore, upon consultation with the instructor, areas in communication which the normal sequence of offerings will not allow. Prer., consent of instructor.


CMMU. 622-3. Seminar: Modern and Contemporary Rhetoric. An examination of the nature and development of rhetorical theories from the Renaissance to the present day.

CMMU. 627-3. Seminar: Intercultural Communication. Examination of multidisciplinary contributions to the theory and process of intercultural communication. Development of models and the design and evaluation of programs intended to facilitate interaction across cultural boundaries. Prer., CMMU. 427/527 or consent or instructor.

CMMU. 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.


CMMU. 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., CMMU. 601 or consent of instructor.

CMMU. 703-3. Empirical Research Methods. Fundamentals of scientific philosophy, research design, and statistical analysis. Required of all departmental graduate students working toward the doctorate. Prer., CMMU. 601 or consent of instructor.

CMMU. 721-3. Empirical Perspectives on Communication. CMMU. 730-3. Scholarship in Communication. Intensive criticism and revision 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., CMMU. 702 and 703 or consent of instructor.

CMMU. 800-0 to 8. Doctor's Thesis.

Independent Study

CMMU./THTR. 940-variable credit. Independent Study (Undergraduate). Prer., written consent of supervising instructor.

CMMU./THTR. 950-variable credit. Independent Study (Graduate). Prer., written consent of supervising instructor.

ECONOMICS

Associate Chair: Suzanne W. Helburn
Department Office: UA Building. Room 610
Telephone: 556-3556

Faculty: Professors: Suzanne W. Helburn, David F. Bramhall, John R. Morris, Jr.
Assistant Professors: Daniel A. Hagen, Julia L. Hansen, Mei-Chu W. Hsiao, James W. Vincent
Emeritus: Byron L. Johnson

Undergraduate

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 do 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 macroeconomics (inflation, unemployment, etc.) and microeconomics (theory of behavior of individual producers, consumers, and investors). Analytic scope ranges from precise mathematical modeling to general philosophical reflection on the nature of society and people.

Requirements for the Major. Students majoring in economics must meet the following requirements in addition to those set by the College of Liberal Arts and
Sciences: at least 33, but not more than 48, semester hours in economics, of which at least 19 must be numbered 301 or higher: Econ. 201, 202, 381, 407, 408, and either 481 or a computer course approved by the student's adviser (the computer courses, if taken outside the Department of Economics, will not count in the student's 33 hours of economics), and either PSC. 110 or 302. All economics majors must take at least 15 semester credit hours of courses in the CU-Denver economics department.

For any of the five core courses (201, 202, 381, 407, 408) for which transfer credit is sought, the department reserves the right to require students to demonstrate competence in those courses. Courses taken on the Boulder campus of the University or taken through the common pool of courses at Metropolitan State College will be considered transfer courses if the number of semester credit hours for the course are not the same as at CU-Denver and demonstration of competency may be required. As of this writing, MSC's Econ. 201, 202, and statistics have differing credit hours.

Students are advised to take ECON. 407, 408, and 381 as early as possible in completing their major requirements and should be aware of prerequisites for these courses. Students planning on attending graduate school are advised to take at least two semesters of calculus (MATH. 140, 241) and as much additional mathematics as they can. They should also take ECON. 480. For students not planning on graduate school, MATH. 107 is the minimum requirement.

Students who do not have an adviser should see the department chairperson for assignment to an adviser.

For all economics courses numbered above 300, the prerequisite, unless otherwise indicated, is ECON. 201 and 202, or ECON. 300.

Requirements for the Minor: Students wishing to earn a minor in economics must take at least 17 semester hours in economics, including ECON. 201, 202, and either 407, or 408. ECON. 201, 202, and 407 or 408 must be taken from, or validated by, CU-Denver economics faculty.

Honors in Economics

Students wishing to earn departmental honors in economics must complete an economics major with a GPA of 3.75 in all upper division economics courses taken at CU-Denver, and must complete an honors thesis. The thesis prospectus must be accepted by at least one economics faculty member before enrolling for honors and there must be signed acceptance by three faculty within one month after enrolling. Students will enroll for independent study (Honors Thesis) and may take two semesters to complete the thesis. Completion will require an oral examination at the end of the thesis.

Graduate

The M.A. program in economics at CU-Denver is directed toward two groups: (1) those who look on the M.A. as a key to career development in business or government service and (2) those who desire to go on to Ph.D. studies in economics or related fields.

In serving these constituencies, the department seeks to strike a balance between generating technical competence in handling modern quantitative techniques and providing solid grounding in several applied fields of economics. Whereas these two aims overlap to some degree in the course offerings, prospective degree candidates should determine rather early in their studies at CU-Denver whether to emphasize quantitative and theoretical work or applied fields, or to balance the two.

In addition to offering regularly a graduate sequence in macroeconomic and microeconomic theory, and econometrics, the department emphasizes the following: urban economics, resource economics, environmental economics, labor economics, education of economists, political economy, mathematical economics, and international economics. Persons interested in the program should contact the graduate adviser in the Department of Economics at 556-3556.

Requirements for Admission

1. General requirements of The Graduate School (including a 2.75 undergraduate cumulative grade-point average).
2. Three letters of recommendation.
3. Sixteen semester hours of undergraduate economics.
4. Acceptable Graduate Record Examination scores.
5. Two official transcripts from all colleges attended.

Degree Requirements

The department offers both a thesis option (Plan I) and a non-thesis option (Plan II).

Core Requirements for both Plan I and Plan II (12 credit hours):
1. Microeconomic Theory (ECON. 507).
2. Macroeconomic Theory (ECON. 508).
3. Econometrics (ECON. 581).

Plan I: M.A. Thesis
1. Thesis Development Seminar (ECON. 697, 2 credit hours).
2. Thesis (ECON. 700, 4 credit hours).
3. 12 hours of electives, at least half of which must be at the 600 level or above.

Plan II: Without Thesis
A total of 18 semester hours in addition to the core requirements. Two fields of concentration are required. Each field consists of a minimum of one 500-level course and one 600-level course (the specific courses to be approved by the faculty member in charge). Of the remaining required hours, at least half must be at the 600 level or above. An internship can substitute for one of the fields of concentration.

Courses

ECON. 201-4. Principles of Economics: 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: 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. Recitation is required. ECON. 201 is not prerequisite to ECON. 202.


ECON. 316-3. Economic Issues of the 1980s. Topics in the likely development of the economy into the next decade: inflation, unemployment, environment, population, and sociopolitical interaction with economics.

ECON. 320-3. Women and the Economy. An examination of women's roles in the economy from the perspective of traditional and radical economics. The course covers the history of women's economic roles, review of the literature, economics of household, labor force, and economic consequences of women's movement.


Note: Unless otherwise specified, ECON. 201 and 202 are prerequisites for all the following courses.

ECON. 380-3. Mathematics for Economists. This course will cover topics in calculus and linear algebra used extensively in economic theory. The course is designed as a "primer" for students entering the graduate program, but is recommended for all who are interested in obtaining a mathematical background oriented toward economic application. Prer., high school algebra.

ECON. 381-4. Statistics with Computer Applications. (ANTH. 405, SOC. 312, S SC. 400.) Introduction to statistical methods and their application to quantitative problems in economics and social sciences. Recitation is required. Prer., college algebra or equivalent, or consent of instructor.

ECON. 388-variable credit. Internship/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. 408-3. Intermediate Macroeconomic Theory. National income and employment theory. Primary emphasis placed on determination of employment and prices. Problems of unemployment and inflation analyzed and appropriate policies considered.

ECON. 417-3. Comparative Socialism. (P SC. 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, education, technology, and popular culture.

ECON. 431-3. Practicum in Economics Education. 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, introduction to theories of learning and instruction, demonstrations and evaluation of alternative teaching strategies and materials for use in discussion sections, and appraisal of student teaching. Prer., ECON. 407 or 408.

ECON. 450-3. The Soviet World: Origins and Present Condition. (P SC. 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. 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.

Upper Division/Graduate Level

ECON. 409/509-3.1 History of Economic Thought. Development of contemporary economic thought from the mercantilists through the classical, Marxist, neoclassical, institutionalist, and Keynesian traditions to the present time. Alternative approaches to scientific activity adopted and developed by the different schools of economics in the context of the economic history of the time.

ECON. 411/511-3.1 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. 412/512-3.1 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., for 400 level, ECON. 411; prer., for 500 level, ECON 511.

ECON. 419/519-3.1 Radical Political Economy. 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 1 of Capital and contemporary extensions of this analysis of capitalist production and capital accumulation.

ECON. 420/520-3.1 Modern Radical Political Economy. Analysis of contemporary capitalism from Marxian and other critical viewpoints. Issues will include capitalist crisis, alienation, ecological destruction, and imperialism. Also, the problems of existing socialist societies and of building effective decentralized self-government. Prer., for 400 level, ECON. 419 or consent of instructor; prer., for 500 level, ECON 519 or consent of instructor.

ECON. 421/521-3.1 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. 422/522-3.1 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. 425/525-3.1 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. 427/527-3.1 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.

ECON. 441/541-3.1 International Trade. Theories of international trade, including classical and neoclassical trade theory, and alternatives to the neoclassical approach. Tariffs and commercial policy, international labor migration, capital movements, and multinational corporations.

ECON. 442/542-3.1 International Finance. The international adjustment process, including the foreign exchange market, balance of payments disequilibria, price and income adjustment, fiscal and monetary policy, and the international monetary system.

ECON 451/551-3.1 Economic History of Europe. Evolution of industrial society with emphasis upon growth and development of English industry and commerce.

ECON. 452/552-3.1 Economic History of the United States. American economic organization and institutions and their development from colonial times to present.

ECON. 453/553-3.1 Economics of Natural Resources. Looks at natural resources uses and how they have changed over time. Examines economic models of renewable resource management and models of exhaustible resource depletion. Analyzes decisions made by private firms and by government affecting the methods and rate of resource development. Examines the effects of resource development on economic growth and environmental quality.

ECON. 454/554-3.1 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 no-growth economy; introduction to major tools of economics useful to environmental planners. Prer., for 400 level, ECON. 202.

ECON. 460/560-3.1 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. 461/561-3.1 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. 462/562-3.1 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. Demonstrations, workshop, and lectures.


ECON. 464/564-3.1 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., for 400 level, senior status; prer., for 500 level, graduate status.

ECON. 466/566-3.1 Health Economics. Presents an economic analysis of the health/medical sector of the U.S. economy.

1Students enrolled at the 500 level may expect additional work and evaluation commensurate with graduate standards.
Lectures, assigned readings, and special projects are used to increase the student's awareness of issues in health care.

**ECON. 471/571-3. Comparative Economic Systems.** Critical study of socialism, capitalism, communism, and other proposed economic systems, emphasizing comparative studies of communist economics.

**ECON. 474/574-3. Monopoly and Competition.** This course involves the student in examining the structure of markets and how features such as numbers of firms and firm size can affect competitiveness and innovation in our economy. Considerable time will be spent examining the set of policies that affect the structure of markets—antitrust law.

**ECON. 476/576-3. Government Regulation of Business.** Examines the economic theory and institutional features of a wide array of regulatory topics. It will survey the current literature on models of optimal pricing and look into practices of public utility regulation, transportation regulation and deregulation, and environmental and worker safety regulations, etc.

**ECON. 477/577-3. Economic Development—Theory and Problems.** Theoretical and empirical analysis of problems of economic development, especially of less developed countries.

**ECON. 480/580-3. Introduction to Mathematical Economics.** Introduction to the use of mathematics in micro and macro economic analysis. Emphasis on model building techniques, solution methods, and economic interpretations. Prer., MATH. 107, 108, or equivalent, ECON. 201, 202, or 300, or consent of instructor.

**ECON. 481/581-3. Introduction to Econometrics.** Introduction to econometric methods and their applications to quantitative economic problems. Simple and multiple regression models and problems encountered in their applications are developed in lectures and applied computer projects. Prer., ECON. 381 or equivalent.

**ECON. 492/592-variable credit. Special Economic Problems.** ECON. 492 for majors in economics; others by consent of instructor. Designed to give students a chance to evaluate critically some practical and theoretical problems under supervision, and to present results of their thinking to fellow students and instructors for critical evaluation. Prer., for 500 level, by consent of instructor.

**Graduate Level**

**ECON. 507-3. Microeconomic Theory.** Fundamental features of partial equilibrium theory of the firm, consumer, and market. General equilibrium and welfare economic topics will be examined. Features of the model that have empirical applications will be accentuated. Prer., ECON. 407 (or equivalent), knowledge of elementary calculus and linear algebra, or consent of instructor.

**ECON. 508-3. Macroeconomic Theory.** This course will examine the major macroeconomic models within a common framework. Differences in the foundations, structure and policy implications of the competing models will be analyzed. Prer., ECON. 408 (or equivalent), knowledge of elementary calculus, or consent of instructor.

**ECON. 600-3. History of Economic Thought.** This course fosters or advances the student's appreciation of the technical apparatus of current economic concepts and introduces students to major theoretical controversies in the development of economic analysis. In addition to secondary sources the student must read in the original texts of certain great economic writers from the Industrial Revolution to the present.


**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. 610-3. The Classical and Radical Economic Traditions.** Comprehensive study of classical ideas of economic progress found in writings of Smith, Ricardo, and J. S. Mill, compared with theories of economic change of Marx, Veblen, Commons, and contemporary Marxist economists.

**ECON. 611-3. Money and Central Banking.** Monetary and financial institutions with focus on relationships among domestic monetary policy, interactional credit, and balance of payments.

**ECON. 612-3. Advanced Monetary Theory.** Major contributions to monetary and banking theory up to the present day and current issues.

**ECON. 621-3. Public Finance I.** Taxation, public expenditures, debts, and fiscal policy. Role of public finance in terms of peace and war. National, state, and local taxation, with some special attention to the state of Colorado.

**ECON. 622-3. 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. 625-3. Urban Economics.** Intensive study of urban economic issues. Prer., ECON. 425/525, or consent of instructor.

**ECON. 626-3. 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. 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. 628-3. Housing.** Evaluation of problems of housing in America. Demand and supply including structure of market, elasticities, segregation, location cost of production, and regulation. Prer., ECON. 425 or equivalent.

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*Students enrolled at the 500 level may expect additional work and evaluation commensurate with graduate standards.*
ECON. 630-2. Economics as a Social Science. The content and methods of economics are reviewed and compared with our knowledge of and methods of studying the total social system.


ECON. 641-3. International Trade. Contemporary and classical literature on theories of international trade. Topics covered include the determination of the pattern and terms of trade, the relationship between growth and trade, and commercial policy.

ECON. 642-3. International Finance. Topics in international finance, including exchange rate determination, the adjustment process, international financial markets, and the international monetary system.


ECON. 653-3. Natural Resources Economics. Application of economic theory to physical resources such as land and renewable resources, as well as to exhaustible resources. Prer., ECON. 407 or 408.

ECON. 654-3. Environmental Economics. Effects of economic growth 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. Labor Economics. Advanced study of the history, nature, and function of labor organizations; 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, especially in less developed countries.

ECON. 681-3. Intermediate Econometrics. This course emphasizes econometric theory and applications of econometric techniques and forecasting methods to quantitative problems in economics and business. The econometric model building and estimation techniques are developed in lectures and applied in students' individual projects through the use of econometric computer programs. Prer., ECON. 481/581 or equivalent, or consent of instructor.


Independent Study

ECON. 940-variable credit. Independent Study (Undergraduate).

ECON. 960-variable credit. Independent Study (Graduate). To be arranged with individual faculty members.

ENGLISH

Chair: Elihu H. Pearlman

Department Office: 1051 9th Street

Telephone: 556-8304

Faculty: Professors: Rex S. Burns, Robert D. Johnston, Elihu H. Pearlman, Mary Rose Sullivan, Peter L. Thorpe

Associate Professors: Richard T. Dillon, Shirley W. Johnston, Joel Salzberg, Richard P. VanDeWeghe, William A. West.

Assistant Professors: Colleen Donnelly, John S. Lofty, Bradford K. Mudge, Howard P. Movshovitz

Adjoint: Kenneth L. Justice


Undergraduate

An undergraduate wishing to major in English may choose one of two basic areas of emphasis: English or Writing. Each emphasis has its own requirements for graduation. Lists of required and suggested courses in each area of emphasis may be obtained from the English department office at 1051 9th Street.

ENGLISH MAJOR

The course of study offered by the Department of English is designed to develop a student's ability to read...
literature responsibly and imaginatively, to foster an understanding and appreciation of the Anglo-American literary inheritance, and to provide the historical perspective from which to evaluate contemporary writing. Careful study of the use of the English language also should help a student to resist the misuse and corruption of language in politics, the media, and elsewhere. Students who complete the program in English are expected to have mastered the ability to express their ideas in clear, succinct, and capable prose.

Requirements for the Major. Students majoring in English must present a total of 39 hours in English excluding ENGL. 100, 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. At least 15 upper division hours of the major's work in English must be completed with the CU-Denver English faculty in order to qualify for the B.A. in English. English courses taken at schools other than CU-Denver must be evaluated by the CU-Denver English department. English majors are required to consult with an adviser as soon as they declare their major.

Required courses for the major include ENGL. 366 (Shakespeare), ENGL. 300 (Critical Writing), ENGL. 497 or 498 (Major Authors or Topics in Literature, 3 hours), and at least 3 hours in an upper division course in American literature (ENGL. 423, 424, 435, or 444). These four required courses all must be completed with faculty in the CU-Denver English department. Only courses completed with a grade of C or above may be counted toward the major.

Departmental Honors. English majors interested in graduating with honors should confer with the honors adviser as soon as possible and no later than the beginning of the spring semester of the junior year.

Students who contemplate a career in teaching should consult with the School of Education, which supervises the teacher education program. They should plan to 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 under Communication and Theatre in this bulletin. For additional literature courses see Ethnic Studies.

Students needing information about the English major may call the Department of English office at 556-8304.

Writing Major

In addition to the English major, the English discipline offers the Writing major. Especially designed for future writers, this major offers a wide range of intensive writing experience combining such areas as technical, fiction, and critical writing. The student is trained in the rhetoric of the arts and humanities, the social sciences, and the sciences.

Total units required: 120 semester hours distributed among core courses, distribution area courses, and electives.

1. Major Courses Required.

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Units</th>
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<tbody>
<tr>
<td>ENGL 200</td>
<td>Advanced Composition</td>
<td>3</td>
</tr>
<tr>
<td>ENGL 215</td>
<td>Introduction to Creative Writing</td>
<td>3</td>
</tr>
<tr>
<td>ENGL 300</td>
<td>Critical Writing</td>
<td>3</td>
</tr>
<tr>
<td>ENGL 315</td>
<td>Technical Writing</td>
<td>3</td>
</tr>
<tr>
<td>ENGL 318</td>
<td>Writing Topics</td>
<td>9</td>
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</tbody>
</table>

English Literature courses above freshman level

Writing Topics (ENGL. 318) consists of three independent studies, one in each of the three distribution areas, in which the student completes individual papers on self chosen topics. The paper may derive from study in a particular course as long as it is in addition to all course requirements, or it may be based on a topic of interest to the student which does not derive form course work. The student must obtain topic approval from the program director, arrange for supervision from a faculty member, and enroll in an independent study. Independent study forms are available in the English department office and must be signed by the faculty supervisor, Writing director, and the associate dean. No more than 3 hours credit will be granted in each area.
CMMU. 210. Speechmaking: or 315. Group Dynamics; or 414. Argumentation .......................... 3
PHIL. 101. Introduction to Philosophy .......................... 3

Total 36

2. College Core Courses for Writing Majors. Students must complete the College of Liberal Arts and Sciences Core Curriculum requirements as specified in the CU-Denver Bulletin and Schedule of Classes. These are:

Area A. Arts and Humanities (not in major departments)
Core courses 6 semester hours

Area B. Natural and Physical Sciences
Core courses 12 semester hours

Area C. Social Sciences
Core courses 12 semester hours

The Writing major's Core Courses requirements differ from the College of Liberal Arts and Sciences requirements in that half of the Core Courses requirements for the major must be at the upper division level. Students can thus meet both requirements by (1) selecting courses from the CLAS approved list (appears in the Schedule of Classes each semester), and (2) taking half at the upper division level.

3. Electives. Total hours required: 54. Elective hours may be selected at the student's discretion, but students are urged to work with their advisor in outlining a program in which electives and requirements support each other. Up to 12 hours may be earned in the Cooperative Education program. Students also may earn up to 24 hours outside the College of Liberal Arts and Sciences.

In order to enroll in the program, students must consult with the Director of Writing through the English department office, 556-8304.

MINORS IN THE DEPARTMENT OF ENGLISH

The Department of English also offers two separate minors.

Literature Minor

This program is designed for students who are interested and attracted to the study of English literature but who have elected to major in another area. The recommended series of courses allows students to become acquainted with some of the methods of literary study and with a number of the most important literary works.

Requirements:
ENGL. 120. Introduction to Fiction, or
ENGL. 130. Introduction to Poetry and Drama .......................... 3
ENGL. 300. Critical Writing .......................... 3
ENGL. 366. Shakespeare .......................... 3
Any two upper division courses, at least one of which must be on the 400 level .......................... 6

Restrictions. These requirements may not be met by independent study. All upper division courses must be taken from a member of the CU-Denver faculty. Only grades of C or above may be counted toward the minor in literature.

Writing Minor

The Writing minor allows students to complement their area of major study with systematic experience in writing.

Requirements:
ENGL. 200. Advanced Composition .......................... 3
ENGL. 215. Creative Writing .......................... 3
ENGL. 315. Technical Writing, or
ENGL. 317. Business Writing .......................... 3
ENGL. 318. Writing Topics .......................... 3
ENGL. 419/519. Special Topics in Rhetoric and Writing .......................... 3

Restrictions. ENGL. 200, 318, and 419 must be taken from CU-Denver faculty. Only grades of C or better may be counted toward the minor.

Graduate

Students admitted to graduate study in English may complete all of their course requirements for the M.A. at CU-Denver. The Ph. D. requires study on the Boulder campus.

REQUIREMENTS FOR ADMISSION

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 and speech, and literature courses counting as credits in education). At least 16 semester hours must be in upper division work.

DEGREE REQUIREMENTS

Students wishing to pursue graduate work in English should note Requirements for Advanced Degrees in this

1Writing Topics (ENGL. 318) consists of three independent studies, one in each of the three distribution areas, in which the student completes individual papers on self chosen topics. The paper may derive from study in a particular course as long as it is in addition to all course requirements, or it may be based on a topic of interest to the student which does not derive form course work. The student must obtain topic approval from the program director, arrange for supervision from a faculty member, and enroll in an independent study. Independent study forms are available in the English department office and must be signed by the faculty supervisor. Writing Director, and the associate dean. No more than 3 hours credit will be granted in each area.
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 CU-Denver.

All students planning to take any graduate English examination must state their intentions to the graduate director for English studies at CU-Denver 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 CU-Denver.

For more information contact the graduate director at 556-8304.

**COURSES**

**ENGL 100-1. Writing Diagnosis.** ENGL 100 is not a course per se, but a writing proficiency test which carries one credit hour toward graduation. New CLAS students (as of spring semester 1982) are required to meet the new proficiency requirement by either (1) passing the ENGL 100 proficiency test or (2) passing ENGL 102 with a grade of C or better. **NOTE:** Students do not have to register in ENGL 100 if they simply wish to take ENGL 101 or 102. The proficiency test is given once only at the middle of each semester. Those who pass the test will receive a grade of P in ENGL 100. Those who fail will receive an I in ENGL 100 until they meet the proficiency requirement by passing ENGL 102 with a grade of C or better; or by passing the test the next time it is offered. (The test may be taken three times in successive semesters.) Once students pass 102 or 100 their I will become a P. **ENGL 101/102-3. Writing Workshop I and II. Writing Workshop I focuses on the abilities and skills needed to write effective expository prose. Emphasizes frequent writing, both in and out of class, with special attention to writing well-formed sentences, paragraphs, and short essays. Writing Workshop II develops student's writing of well-structured and graceful expository prose. Focus on developing students' ability to write essays that describe, narrate, explain, and argue. Students are placed in ENGL 101 or 102 after diagnostic testing during the first week of classes to determine their writing needs.**

**ENGL 103-3. Intermediate Composition.** Emphasis on the longer essay and the research paper, Prer. ENGL 102 or consent of instructor.

**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.** Reading, discussion, and writing about the ways writers use language to affect others. Focus on the power of language in such areas as politics, sexism, advertising, prejudice, and propaganda. Equal focus on developing individual student writing styles at advanced levels. Prer. ENGL 102 or 103 or consent of instructor.

**ENGL 206-3. Standard Grammatical Uses.** Review of conventional methods to recognize parts of speech and to analyze sentence structure.

**ENGL 215-3. Introduction to Creative Writing.** Reading, discussing, and writing short fiction and poetry in a workshop setting.

**ENGL 225-3. Introduction to Film.** An introduction to the technique and content of films: camera work, editing, acting, sound, and theme in the films of Chaplin, Griffith, Murnau, Hitchcock, Ford, Riefenstahl, Godard, and others.

**ENGL 230-239/330-339-3. Topics in Literature.** The following topics have been offered recently: modern writer in a godless world, the Romantic hero, American wit and humor, literary perceptions of motherhood, science fiction, women in literature, opera as drama. These courses may be taken at the 200 or 300 level.

**Note:** The seven Great Books courses give students from all disciplines and colleges an opportunity to gain a general overview of the history of western civilization through an examination of some of the great books that characterize our culture's various stages of development. They are listed below in chronological order. Though there are obvious advantages in starting with the two Heritage courses and then proceeding with the others in sequence, the courses may be taken in any order. Students are encouraged to let their interests guide them to those courses in the series which seem most attractive.

**ENGL 251-3. Great Books I: The Classical Heritage.** An examination of some of the chief literary works of ancient Greece and Rome, including selected writings of Homer, the Greek tragedians, Plato, and Virgil.

**ENGL 252-3. Great Books II: The Biblical Heritage.** This course complements ENGL 251 in its examination of another fountainhead of the western world. Representative portions of both the Old and the New Testament are studied.

**ENGL 253-3. Great Books III: The Medieval Synthesis.** English and continental works, both religious and secular. Readings include *Beowulf*, selections from *The Canterbury Tales*, and Dante's *Inferno*.


**ENGL 256-3. Great Books VI: Nineteenth-Century Expansions and Explorations.** Three novels (one American, one English, one continental), plus representative plays and poems, are read and discussed. Among the writers who might be discussed are Dickens, George Eliot, Flaubert, Dostoevsky, and Tolstoi.

**ENGL 257-3. Great Books VII: The Modern Western World.** Three novels (one American, one English, one continental), plus representative plays and poems, are read and discussed. Among the writers who might be discussed are Joyce, Proust, Mann, Kafka, Beckett, and Pound.

**ENGL 279-3. Survey of Ethnic Literature.** (ETST. 279.)

**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.** Theory and practice of the criticism of novels, poems, and plays. Extensive writing at advanced levels. Open to English and writing majors; nonmajors admitted with instructor's consent. Students are advised to take ENGL 102, 103, or 200 before enrolling in this course.

**ENGL 301-3. Honors in Humanities Writing Seminar.** Open only to students in the undergraduate Honors in Humanities Program. The seminar is taken in conjunction with one of the subject-oriented courses in the humanities clusters. Preliminary writing exercises will culminate in a long paper which will be judged by the instructor of the Writing Seminar and the instructor of the cluster course which has provided the subject matter for the paper. Required of students in the Honors in
Humanities Program. May be repeated for up to 6 hours credit.

**ENGL 302-3.** Writing Workshop: Poetry. Writing poetry. Seminar. May be repeated for up to 6 hours credit.

**ENGL 305-3.** Writing Workshop: Fiction. Writing fiction. Seminar. May be repeated for up to 6 hours credit. Prer., ENGL 215 or consent of instructor.

**ENGL 306-3.** 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, Flaherty, Welles.

**ENGL 307-3.** 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, Rossolini, Kurosawa, Bergman.

**ENGL 315-3.** Technical Writing. Introduction to the study and writing of technical documents. Examination of the processes, style, structure, and forms of technical writing, with emphasis on audience analysis, organization, clarity, and precision. Prer., ENGL 102 or consent of instructor.

**ENGL 317-3.** Business Writing. Writing business correspondence. Emphasis on style, structure, format of memoranda, letters, resumes, and short reports. Prer., ENGL 102 or consent of instructor.

**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 330-339/230-239.** Topics in Literature. Topics such as the following will be offered at regular intervals: modern writers in a godless world, the Romantic hero, American wit and humor, literary perceptions of motherhood, science fiction, women in literature, opera as drama. These courses may be taken at the 200 or the 300 level.

**ENGL 363-3.** Chaucer. A study of Chaucer's major works with emphasis upon The Canterbury Tales. Reading in Middle English after a short introduction to the language.

**ENGL 366-3.** Shakespeare. Representative tragedies, comedies, and histories by England's greatest writer.

**ENGL 368-3.** Milton. Milton's poetry and selected prose.

**ENGL 393-variable credit.** Internship/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.

Note: Before taking any 400-level course in English, a student must have earned 36 semester hours of college credit.

**ENGL 401-3.** Advanced Composition for Secondary School Teachers. Examination of the theory and methods of teaching writing in the secondary school. Prer., ENGL 102 or consent of instructor.

**ENGL 402-3.** Literature for Adolescents. (SECE. 538.) 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 415-3.** Rhetorical Theory for Writing Teachers. Examination of the principles and applications of rhetorical theory and its relationship to writing. Topics such as the following will be offered at regular intervals: rhetorical theory and technical writing; rhetorical theory and the teaching of writing; rhetorical theory and literary criticism.

**ENGL 420-3.** Development of the English Novel I. From the beginnings to 1830.

**ENGL 421-3.** Development of the English Novel II. From 1830 to World War II. Continuation of ENGL. 420.

**ENGL 423-3.** Development of the American Novel I. From the Beginnings to 1900.

**ENGL 424-3.** Development of the American Novel II. From 1900 to the present. Continuation of ENGL 423.

**ENGL 425-3.** Twentieth-Century Fiction. The modern novel in an international perspective, with emphasis on new tendencies.

**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 present. Continuation of ENGL 430.

**ENGL 443-3.** British and American Poetry of the 20th Century.
ENGL. 446-3. Recent World Literature. Survey of important works and trends in poetry, drama, and fiction since World War II.

ENGL. 466-3. Contemporary Chicano Literature. (ETST. 476.)

ENGL. 470-3. Directed Readings I. For students who, upon reaching their senior year, wish to explore areas of English literature not covered by their regular course work. Required of students intending to graduate with honors in English; recommended for students planning to continue with graduate work in English. Students should consult the departmental adviser or chairman before registering for this course.

ENGL. 471-3. Directed Readings II. A continuation of ENGL 470 for students wanting an additional opportunity to explore hitherto unexamined areas of English literature. Students should consult the department adviser or chairman before registering for this course.

ENGL. 472-3. Honors Essay. Students taking departmental honors in English must produce an honors essay under the direction of the Honors Committee. Upon completion, the essay will be offered for defense. Only for students in Honors English.

ENGL. 477-3. Topics in Literature: Senior Seminar. 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 instructor.

ENGL. 478-3. Major American Authors: Senior Seminar. Intensive study of works of one major British or American author. Open to English majors only, except with consent of instructor.

Upper Division/Graduate Level


ENGL. 406/506-3.1 Semantics. The meaning of words, their changes of meaning, and the relationship between words and reality.

ENGL. 408/508-3.1 History of the English Language. History of the language including the sound changes affecting modern English and its grammatical forms and vocabulary. Elementary knowledge of English grammar assumed.

ENGL. 412/512-3.1 Technical Communication: Writing. Intensive practice in technical writing, using simulations of professional writing situations. In a workshop featuring peer criticism, students will analyze diverse audience and communication problems, including those with challenging technical content. From these analyses, they will respond with appropriately designed writing that will be the subject of class discussion. Special emphasis will be placed on the decision process. Prereq. ENGL. 315 or consent of instructor.

ENGL. 413/513-3.1 Technical Communication: Editing. Intensive practice in editing technical documents. Emphasis will be on contextual editing (i.e., editing parts as they related to the whole document and purpose) as well as copyediting. Students will review editing strategies and examine methods of increasing document readability. Special attention will be given to solving readability problems syntactically and through format design. Prereq. ENGL. 315 or consent of instructor.

ENGL. 416/516-3.1 Poetics. An advanced poetics course for creative writing students. Instruction in the use of a variety of forms from different eras and traditions in fiction and poetry.

ENGL. 419/519-3.1 Special Topics in Rhetoric and Writing.

ENGL. 435/535-3.1 American Drama. Survey of American drama, with emphasis on O'Neill and subsequent playwrights.

ENGL. 444/544-3.1 American Poetry. From the beginnings through the 20th century.

ENGL. 450/550-3.1 Medieval Literature. Selections representative of the life and thought of the Middle Ages up to 1500.

ENGL. 452/552-3.1 The English Renaissance. Selected works from the 16th and 17th centuries.

ENGL. 454/554-3.1 Restoration and the 18th Century. Selected works from the period 1660-1800.


ENGL. 458/558-3.1 The Victorian Age. Main currents of Victorian thought in prose and poetry, 1830-1890.

ENGL. 460/560-3.1 Modern British and Irish Literature. Chronological survey of the period 1890 to World War II.

ENGL. 465/565-3.1 Readings in American Literature. Offers a variety of limited special topics which fall outside the other American literature offerings. Extensive reading in the history of American literature as basis for graduate major or minor in the field.

Graduate Level


ENGL. 518-3. Rhetorical Theory. Examination of the principles and applications of rhetorical theory and its relationship to writing. Topics such as the following will be offered at regular intervals: rhetorical theory and technical writing; rhetorical theory and the teaching of writing; and rhetorical theory and literary criticism.


ENGL. 563-3. Chaucer. A study of Chaucer's major works with emphasis upon The Canterbury Tales. Reading in Middle English after a short introduction to the language.


ENGL. 570-3. Old English I.

ENGL. 571-3. Beowulf: Old English II.

ENGL. 573-3. Chaucer.

ENGL. 583-3. Practicum in the Teaching of Composition. Supervised work in teaching composition. Students should have taken, or be enrolled in, ENGL. 509, and must be appointed as teaching assistants. Credit awarded one time only.

ENGL. 591-3 to 6. Directed Reading. Gives the graduate student in the M.A. program instruction on an individual basis. For examination preparation only

Advanced Seminars

ENGL. 600-609-3. Studies in Major Authors. Intensive study of works of one major British or American author.


1Students enrolled at the 500 level may expect additional work and evaluation commensurate with graduate standards.
ENGL 899-1 to 20. Doctor's Dissertation.
ENGL 951-variable credit. Tutorials in Medieval Studies.
ENGL 952-variable credit. Tutorials in Renaissance Studies.
ENGL 953-variable credit. Tutorials in 18th-Century Studies.
ENGL 954-variable credit. Tutorials in 19th-Century Studies.
ENGL 955-variable credit. Tutorials in American Studies.
ENGL 956-variable credit. Tutorials in Modern and Contemporary Literature.
ENGL 957-variable credit. Tutorials in Literary Theory.
ENGL 958-variable credit. Tutorials in Language and Rhetoric.
ENGL 959-variable credit. Tutorials in Creative Writing.
ENGL 961-variable credit. Advanced Medieval Studies.
ENGL 962-variable credit. Advanced Renaissance Studies.
ENGL 963-variable credit. Advanced 18th-Century Studies.
ENGL 964-variable credit. Advanced 19th-Century Studies.
ENGL 965-variable credit. Advanced 20th-Century Studies.
ENGL 966-variable credit. Advanced American Studies.
ENGL 967-variable credit. Advanced Critical Studies.
ENGL 968-variable credit. Advanced Study in Language and Rhetoric.

Independent Study

ENGL 621-3. Independent Study.
ENGL 910-variable credit. Independent Study (Lower Division).
ENGL 940-variable credit. Independent Study (Upper Division).
ENGL 950-variable credit. Independent Study (Graduate Level I). 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 (Graduate Level II). See ENGL 950.

ENVIRONMENTAL SCIENCE, MASTER OF SCIENCE

The environmental science degree is designed to provide students with training in engineering, natural/physical sciences, and socioeconomic analysis. The goals of the program are to: (1) enhance the interdisciplinary communication and analytical skills of the student, and (2) provide opportunities for more intensive training within a particular subject area. Students will receive instruction in the physical and biological dynamics of various ecosystems, environmental engineering, and socioeconomic issues associated with environmental analysis.

Degree Requirements

The degree curriculum consists of three components: (1) a set of five core courses required of all students (16 hours); (2) elective courses taken in two of the three subject areas (18 hours minimum); and (3) an in-service research project and report (3 hours). At least 21 of the 37 credit hours required for the degree must be at the 500 level or above. Program flexibility is provided through the selection of elective courses in various subject areas.

To fulfill the elective requirements, students select one of the following options. Each option includes courses from two of the three subject areas (engineering, natural/physical sciences, socioeconomic sciences).

Engineering Option: 6 hours of natural/physical sciences or socioeconomic sciences and 12 hours of engineering.

Natural/Physical Sciences Option: 6 hours of engineering and 12 hours of natural/physical sciences.

Socioeconomic Science Option: 6 hours of engineering and 12 hours of socioeconomic sciences.

The degree is offered through cooperation between the College of Engineering and Applied Science and the College of Liberal Arts and Sciences. The program is supervised by an executive committee which includes faculty representatives from both colleges. Information on specific course requirements and course options can be obtained by contacting Professor Willard Chappell at 556-3460.

ETHNIC STUDIES

Director: Cecil E. Glenn
Office: UA Building, Room M108
Telephone: 556-2700

Director, American Indian Education Program: Vivian Locust
Acting Director, Asian American Education Program: Peggy Lore
Director, Black Education Program: Cecil E. Glenn
Director, Hispanic American Education Program: Danny Martinez
Office: UA Building, Room M109
Telephone: 556-2578

Undergraduate

Ethnic studies is the academic investigation of the four major minority groups in the U.S. The interdisciplinary nature of the ethnic studies curriculum program provides students the opportunity to develop a greater understanding of cultural pluralism and to acquire skills needed in professional and social service fields. The program offers a minor in ethnic studies.

Requirements for the Minor. The ethnic studies minor is designed to help students majoring in the liberal arts and sciences develop a sophisticated and broad understanding of ethnicity and its role in contemporary American society. The program features an interdisciplinary curriculum that analyzes the ethnic experience from the perspectives of the various social sciences and humanities. Further, it provides students with the theories, concepts, and generalizations needed to comprehend and interpret relations between and among ethnic groups in the U.S.

The minor in ethnic studies offers to students the opportunity to enhance and broaden the body of knowledge acquired in their chosen majors, and to apply it in a
variety of careers involving intercultural relations. A student who wishes to minor in ethnic studies is required to complete 21 semester hours in ethnic studies with a grade of C or better. At least three of the required 21 hours must be in courses numbered 300 or above. Courses taken to satisfy the student's major requirements may not be applied toward the requirements for the minor in ethnic studies.

The 21 hours required must be distributed as follows: 3 hours in social perspective courses, 3 hours in cross-cultural perspective courses, 12 hours in ethnic perspective courses and ETST/SOC. 400-3, Ethnicity in America. Interested students should obtain a list of these courses from an ethnic studies adviser.

ETHNIC STUDIES COURSES


ETST. 303-3. Race, Gender, Law, and Public Policy. (P SC. 303.) Historical overview of race and gender relations in the U.S. and an examination of the treatment of race and gender issues in the judicial system and in public policy.

ETST. 320-3. Law and Minorities I. Designed to acquaint students with the legal system of American society; includes contracts, buying and selling, wills and inheritance, debtors and creditors, landlord and tenant, family relations, criminal law, and civil rights.

ETST. 325-3. Pathology of the Ghetto I. This dynamic course combines aspects of urban studies and sociology. Contemporar­
y cultural factors of the minority ghetto experience will be investigated as elements in urban crisis. Emphasis is placed on possible solutions through government agencies and com­munity organization.

ETST. 326-3. Pathology of the Ghetto II. Continuation of ETST. 325.

ETST. 327-3. Culture of Poverty. A study of membership in groups that have been poor for generations and the creation of a separate culture. This course studies blacks, whites, Mexican Americans, Native Americans, and other ethnic groups that have lived in this society in a state of poverty.

ETST. 339-3. Literature of Social Protest from an Ethnic Per­spective. The literature of social protest of various ethnic groups, examined from a literary perspective and with reference to political and social theories.

ETST. 345-3. Due Process and the Socially Disadvantaged. Structured in layman's terms, this innovative course presents current information on occupational litigation, legal rights, due process, the future of affirmative action, and techniques of operational procedure in these areas.

ETST. 350-3. Prejudice, Stereotyping, and American Society. An examination of prejudice and stereotyping in American society, with particular emphasis on institutions; how institutions harbor and reinforce racial and ethnic stereotyping and its impact on equal opportunity for racial and ethnic minority groups and women.

ETST. 355-3. Minority Politics. (P SC. 355.) An examination of the social, cultural, and economic factors that affect the political choices of ethnic minorities in the United States. Analysis of minority political action.

ETST. 370-3. Culture, Racism, and Alienation. The effects of racism on the personality of participants in racist cultures.

ETST. 405-3. Intergroup Relations. A study of intergroup (race) relations at the small group level. Includes analysis of a group that has been stratified into a majority of white students and a fixed number of minority students.

ETST. 412-3. Civil Rights. Designed to introduce the student to the field of civil rights and equal employment opportunities. Emphasis on fair employment practices and procedures. Field visits.

ETST. 481-3. Language and Culture. (ANTH. 481.) This course aims at developing insights into the relationship between verbal behavior and social organization. It draws upon linguistics, anthropology and psychology to answer such questions as "What is language?" "How did it originate and evolve?" "How does language vary across cultural groups and social classes?"

Afro-American Studies

ETST. 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 population.


ETST. 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.

ETST. 275-3. The American Writer and the Black Man II. Continuation of ETST. 274 but may be taken independently of that course.


ETST. 398-variable credit. Internship/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.


ETST. 451-3. Black Politics. (P SC. 451.) Examination of black politics in the U.S.; the role of black interest groups, structure and functions of black political organizations, goals and political styles of black politicians, trends and future of black politics in the United States.

American Indian Studies

ETST. 249-3. Native American Literature. An introduction to native American literature and other expressive forms with emphasis on their esthetic, linguistic, psychological, and historical properties, as well as the contemporary social and cultural influences upon native authors and their material.

ETST. 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.


ETST. 321-3. The American Indian and Federal Law. A survey of the special status of American Indians, as well as the problems, costs, and benefits affecting various tribal groups and individuals as exemplified in a selection of actual case studies.

ETST. 360-3. The Myths and Legends of America. (ANTH. 365.) An exploration of the spectrum of the myths and legends of native America which focuses on the relationship between the collective myth and the individual.

ETST. 361-3. Selected Topics: Native Americans. Examines specific topics on Native Americans to be selected by the instructor and students. Detailed study of subjects related to Native American experience and communities.


ETST. 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.

ETST. 436-3. The American Indian in Contemporary Society. Begins with the historical background on American Indian acculturation and persistence, but emphasizes the present day relations between Indian communities and the dominant society, stressing conditions and events in Denver and the Southwest generally.


Asian American Studies


ETST. 330-3. Topics on Asian Americans. Examines 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.

ETST. 335-3. Asian American Literature. (ENGL. 235/335.) The readings in this course will look at the experience of men and women in different generations and examine how each group attempted to maintain traditional values in a foreign land, how it attempted to assimilate, and how it forged a new identity. Readings include short stories, poetry, essays, and novels by leading Asian American writers.

ETST. 341-3. Psychology of the Asian in America. (PSY. 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 psychology.

ETST. 356-3. Asian Pacific Women in American Society: Dolls or Dragons? The course will examine processes of change in values, roles, and relations for Asian-American/Pacific Islander women, using contemporary and historical readings that address problems such as generational differences, assimilation, and changing roles.

ETST. 398-variable credit. Internship/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.

Hispanic American Studies

ETST. 127-3. Contemporary Mexican American I. An introductory course in which the basic terminology of the Chicano milieu is defined and a survey made of the Chicano movement from its early manifestations to the present.

ETST. 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 society. The purpose of the course is literary but serves also to dispel many false views of Mexico as a rural, traditionally conservative country.

ETST. 212-3. Contemporary Latin American Literature in Translation. The approach is the same as in ETST. 211. The best of the contemporary Latin American authors are studied: Borges, Fuentes, Rulfo, Carpentier, Cortazar, and others.

ETST. 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.
and motivation.

...in the study of the Southwest. 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. Prereq., SPAN. 212 or equivalent.

ETST. 304-3. Workshop in Southwest Spanish. (SPAN. 304.) 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., ETST. 303 or consent of instructor.

ETST. 310-3. Mexican American Ethnic Relations. An interesting and innovative mix of anthropology, history, and sociology. Persons of Spanish, Spanish-Indian, and Mexican descent will be studied. Areas of focus will include ethnohistorical backgrounds, current interrelations, and social movements in both rural and urban groups. Other topics: cultural patterns, identity maintenance, and social forms and problems of national incorporation.


ETST. 340-3. Social Psychology and the Mexican American. (PSY. 340.) Exposes students to the research on Mexican Americans in the fields of intelligence and achievement, language and learning ability, attitudes, perception, personality, and motivation.

ETST. 383-3. History of Mexican American in Colorado I. (HIST. 383.) Research-oriented seminar course in which the student is expected to gather material on the subject from original sources.

ETST. 398-variable credit. Internship/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.

ETST. 432-3. Education in Multilingual Communities. 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; intraschool social and academic stratification.

ETST. 455-3. The Mexican American in Politics. (PSC. 455.) 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.

ETST. 459-3. The Mexican American in the Southwest. A study of the development of the social structures of Mexican Americans in the Southwest and the forces that have affected them.

ETST. 476-3. Contemporary Chicano Literature. (ENGL. 476.) A summary of modern Chicano authors. This course acquaints the student with the motifs and currents of the Chicano movement, whose literature is in the vanguard of American letters.

FINE ARTS

Co-Chairs: Gerald C. Johnson, Ernest O. Porps
Department Office: Arts Building, Room 185
Telephone: 556-4891
Faculty: Professor: Charles L. Moore
Associate Professor: John R. Fudge, Gerald C. Johnson, Ernest O. Porps, Ludwik C. Turzanski
Assistant Professor: Celia Rabinovitch, Ruth Thorne-Thomsen
Adjunct: Paul E. Biagi, Richard G. Conn
Attendant: Jane Comstock

Undergraduate

An education in fine arts is based on discipline, absorption, and knowledge. Discipline is the relationship of the student to material or form. What comes through the form is the self of the student's relationship to the world. This constant exposure through discipline leads to absorption which can be seen as a fascination with and appreciation of both self and the world. In fine arts, the record of this process is made visible for the world to see and is called art. The sense of art or artfulness is basic to the very act of being a human being. The experience of art/art class touches the student in two ways. Firstly, there is the detail of each class, the actual techniques of the class title itself. For example, in a basic painting class, the student will learn both the process and the product of painting. The second aspect is the all important by-product of the art process which is the artfulness itself. This sense or knowledge, once it is experienced, enriches and empowers all activities of human undertaking. Because of this it is a very good idea for everyone, for yourself, no matter what your plan is for gaining livelihood, to have some experience of the art process.

Fine Arts offers both a B.A. in fine arts, and a B.F.A. in creative arts with concentrations in painting, drawing, sculpture, art history, and photography. The B.A. degree must include at least 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 grade-point average in all course work at the time of application, which may not be earlier than the junior year. Forms for application are available in the Fine Arts Department office, Arts Building, Room 185.

Requirements for the Major. The core curriculum for fine arts majors in studio art includes 12 hours of Studio I (F A. 100, 101, 102, 202); F A. 180-181 (History of Art Survey I and II); F A. 496 (Art Seminar); and 6 hours of upper division art history. Students who are candidates for the B.A. degree must take a minimum of 21 hours in residence, and those who are candidates for the B.F.A. degree must take a minimum of 27 hours in residence. Up to 9 hours of credit in art areas outside those specified above may be applied to the major, e.g., ceramics, jewelry design, commercial art, woodworking, etc.
B.A. requirements for a concentration in art history are as follows: 12 hours of Studio I (FA. 100, 101, 102, 202); F A. 180-181 (History of Art Survey I and II); F A. 480 (Renaissance Art); F A. 490 (Nineteenth-Century Art); and F A. 491 (Twentieth-Century Art); and F A. 497 (Methods in Art History). This amounts to a total of 30 hours of required courses; 12-18 hours of upper division electives may be taken, for a total of 42-48 hours required for the art history concentration fine arts major. A minimum of 21 hours must be taken in residence.

The core curriculum is set up to facilitate as much as possible a variety of viewpoints and creative approaches for the beginning student. If this seems restrictive to an individual student because of prior experience, discipline advisers are open to alternative possibilities that would accomplish the same end.

Requirements for the Minor. Two minors in fine arts with a concentration in either studio art or art history art available. Interested students should contact the fine arts department, Arts Building, Room 185.

Graduate

Some course work at the graduate level can be taken at CU-Denver in this discipline, but degree programs must be completed through the University of Colorado at Boulder; 500-level courses are open to qualified seniors.

The graduate courses in fine arts also are applicable to the Master of Humanities program at CU-Denver.

COURSES

FA. 100-3. Basic Drawing. Exploration of drawing approaches and media.


FA. 499-3. Topics in Studio Art. Designed to accommodate a variety of subjects in studio art which are not normally covered in studio courses.

Drawing

FA. 300-3. Intermediate Drawing. Sequel to Basic Drawing, covering further explorations of drawing media, techniques, and more advanced problems in composition.

FA. 301/401/501-3. Life Drawing. Problems in drawing from life; exploring the possibilities in pictorial design and composition.


Printmaking

FA. 340/341-3. First-Year Printmaking. Introduction to intaglio and relief printing, including metal engraving and etching, and woodcut.

FA. 342/343-3. Silk Screen (Serigraphy). Silk screen techniques as they relate to fine art prints.


Painting


FA. 520/521-3. Graduate Painting. Expressive pictorial problems involving varied subject matter and painting media, with an emphasis on individual development.

Sculpture


Photography

FA. 315-3. Photography I. First semester of comprehensive foundation course in black and white photography. Introduction to aesthetics, concepts, and history of photography as well as basic camera and darkroom technique. Emphasis on photography as a means to a formal and expressive end.

FA. 317-3. Color Photography I. Introduction to color theory, materials, and technique. Using language and skills acquired in Photo I, students will explore the symbolic and psychological possibilities of color in image making. Pre., F A. 315 or consent of photography instructor.
FA. 319-3. Photography II. Second semester of comprehensive foundation course in black and white photography. Further development of concepts, vocabulary, and aesthetics, as well as camera and darkroom skills. Prereq., 315 or consent of photography instructor.

FA. 383-3. History of Photography. A comprehensive history of photography, from 1839 to the present. Slides of historic photographs and a number of original photographs will illustrate the various stages, techniques, and types of photography and their relationships to the totality of art.

FA. 415-3. Photography III. An intensive project-oriented course. Emphasis on development of ideas, process, and critical evaluation. Students may work with color or black and white materials. Prereq., F A. 319 or consent of photography instructor.

FA. 498-3. Senior Photography Seminar. Advanced project-oriented course. Emphasis on integrating visual and conceptual ideas in a cohesive body of work. A research paper is required to support project. Final critique with no fewer than two other fine arts faculty. Exhibition of work in a public place. Donation of project slides to the CU-Denver archives.

General Arts

FA. 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.

FA. 401-3. 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.

FA. 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.

Art History

Note: Not all art history courses are offered every year. Check current Schedule of Classes.

FA. 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.

FA. 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.

FA. 383-3. History of Photography. A comprehensive history of photography, 1839 to the present. Slides of historic photographs and a number of original photographs will illustrate the various stages, techniques, and types of photography and their relationships to the totality of art.

Art History — Upper Division/Graduate Level

FA. 404/504-3.1 Art of the Ancient Mideast. A survey of the architecture, sculpture, and painting of the ancient Mideast from their beginnings to the end of the Persian Empire, including the arts of Anatolia, Egypt, Mesopotamia, and Persia.

FA. 405/505-3.1 Art of India and Southeast Asia. A survey of the architecture, sculpture, and painting of India and those areas of Southeast Asia influenced by India from the period of Mohenjo Daro and Harappa to the present. The Himalayan region will be treated as will Tantric art in general.

FA. 406/506-3.1 Art of Islam. Art and architecture of the Islam peoples from the time of Mohammed to the present.

FA. 460/560-469/569-3.1 Topics in Art History. 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 Classes for specific topic descriptions.

FA. 471/571-3.1 Pre-Columbian Art. Architecture, sculpture, and painting of the high cultures of Meso-America and the Andean area before the Spanish conquest.


FA. 474/574-3.1 Arts of Japan. Appreciation and chronological development of the arts of Japan. Emphasis upon the arts of Shinto and Buddhism as well as the particular Japanese aesthetic.

FA. 475/575-3.1 Arts of China. A survey of Chinese painting, sculpture, and architecture from the neolithic period through the present era, including the art of Tibet.

FA. 477/577-3.1 Art of the Ancient Mediterranean. Greek art and architecture from archaic through Hellenistic periods, Etruscan art, and Roman art and architecture from the Republican period to the fall of the empire.

FA. 478-578-3.1 Art of the Middle Ages. A survey of sculpture, painting, and architecture from A.D. 300 to 1500, which includes the art of the Early Christian, Byzantine, Early Medieval, Romanesque, and Gothic periods.

FA. 480/580-3.1 Renaissance Art. The art and architecture of Italy and Northern Europe (Flanders, France, and Germany) from the late 14th century to the late 16th century.

FA. 484/584-3.1 Baroque and Rococo Art. The history of art in Italy, Spain, France, England, and the low countries in the 17th and 18th centuries.

FA. 487/587-3.1 American Art I. Study of American art and architecture from the Colonial period through the 19th century.

FA. 488/588-3.1 American Art II. Study of American art and architecture from the 19th century to the present.


FA. 491/591-3.1 Twentieth-Century Art. A survey of major trends in painting, sculpture, and architecture from Post-Impressionism to the present.

FA. 497/597-3.1 Methods in Art History. A seminar in the nature and purpose of the study of the history of art in which the student is introduced to basic approaches, various research methodologies, and professional career possibilities in the history of art.

Independent Study and Seminar

FA. 398-variable credit. Internship/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.

FA. 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. Prereq., 12 hours of basic art courses or equivalent. F A. 180-181, or consent of instructor. May be repeated once with consent of instructor.

Footnote: Students enrolled at the 500 level may expect additional work and evaluation commensurate with graduate standards.
F A. 596-3. Art Seminar. Presented concurrently with F A. 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.

F A. 930-variable credit. Independent Study (Undergraduate). Individual projects or studies assigned by the major professor. To be arranged.

GEOGRAPHY

Associate Chair: Richard E. Stevens
Department Office: East Classroom Building, Room 233
Telephone: 556-3456
Faculty: Professor: Richard E. Stevens
Associate Professor: Charles G. Schmidt
Instructor: Jeanne K. Mayne

Geography Advisory Board:
Robert Alexander, Research Geographer, USGS
Rhoda Bliss, Associate, HOH Associates, Inc.
Donald Cover, Director, Office of Transit Assistance, UMTA, Department of Transportation, Denver Regional Office

Undergraduate

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) or 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.

Requirements for the Major. Students majoring in geography must complete the following basic courses or their equivalents: GEOG. 130, 223, 224, 306, and 341. 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 at least 15 hours of which must be taken at CU-Denver) 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.

Requirements for the Minor. Students interested in a minor in geography should contact a departmental adviser for information and specific requirements.

Graduate

Work toward the M.A. degree is offered at CU-Denver in the areas of urban economic/social geography, transportation, quantitative methods, land use, perception, and environmental planning. Graduate training toward the Ph. D. degree is also available. All 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.

Requirements for Admission

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.

DEGREE REQUIREMENTS

Two types of degree programs are available. Plan I requires a minimum of 18 credit hours of course work and 6 credit hours of thesis research and presentation work. Plan II requires a minimum of 30 credit hours of course work, including 4 to 6 independent student credit hours involving completion of a project or paper of publishable quality.

All incoming graduate students must complete three graduate seminars with three different departmental faculty within the first semester (or first year for part-time students). At least one of the three courses must be in physical geography and one in human geography. The performance in these courses will be used by a faculty committee to (1) determine the general fitness of the student to continue toward the M.A. degree and (2) identify any academic deficiencies the student may have.

For further information call the geography department, 556-3456.

COURSES

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. 200-3. Data Analysis in Earth Science. (GEOL. 277.) An introduction to scientific methods for earth science, nature of earth science data, sampling techniques, data representation, and elementary data description and analysis methods.

GEOG. 220-3. Natural Hazards. A survey of those physical phenomena that often cause substantial damage when they occur in areas of human settlement.

GEOG. 223-4. Climate and Humans. A general introduction to elements of weather, physical climatology, and world regional climate classification.

GEOG. 224-4. Landforms. (GEOL. 201.) Study of earth materials, features, and processes, and how they relate to man.

GEOG. 261-3. World Cities. An introduction to major world urban trends, and comparative investigation of similarities and differences among specific cities around the world. The course includes a review of economic growth forces, transportation characteristics, land use patterns, housing issues, and government policy.

GEOG. 265-3. Retail Business Location. An introduction to the major site, neighborhood, and regional factors influencing retail/service business locations.

GEOG. 299-3. Special Topics. Introduction to current topics and issues in geography such as patterns of world cities, environmental management and similar issues of interest to non-majors.

GEOG. 306-3. Map Reading and Elementary Surveying. Introduction to the analysis and use of maps, and to elementary field techniques as research tools. Two all-day field projects.

GEOG. 308-3. Introduction to Cartography.


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. 313-3. Central America and the Caribbean. A survey of the physical environment and cultural development of Central America and the Caribbean islands.
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. 317-3. Africa. A physical, cultural, and economic approach to an understanding of man/land relationships on the continent.

GEOG. 324-3. Introduction to Soils.

GEOG. 326-3. Urban Environmental Problems. An introduction to the major elements of the physical environment that influence the development of cities and that affect the quality of life in cities.


GEOG. 398-variable credit. Internship/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. 399-3. Special Topics. Investigation of current topics in geography such as analysis of issues (crime, public transportation), techniques (socioeconomic impact analysis), or areas of specialization (climatology). Prerequisites vary with each topic, but will be no less than six hours in relevant social or physical science.

GEOG. 424-4. Principles of Geomorphology. (GEOL. 463.)

GEOG. 441-3. Environmental Conservation. Introduction to various environmental problems such as water/air pollution, soil erosion, and deforestation.


Upper Division/Graduate Level


GEOG. 461/561-3. Geography of Cities. Detailed analysis of research efforts concerning the origin, economic growth processes, distribution, and functions of urban areas.

GEOG. 463/563-3. Transportation: Structure and Policies. Consideration of advanced concepts and theories leading to description and understanding of the relationships between people, products, and transportation systems over space and time.

GEOG. 465/565-3. Location Analysis. The study of commercial and industrial activities, emphasizing theories of locational structure and methods of analysis.

Graduate Level


GEOG. 600-3. Advanced Quantitative Methods in Geography. (GEOL. 488.) Continuation of GEOG. 400/500 with emphasis on more advanced mathematical and statistical techniques in geography and related fields. Prereq., GEOG. 400/500 or consent of instructor.


GEOG. 800-1 to 8. Doctor's Thesis.

Independent Study

GEOG. 940-1 to 3. Independent Study (Undergraduate). Independent research primarily for undergraduate majors. Prereq., consent of department.

GEOG. 950-1 to 3. Readings in Geography (Graduate). Section 1, economic; 2, physical; 3, urban; 4, social; 5, quantitative; 6, transportation.

GEOG. 960-1 to 3. Independent Study (Graduate). Independent research for graduate major students. Prereq., consent of department.

GEOLOGY

Associate Chair: Wesley E. LeMasurier

Department Office: East Classroom Building, Room 233

Faculties: Professors: Wesley E. LeMasurier, John G. Weihaupt

Associate Professor: Martin G. Lockley

Assistant Professor: Jeffrey P. Kurtz

Instructors: Karen Houck, John Roulston

Geology Advisory Board:
Art Berman, Amoco Production Company
W.E. Bischoff, Sohio Petroleum Co., Houston, Texas
N.Y. Chang, Professor of Civil Engineering, CU-Denver

Ed Coalson
John C. Dolson, Amoco Production Company
Richard Ebens, Marathon Oil Company
Dave Eby, Champlin Petroleum Co.
George Ecker, Amoco Production Company
William T. Evans, Phillips Petroleum
Ted W. Fautin, Phillips Petroleum
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Esther R. Magathan
Gustavo Morales
J. E. Parker, Coastal Oil and Gas
Dave Pasta, Texaco Inc.
James Pendleton, Colorado Department of Natural Resources
J. T. Rice, Aminoil USA Inc., Houston, Texas
John W. Rold, State Geologist and Director
Jordan Sawdo

1 Students enrolled at the 500 level may expect additional work and evaluation commensurate with graduate standards.
Maureen S. Schultz  
Russ Seni, Texaco Inc.  
John Severson, Amoco Production Company  
A. B. Slaybaugh, Conoco Inc.  
Jack Thomas, Amoco Production Company  
David C. Underwood, President, American/Canadian Stratigraphic  
Dick Walker, Bass Enterprises  
Steve Wright, Cheveron, U.S.A.  
Danny Wyatt, Consulting Geologist  
Jeffrey M. Yarus  

Undergraduate  
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 research and applied technology.  
Employment opportunities for well-qualified geologists vary greatly with economic conditions. A graduate degree is strongly recommended for those seeking professional level 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.  

Requirements for the Major. Students majoring in the geological sciences may choose from among five curriculum options to suit a variety of career or educational objectives. Most options require all of the following courses within the department: physical geology I and II, mineralogy, structural geology, field geology, petrology, paleontology, and sedimentation stratigraphy. In addition, most career-oriented students must take the following courses in allied fields: CHEM. 103, 106; MATH. 140, 241; and PHYS. 231-232, 233-234, C S. 201 or 210. All courses required for the geology major must be taken for a letter grade (no pass/fail). Required upper division geology courses must all be C grade or better. Transfer students should note that at least 18 hours of upper division CU-Denver geology courses must be taken. The program is offered entirely in the evening (excepting field geology), with the exception of a very few nontechnical electives.  

Requirements for the Minor. Students interested in a minor in geological sciences should contact a department adviser for information and specific requirements.  
It is possible to do a significant proportion of the work required for an M.S. degree on the Denver campus, but prospective graduate students must be prepared to take about one-half of their course work on the Boulder campus at this time.  
More information about opportunities for Denver students is available in the CU-Denver geology department, 556-3456.  

COURSES  
GEOL. 102-3. History of Life. A nontechnical study of life forms and their relationships to environments through earth history. Includes discussion of major evolutionary events and current controversies. Recommended for CLAS science requirement.  
GEOL. 120-3. Introduction to Oceanography. A survey of modern scientific knowledge of the world's oceans. Intended for non-science students, the course offers a non-quantitative introduction to the major facts and principles of physical, chemical, biological, and geological oceanography. Recommended for CLAS science requirement.  
GEOL. 133-1. Volcanoes. A nontechnical survey of volcanoes including their geological and geographic locations, origins, history, behavior, hazards, prediction, and human impact. Recommended for CLAS science requirement.  
GEOL. 201-4. Introduction to Geomorphology. (GEOG. 224.) A one-semester survey course in physical geology emphasizing surface processes and how they relate to man. Designed for nonscience students and those who do not intend to take additional work in geology. Includes Sunday field trips. Recommended for CLAS science requirement.  
GEOL. 207-4, 208-4. Physical Geology I and II. 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 processes, 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 all-day field trips per semester. Prer., basic high school courses in mathematics, physics, and chemistry are advisable. Students may follow GEOL. 201 with GEOL. 208 if they wish additional work in geophysics and internal processes, or they may begin the 207-208 sequence with GEOL. 208 with consent of 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. 303-3. Geologic Map Analysis. An introductory course in interpretation and construction of geologic maps and cross sections. This lab- and field-oriented course is designed to focus on classical geometric relationships, analysis of geologic maps, and field mapping techniques. Prer., GEOL. 207 and 208 or equivalents.  
GEOL. 309-4. Petroleum Technology. An introductory course with lab, covering the basic principles of petroleum geology, petroleum engineering, and geophysical methods of petroleum exploration. Designed to introduce students to the science and business of petroleum exploration and exploitation. Prer., GEOL. 207 and 208 or equivalents.  
GEOL. 312-5. Structural Geology. Descriptive and interpretive study of the deformation structures found in sedimentary, metamorphic, and igneous rocks (i.e., folds, faults, foliation, etc.). 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 classification, distribution, and origin of igneous, metamorphic, and sedimentary rocks, including their identification in hand specimens. Pre., physical geology and mineralogy.

GEOL. 330-3. Astrogeology. A descriptive and theoretical study of the geological and geophysical characteristics of the planets and natural satellites of the solar system. Topics include the fundamental geology of the solar system, geologic significance of meteorites, geological structure and the origin of the planets and natural satellites, the geomorphology of the planets, the geological parameters of impact phenomena, igneous processes, and geological mapping of planetary surfaces. Pre., GEOL. 207 and 208.

GEOL. 341-4. Introductory Paleontology. The study of invertebrate fossils, including a survey of the organic world and its history in the geological past. Includes biometrics and an introduction to evolution and paleoecology, and discussion of the uses of fossils in geologic correlation. Pre., Introductory geology or biology.

GEOL. 342-4. Sedimentation and Stratigraphy. An introduction to the principles of sedimentology and stratigraphy. Emphasis will be on dynamic processes within sedimentary environments and the resulting stratigraphic record. Pre., Introductory geology or biology.

GEOL. 398-variable credit. Internship/Cooperative Education. Designed experiences involving application of specific, relevant concepts and skills in supervised employment situations. Pre., sophomore standing and 2.5 grade-point average.

GEOL. 406-3. Air Photo Analysis. (GEOG. 406.) Use of aerial photographs for the analysis of urban-industrial patterns, vegetation, agriculture, landforms, and geologic structure. Pre., GEOG. 306 or consent of instructor.


GEOL. 444-3. Glacial Geology and Climatology. A descriptive and theoretical study of the characteristics of glacial and glacial age features, processes and climatology. Topics include glacial geologic features, ice sheets, polar exploration, geochronology, glacial stratigraphy, geopolarity epochs, glacial isostasy, eustatic change, atmospheric structure and circulation in the ice ages, paleoclimatology, paleoherbivores, and Holocene. Pre., GEOL. 207 and 208.

GEOL. 494-3. Mineral Resources in World Affairs. Non-technical study of the distribution, uses, and conservation of economic minerals and fuels. Topics to be discussed include the role of the Middle East in the present and future supply of fossil fuels; the potential of oil shale development in the U.S.; the potential of coal slurry pipelines; the future of nuclear power; alternate energy sources; acid rain; the potential for deep-sea mining of metallic deposits; mineral economics; the Law of the Sea; and the role of foreign governments in the mineral industry. Some special topics will be presented by industry and government experts.

Upper Division/Graduate Level

GEOL. 409/509-4.1 Well-log Analysis. A senior/graduate level course introducing the theory behind well-logs and their uses in stratigraphic studies. Emphasis is on determining lithology, porosity, and attitude from logs and applying this information to geologic studies. Pre., GEOL. 208, 342 (312 recommended). MATH. 112, and one year of college physics.

GEOL. 417/517-4.1 Optical Mineralogy. A systematic study of the optical properties of minerals and their identification in thin section and grain mounts. Pre., PHYS. 231 and 232. GEOL. 301 or equivalent. Intended for advanced undergraduate geology majors or first-year graduate students. A substantial laboratory project is required for graduate credit.

GEOL. 425/525-4.1 Ore Deposits. An introduction to metaliferous deposits. The first part of the course deals with the chemistry of ore-bearing fluids, their migration and deposition; the second part focuses on wall rock alteration, metal zoning, isotopic and fluid inclusion studies. The course concludes with discussion of the characteristics of various ore deposits and their relationship to plate tectonic regimes. Pre., GEOL. 301 and 323.

GEOL. 435/535-3.1 Geochemistry. An introductory course in geochemistry, covering cosmochemistry, nucleosynthesis, structure and composition of the earth, the chemistry of the hydrosphere, atmosphere and biosphere, evidence for the origin of life, major chemical cycles in the oceans, isotopic geochemistry and geochronology. Pre., GEOL. 207-208, 301, and first-semester college chemistry. GEOL. 323 recommended.

GEOL. 441/541-3.1 Organic Geochemistry. (CHEM. 441.) A course emphasizing structures, distribution, diagenesis, social-economic importance, and methods of analysis of organic matter in soils, marine sediments, coals, oil shales, as well as petroleum and carbonaceous meteorites. Pre., CHEM. 342 or consent of instructor.

GEOL. 475/575-4.1 Paleoenecologic Facies Analysis. An introduction to basic and applied paleoecology through the study of relationships between fossil assemblages and sedimentary facies. Emphasis is on the understanding of faunal association and biofacies and the potential of paleoecological studies in the interpretation of depositional environments and biostatigraphic analysis. Pre., GEOL. 341. GEOL. 342 recommended.

GEOL. 481/581-3.1 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. Pre., GEOL. 312 and 342. GEOL. 485/585 recommended.

GEOL. 485/585-3.1 Plate Tectonics and Regional Structural Analysis. The evolution of the classical structural provinces of North America is 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. Pre., GEOL. 312 or equivalent.

GEOL. 493/593-4.1 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 college courses in physics, mathematics, and geology required.

1 Students enrolled at the 500 level may expect additional work and evaluation commensurate with graduate standards.
Graduate Level

GEOL 560-3. Seminar: Research and Writing in the Natural Sciences. This senior/graduate-level course deals with the nature and importance of scientific research, and traditional means by which the results are conveyed in the scientific literature. Included also are topics related to masters degree theses, doctoral degree dissertations, and the funding of scientific research. Prer., senior or graduate-level standing, with a major in a physical or biological science.

GEOL 571-2. Seminar in Structure/Tectonics. Graduate level special topics seminar in structural geology and tectonics. Topics will vary from year to year. A term paper and oral presentation will be required by all participants taking the class for credit.

GEOL 578-2. Ore Deposits Seminar. A graduate level course on special topics in the field of economic geology. Topics will vary from year to year. All seminars will require extensive literature readings on the topic and active classroom discussion by students. At least one professional-style oral presentation will be required of all students. Prer., GEOL. 425/525 or equivalent.

GEOL. 663-4. Sedimentary Petrology. Study of the origin, classification, and diagenesis of sediments and sedimentary rocks. Emphasis will be on the principles of diagenesis, especially the chemical and textural aspects of diagenesis and porosity evolution. Prer., sedimentation and stratigraphy, or the equivalent, with consent of instructor. Recommended: optical mineralogy.

Independent Study

GEOL. 940-1 to 2. Independent Study (Undergraduate).

HISTORY

Chair: Ernest Andrade, Jr.
Department Office: UA Building, Room 610
Telephone: 556-4830
Faculty: Professors: Frederick S. Allen, Ernest Andrade, Jr., Mark S. Foster, John S. Haller, Jr., James B. Wolf
Associate Professors: Mary S. Conroy, Thomas J. Noel, Myra L. Rich
Assistant Professor: Philip A. Hernandez
Adjunct: G. Michael McCarthy

History Advisory Board:
The Hon. Clifford Dodge,
The Hon. Dennis Gallagher,
The Hon. Regis Groff,
Bruce Rockwell, Chairman of the Board, Colorado National Bank,
Barbara Sudler, Colorado Historical Society,
Tom Tancredo, Regional Representative, U.S. Department of Education

Undergraduate

History constitutes an intellectual challenge not only because of its special responsibility, the search for reality in the past, 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, and even the natural sciences. Perhaps more important to the history student than learning what has happened is understanding the process of change. By comparing the state of mankind over decades or centuries, the history student identifies fundamental social trends and analyzes critical causal factors. The history student develops research, analytical and writing skills necessary not only for work, but for living. A history major builds confidence for making judgments in many fields of human endeavor.

The bachelor's degree in history provides preparation 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 of develop careers in business. History is traditionally a valued background for applicants to law school and graduate schools of business administration. An attraction of the major in history is its generality, making it an excellent choice for those who are still seeking career goals.

Requirements for the Major. Undergraduate students majoring in history enrolled prior to fall 1980 must complete a minimum of 36 semester hours in history, at least 18 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. 201 or 202 or any two non-European lower division history courses.

After fall 1980, new major requirements were established for students enrolling as history majors. Twelve hours of specific lower division courses and 3 hours in a senior seminar are required. In the first two academic years all majors shall take two introductory sequences: 6 hours of Western Civilization (HIST. 101 and 102) and 6 hours of U.S. History (HIST. 201 and 202). By the senior year, history majors shall be required to take a 3-hour seminar, HIST. 498, with research paper. Also, majors must complete 18 upper division hours at the University of Colorado unless there is special reason to do otherwise.

Internships. Students may qualify for internships with the Colorado State Historical Society, Historic Denver, Museum of Natural History, the state legislature, and other agencies to earn credit and experience. Information on internships is available from the history faculty.

Honors Program. Students with a cumulative grade-point average of 3.2 or higher may compete for a degree in history awarded with Latin praise of cum laude, magna cum laude, and summa cum laude.

To compete, students must complete a research project, either in the senior seminar or in independent study,
and pass a comprehensive examination on all their history course work. This examination will take place in the final semester of residence.

Requirements for the Minor. Students interested in a minor in history are required to complete 18 hours in specified course work. Information on the history minor is available from department advisers.

Independent Study. Students may take up to 12 credit hours of courses in independent study (no more than 6 per semester), with permission of the instructor concerned.

Graduate

The history faculty of the University of Colorado at Denver offers a master's degree program which encompasses certain fields of modern history. Students applying for admission to the program should have sufficient background in history, though not necessarily a B.A. in the subject, and some knowledge of allied social sciences to afford adequate foundation for graduate work; however, the department encourages applications from individuals interested in resuming their education.

The master's degree in history is traditionally viewed as training for careers in education, government service, museum and archive management, or historic preservation activities as well as for further degree work in law and business management. But the degree program also is attractive to individuals who want to further their general education.

Requirements for Admission

Applications forms for admission to graduate study in history are available from The Graduate School office. In addition to the general admission requirements of The Graduate School, applicants for admission to the history program must take the verbal section of the Graduate Record Examination. The Admissions Committee will examine carefully all materials submitted, including transcripts and letters of recommendation, and advise that candidates make appointments for an interview.

Degree Requirements

Candidates in history must satisfy the general requirements of The Graduate School which are outlined in this bulletin. In meeting the master's degree requirements of the Department of History, candidates have two options. They must complete either 30 semester hours of course work, or 24 semester hours of course work and a thesis. Under the first option, candidates must include in the thirty hours at least 15 hours of course work at the 600 level or above and 3 hours of 700-level work in their major field. The thesis (4-6 hours) counts as 700-level work. A candidate is urged to select his or her thesis, which is subject to departmental approval, by the beginning of the second semester. The writing of the thesis shall be under the supervision of the candidate's major adviser. Except in special circumstances, the department strongly recommends the thesis option.

Upon nearing the completion of their degree work, all candidates are required to pass a final written comprehensive examination in their major field. The examination, to be registered for in advance, will be given each semester, including summers, at announced times and will be conducted by the department.

A residency of at least one academic year is required for the degree.

Particular Requirements for the Master's Degree in History

1. HIST. 601, Historiography, is required of all graduate students.
2. Each candidate must select one of the fields listed below as a major field which shall comprise not more than 50 percent of the M.A. program:

   The United States to 1865
   The United States Since 1865
   Modern Europe (Since 1500)
   Africa

3. Candidates must select a second field of history as their minor and complete 6 hours of work in that field; however, candidates selecting one of the U.S. fields as their major may not select the other U.S. field as their minor.
4. With the consent of their major adviser, candidates may include in their programs a minor in museology, to consist of 6 semester hours, a minor in archival and records management procedures to consist of 6 hours, or a minor in historic preservation to consist of 6 hours.
5. With the consent of their major adviser, candidates may include in their program a minor consisting of work taken outside the Department of History. The minor may be chosen from the following subjects: economics, political science, psychology, sociology, anthropology, geography, philosophy, literature, art history, or education.

6. Candidates working in the area of study involving the use of a foreign language will be required by their major adviser to demonstrate proficiency in that language.

7. In history courses no grade lower than B will count toward the completion of the course work for the master's degree.

8. Candidates may register for up to 6 hours of Independent Study (HIST 950). In special circumstances, with consent of the major adviser, candidates may register for up to 9 hours of independent study.

Additional independent study must be approved by the department chair upon the advice of the major adviser.

For further information concerning the master's degree in history at CU-Denver, direct inquiries to Chairman, Department of History, University of Colorado at Denver, 1100 14th Street, Denver, CO 80202 or telephone 556-4830.

COURSES


HIST. 102-3. Western Civilization II. An introduction to modern European civilization and its spread over the world. Covers topics on economics and society, political organization, intellectual history, and art from A.D. 1500 to the 20th century.

HIST. 201-3. American Biographies to 1865. Through biographical studies of famous individuals in American history, this course provides an introduction to the major forces, events, and individuals that shaped the historical development of American society beginning with the European discovery of America and concluding with the Civil War.

HIST. 202-3. American Biographies Since 1865. Through biographical studies of famous individuals in American history, this course provides an introduction to the major forces, events, and individuals that shaped the historical development of American society from the Civil War to the present.


HIST. 215-3. Afro-American History I. (ETST. 215.) Major emphasis on the events that have occurred in the life of Afro-Americans from the time of their first landing in the U.S. to the present.


HIST. 278-3. Modern Latin America. A survey of the historical development of the modern Latin American countries beginning with the independence movements of the early 19th century and emphasizing the 20th-century issues and problems that have characterized these countries and affected their relations with the United States.


HIST. 302-3. Europe in the Age of Total War. An advanced study of the evolution of Europe since 1900. Covers militarism, fascism, communism, and existentialism in the context of European history.

HIST. 310-3. England to 1714. A sampler of the rich, diverse, and dramatic history of the people of the British Isles. State formation, economic and social change, and cultural values are several of the themes threaded through this survey course.

HIST. 311-3. England Since 1714. In this course we ponder the dramatic rise of the British industrial, commercial, and political empire during the 18th and 19th centuries and its equally dramatic decline in the 20th century.

HIST. 340-3. Denver. An introduction for all students to the Queen City's evolution from a mining supply town to the metropolis of the Rockies. Includes museum visits and walking tours.

HIST. 341-3. Southwestern Cultures. Examines history of Indian, Hispanic, and Anglo cultures in the Southwestern United States, emphasizing cultural interrelations and artistic achievements of each culture.


HIST. 347-3. Famous U.S. Trials — 19th Century. A study of the origins and early history of the American constitution with the famous trials and landmark Supreme Court decisions that affected its development through the 19th century. Also introduces students to constitutional law and legal research.

HIST. 348-3. Famous U.S. Trials — 20th Century. Examines famous trials and landmark decisions of the Supreme Court since 1900. Also introduces students to constitutional law and legal research.

HIST. 350-3. The American Presidency. HIST. 370-3. Mexico to 1821. Survey of Mexican history from the rise of civilization in pre-Columbian Mexico to the gaining of independence from Spain. The emphasis will be on Mayan and Aztec civilizations, the Spanish Conquest, and the character of Spanish colonial rule.

HIST. 371-3. Mexico Since 1821. A continuation of the survey of Mexican history from the gaining of independence to modern times. Examines the efforts of Mexico to establish and maintain a republic, relations between Mexico and the United States, the revolution of 1910, and the emergence of contemporary Mexico.
HIST. 375-3. 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.

HIST. 376-3. 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.

HIST. 391-3. Introduction to African History. By looking at specific examples of the cultural, political, and economic experience of African society, this course will attempt to introduce and make comprehensive the diverse history of the people of Africa.

HIST. 395-3. African History by Novels. An introduction to modern Africa through the eyes of creative writers. Various topics, such as childhood, religion, colonialism, are presented from two points of view — the African and the non-African.

HIST. 398-variable credit. Internship/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. 498-3. History Seminar. For majors and general students to focus on the emergence of historiography, various research methods, and the rise and fall of varying schools of historical thought.

Upper Division/Graduate Level

HIST. 403/503-3.1 Medieval Europe.
HIST. 404/504-3.1 Europe: The Renaissance and Reformation.
HIST. 407/507-3.1 European Diplomatic History in the 20th Century.

HIST. 408/508-3.1 Early Modern European Intellectual History. This course will focus on the enlightenment and examine the ideas of Montesquieu, Voltaire, Diderot, Rousseau, Adam Smith, and Condorcet.

HIST. 409/509-3.1 Modern European Intellectual History. This course will examine the ideas of Marx, Darwin, Freud, and others in the making of the modern European mind.

HIST. 410/510-3.1 Science and Technology.

HIST. 411/511-3.1 Nineteenth-Century England. England during the 19th century was at its zenith as an economic and imperial power. This course explores the basis of British power and the political and social tensions that were created by it.

HIST. 412/512-3.1 Twentieth-Century England. The 20th century has been an era of retrenchment for England. This course examines the consequences of that decline on the political and social institutions in Great Britain.

HIST. 413/513-3.1 British Imperialism. An evaluation of the economic, diplomatic, and racial themes of the Nineteenth and Twentieth Century British Empire.

HIST. 414/514-3.1 Non-Western British Empire. Study of several of the major issues affecting the rise and decline of the British Empire in Asia and Africa during the 19th and 20th centuries. The assumption of the imperialists, the effects of imperial rule, and the contraction of empire will be evaluated through a combination of readings, lectures, discussions, and reports. While related to HIST. 413, this course is an independent unit with no specific prerequisites.

HIST. 415.515-3.1 Britain's Imperial Aftermath.
HIST. 418/518-3.1 French Revolution and Napoleon. The course will analyze the revolutionary movement in Europe from the 1780s to the 1820s.

HIST. 421/521-3.1 Germany in the 20th Century. This course will analyze the German problem in modern Europe and seeks to answer the reasons why Germany adopted a policy of reckless imperialism abroad and succumbed to a nasty variety of facism at home.

HIST. 425/525-3.1 Prehistoric, 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; rise of Moscow and its dominance over other contenders for rule; autocracy, serfdom, and the ecclesiastical schism.

HIST. 426/526-3.1 The Emergence of Modern Russia: Peter the Great to 1856. The development of imperial political institutions, church-state relationships; class stratification; scientific, educational, and cultural developments in 17th, 18th, and early 19th-century Russia.

HIST. 427/527-3. Reform and Revolution in Russia: the 1860s to 1917. Emphasis upon Russia's attempts to modernize, beginning with great reforms of the 1860s and 1870s; increasing polarization of government and opposition groups. Examines governmental point of view through several monographs and revolutionary theory, including thought of Marx, Engels, Lenin, and Trotsky.

HIST. 428/528-3.1 Soviet 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, industrialization, collectivism, the Stalinist purges, up to the present.

*Students enrolled at the 500 level may expect additional work and evaluation commensurate with graduate standards.*
HIST. 429/529-3.1 Russian Intellectual and Cultural History. Students will study Russian art and architecture through the 19th and early 20th centuries, read great literary works, and finally, analyze the Russian music of this period.

HIST. 440/540-3.1 The American Southwest. An examination of the major forces and issues that have shaped the development of the modern southwest. Emphasis will be on cultural relations, political issues, and environmental problems.

HIST. 441/541-3.1 The Hispanic Southwest. An historical inquiry of the following topics: the two centuries of Spanish rule, the brief period of Mexican control, and the relationship that developed between the Hispanic inhabitants of the region and the American government. The course seeks to further understand the emergence of the modern Chicano movement and its impact on the southwest.

HIST. 442/542-3.1 Women in U.S. History. An analysis of women’s place in society, in the labor market, and in personal evaluation over the last 300 years.

HIST. 443/543-3.1 Urban America: Colonial Times to the Present. 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. 445/545-3.1 U.S. Diplomatic History Since 1912. The main 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 U.S. intervention in two world wars, the Cold War, and the overextension of U.S. commitments since 1960.

HIST. 446/546-3.1 U.S. Society and Thought 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. 447/547-3.1 U.S. 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. 453/553-3.1 The American Colonies to 1750. 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. 454/554-3.1 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. 455/555-3.1 Early National America, 1789-1840. This survey of the 51 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. 456/556-3.1 The American South, 1607-1860. Examines the origins of this distinctive region, the introduction of slavery and the development of plantation society, the controversy over the status of slavery in the Union, and concludes with the secession crisis.

HIST. 457/557-3.1 U.S. Civil War and Reunion. Begins with the causes and outbreak of the American Civil War, describes the military conflict and the social aspects of the war and examines the federal efforts to reconstruct the southern states and protect the rights of black citizens after 1865.

HIST. 458/558-3.1 The Gilded Age: U.S. History, 1865-1900. Topical study of evolution and growth of major American institutions. Among the more important topics are the rise of big business, impact of industrialism, immigration, the rise of the city, the plight of the native Americans, the West, agrarian discontent, and foreign policy.

HIST. 459/559-3.1 Progressivism, Depression, and War: U.S. History, 1900-1945. A topical study of changes in American institutions, including attempts to control the corporate giants, growth of labor organization, World War I and reaction, rise of consumerism in 1920s, causes of the crash of 1929, the Depression, the New Deal and its critics, and the U.S. In World War II.

HIST. 460/560-3.1 Affluence and Anxiety: The U.S. Since 1945. An examination of the major developments with special emphasis on the following topics: The onset of the Cold War, growth of unparalleled prosperity, problems of world leadership, the civil rights movement, division over Vietnam, and economic uncertainties of the 1970s.

HIST. 464/564-3.1 U.S. Business History. A survey of the major changes in business practices from colonial times to the present. Primary emphasis will be placed on the industrial revolution and after.

HIST. 465/565-3.1 U.S. in the Pacific. 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. 467/567-3.1 The American Family. Historical perspectives about the viability of the family, its responses to social and economic change, and the roles of its members.

HIST. 475/575-3.1 Canada and the United States. A survey of U.S.-Canadian relations from colonial times to the present. Major themes include the American invasions of Canada, Canadian fears which led to the creation of the Dominion in 1867, boundary and other problems, growth of American cultural-economic domination, and strategic-military integration of the two countries since World War II.

HIST. 480/580-3.1 Southern Africa. A history in depth of the clash of peoples and cultures in Africa south of the Zambesi River. African and Africaner political, economic, and cultural development in a single land and the consequences of several competing nationalism existing side by side will be examined. Apartheid and African opposition to it will be analyzed.

HIST. 484/584-3.1 African Struggle for Independence. An assessment of its leadership from the Colonial era to today’s Africa.

HIST. 485/585-3.1 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. 486/586-3.1 The Modern Middle East.

1 Students enrolled at the 500 level may expect additional work and evaluation commensurate with graduate standards.
HIST. 494/594-3. 1 The Indochina War. Covers the conflict in Vietnam with roots in the period prior to World War II. Main topics include the rise of nationalism in French Indochina, the war against the French, the northern moves to unify Vietnam, American intervention, and eventual victory of the northern regime.

Graduate Level
HIST. 611-3. Readings in European History.
HIST. 612-3. Readings in British History.
HIST. 628-3. Readings in Russian History.
HIST. 657-3. Readings in U.S. Civil War and Reconstruction.
HIST. 681-3. Readings in Modern South Africa.
HIST. 690-3. Introduction to Archive and Records Management.
HIST. 710-3. Readings in European History.

Independent Study
HIST. 940-variable credit. Independent Study (Undergraduate).
HIST. 950-variable credit. Independent Study (Graduate).

HUMANITIES, MASTER OF
Director: M. Kent Casper
Office: Central Classroom Building, Room 275
Telephone: 556-8394

The Master of Humanities is an interdisciplinary degree offered at CU-Denver. 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 well suited for public school teachers seeking a broader range of expertise in the humanities; it offers career enhancement and intellectual enrichment to a wide spectrum of adult learners, including those wishing certification in arts administration.

All courses required for the M.H. degree are offered at CU-Denver.

Requirements for Admission

Students are required to take the Graduate Record Examination aptitude test as an aid in the planning of their 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. Each student's program is supervised by an advisory committee consisting of two or three members of the graduate faculty, each from a different area of the humanities.

In addition to the 3 hours for HUM. 500, 3 hours for HUM. 550, and 2 hours for HUM. 599 (all required courses that are 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 at least two (maximum 3) of the following areas:

- Communication and theatre
- English
- Fine Arts
- French language and literature
- History
- Music
- Philosophy
- Spanish language and literature

Study in areas other than those listed above may be accepted as agreed upon by the student and the advisory committee.

Students choosing two areas must complete a minimum of 9 hours in each, and those choosing three areas must complete a minimum of 6 hours in each.

Within one calendar year of entering the M.H. program, the student is required to take HUM. 500 (may be repeated as HUM. 501). After at least 12 hours in the program, HUM. 550 is required. Finally, HUM. 599 is a required culmination course. All required courses count as part of the 32 hours that make up the program.

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 32 hours required for the degree, the student is required to pass a comprehensive examination covering the 2 (or 3) areas in which course work has been concentrated. It should be stressed that this

1Students enrolled at the 500 level may expect additional work and evaluation commensurate with graduate standards.
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 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 at least two 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, students must uphold the high standards of The Graduate School, maintaining at least a B average in all courses taken subsequent to their admission to the M.H. program.

Required Courses

Courses specifically required for the M.H. degree are HUM. 500, 550, and 599.

The 24 hours (in addition to the required courses) required for the degree will normally be drawn from the 500-level courses which already exist at CU-Denver.

For further information about the Master of Humanities degree program students should contact 556-2305.

COURSES

HUM. 101-3. The Humanistic Tradition: Modes of Expression. A team-taught exploration of the various expressions of human experience in literature, theatre, music, and the visual arts; in particular, an examination of the interconnections among these modes of expression — narrative, visual, and aural. No prerequisites. Open to all students. May be applied to the humanities requirement in the College of Liberal Arts and Sciences.

HUM. 500-3. Introduction to Interdisciplinary Graduate Studies. A one-semester seminar which investigates the definition of the humanities, their place in the life of man, the various media through which they manifest themselves, and related matters. Required of all Master of Humanities degree candidates; open to other qualified graduate and undergraduate students with consent of instructor. (May be repeated as 501.)

HUM. 550-3. Mid-Program Seminar. The seminar explores a specific interdisciplinary topic, involving students in independent research, problem solving, and presentation. Required of all M.H. students who have completed at least 12 hours of graduate work. Open to non-MH graduate students with consent of instructor.

HUM. 599-2. Directed Readings in Interdisciplinary Humanities. Capstone course of the M.H. program, concentrating on the student's interdisciplinary focus that will form the topic of comprehensive exam and/or thesis project. Involves work with two-member faculty advisory committee. Required of all M.H. students after 30 hours of graduate work.
MATHEMATICS

Chair: J. Richard Lundgren
Department Office: Science Building, Room 101
Telephone: 556-8442
Faculty: Professors: Harvey J. Greenberg, Collin J. Hightower, J. Richard Lundgren, Thomas A. Manteuffel, Stephen McComick, Stanley E. Payne, Roland A. Sweet
Associate Professors: Roxanne M. Byrne, Zenas R. Hartvigson, Sylvia Lu, Tom Russell, Ramalingam Shanmugam, Charles I. Sherrill III
Assistant Professors: William Briggs, William Cherowitzo, Kathryn Jones, Weldon A. Lodwick, Jan Mandel, Jennifer Ryan, Burton Simon
Adjunct: Hitoshi Ombe, John W. Ruge, William J. Wolfe

Undergraduate

Mathematics is an ancient art, and from the outset it has been both the most highly esoteric and the most intensely practical of human endeavors. The last quarter century has been one of dazzling accomplishments in science and technology, especially in mathematics which is experiencing a development rare in intellectual history. This flourishing of the discipline has run hand-in-hand with burgeoning applications which permeate the theoretical fabrics of many disciplines and have become an integral, pervasive, and essential component of science, social science, technology, and business.

At CU-Denver, the student has the opportunity to investigate both the theoretical and applied aspects of mathematics. Subjects studied range from traditional courses in calculus and algebra to such new courses as mathematical modeling, where a student may investigate models used in areas such as medical research or space exploration, and supercomputing, where a student studies the design and analysis of algorithms used in the new generation of supercomputers.

The study of mathematics can prepare the student for careers in business, industry, teaching, law, government, medicine, engineering, and the sciences. The scope of these careers is continuously growing as computers become increasingly important in modern life.

COMPUTER SCIENCE

Engineering: John Clark, Hans Gethoffer, Paul Hulquist, William D. Murray, Rodney Schmidt, and Lloyd Williams
Business: Peter Bryant, James Gerlach, Richard Hackathorn, Johan Karimi, and Bob Kuo

Computers have an impact on every aspect of modern life. Knowledge of the basic principles and methods of computer science can be helpful to students in their personal lives as well as useful in developing job skills. For students interested in studying computer science in depth, or preparing for a career in computer science, there are several options in the College and the University. The mathematics department has established a Computational Mathematics Group which provides students with laboratory experience in computational mathematics and an opportunity to use, through access lines, various supercomputers located throughout the country. Students have an opportunity to participate on research teams working on problems at the frontier of research in supercomputing.

Many students interested in computer science select the computer science option of the mathematics major. Details of this program can be found in the mathematics section of this bulletin. Another possibility is to designate mathematics/computer science as a primary subject in the College's individually structured 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 other subject areas. In addition to these options in the College, the College of Engineering and Applied Science offers a major in computer science and the College of Business offers a specialization in information sciences.
Degrees Offered

The mathematics department offers the B.A. degree in mathematics, the M.A. degree in mathematics, the M.S. degree in applied mathematics, and the Ph.D. in applied mathematics. See the graduate mathematics information in this section of the bulletin.

The mathematics major has five options from which students may choose depending on their interests or career plans. It also is possible for a student to minor in mathematics. Two special features of the program are the Math Clinic and the Computational Mathematics Group. In the clinic, students are part of a research team investigating problems provided by local business, industry, or government agencies. The Computational Group provides students with a laboratory experience in computational mathematics and an opportunity to use, through access lines, various supercomputers located around the country.

Selecting a First University
Mathematics Course

The following information should assist you in choosing your first course in mathematics at CU-Denver. If you need further information, contact a departmental adviser.

1. All business students should plan to take MATH. 107 and either MATH. 108 or 140.

2. Other students taking mathematics courses should begin the customary mathematics sequences according to their current knowledge in mathematics as described in the following chart:

<table>
<thead>
<tr>
<th>Recommended First Course</th>
<th>Current Knowledge</th>
</tr>
</thead>
<tbody>
<tr>
<td>MSC's Math. 101, 102, and/or 103; or DACC's MATH. 106 and/or 111</td>
<td>Less than one year high school algebra and one year high school geometry</td>
</tr>
<tr>
<td>MATH. 101</td>
<td>One year high school algebra and one year high school geometry</td>
</tr>
<tr>
<td>(a) MATH. 111</td>
<td>Two years high school algebra and one year geometry:</td>
</tr>
<tr>
<td>(b) MATH. 112</td>
<td>(a) with C average</td>
</tr>
<tr>
<td></td>
<td>(b) with at least B average</td>
</tr>
<tr>
<td>MATH. 113</td>
<td>Two years high school algebra, one year high school geometry and .5 to one year trigonometry</td>
</tr>
<tr>
<td>(a) MATH. 140</td>
<td>(a) with C average</td>
</tr>
<tr>
<td></td>
<td>(b) with at least B average</td>
</tr>
</tbody>
</table>

Requirements for a B.A. in Mathematics

Students in the College of Liberal Arts and Sciences can complete a mathematics major by satisfying all of the following requirements. Each course must be completed with a grade of C or better.

MINIMUM HOUR REQUIREMENT

A student must have 30 semester hours of mathematics courses.

UPPER DIVISION HOUR REQUIREMENT

A student must have at least 24 semester hours of mathematics courses numbered 300 and above excluding MATH. 303, 304, 325, 383, 405, 406, 495, 496, and 497. Of these 24 hours, at least 15 must be from CU-Denver.

COURSES REQUIRED FOR ALL MATHEMATICS MAJORS

1. A mathematics major must choose an adviser or be assigned one (contact departmental secretary for information at 556-8842). Electives must be approved by the student's adviser.

2. Three semesters of calculus (MATH. 140, 241, 242).

3. Applied linear algebra (MATH. 319).

4. An advanced algebra course approved by the student's departmental adviser (MATH. 314 or 301).

5. Advanced finite mathematics (MATH. 413).

6. Two computer science courses approved by the adviser (C S. 141 and 242 are acceptable).

7. A sequence of two upper division courses of continuing depth, to be selected from the following:

   a. Advanced Calculus (MATH. 431, 432) for students interested in the applied mathematics option, the pure mathematics option, or graduate school.
   b. Numerical Analysis (MATH/C S. 465, 466) for students interested in computer science or applied mathematics.
   c. Higher Geometry (MATH. 321, 442) for students interested in mathematics education option.
   d. Advanced Finite Mathematics (MATH. 413, 414) for students interested in the applied mathematics or computer science options.
   e. A one year sequence in probability theory and mathematical statistics approved by the student's departmental adviser for students interested in probability/statistics or applied mathematics options (e.g., MATH. 481, 482).

8. It is highly recommended that a mathematics major take one semester of math clinic (MATH. 499). For information, see the clinic brochure, the list of upcoming clinics, or talk to the clinic director.

9. The mathematics department has five options:

   a. Pure mathematics
   b. Applied mathematics
   c. Computer science
   d. Probability and statistics
   e. Mathematics education

1To assist students in determining current knowledge, a self test is available for interested students. This test (including answers) is available in the Auraria Book Center.
A mathematics major must choose at least one of the above options and consult the next section describing additional requirements.

ADDITIONAL REQUIREMENTS FOR THE MATHEMATICS MAJOR OPTIONS

1. Pure Mathematics Option
   a. Abstract Algebra (MATH. 314)
   b. Advanced Calculus I and II (MATH. 431 and 432)

2. Applied Mathematics Option
   a. Differential Equations (MATH. 320)
   b. Introduction to Mathematical Modeling (MATH. 491 or 492)
   c. Math Clinic (MATH. 499)

3. Computer Science Option
   a. Applied Algebra (MATH. 301)
   b. Numerical Analysis (MATH. 465)
   c. One of the following:
      Advanced Finite Mathematics II (MATH. 414)
      Numerical Analysis II (MATH. 466)
   d. Assembly Language Programming (C S. 252)
   e. Two other computer science electives approved by the student's adviser.

4. Probability/Statistics Option
   a. A one-year sequence in probability and statistics approved by the student's departmental adviser (e.g., MATH. 481, 482).
   b. Students with an interest in statistical computing should elect MATH. 319.
   c. Students will take at least one statistics methods class with the approval of the student's departmental adviser.

5. Mathematics Education Option
   a. Higher Geometry (MATH. 321, 422)
   b. A one-year sequence in algebra (MATH. 314 and MATH. 319)
   c. Students interested in teaching in public schools are required to be certified. Information about certification requirements is available from the School of Education.

REQUIREMENTS FOR MATHEMATICS MINOR

MATH. 140 and 241 (or equivalents) ........ 8 credits
At least 12 credits of electives, including at least 9 hours of course work at the 300 level or above and not including MATH. 303, 304, 325, 383, 405, 495, 496, and 497 ............ 12 credits
Total ........................................ 20 credits

NOTE: All mathematics courses numbered 300 and above must be completed at CU-Denver. No grade below a C will be counted toward the minor requirements. Mathematics courses numbered lower than calculus cannot be counted toward the minor requirements.

Graduate

The Department of Mathematics offers the M.A. degree in mathematics, the M.S. degree in applied mathematics, and the Ph.D. degree in applied mathematics. (Also see Master of Basic Science.) Each of these degree programs conforms to the rules and policies of The Graduate School.

REQUIREMENTS FOR ADMISSION

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 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 (also see The Graduate School admission requirements).

REQUIREMENTS FOR THE M.A. AND M.S. DEGREES

Students must present 30 hours of course work for either of the master's degrees. At least 24 of these hours must consist of graduate level (numbered 500 or higher) mathematics courses. Any courses taken outside of the department must be numbered 400 or higher.

There is no thesis requirement for either degree, although a thesis option is available. Following completion of course work, candidates must make a one hour oral presentation before a committee consisting of three graduate faculty members. There is no foreign language requirement for either master's degree.

The M.A. degree provides a broad education in classical and modern mathematics through fundamental core courses. Students are required to take a graduate sequence in real analysis, complex analysis, and abstract algebra. The remaining courses should be selected in consultation with a graduate adviser.

The M.S. program provides a training in applied mathematics as it is represented in the fields of (1) discrete mathematics, (2) operations research, (3) computational mathematics, (4) applied statistics, (5) mathematics of science and engineering, and (6) mathematical foundations of computer science. Each student must take the two core courses, Applied Analysis and Applied Linear Algebra. The choice of one of the above six options will determine additional course requirements.

Every master's degree student is encouraged to participate in the Math Clinic, a unique program in which students have an opportunity to work on real-world problems supplied by local industry, research firms, and government agencies.

REQUIREMENTS FOR THE PH.D.

The mathematics department also offers a Ph.D. in applied mathematics. The degree is designed to give
candidates a broad training in classical applied mathematics and to provide research opportunities in the fields of discrete mathematics, operations research, computational mathematics, applied statistics, and the mathematics of science and engineering.

There are six stages in the Ph.D. program as prescribed by The Graduate School: course work, residence requirement, foreign language requirement, preliminary examination, comprehensive examination, and thesis.

Students are required to take at least 42 hours of graduate level mathematics courses beyond the bachelor's degree. In addition, 30 hours of thesis credit must be taken. Courses should be selected in consultation with a graduate adviser. The only required courses are 3 hours of Math Clinic and 3 hours of a reading course. A 3.25 grade-point average must be maintained throughout all course work.

Six semesters of residence credit are required as specified in the rules of The Graduate School. All students are strongly advised to spend at least one year doing full-time course work or research with no outside employment.

The foreign language requirement consists of demonstrating fourth semester competency in one foreign language.

The preliminary examination is designed to determine that students who intend to pursue the Ph.D. program are qualified to do so. The examination consists of two three-hour written parts in the areas of applied analysis and applied linear algebra. The examination is generally taken after three or four semesters of course work.

Application for candidacy is made after completion of the preliminary examination, the foreign language requirement, and three credits of residency. The application must be submitted at least two weeks before taking the comprehensive examination. The comprehensive examination is designed to measure breadth in applied mathematics and depth in a specific field. The breadth component is tested in a written examination, the depth component in an oral examination.

Each student must write and defend a thesis containing original contributions and evidence of significant scholarship. The thesis defense is public and must be given before an examining committee approved by the dean of The Graduate School.

The mathematics department is also the residence of the Computational Mathematics Group, an organization that coordinates research and course work in supercomputing and algorithms for advanced computer architectures. For further information about any of the graduate degree programs, call 556-8442 or 556-4807.

COURSES

MATH. 100-1. CLAS Computation Test. Meets one time only at which time the CLAS computation examination will be given to new students in CLAS. This is not a placement test.


MATH. 107-3. Algebra for Social Sciences and Business. Sets and functions, linear programming, probability, and matrix algebra. Emphasis is on applications. Attendance at the first class is mandatory. Students not attending the first class will be disenrolled from the course. At the first class session each student will be required to pass a placement test for permission to continue in MATH. 107 unless at this first class session the student provides a grade sheet from one of the three preceding semesters showing a grade of C or better in CU-Denver's MATH. 101 or a higher level algebra or calculus course (neither MATH. 108, 135, or 383 will satisfy this requirement). Students who do not pass the placement test will be automatically transferred to a MATH. 101 section at the same hour as the MATH. 107 class. No registration allowed after first class. Note: The placement test passing score is approximately at the same level as a score of 18 on the Intermediate Algebra Descriptive Test of Math Skills Self Test (aisle 19 at the Book Center).

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. Prereq., two years high school algebra or MATH. 107.

MATH. 111-3. College Algebra. Topics in algebra designed for students who intend to take the calculus sequence. Prereq., two years high school algebra and one year high school geometry or MATH. 101. No co-credit with MATH. 113.

MATH. 112-3. College Trigonometry. Topics in trigonometry, analytic geometry, and elementary functions designed for students who intend taking the calculus sequence. Prereq., MATH. 111 or two years of high school algebra and one year high school geometry with a grade average of B or better. No co-credit with MATH. 113.

MATH. 113-4. Precalculus Mathematics. This is a condensed treatment of the topics in MATH. 111 and 112. Prereq., two years of high school algebra, one year of high school geometry and trigonometry. No co-credit with MATH. 111 and 112.

MATH. 135-3. Computer Literacy. This is a laboratory based course for students with little or no experience using computers. The two lectures each week focus upon a variety of computer related topics such as ethics, social issues related to the computer revolution, computer theory, and problem-solving related programming. Each student will have 2 hours per week of hands-on laboratory instruction on using a microcomputer with modern computer application tools including a word processor, a database management system, a spread sheet, etc. Also, students will learn elementary computer programming.

MATH. 140-4. Analytic Geometry and Calculus I. The first course of a three-semester sequence (MATH. 140, 241, 242) in calculus. Students cannot receive credit for both MATH. 108 and 140. Topics covered include an introduction to differential and integral calculus, including applications of the derivative and the definite integral. Prereq., MATH. 112 or 113; or two years high school algebra, one year high school geometry, and one-half to one year of trigonometry with average grades of B or better and completed within the past 15 months.

MATH. 241-4. Analytic Geometry and Calculus II. The second of a three-semester sequence (MATH. 140, 241, 242) in calculus. Topics covered include exponential, logarithmic, and trigonometric functions, techniques of integration, indeterminate forms and improper integrals, infinite series, and analytical geometry. Prereq., MATH. 140.

Topics covered include vectors, vector-valued functions, partial differentiation, multiple integrals and vector calculus. Pre., MATH 241.

**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, elementary combinatorics, and graph theory. Pre., MATH 241 or consent of instructor.

**MATH 301-3. Applied Algebra for Computer Science.** An introduction to those concepts in algebra and logic which have application to computer science. Topics will include finite state machines, formal languages, groups, coding theory, and finite fields. Pre., MATH 300.

**MATH 302-4. Elementary Differential Equations and Linear Algebra.** Designed primarily for majors in applied science and engineering. Topics include elementary differential equations, matrices and determinants, vector spaces and linear transformations, characteristic values, linear differential equations and systems of differential equations. Pre., MATH 242 with grade of C or better. Students cannot receive credit for both MATH 302 and MATH 319 or 320.

**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. Pre., MATH 303 or consent of the instructor.

**MATH 311-3. Computer Applications in Mathematical Sciences.** (C SC. 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. Pre., C SC. 201 and MATH. 140.

**MATH 314-3. Introduction to Modern Algebra.** Groups, rings, fields, polynomials. Pre., MATH. 300, or consent of the department.

**MATH 319-3. Applied Linear Algebra.** Designed primarily for students interested in applied mathematics, computer science, science, or engineering. Topics include solving systems of equations using Gaussian elimination with partial pivoting, LU — decomposition of matrices, matrix algebra, determinants, vector spaces, linear transformations, eigenvalues, and applications. Pre., MATH. 241 with grade of C or better. Students cannot receive credit for both MATH 302 and 319.

**MATH 320-3. Elementary Differential Equations.** Systematic introduction to ordinary differential equations. Topics include equations of order one, linear equations with constant coefficients, systems of equations, variation of parameters, the Laplace transform, inverse differential operators and infinite series solutions to linear equations. Pre., MATH. 319. Students cannot receive credit for both MATH 302 and 320.

**MATH 321-3. Higher Geometry I.** Axiomatic systems. The foundations of Euclidean and Lobachevskian geometries. Pre., MATH. 300 or consent of department. This course is offered every Fall Semester.

**MATH 325-3. Microcomputers and Problem Solving I.** Solve a wide variety of problems using microcomputers. Students will use programming language BASIC, but no previous programming experience will be required. Some pre-packaged programs also may be used. This is a laboratory class.

**MATH 326-3. Microcomputers and Problem Solving II.** Continuation of MATH. 325. More complex problems will be solved using microcomputers. Some additional languages and tools may be used depending on the instructor, but no previous preparation will be needed except MATH. 325. This is a laboratory class. Pre., MATH. 325.

**MATH 327-3. Problem Solving with Pascal.** This course will focus on problem solving by developing and refining algorithms for solving a variety of problems. Even though it is assumed that students will have had a "first course" in Pascal, the first problem will be selected to allow some review of the syntax and use of Pascal. Advanced topics in Pascal will be covered as needed to code the algorithms developed for complex problems late in the semester.

**MATH 352-3. Computable Functions.** Turing computers, computer functions, alternate formulations of computable functions, the halting problem and noncomputable functions. Church's thesis, universal machines, Godel's incompleteness theorem, and undecidable theories. Pre., college algebra or consent of instructor.

**MATH 381-3. Introduction to Probability.** (E E. 381) Basic concepts, conditional and marginal probabilities, independence, discrete and continuous distributions, functions and moments of random variables, Central Limit Theorem, characteristic functions. Students cannot receive credit for both MATH. 381 and 481. Pre., MATH. 242.

**MATH 383-3. Introduction to Statistics.** Study of the basic statistical concepts. Introduction to statistical distributions, statistical inference, and hypothesis testing. Pre., college algebra or equivalent. Not for mathematics or engineering majors. No co-credit with MATH. 481 or 482.

**MATH 398-variable credit. Internship/Cooperative Education.** Designed experiences involving application of specific, relevant concepts and skills in supervised employment situations. Pre., sophomore standing and 2.5 grade-point average.

**MATH 403-3. Introduction to Topology.** Metric spaces and topological spaces; homotopy and homology in simplicial complexes. Pre., MATH 300 or consent of the department.

**MATH 405-3. Foundations of Mathematics for Intermediate Grades I.** A study of the mathematical foundations underlying the arithmetic, algebra, probability, and statistics customarily covered in grades 4 through 8 or 9. Attention is directed to problem solving and appropriate utilization of hand-held calculators. Pre., MATH. 303 and 304 or equivalent.

**MATH 406-3. Foundations of the Mathematics for Intermediate Grades II.** A study of the mathematical foundations of geometries and applications of mathematics appropriate for a teacher of grades 4 through 8 or 9. Attention is directed to problem solving and appropriate utilization of hand-held calculators. Pre., MATH. 303 and 304 or equivalent.

**MATH 411-3. Theory of Numbers.** Divisibility, greatest common divisor, prime numbers, fundamental theorem of arithmetic, congruences, and other topics. Pre., MATH. 300 or consent of the department.

**MATH 412-3. Topics in Mathematics.** Special topics in mathematics will be covered. Students should check the current Schedule of Classes 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. 413-3. Advanced Finite Mathematics I. (C SC. 413.) An introduction to discrete structures and their applications. Major emphasis is on applications of graph theory to computer science, engineering, operations research, social science, and biology. Topics include connectivity, coloring, trees, Euler and Hamiltonian paths and circuits, matching and covering problems, shortest route, and network flows. Prer., MATH. 140 and 300.

MATH. 414-3. Advanced Finite Mathematics II. (C SC. 514.) Major emphasis is on applied combinatorics and combinational algorithms, with applications in computer science and operations research. Topics include general counting methods, generating functions, recurrence relations, inclusion-exclusion, Polya's enumeration theory, and block designs. Prer., MATH. 413 and 301.

MATH. 415-3. Introduction to the Theory of Automata and Computability. Introduces the basic mathematical tools necessary for theoretical studies in automata, computability and related areas of computer science. Designed to make key mathematical developments in computer science readily accessible and to provide an introduction to a wide variety of topics in theoretical computer science. Prer., MATH. 301.


MATH. 422-3. Higher Geometry II. An introduction to the study of affine and projective geometry. This course is offered in the spring of even numbered years. Prer., MATH. 321 or consent of department.

MATH. 431-3. Advanced Calculus I. Calculus of one variable, the real number system, continuity, differentiation, integration (possibly Riemann-Stieltjes). 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 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. 319 or 302.


MATH. 438-3. Advanced Calculus for Engineers II. Fourier series, Laplace transforms, Gamma and Beta functions, Bessel's functions, and other special functions. Prer., MATH. 437 and MATH. 320 or 302 or 443.

MATH. 445-3. Complex Variables for Engineers and Scientists I. Topics include complex algebra, Cauchy-Riemann equations, Laurent expansions, theory of residues, complex integration, and introduction to conformal mapping. Technique and applicability are stressed. Prer., MATH. 302 or 320.

MATH. 446-3. Complex Variables for Engineers and Scientists II. A continuation of MATH. 445, with coverage dependent partly on the interests of the class. Topics include Schwartz-Christoffel transformations and thorough development of techniques of conformal mappings. Solution of boundary value problems will be emphasized. Prer., MATH. 445.

MATH. 447-3. Introduction to Partial Differential Equations I. Boundary value problems for the wave, heat, and Laplace equations; separation of variables method, eigenvalue problems, Fourier series, orthogonal systems. Prer., MATH. 320 or 302 or 443.


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. Prer., ordinary differential equations.

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. Prer., ordinary and partial differential equations.


MATH. 467-3. Computer Techniques in Engineering. (E E. 455.) Introduction to the use of numerical methods in engineering and science. Those methods suitable for solution by high-speed digital computers are emphasized. Prer., E E. 201 and MATH. 320 or 302.


MATH. 475-3. Topics in Finite Mathematics. Especially suitable for those students who are not majoring in engineering or physical science. Prer., consent of department.


MATH. 478-3. Mathematical Foundations of Operations Research. (Same as B AD. 507.) This course surveys mathematical approaches to the following questions: How can a
decision problem be usefully represented by a mathematical model? How can we obtain effective answers to problems? What do the answers mean? Particular techniques include linear programming, netforming and scheduling. It is intended to demonstrate the power and limitations of mathematical methods. Prer., B AD. 502 or equivalent.


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. 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 Middle School 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 discipline adviser. Prer., consent of department.

MATH. 497-1 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 discipline adviser. Prer., consent of department.

Upper Division/Graduate Level

MATH. 491/591-3, 492/592-3. Mathematical Modeling I and II. This full year sequence investigates the formulation and solution of mathematical problems which originate in a wide variety of applied fields. Emphasis will be given to both the process of problem formulation and to various methods of solution. The first semester deals with problems in the natural, physical, and biological sciences. The second semester covers problems in the social, economic, and management sciences. Prer., for first semester. MATH. 319, 320; prer., for second semester. MATH. 319.

MATH. 499/599-3. Math Clinic. Designed for students in the Applied Mathematics Program. The clinic is intended to illustrate the applicability and utility of mathematical concepts in investigations of various contemporary societal issues. Research problems investigated by the clinic may originate from a variety of sources — business and industry, government agencies, educational institutions, or nonprofit organizations. Supervised by University faculty, each research team investigates problems requiring substantial time commitments over one semester, the summer, or an entire academic year. Proposed projects are reviewed by a faculty panel prior to final approval. Prer., MATH. 241.

Graduate Level


MATH. 503-3. Problem Solving and Mathematics for Professional Teachers I. Designed for professional teachers who teach mathematics as part of their assignment. Emphasis is on the topics of arithmetic and the mathematics encountered in teaching. The instruction is developed around models of the mathematical notions with emphasis on techniques of problem solving. Instruction on the use of computers and calculators is integrated into the course, but no previous programming experience is presumed.

MATH. 504-3. Problem Solving and Mathematics for Professional Teachers II. Designed for professional teachers who teach mathematics as a part of their assignment. Emphasis is on geometry topics, metric measure, probability and statistics topics, and on problem solving. All instruction is developed around models of the mathematical topics involved. The use of microcomputers and calculators as tools for problem solving is integrated throughout, but no previous programming experience is presumed.

MATH. 505-3. Applied Graph Theory. Major emphasis is on applied graph theory and graph algorithms. Topics will include applications of graphs to problems in computer science, engineering, operations research, biology, and environmental and social science. Prer., graduate standing.


MATH. 507-3. Applied Analysis. This is a core course requirement for all graduate students designed as a review of essential topics of advanced calculus and as an introduction to courses in Real and Complex Analysis (MATH. 531 and 534, respectively). Topics include Taylor Series in one and several variables, vector, calculus, elements of point set topology, Fourier series, introduction to Hilbert spaces. Prer., advanced calculus II.

MATH. 509-3. Advanced Finite Mathematics. (C SC. 514.) Major emphasis is on applied combinatorics and graph and combinatorial algorithms with applications in computer science and operations research. Topics include general counting methods, generating functions, recurrence relations, inclusion-exclusion, Polya's enumeration theory, and network algorithms. Prer., graduate standing. Not open to students who have had MATH. 414.

MATH. 510-3. History of Mathematics. A history of the development of mathematical techniques and ideas from early civilization to the present including the interrelationships of mathematics and sciences. Prer., Math 140. Not open to students who have had MATH. 472.

1Students enrolled at the 500 level may expect additional work and evaluation commensurate with graduate standards.


MATH. 517-3. Boolean Algebra. Axioms, subalgebras, ideals, direct and free products, free algebras, representation theorem, completions. Prere., MATH. 314. Not open to students who have had MATH. 543.

MATH. 518-3. Applied Linear Algebra. The focus of this course is on those topics in linear algebra which are important in applications. Topics covered include: practical solution of systems of equations, projections, eigenvalues and eigenvectors, unitary transformations, Schur, QR, and singular value decompositions, similarity transformations, Jordan forms, and positive definite matrices. Prere., MATH. 319.

MATH. 520-3. Applied Algebra. Study of those topics in algebra with applications in computer science. Topics will include: groups, rings, fields, and Boolean algebras with applications to combinatorial and sequential networks, languages and automata, and codes. Prere., MATH. 314 or 301.

MATH. 521-3, 522-3. Projective Geometry I and II. Advanced topics in projective geometry. Topics may include finite projective planes, free projective planes, derivation, collineation groups, higher dimensional projective spaces, ovals and ovoids. Prere., MATH. 422 and 319 and MATH. 301 or 314, or consent of instructor.


MATH. 525-3, 526-3. Microcomputers and Problem Solving for Teachers, I, II. This is a two-semester sequence designed for teachers. Participants will be taught the computer language BASIC and will be taught to solve a wide variety of problems using the microcomputer. For MATH. 525, no previous programming experience is needed. For MATH. 526, knowledge of the computer language BASIC will be needed — such as would be acquired in MATH. 525. One microcomputer will be assigned to each participant. This enables each participant to get a generous amount of hands-on operating experience. Both courses are appropriate for elementary teachers, as well as teachers of social, natural and physical sciences, and mathematics.


MATH. 533-3, 534-3. Partial Differential Equations I, II. General theory of partial differential equations; first order equations; classification of second order equations; theory and methods of solution of elliptic, parabolic, and hyperbolic types of equations; maximum principles; Green's functions; potential theory; and miscellaneous special topics. Prere., two semesters of advanced calculus and undergraduate course of ordinary differential equations.


MATH. 537-3, 538-3. Topics in Applied Mathematics. Selected topics in mathematical problems arising from various applied fields such as mechanics, electromagnetic theory, economics, etc. Prere., consent of instructor.

MATH. 541-3, 542-3. Calculus of Variations I, II. Classical necessary and sufficient conditions with emphasis on the simplest problems; the problem of Lagrange, and the problem of optimal control. Direct methods and applications. Prere., MATH. 432 and 443/453.


MATH. 546-3. Theory of Automata. (C SC. 546.) Finite-state machines, regular expressions, paths on graphs, and the relations among these. Turing machines, some equivalent machines, the idea of computability, etc. Prere., C SC. 401 or 453.


MATH. 580-3. Sample Surveys. Application of statistical sampling theory to the design of population surveys, including simple random, stratified, systematic and cluster sampling, the sources of errors. Ration estimates and cost minimization. Prereq., undergraduate, or consent of instructor.

MATH. 581-3, 582-3. Mathematical Statistics. Mathematical theory of statistics. Topics covered will include discrete and continuous probability models, estimation and testing of hypotheses, multivariate analysis, nonparametric inference. Prereq., MATH. 319 and 481, or consent of the instructor.

MATH. 583-3. Topics in Mathematical Probability. Topics covered are discrete and continuous probability distributions, bivariate and multivariate probability models, law of large numbers, limit theorems, moment generating functions, and characteristic functions. Prereq., MATH. 381 or 481.

MATH. 584-3. Time Series Analysis. Basic concepts: trend, seasonality, cyclic and irregular effects in time series data. Regression and smoothing methodologies. Autoregressive and mixed model procedures, including the Box-Jenkins method. Prereq., MATH. 381 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., MATH. 381 or 481.

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 is on the application of the above techniques as an aid to research in behavioral, biological, and physical sciences. Prereq., consent of instructor.

MATH. 588-3. Statistical Methods for Data Analysis. A continuation of MATH. 587. Application of the method of least squares in the fitting of linear and nonlinear models to data. Analysis of balanced, unbalanced, and unplanned experiments. Use of packaged computer programs. The emphasis will be on the practical aspects of applying statistical techniques to the analysis of data. Prereq., MATH. 587 or consent of instructor.


MATH. 593-3. Linear Programming. The general linear programming problem and commonly used techniques for its solution. Prereq. MATH. 319 and advanced calculus, or consent of instructor.


MATH. 595-3. Multivariate Methods. This course provides basic statistical concepts and methods to analyze multivariate data. Topics covered are multivariate hypothesis testing and estimation, multivariate analysis of variance, factor analysis, multidimensional scaling, and principal components. Prereq., MATH. 581 and 568.

MATH. 596-3. Engineering Statistics. Descriptive analysis of data, discrete and continuous statistical distributions, estimation and hypothesis testing in single and multiple populations, analysis of covariance techniques, multiple regression techniques, experimental designs, survey techniques, and forecasting methods.

MATH. 597-3. Non-Parametric Statistics. Non-parametric methods of estimation and hypothesis testing provide analytical alternatives in instances when assumptions about the parametric form of population samples seem unwarranted or questionable. This course will expose many non-parametric techniques.

MATH. 598-3. Multigrid Methods for Large Scale Computational Models. Multigrid methods are fairly sophisticated techniques for efficient solution of many large scale computational problems, most notably partial differential equations. This course will provide a thorough introduction to basic multigrid principles followed by an exploration into more advanced applications. Prereq., MATH. 319 and 465.

MATH. 599-3. Math Clinic. Designed for students in the Applied Mathematics Program. The clinic is intended to illustrate the applicability and utility in mathematical concepts in investigations of various contemporary societal issues. Research problems investigated by the clinic may originate from a variety of sources — business and industry, government agencies, educational institutions, or nonprofit organizations. Supervised by University faculty, each research team investigates problems requiring substantial time commitments over one semester, the summer, or an entire academic year. Proposed projects are reviewed by a faculty panel prior to final approval. Prereq., MATH. 241.

The following six reading courses are offered regularly primarily for Ph.D. students who have reached the research level in the designated fields. The seminar format of these courses requires significant student participation. Prereq., consent of instructor.


boundary value problems, basic error estimates, applications to elasticity, practical aspects of the finite element method.

Pre., MATH. 432.


MATH. 698-3. Multigrid Methods of Large Scale Computational Models II. Multigrid methods are fairly sophisticated techniques for efficient solution of many large scale computational problems, most notable partial differential equations. This course will provide a thorough introduction to basic multigrid principles followed by an exploration into more advanced applications. Pre., MATH. 319 and 465.

Independent Study

MATH. 940-1 to 3. Independent Study (Undergraduate). Variable credit depending on the student's needs. This course is listed for the benefit of the advanced student who desires to pursue one or more topics in considerable depth. Supervision by a full-time faculty member is necessary, and the dean's office must concur. Students may register for this course more than once with department approval. Pre., consent of department.

MATH. 950-1 to 6. Independent Study (Graduate). Available only through the approval of the graduate adviser. Subjects arranged to fit the needs of the particular students.

DEPARTMENT OF MODERN LANGUAGES

Chair: Donald L. Schmidt
Department Office: Central Classroom Building, Room 206A
Telephone: 556-4893
French Faculty: Associate Professor: Blandine M. Rickert
Assistant Professors: Diane M. Dansereau, Kevin C. O'Neill
German Faculty: Associate Professors: M. Kent Casper, Carsten E. Seecamp
Assistant Professor: Mark Lehrer
Adjunct: Helga S. Watt
Spanish Faculty: Professor: Edith R. Rogers
Associate Professors: Felipe Diaz-Jimeno, Francisco A. Rios, Donald L. Schmidt
Linguistics Faculty: Professor: Glendon F. Drake

The Department of Modern Languages includes French, German, Russian, and Spanish. At present, majors and minors are available in all but Russian. A major or minor in a foreign language helps to prepare the student for a variety of career options, including international business, government service, teaching, public services, translating and interpreting, and further study at the graduate level. It is particularly useful to combine the minor with a major in another field for specific career objectives. With increasing frequency, mastery of a second language is providing a competitive edge to candidates for a variety of positions, especially in business, government, the health-care field, and social services.

The department strongly recommends that all majors and minors include some study in an appropriate country abroad while they are fulfilling their degree requirements at CU-Denver. Credit will normally count toward satisfaction of the major and minor requirements, but the student should see an adviser before enrolling in a program abroad to assure full transfer of credit. Courses taken abroad and designated as French, German, or Spanish beyond the first year are subject to the 48-hour-maximum rule in the College of Liberal Arts and Sciences regarding credit hours applied to a degree from a single discipline. An Honors program leading to graduation cum laude, magna cum laude, or summa cum laude, is available to all qualified majors in French, German, and Spanish. See a department adviser for details.

In addition to fulfilling the major and minor, courses in the Department of Modern Languages prepare students in language, literature, and civilization as a part of an enhanced liberal education, and certain courses in each language are accepted as core courses toward the B.A. degree in the College of Liberal Arts and Sciences.

Courses also are functionally supportive of such programs as those leading to the teaching certificate, the Master of Humanities degree, and the Master of Arts degree in bilingual-multipurpose studies offered at CU-Denver, as well as to the Master of Arts programs in French, German, and Spanish offered in conjunction with the Boulder campus. Only courses numbered 500 and above may be applied to the master's degree; students enrolled in a master's program in French, German, or Spanish should consult with their adviser in Boulder before enrolling in courses on the Denver campus.

Foreign Language Requirement

Students who have completed a Level III high school course in a second language have automatically satisfied the College requirement in foreign language. The requirement may also be satisfied by completion of a third-semester course in French, German, Russian, or Spanish, or by demonstration of equivalent proficiency by placement test. Students who have studied a second language in high school and wish to continue with it will be placed according to their high school record and verbal SAT or ACT score. Students may not receive credit for a course lower than that into which they are 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.

FRENCH

Undergraduate

The French program offers a variety of courses for students interested in French language, literature, civilization, and culture. Two options are available for the major, and two for the minor.

Requirements for the Major. Students majoring in French must complete a minimum of 36 semester hours
beyond first-year proficiency. Students presenting four years of high school French for admission must complete 30 hours beyond the second year. At least 18 credit hours of upper division work must be taken from the faculty in French at CU-Denver. Courses taken at other institutions while a student is enrolled at CU-Denver may be applied to the major only with department approval prior to enrollment in those courses. No courses taken on a pass/fail basis may be credited toward the major, and no grade of less than C may be credited toward the major. Upon declaring a major in French, each student will be assigned a faculty adviser with whom the student should consult at least once per semester thereafter. It is especially important that students have their transcripts reviewed by their adviser prior to enrolling in their final 30 credit hours at CU-Denver. Failure to do so may result in delay of graduation. Students majoring in French may choose between the following options:

Option A: Literature. Required courses are: FR. 211 and 212 or 213; 301 and 302; 311 and 312; 305 and 401; and a minimum of 6 hours of French literature courses at the 400 level.

Option B: Culture and Civilization. Required courses are: FR. 211 and 212 or 213, 301 and 302, 311 or 312, 305 and 401, 320, 420 and 421.

Requirements for the Minor. A total of 21 credit hours beyond FR. 102 is required. At least 9 credit hours of upper division work must be taken from the faculty in French at CU-Denver. Courses taken at other institutions while a student is enrolled at CU-Denver may be applied to the minor only with department approval prior to enrollment in those courses. No courses taken on a pass/fail basis may be credited toward the minor, and no grade of less than C may be credited toward the minor.

Students may choose a French minor with an oral emphasis or a written emphasis. Required courses for the oral emphasis include FR. 211, 212, 301, 302, 320, and 6 hours of electives at or above the 200 level. Requirements for the written emphasis include FR. 211, 212, 305, 311, 312, and 6 hours of electives at or above the 200 level.

Students planning to acquire certification for teaching French at the secondary level are required to take FR. 496, Methods of Teaching Modern Languages. Also, prior to enrolling in student teaching with the School of Education, the student must demonstrate oral and written proficiency in French through an examination administered by the Department of Modern Languages. The student should see an adviser in French for details.

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.

Students majoring in French must satisfy the requirements of the College of Liberal Arts and Sciences.

Graduate

At present CU-Denver 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 and to the Master of Humanities program at CU-Denver, depending upon degree plan approval by the appropriate graduate adviser.

COURSES

FR. 112-5. Beginning French II: Reading. Prer., FR. 101 or one year of high school French.
FR. 211-3. Conversation and Culture. Prer., FR. 102 or two years of high school French.
FR. 212-3. Reading and Composition. Prer., FR. 102 or two years of high school French.
FR. 290-3. Topics in French Literature in English. Courses in specialized areas of French literature will be offered at regular intervals. Topics will include: eroticism in French literature; women in French literature; literature and social change in France; exoticism in French literature; great French books; literature and French national character; classical and baroque themes.
FR. 301-3. French Phonetics and Pronunciation. Prer., FR. 211 and 212 or consent of instructor.
FR. 302-3. Oral Practice. Prer., FR. 301 or consent of instructor.
FR. 305-3. French Composition I. Prer., FR. 211 and 212, or consent of instructor.
FR. 311-3. Main Currents of French Literature I. Prer., FR. 211 and 212 or consent of instructor.
FR. 312-3. Main Currents of French Literature II. Prer., FR. 211 and 212 or consent of instructor.
FR. 390-3. Topics in French Literature in English. See FR. 290. FR. 398-variable credit. Internship/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.
FR. 401-3. Advanced Composition. Prer., FR. 305 or consent of instructor.
FR. 403-3. Advanced Oral Practice. Prer., FR. 301 and 302, or consent of instructor.
FR. 405-3. Advanced French for Business. Prer., FR. 305 and 401, or 8 French courses beyond first year, or consent of French adviser.
FR. 420-3. French Civilization to 1789. Prer., FR. 302 and 320, or 302 and either 311 or 312, or consent of instructor.
FR. 421-3. French Civilization from 1789 to Present Day. Prer., FR.302 and 320, or 302 and 311, or 420, or consent of instructor.
FR. 425-3. 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 at the secondary level.

Upper Division/Graduate Level
FR. 431/531-3.1 Seventeenth-Century French Theatre and Poetry. Prer., for 400 level, FR. 311 or consent of instructor.
FR. 436/536-3.1 Eighteenth-Century French Novel, Theatre, and Poetry. Prer., for 400 level, FR. 311 or 312, or consent of instructor.
FR. 443/543-3.1 Nineteenth-Century French Novel. Prer., for 400 level, FR. 312 or consent of the instructor.
FR. 448/548-3.1 Twentieth-Century French Novel. Prer., for 400 level, FR. 312 or consent of instructor.
FR. 450/550-3.1 Black Literature of the French-Speaking World. Prer., for 400 level, FR. 312 or consent of instructor.

Independent Study
FR. 940-variable credit. Independent Study (Upper division). FR. 950-variable credit. Independent Study (Graduate level I).

GERMAN

Undergraduate

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 skills 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.

Requirements for the Major. Students majoring in German must complete 36 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 18 hours of upper division credit must be taken from the faculty in German at CU-Denver. Courses taken at other institutions while a student is enrolled at CU-Denver may be applied to the major only with departmental approval prior to enrollment in those courses.

Upon declaring a major in German, each student will be assigned a faculty adviser with whom the student should consult at least once per semester thereafter. It is especially important that students have their transcripts reviewed by their adviser prior to enrolling in their final 30 credit hours at CU-Denver. Failure to do so may result in delay of graduation.

No courses taken on a pass/fail basis may be credited toward the major, and no grade of less than C may be credited toward the major. Majors must maintain a B average in German. Required courses for the major are GER. 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 to take GER. 496, Methods of Teaching Modern Languages. Also, prior to enrolling in student teaching with the School of Education, the student must demonstrate oral and written proficiency in German through an examination administered by the Department of Modern Languages. See your adviser in German for details.

Requirements for the Minor. Students with a minor in German must complete 21 semester hours beyond GER. 102. At least 9 credit hours at the upper division level must be taken from the faculty in German at CU-Denver. Courses taken at other institutions while a student is enrolled at CU-Denver may be applied to the minor only with departmental approval prior to enrollment in those courses. No courses taken on a pass/fail basis may be credited toward the minor, and no grade of less than C may be credited toward the minor. Courses are to be distributed as follows:

- 200 level — a minimum of any two courses is required before a student may take upper division courses.
- 300 level — GER. 301 and 302 are required.
- The remaining 9 hours are electives of which at least 6 hours must be taken at the 300 or 400 level.

COURSES

GER. 101-5. Beginning German I. Introduction to basic grammar, sentence structure, and speech patterns.
GER. 102-5. Beginning German II. Continuation of GER. 101. Prer., GER. 101 or one year of high school German.
GER. 211-3. Practical Everyday German. Prer., GER. 102 or two years of high school German.
GER. 212-3. Conversation and Culture. Prer., GER. 102 or two years of high school German.
GER. 213-3. Current Topics of the German-Speaking World. Prer., GER. 211 or 212, or consent of instructor.
GER. 221-3. Readings and Translation. Stresses reading and translation skills rather than speaking. Students work with short German texts in a variety of areas: natural and social sciences, history, literature, etc. Lectures in English. Prer., GER. 102.
GER. 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., GER. 211 or 212 or consent of instructor.

Students enrolled at the 500 level may expect additional work and evaluation commensurate with graduate standards.
GER. 302-3. Advanced Conversation and Composition. Continuation of GER. 301 with stress on written expression. Prer., GER. 301 or consent of instructor.
GER. 398-variable credit. Internship/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.
GER. 401-3. Idiom and Stylistics I. Analysis of and practice with more complex German usage in descriptive, literary, and scientific texts. Emphasis on increasing understanding of refinements in style and idiom.
GER. 402-3. Idiom and Stylistics II. Continuation of GER. 401.
GER. 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.

Literature in German
GER. 311-3. Introduction to German Literature I. Selected readings from German short stories, dramas, and poetry, primarily from the modern period. Emphasis on techniques of reading. Conducted in German. Prer., GER. 211 or 212, or consent of instructor.
GER. 312-3. Introduction to German Literature II. Selected readings from German literature with emphasis on literary styles and movements and relationship to larger cultural patterns. Conducted in German. Prer., GER. 211 or 212, or consent of instructor.
GER. 333-3. German Classical Literature. The Age of Idealism prior to Romanticism will be explored through the writings of Lessing, Goethe, Schiller, Wieland, et al., and through lectures on the historical, philosophical, and social components of the times. Includes some treatment of classical German music. Conducted in German. Prer., any third-level German course.
GER. 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 Transformsations 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.
GER. 412-3. Issues and Currents in 18th- and 19th-Century German Literature. Format similar to GER. 411. Topical focus varies with each offering (e.g., the Symbolism of Goethe's Poetry, the Fairy-Tale Pattern in 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
NOTE: Courses conducted in English with texts in English translation. Credit toward German major is given if some work (to be specified by the instructor) is done in German.
GER. 251/351-3. Faust in Literature and Music. A survey of the Faust legend in literature and music. Included works are by Marlowe, Goethe, Berlioz, Schumann, Gounod, Boito, and others.
GER. 252/352-3. German Romanticism and the Modern Spirit. Exploration of the modern works of modern German Romantics like Herzog and those of the originators of Romanticism in the late 18th and early 19th centuries, demonstrating through the parallels and contrasts how German Romantic thought, literature, and art have continued to have an impact on the modern world.
GER. 281/381-3. 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, Büchner, and Kleist.
GER. 282/382-3. German Literature in Translation II. In-depth study of two or three authors from the late 19th and early 20th centuries, such as Hauptmann, Mann, Hesse, Grass, Brecht, and Kafka.
GER. 323-3. German Civilization I: From Medieval Through Age of Idealism. Selected highlights of major cultural aspects of the height of the Middle Ages, the Reformation, the Enlightenment, and the Age of Idealism.
GER. 324-3. 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.
GER. 353-3. Aesthetics and Decadence: Art and Literature at the Turn of the Century. This course examines European aestheticism as artistic movement and as lifestyle around 1900. Recurring motifs and topics will include seduction, artifice, the assault on nature, and, above all, "decadence." Authors include Hugo von Hofmannsthal, Thomas Mann, Nietzsche, Wilde, and Joyce.
GER. 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.).

Independent Study
GER. 940-variable credit. Independent Study (Upper division).
GER. 950-variable credit. Independent Study (Graduate level I).

SPANISH

Undergraduate

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 U.S.

Requirements for the Major: A major in Spanish consists of the following requirements:

General Requirements

1. A total of 36 credit hours beyond SPAN. 102. To include 30 credit hours of upper division (300 and above). For those entering the program at the upper division level, only the 30 credit hours at the 300 and 400 levels are required. None of the required hours may be taken on a pass/fail basis, and no grade of less than C may be credited toward the major. Courses taken at other institutions while a student is enrolled at CU-Denver may be applied to the major only with departmental approval prior to enrollment in those courses.
2. A minimum of 12 credit hours at the 400 level.

3. In addition to the 30-36 credit hours in Spanish, a minimum of 6 credit hours from one or more of the following areas: (a) Latin American studies (e.g., history, political science, etc.); (b) Hispanic American studies; (c) linguistics; (d) upper division courses in another foreign language or comparative literature; (e) cross-cultural studies.

4. At least 18 credit hours in Spanish at the upper division level must be taken from the faculty of the University of Colorado at Denver.

Specific Requirements

1. A minimum of 15 credit hours in courses in literature and culture/civilization, to be distributed as follows: (a) Introduction to the Study of Literature; (b) a minimum of 3 credit hours in culture/civilization; (c) a minimum of 3 credit hours in Peninsular (Spain) literature; (d) a minimum of 3 credit hours in Spanish American literature; and (e) at least one course on the period before 1800.

2. A minimum of 9 credit hours in language skills and theory.

3. 6 credit hours in electives to be chosen from among upper division courses in Spanish.

Students seeking certification for teaching Spanish at the secondary level should take 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. Students seeking teacher certification must take the language proficiency test administered by the Department of Modern Languages prior to enrolling in practice teaching with the School of Education. See an adviser in Spanish for details.

Upon declaring a major in Spanish, each student will be assigned a faculty adviser with whom the student should consult at least once per semester thereafter. It is especially important that students have their transcripts reviewed by their adviser prior to enrolling in their final 30 credit hours at CU-Denver. Failure to do so may result in delay of graduation. Students considering entering graduate school, either at CU-Denver or elsewhere, should see an adviser as early as possible since admission depends largely on courses taken in the major.

Requirements for the Minor. A total of 21 credit hours beyond SPAN. 102, including a minimum of 15 credit hours at the upper division level. At least 9 credit hours at the upper division level must be taken from the faculty in Spanish at CU-Denver. None of the required credit hours may be taken on a pass/fail basis, and no grade of less than C may be credited toward the minor. Courses taken at other institutions while a student is enrolled at CU-Denver may be applied to the minor only with departmental approval prior to enrollment in those courses. Each student with a minor in Spanish shall meet the distribution requirements listed below:

Distribution Requirements

1. A minimum of two courses in language skills and theory at the upper division level.

2. A minimum of one course in culture/civilization at the upper division level (to assure credit for these courses, natives of Hispanic countries must consult the department before enrolling).

3. 6 credit hours in electives at the upper division level.

Graduate

At present CU-Denver 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 CU-Denver, depending upon degree plan approval by the appropriate graduate adviser.

COURSES

SPAN. 101-5. Sect. 1, SPAN. 102-5, Sect. 1. Intensive Spanish. These two sections together comprise a 10-hour, one semester course. Offered in the summer term only.


SPAN. 212-3. Second-Year Spanish II. Prer., SPAN. 211 or placement.

SPAN. 213-3. Current Topics in the Spanish-Speaking World. Prer., SPAN. 211 or consent of instructor.

SPAN. 301-3. Advanced Conversation I. Prer., SPAN. 212 or consent of instructor.

SPAN. 302-3. Advanced Conversation II. Prer., SPAN. 301 or consent of instructor.


SPAN. 311-3. Latin America: A Tradition of Conflict. SPAN. 311 is an equivalent in English to SPAN. 321, for non-major or minor credit, requiring no knowledge of Spanish. Both courses are based on an interdisciplinary approach to Latin America.

SPAN. 320-3. Culture and Civilization of Spain. Prer., SPAN. 212 or consent of instructor.


SPAN. 322-3. Folklore and Culture of the Mexican Southwest. Prer., SPAN. 212 or consent of instructor.

SPAN. 325-3. Introduction to the Study of Literature. Prer., SPAN. 212 or consent of instructor.


SPAN. 331-3. Spanish Writing and Grammar I. Prer., SPAN. 212 or consent of instructor.

SPAN. 332-3. Spanish Writing and Grammar II. Prer., SPAN. 331 or consent of instructor.

SPAN. 334-3. Twentieth-Century Spanish American Novel and Essay. Prer., SPAN. 325 previously or concurrently, or consent of instructor.
SPAN. 340-3. Survey of Spanish Literature. Prere., SPAN. 325 previously or concurrently, or consent of instructor.
SPAN. 341-3. Survey of Spanish Literature II. Prere., SPAN. 325 previously or concurrently, or consent of instructor.
SPAN. 350-3. Survey of Latin American Literature I. Prere., SPAN. 325 previously or concurrently, or consent of instructor.
SPAN. 351-3. Survey of Latin American Literature II. Prere., SPAN. 325 previously or concurrently, or consent of instructor.
SPAN. 352-3. Contemporary Mexican Literature. Prere., SPAN. 325 previously or concurrently, or consent of instructor.
SPAN. 353-3. Spanish American Short Story. Prere., SPAN. 325 previously or concurrently, or consent of instructor.
SPAN. 356-3. Spanish American Drama. Prere., SPAN. 325 previously or concurrently, or consent of instructor.
SPAN. 357-3. Spanish American Poetry. Prere., SPAN. 325 previously or concurrently, or consent of instructor.
SPAN. 362-3. Don Quixote in English. SPAN. 362 is for non-major credit and does not require a knowledge of Spanish.
SPAN. 370-3. Spanish for International Business I. Prere., SPAN. 212 or consent of instructor.
SPAN. 371-3. Spanish for International Business II. Prere., SPAN. 370 or consent of instructor.
SPAN. 372-3. Spanish Business Documentation and Correspondence. Prere., SPAN. 370 or consent of instructor.
SPAN. 373-3. Special Topics in Spanish for International Business. Prere., SPAN. 370 or consent of instructor.
SPAN. 391-3. Topics in Spanish Literature. Prere., SPAN. 325 or consent of instructor.
SPAN. 398-variable credit. Internship/Cooperative Education. Designed experiences involving application of specific, relevant concepts and skills in supervised employment situations. Prere., sophomore standing and 2.5 grade-point average.
SPAN. 411-3. Contemporary Spanish Literature. Prere., SPAN. 340 or 341 or consent of instructor.
SPAN. 412-3. Contemporary Spanish Literature. Prere., SPAN. 350 or 351 or consent of instructor.
SPAN. 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 at the secondary level.

Upper Division/Graduate Level
SPAN. 415/515-3.1 Masterpieces of Spanish Literature.
SPAN. 416/516-3.1 Masterpieces of Spanish-American Literature.
SPAN. 422/522-3.1 Mexican Literature.
SPAN. 430/530-3.1 Generation of 1898.
SPAN. 432/532-3.1 Spanish Literature Since the Spanish Civil War.
SPAN. 440/540-3.1 Romanticism in Spain.
SPAN. 441/541-3.1 Modernism.
SPAN. 452/552-3.1 Golden Age Drama.
SPAN. 453/553-3.1 Golden Age Prose.
SPAN. 462/562-3.1 Don Quixote.
SPAN. 491/591-3.1 Special Topics in Spanish Literature. Prere., for 400 level, SPAN. 325 or equivalent, or consent of instructor.

Independent Study
SPAN. 940-1 to 3. Independent Study (Undergraduate).
SPAN. 950-1 to 3. Independent Study (Graduate).

PHILOSOPHY
Associate Chair: Frank H. Marsh
Department Office: 1050 9th St.
Telephone: 556-4868
Faculty: Professor: Frank H. Marsh
Associate Professors: Charles A. Kenevan, Glenn A. Webster
Assistant Professor: Mark Yarborough
Adjunct: Manuel Laderman, Terry L. Macaluso

Undergraduate
The philosophy program is recommended to those students whose goal is a liberal arts 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 fields as law and medicine.

Requirements for the Major. PHIL. 144, 300, 302, and at least one upper division course in each of the following four areas:
1. Metaphysics and/or epistemology
2. Ethics and/or social philosophy
3. One philosophical problem or philosopher
4. One course relating philosophy to art, religion, science or history.

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 the consent of instructor.

Requirements for the Minor. A minor in philosophy is available at CU-Denver. Interested students should contact a department adviser for information.

Graduate
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 CU-Denver in this discipline, all degree programs must be arranged through the University of Colorado at Boulder.

1 Students enrolled at the 500 level may expect additional work and evaluation commensurate with graduate standards. At present CU-Denver offers no Spanish courses above 599. Courses at the 500 level are applicable to an M.A. degree in Spanish from CU-Boulder and to a Master of Humanities degree from CU-Denver.
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. in comparative East/West philosophy and in history and philosophy of science), details of which may be had on request.

COURSES

PHIL. 101-3. Introduction to Philosophy.
PHIL. 102-3. Ethics. Introductory study of major philosophies on the nature of the good of man, principles of evaluation, and moral choice.
PHIL. 120-3. 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 and body; artificial intelligence; sciences and ethics; 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. 163-3. Introductory Topics in Religious Studies. These are topics in religious study as distinct from philosophy of religion. Such topics may range from comparative religion to the history of religion, to more specialized topics such as Jewish thought.
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. 221-3. Modern Social Theories. Present social issues, together with theoretical analyses by communist, fascist, and democratic thinkers.
PHIL. 290-3. A Philosophical Classic. Detailed study of one major philosophic text which illustrates a variety of types of philosophical concerns. Emphasis on techniques for analysis, discussion, and assessment of philosophical argumentation. Such works as The Republic, Leviathan, and Treatise of Human Nature.
PHIL. 315-3. Ethical Theory. Selected problems in classical and contemporary ethical theory.
PHIL. 328-3. Philosophy of Education.
PHIL. 340-3. Philosophy of Science. Examination of some major concepts and problems of scientific thought: explanation, confirmation, causality, measurement, and theory construction.
PHIL. 344-3. Introduction to Symbolic Logic.
PHIL. 363-3. Topics in Religious Studies. More advanced course in religious studies as distinct from the philosophy of religion. Religious studies is concerned with the detail and nature of religion in its various manifestations — world religions, sacred texts, rituals, theologies, mythologies, and other beliefs and special experiences. Hence, topics in religious studies may range from detailed examination of particular religious texts, such as the Old Testament or the Koran, to comparative and historical studies of the world religions, to examination of particular themes in religious beliefs, such as mysticism or hope for afterlife, to the psychology of religion.
PHIL. 370-3. Aesthetic Theory. Introduction to major theories of aesthetics and contemporary discussions of problems in aesthetics; i.e., the nature of art, the problem of evaluations in art.
PHIL. 398-variable credit. Internship/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. 403-3. Twentieth-Century Speculative and Idealistic Philosophy.
PHIL. 404-3. Twentieth-Century Phenomenology and Existentialism.
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.

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. 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. 496-3. Senior Major Colloquium.

Upper Division/Graduate Level

PHIL. 420/520-3. 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.

PHIL. 424/524-3.1 Bioethics. This three-hour credit course, which requires no prerequisites, examines in detail the philosophical foundations of ethical decision making in medicine, biology, and the life sciences. The presuppositions and theoretical implications of various practices, actual and projected, will be examined. Specific areas of inquiry will include: human experimentation, in death and dying, genetic engineering, genetic screening, artificial reproduction, in vitro fertilization, organ transplantation, euthanasia, responsibilities of allied health care professionals, confidentiality and truth-telling, psychosurgery, use of drugs in behavior modification, and allocation of scarce resources, etc.

PHIL. 430/530-3.1 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.

Graduate Level

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. 510-3. Topics in the History of Philosophy.
PHIL. 534-3. Epistemology.
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 abstractions in history of science.


PHIL. 570-3. Aesthetics. An analysis of the principle 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. 582-3. Philosophy of Hume.
PHIL. 583-3. Philosophy of Kant.
PHIL. 584-3. Philosophy of Spinoza.
PHIL. 589-3. Philosophy of Hegel.
PHIL. 590-3. Philosophy of Whitehead.
PHIL. 591-3. Philosophy of St. Thomas.
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. 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 principle problems in the area and to establishing the distinctive features of political realities.


Independent Study

PHIL. 940-variable credit. Independent Study (Undergraduate).

PHIL. 950-variable credit. Independent Study (Graduate).

1 Students enrolled at the 500 level may expect additional work and evaluation commensurate with graduate standards.
PHYSICS

Chair: Martin M. Maltempo
Department Office: East Classroom Building, Room 233
Telephone: 556-3456
Faculty: Professors: Willard R. Chappell, Herman Sievering, Clyde S. Zaidins
               Associate Professors: Martin M. Maltempo
               Assistant Professors: Gayl P. Cook, Alan Rice, William R. Simmons
Adjunct: Paul E. Biagi

Undergraduate

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 such areas as business, law, politics, 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.

Requirements for the Major. All physics majors, under any option, must consult with an adviser. The basic requirements include two semesters of other sciences for all majors and the following courses in the chosen option.


Plan III. PHYS. 105, 106 (or 201, 202), 317, and 15 hours of upper division physics electives, such as 308, 362, 363, 395, 464, or 466, and Philosophy of Science.

Requirements for the Minor. Students interested in completing a minor in physics should contact a department adviser for information and specific requirements.

Graduate

While some course work at the graduate level may be taken at CU-Denver 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.

COURSES

PHYS. 100-4. Introduction to Physics. An introductory survey course for nonscientists which emphasizes the main concepts of physics. Although this course is mainly descriptive, some high school algebra will be used. The accompanying lab work is designed to illustrate the material discussed in the lectures.

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 Classes for the particular modules being offered. Designed for nonscience majors to fulfill the natural science requirement.

PHYS. 201-5, 202-5. College Physics I, II. Four lect. and one lab. per wk. PHYS. 201: mechanics, heat, and sound. Prereq., college algebra and trigonometry. PHYS. 202: electricity, light and modern physics, and MATH. 112.


PHYS. 233-4. General Physics II: Calculus-based. Covers electromagnetic fields, oscillatory systems, introductory quantum physics, and waves. Four hours lect. per wk. Prereq., Calculus II.


PHYS. 281-3. Modern Physics. Presents a study of the events and discoveries that occurred during the latter part of the 19th and the first part of the 20th centuries which led to the discovery of quantum mechanics in 1925; viz: cavity radiation, ether and special relativity, particle nature of radiation, wave properties of particles, models of the atom, and the introduction of quantum mechanics. Prereq., PHYS. 233 and Calculus II.

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, and small oscillations. Prereq., PHYS. 233; coreq., differential equations.

PHYS. 333-4. Principles of Electricity and Magnetism. Elements of mathematical theory of electricity and magnetism, including magnetostatics, electrostatics, polarized media, direct and alternating current theory, and introduction to electromagnetic fields and waves. Prereq., PHYS. 233, Calculus III.

PHYS. 341-3. Thermal Physics. A course covering the basic concepts of the three related disciplines of thermodynamics, statistical mechanics, and kinetic theory. Prereq., PHYS. 233.
PHYS. 362-3. Sound and Music. This course will consider the basic nature of sound waves, the ear and hearing, and musical instruments. Although this course is mainly descriptive, some high school algebra will be used. Prere., MATH. 101 or equivalent.

PHYS. 381-3. Quantum Mechanics. A course in which both wave and matrix mechanics are developed and applied to selected problems in atomic physics. Prere., PHYS. 321.

PHYS. 398-variable credit. Internship/Cooperative Education. Designed experiences involving application of specific, relevant concepts and skills in supervised employment situations. Prere., sophomore standing and 2.5 grade-point average.

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. Prere., PHYS. 341 and 381.

PHYS. 451-3. Optics. A course which presents a contemporary treatment of selected topics in optics, such as matrix methods in geometrical optics, the Fourier analysis approach to physical optics and interaction of light with matter. Prere., PHYS. 233.

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. Prere., 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. Prere., upper division standing.

PHYS. 465-3. Solid State Physics. Covers the basic thermal and electrical properties of solids which are explained in terms of the Brillouin zone structures of phonons and electrons. Prere., PHYS. 341 and 381.

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 relationships between physics and art and the possibilities of art based on science and technology. Prere., 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. Prere., PHYS. 381.

PHYS. 482-3. Subatomic Physics. An introductory treatment of the various concepts and models used to describe nuclear and high energy particle phenomena. Prere., PHYS. 481.

PHYS. 489-3. Advanced Physics Topics. This course covers a particular topic, as announced in the Schedule of Classes. May be taken more than once for credit in different topics. Prere., PHYS. 231 and 233.

PHYS. 495-2, 496-2. Senior Laboratory. Individual project laboratory with emphasis on modern physical experimentation.

Independent Study

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.

POLITICAL SCIENCE

Chair: Stephen C. Thomas
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Faculty: Professor: John Ostheimer
Associate Professors: Michael S. Cummings, Joel C. Edelstein, Jana M. Everett, Stephen C. Thomas
Assistant Professors: Glenn T. Morris, Lawrence J. Mosqueda

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Helen Shreves, Esq., President, Colorado Women's Bar Association
Arie Taylor
Sue Thomas
Arthur Warner, M.D., Kaiser Permanente
Undergraduate

Political science is the study of people, power, and the public good. Looking at a variety of societies, institutions, and interpersonal situations, the discipline asks who has the 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 Nigeria to Nicaragua 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 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. The students' internship experiences increase their 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.

Requirements for the Major. Undergraduate majors must complete a minimum of 30 semester hours in political science, of which at least 21 must be 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 majors must include the following: P SC. 100, 110, 301, 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 earn course credit for political internships through Cooperative Education, P SC. 398, and for individually tailored courses of independent study.

Requirements for the Minor. A student can earn an undergraduate minor in political science by completing 15 semester hours distributed as follows: one lower division course (P SC. 100 or 110) and four upper division courses including one each in political theory, American politics, comparative politics, and international relations.

Graduate

Requirements for Admission

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 CU-Denver by enrolling in political science courses as a non-degree 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. 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 the work deficiencies in political science). Applicants are normally expected to present an undergraduate GPA of at least 3.0. In addition to transcripts and letters of recommendation specified by The Graduate School, applicants must submit a statement of academic objectives. Standardized test scores and samples of scholarly work are not required of applicants, but will be considered if submitted.

Degree Requirements

The degree requirements 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 CU-Denver is on critical perspectives, creative teaching and writing, interdisciplinary work, experimental involvement, and cooperative research projects. Close and continuing contact among students and faculty and students is encouraged.

For further information contact 556-3556 or 556-8317.

Courses

General Courses

P SC. 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.

P SC. 300-1 to 3. Topics in Political Science. Covers different areas of politics. Can be taken more than once for credit when topics vary. Includes conference participation (1 unit).

P SC. 301-3. 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. Prereq. P SC. 100 or consent of instructor. (Formerly P SC. 200.)

P SC. 398-variable credit. Internship/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.

P SC. 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. Prereq. consent of instructor.

Independent Study

P SC. 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. Prereq., 15 semester hours in political science and consent of instructor.

P SC. 950-1 to 3. Independent Study (Graduate).

American Government and Politics

P SC. 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.

P SC. 303-3. Race, Gender, Law, and Public Policy. Historical overview of race and gender relations in the U.S. and an examination of the treatment of issues of race and gender in the judicial system and public policy.

P SC. 306-3. Power in American Society: An Introduction to U.S. Political Economy. An intermediate level introduction to the political and economic forces and structures which shape the opportunities available to the American people. Among topics included are reciprocal impacts of government and business, the federal budget, taxation, lobbying and special interest, and elections. Open to business majors in place of P SC. 100.


P SC. 320-3. Practical Politics. Liberal, conservative, and radical approaches to political action. Political resources, opportunities, and effectiveness. Political strategies and tactics. Key political informational sources. Moral and pragmatic dilemmas of political action. Individual and group interest versus the public good. Student political involvement required.

P SC. 340-3. Love, Responsibility, and Justice: An Exploration through Film.

P SC. 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.

P SC. 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. Open to business majors in place of P SC. 100.

P SC. 355-3. Minority Politics. An examination of the social, cultural, and economic factors which affect the political choices of ethnic minorities in the United States. Analysis of minority political action.

P SC. 380-3. Cross Cultural Field Experience.


P SC. 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. Citizen involvement in urban decision making.

P SC. 408-3. Municipal Government and Administration.


P SC. 435-3. Environmental Politics. Political, legal, and economic forces in environmental law and policy. Special emphasis on air and water pollution and on threats to public and agricultural land.


P SC. 444-3. Contemporary Culture and Politics in America. Intellectual and experiential investigation of the interplay of culture and politics in American society, as manifested in literature, social and political philosophy, psychological writings and trends, radical movements and daily behavior.

P SC. 446-3. Administrative Law.

P SC. 449-3. American Judicial System. Examination of the principle actors in the legal system: police, lawyers, judges, citizens. About half the course will be devoted to the study of judicial behavior, especially at the Supreme Court level.


P SC. 455-3. The Mexican American in Politics. (ETST 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.

P SC. 456-3. Political Perspectives on Women. Analysis of the political experience of women and of strategies of change.

P SC. 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 conditions under which political socialization contributes to system maintenance and/or change as well as variations across genders, classes, ethnic groups, and political systems will be considered.

P SC. 460-3. Politics of South Asia, India, Pakistan, Bangladesh, Sri Lanka. Why are these nations underdeveloped? Examination of alternative explanations including religion, colonialism, class structure, political leadership, and the international systems. Discussion of the contemporary political situation and prospects for the future.

Graduate Level

P SC. 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. Prereq., graduate standing or consent of instructor.

P SC. 502-3. Seminar: Colorado Politics. Research and problems in practical politics, with emphasis on politics in Colorado. Prereq., P SC. 403 or consent of instructor.


P SC. 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 incorporate fully the study of women into political science. Papers and a research design.
P SC. 603-3. Research Seminar: Democratic Theory, Participation, and Industrial Democracy. Two-fold purpose: to introduce the student to the literature of direct and industrial democracy and to provide an experience in research (research design, test construction, and interviewing).

Comparative Politics

P SC. 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. Open to business majors in place of P SC. 100.
P SC. 310-3. Women in a Changing World. 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. Open to business majors in place of P SC. 100.
P SC. 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 economy; executive-legislative relationships; electoral systems; political parties and interest groups; political conflict and citizen participation; and the impact of social changes on political institutions.
P SC. 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 modernization in transitional politics. Violent and Nonviolent change.
P SC. 419-3. Political Systems of Sub-Saharan Africa.
P SC. 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 to 20th-century developments.
P SC. 460. Politics of South Asia.
P SC. 462-3. Comparative Socialism. (ECON. 417.) 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, education, technology, and popular culture.

Graduate Level

P SC. 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 of the heuristic value of this conceptual framework for the comparative study of non-Western politics. Introduction to research methods and materials in this field.
P SC. 513-3. Seminar: Latin American Politics. Seminar designed to stress intensive study of the political process system in Latin America with special emphasis on the variables which affect Latin American political behavior and development. Prer., P SC. 413 or consent of instructor.
P SC. 515-3. Seminar: Political Economy of Marxist Socialist States. Critical examination of variables which affect policy 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.
P SC. 539-3. Administrative Problems in Developing Countries.
P SC. 560-3. Seminar: Comparative Political Parties and Interest Groups.
P SC. 561-3. Seminar: Political Systems of East Asia. Discussion of readings about China or other Asian political systems. Analysis of several of the following: party-government relations, ideology and political behavior, leadership, diplomacy, political and economic development. A seminar paper. Research methods and materials.

International Relations

P SC. 304-3. International Relations. Basic background and methods for analysis of current issues in international affairs such as the arms race, detente, human rights, and the role of multinational corporations. Open to business majors in place of P SC. 100.
P SC. 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.

P SC. 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.

P SC. 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 colonialism and imperialism.

P SC. 426-3. International Law.

P SC. 428-3. International Behavior. Presentation of alternate theoretical frameworks for the explanation of international processes. Theories of conflict behavior and social organization applied to problems of war and peace. Major emphasis on the role of systematic empirical research in the development of theories of international behavior.

P SC. 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.

P SC. 473-3. Middle East and World Affairs.


P SC. 475-3. Africa in U.S. Foreign Policy.

P SC. 476-3. International Relations in the Far East.


Graduate Level

P SC. 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.

P SC. 523-3. Seminar: American Foreign Relations. Examination of selected 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


P SC. 440-3. Early Political Thought. Main currents of political thought in their historical setting from Plato to Machiavelli, with a critical evaluation of those elements of continuing worth. Required of all majors.

P SC. 441-3. Modern Political Thought. Main currents of political thought in their historical setting from the 17th century to the present. Development of the student's own political theory. P SC. 440 is not a prerequisite for P SC. 441. Required of all majors.


P SC. 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.

P SC. 448-3. Constitutional Law II. Continuation of P SC. 447, with emphasis on the war power, powers of the president, citizenship, the Bill of Rights, and the Civil War Amendments. Case method.

P SC. 490-3. Revolution and Political Violence. Study, discussion, and evaluation of alternative frameworks for the analysis of revolution and political violence. The 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.

P SC. 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.

P SC. 493-3. Contemporary Issues in Civil Liberties. Conflicting rights of individuals and their society in several areas of civil liberties, including religious cults, free speech, sexual freedom, racial quotas, and antigovernmental actions and publications. Course will include case-law readings, guest speakers, and class discussions.
Graduate Level

P SC. 500-3. Method and Purpose in Social Science I. (S SC. 501.)
P SC. 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.
P SC. 541-3. Seminar: Selected Political Theories. Selected political philosophies or theories in classical or modern political thought.
P SC. 545-3. Seminar: American Political Thought. Intensive research in and presentation of selected topics relating to the development of American political ideas.
P SC. 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; Prereq., P SC. 447-448 or consent of instructor.
P SC. 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.
P SC. 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 is studied as forms of political violence, and the role of systematic empirical research is emphasized in the development of general theories of intergroup conflict.
P SC. 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, existentialist, and social psychology; alienation, ethnocentrism, dogmatism, and aggression as political variables. Prereq., consent of instructor.
P SC. 641-3. Seminar: Political Thought. Intensive research in and presentation of selected topics intended to introduce the mature student to the broad context in which political ideas arise. Deals with classical and modern thought. Prereq., P SC. 440, 441, or consent of instructor.
P SC. 642-3. Seminar: Systematic Political Theory. Theories relevant to an understanding of social and political systems and behavior.
P SC. 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 also are examined.

Public Administration


P SC. 432-3. Public Administration. Role of administration in government; trends in American public administration; techniques of management; theories of public administration.

PSYCHOLOGY

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Department Offices: St. Cajetan's Center, Room 019
Telephone: 556-8565
Faculty: Professors: Janis W. Driscoll, Carolyn H. Simmons, Gary S. Stern
Assistant Professors: Joy L. Berrenberg, Mitchell M. Handelsman, Susan Hazaleus, Peter S. Kaplan, Kurt Sera-Kraiger
Adjunct: Elaine K. Miller
Emeritus: Nell G. Fahrion

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Doda White, Property Management and Real Estate
Don White, Electrical Contractor

Undergraduate

Psychology is the scientific study of behavior, consisting of the following major areas of study: experimental psychology, biopsychology, developmental psychology, social psychology, learning and cognition, personality, and abnormal psychology. The requirements for the major are designed to introduce the student to the spectrum of psychology, including an early exposure to research methods 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, law, public relations, and health careers. Traditionally, job opportunities within the field of psychology require graduate study; however some students find jobs in the mental health and social service fields with a B.A. degree in psychology. The major also prepares the student for graduate work in psychology. A program leading to the master's degree in particular applied areas of psychology is available at CU-Denver.

Requirements for the Major. Students should consult with a department adviser when they declare a psychology major. Psychology major requirements include at
least 30 and not more than 48 semester hours in psychology. Of these, at least 16 hours must be in upper division courses and 14 of the upper division hours must be completed at CU-Denver. No grade below C will be accepted toward the major requirements. MATH. 107 and ENGL. 102 must be included in the lower division curriculum. Specific course requirements include: PSY. 100, 209, and 310; at least two biotropic psychology courses such as PSY. 322, 405, 414, 416, 425, 438; at least two sociotropic psychology courses such as PSY. 320, 321, 330, 440, 441, 445, 449, 466, 471; at least one advanced laboratory course such as PSY. 407, 415, 417, 422, 439, 444; and one integrative course, PSY. 451.

Students interested in earning departmental honors should consult with the Psychology Honors Adviser during the junior year. Psychology majors transferring from other institutions must complete a minimum of 14 upper division hours in psychology at CU-Denver, including two biotropic psychology courses, two sociotropic courses, and one laboratory course.

Requirements for the Minor. A minor in psychology requires the completion of the following courses with a grade of C or better: PSY. 100, 209, and 451, one biotropic psychology course, and one sociotropic psychology course.

Further information about the department may be obtained from department advisers or by calling 556-8565.

Graduate

The M.A. degree in psychology at CU-Denver can be obtained with a specialty in industrial/organizational psychology, research in social-personality, psychometrics, and counseling, or animal behavior. Students interested in the M.A. degree should obtain information directly from the Department of Psychology.

Requirements for Admission

Students wishing to be admitted to the M.A. program should be familiar with the Requirements for Advanced Degrees. Applicants must have a baccalaureate degree from an accredited college or university. The minimum GPA is 2.75, although a substantially higher GPA is typical of successful applicants. The GRE General Test and Subject Test in Psychology are required. In addition, the decision to admit an applicant is based on letters of recommendation, relevant work or research experience, and completion of required prerequisite courses for each specialty. Both full- and part-time students are encouraged to apply.

Degree Requirements

Students are required to complete 24 semester hours of course work and either a thesis or an internship in an approved agency setting.

Further information can be obtained from the Department of Psychology, 556-8565.

Courses

PSY. 100-3. Introduction to Psychology. Introduction to the scientific study of behavior including an overview of motivation, perception, learning, personality, bio-psychology, human development, abnormal, and social psychology.

PSY. 209-3. Methods in Behavioral Science. A survey of methods used by behavioral scientists, including observation and measurement techniques, correlational studies, and experimental methods. Emphasis will be on the logic of each method and the interpretation of results. Statistical content is minimal.


PSY. 299-1 to 3. Topics in Psychology. Study of special topics to be selected by the instructor. May be repeated for credit.

PSY. 310-4. Introduction to Statistics. Research methods and analysis of data. Intended for those who plan to major in psychology. Prer. or coreq., PSY. 100 and MATH. 107.

PSY. 313-3. Organizational Psychology. A survey of the behavior of individuals in organizations. Topics include leadership and motivation theories; group dynamics; measuring, understanding and explaining job attitudes; analyzing and designing jobs; training and organizational development. Prer., PSY. 100.

PSY. 315-3. Industrial Psychology. Survey of the field of industrial psychology. Organizational structure, communication networks, personnel selection, training, stress, and human relations will be examined. Prer., PSY. 100 or other introductory psychology course.


PSY. 341-3. Psychology of the Asian in America. An introduction, combining lecture and discussion, of the psychological perspectives 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; S SC. 339 recommended.

PSY. 350-3. Psychology and the Law. Examines the legal and extralegal applications of psychology such as assessment of insanity and competence, psychologists as expert witnesses, accuracy of eyewitness accounts, and issues relating to employment discrimination.

PSY. 372-3. Developmental Psychology. Exploration of the biological influences on the development of brain and behavior. Emphasis is on evolution and development, the role of experience in prenatal and postnatal development, the ontogeny of sensory systems, learning and memory, and the biological bases of language acquisition.

PSY. 398-variable credit. Internship/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.

PSY. 399-1 to 3. Topics in Psychology. Study of special topics to be selected by the instructor. May be repeated for credit.

PSY. 405-3. Physiological Psychology. The morphological, neurochemical, and physiological bases of behavior. Prer., PSY. 100 and 6 additional hours of psychology.

PSY. 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 coreq., PSY. 405.


PSY. 414-3. Cognitive Psychology. Introduction to the study of human cognitive processes; the development of conceptual behavior, memory, and thinking. Prer., PSY. 100 and 6 additional hours in psychology, or consent of instructor.

PSY. 415-2. Laboratory in Cognitive Psychology. Laboratory projects demonstrating cognitive principles and behaviors. This class may be used to fulfill the advanced laboratory requirement in the psychology major. Prer. or coreq., PSY. 414.

PSY. 416-3. Psychology of Perception. The study of sensory processes and perceptual variables. Prer., PSY. 100 and 210 or 310.

PSY. 417-2. Laboratory in Perception. Demonstrations and experiments dealing with perception. Prer. or coreq., PSY. 416. May be used to fulfill the advanced laboratory requirement in psychology.

PSY. 421-1. Theories of Learning and Motivation.

PSY. 422-2. Laboratory in Learning. Laboratory projects demonstrating basic principles of operand 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 coreq., PSY. 322.

PSY. 425-3. Advanced Animal Behavior. (BIOL. 425.) Comparison of behavior in a variety of species, with emphasis on social behavior and its evolution.

PSY. 439-2. Laboratory in Animal Behavior. (BIOL. 439.) Laboratory projects and field observations of the behavior of animals. Prer. or coreq., BIOL./PSY. 225 or BIOL./PSY. 425.

PSY. 440-3. Theories of Social Psychology. General psychological principles underlying social behavior. Analysis of topics such as attitudes, group relations, leadership, conflict resolution, altruism. Prer., 6 hrs. of psychology or consent of instructor.

PSY. 441-3. Experimental Social Psychology. Readings and lectures focused on the formulation of researchable problems in social psychology. Prer., PSY. 100, 210, or 310; coreq., PSY. 444.

PSY. 444-2. Social Psychology Laboratory. Experimental methods of studying social psychological processes. Coreq., PSY. 441. May be used to fulfill the advanced laboratory requirement in psychology.


PSY. 449-3. Cross-Cultural Psychology. The influence of culture and subculture on personality, including sex roles, patterns of child rearing, attitudes and values, and mental illness. Prer., 6 semester hours of courses in psychology, sociology, and/or anthropology in any combination.


PSY. 466-3. Psychology of the Exceptional Child. Psychology of retarded, handicapped, and gifted children. The relation of special traits to educational and social needs. Prer., PSY. 100, a course in development or child psychology, and upper division standing.


Upper Division/Graduate Level

PSY. 409/509-3.1 Hormones and Behavior.

PSY. 412/512-3.1 Quantitative Genetics. (BIOL. 412/512.)

PSY. 413/513-3.1 Drugs and the Nervous System.

PSY. 499/599-1 to 3.1 Topics in Psychology. Advanced study of special topics to be selected by the instructor. May be repeated for credit. Prer., consent of instructor.

Graduate Level

PSY. 501-3. Proseminar in Advanced Developmental Psychology I. Survey of the normal developmental psychology and conditions affecting normal development. Prer., graduate standing or consent of instructor.


1Students enrolled at the 500 level may expect additional work and evaluation commensurate with graduate standards.
cytogenetics, quantitative genetics, developmental genetics, biochemical genetics, and evolutionary genetics.

**PSY. 514-3. Industrial Psychology.** An advanced survey of the field of industrial psychology. Prer., admission to graduate program in psychology or consent of instructor.

**PSY. 515-3. Seminar in Organizational Psychology.** A survey of traditional topics in organizational psychology including job attitudes, work motivation, and leadership. Current topics as defined by research in leading professional journals. Prer., undergraduate course in industrial or organizational psychology, graduate student status, or consent of instructor.

**PSY. 525-3. Animal Behavior.** (BIOL. 525.) Principles of behavior in a variety of animal species. Study of similarities and differences among animals. Prer., 6 hrs. of biology or psychology and graduate student status, or consent of instructor.

**PSY. 536-3. Introduction to Psychotherapy.** Survey of some of the major schools of psychotherapy, including psychodynamic, person-centered, rational-emotive, and family systems. Prer., admission to the graduate program in psychology or consent of instructor.

**PSY. 537-3. Exceptional Infant and Child.** An advanced survey of major types of exceptionality in infants and young children; description, prevalence, etiology, prognosis, assessment, and intervention. Prer., admission to the graduate program in psychology or consent of instructor.

**PSY. 545-3. Advanced Personality Theory.** Advanced topics in personality theory. Prer., admission to the graduate program in psychology or consent of instructor.

**PSY. 570-3. Applied Research Methods.** Exploration of the use of program evaluation in various applied psychology settings. Introduction to the use of the Statistical Package for Social Scientists in computer data analysis. Design of individual program evaluation proposals. Prer., admission to the graduate program in psychology or consent of instructor.

**PSY. 571-3. Advanced Statistical Methods.** Experimental design and analysis of controlled interventions and evaluations. Emphasis on multifactor analysis of variance, orthogonal contrasts, post-hoc tests, multiple regression, and analysis of co-variance. Prer., admission to the graduate program or consent of instructor.

**PSY. 573-3. Clinical Psychology: Ethics and Issues.** An overview of the field of clinical psychology. Problems of ability and adjustment will be addressed in terms of theory, diagnosis, and treatment. Prer., admission to the graduate program in psychology or consent of instructor.

**PSY. 583-3. Interviewing and Counselling.** Introduction to the theoretical and research basis for interviewing and counseling techniques. Limited to students who are admitted to the graduate program in psychology or consent of instructor.

**PSY. 585-3. Principles of Psychological Testing.** Principles underlying construction, validation, and use of tests of ability and personality.

**PSY. 598-4 to 8. Psychology Internship.** Half- or full-time placement in a setting which provides supervision by qualified professionals. Students will participate in screening, diagnosis, therapeutic intervention and/or evaluation and research. Prer., completion of 24 hours of course work in the CU-Denver graduate program in psychology.

**PSY. 603-3. Research Practicum.**

**PSY. 640-3. Child Assessment.** Psychometric theory and practice in assessment of children with focus on the Stanford-Binet, the DDST, WPPSI, and WISC-R. Prer., admission to the graduate program in psychology or consent of instructor.

**PSY. 641-3. Infant Assessment.** Psychometric theory and practice in assessment of infants, with focus on the Bayley Scales, and some attention to the Brazelton, McCarthy, etc. Prer., admission to the graduate program in psychology or consent of instructor.

**PSY. 642-3. Adult Assessment.** Psychometric theory and practice in assessment of adults. Focus on the WAIS and Stanford-Binet with some attention to tests of interests and aptitude. Report writing and ethical issues also will be covered. Prer., admission to the graduate program in psychology or consent of instructor.

**PSY. 671-3. Quantitative Methods II.** Multivariate statistics. Topics include canonical analysis, discriminate function analysis, and multiple regression. Prer., admission to graduate program in psychology or consent of instructor.

**PSY. 700-3 to 6. Master's Thesis.**

**Independent Study**

**PSY. 940-variable credit. Independent Study (Undergraduate).** Prer., consent of instructor.

**PSY. 950-1 to 6. 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 or consent of instructor.

**SOCIAL SCIENCE, MASTER OF**

**Director:** Richard H. Ogles
**Office:** UA Building, Room 712
**Telephone:** 556-2847

The Master of Social Science (M.S.S.) program is designed to meet the needs of students who prefer flexibility in constructing an individualized course of study in social science. The program is intended for students interested in exploring different social sciences in order to develop their own interdisciplinary perspectives in such areas as public policy, women's issues, urban problems, educational reform, cross-cultural studies, or politics. The participating disciplines are anthropology, economics, history, political science, psychology, social or economic geography, and sociology. Course work also may be chosen from such disciplines or colleges as communication, English, ethnic studies, philosophy, education, public affairs, and architecture and planning.

Within a flexible framework of degree requirements, faculty assist students to develop coherent programs which can provide: training for advancement in the professions of education, business, the helping professions, politics, or public service; a basis for further graduate study in a specific social science discipline or professional field; a means for teachers and other professionals to tailor degree programs to fit personal career development or on-the-job needs; and a nontraditional option for adults re-entering the academic world to pursue liberal educational goals in the social sciences. The M.S.S. is not intended as a substitute for professional clinical training and does not equip the students with the clinical skills needed to do psychotherapy.

**Requirements for Admission**

To qualify for regular admission, applicants must meet the general requirements of The Graduate School. Applicants must have completed a baccalaureate degree or its...
equivalent with an overall GPA of at least 2.75 of a possible 4.0 and at least 18 semester hours of course work in social science. Three letters of recommendation and two copies of official transcripts from all colleges and universities attended must be submitted as well as a statement specifying the purpose and goal of advanced study in the social sciences written in clear, effective English. Standardized test scores and samples of scholarly work are not required but will be considered if submitted. In addition, applicants must interview with the M.S.S. director to discuss study plans. An appropriate substitute for the interview may be arranged for out-of-state applicants. An applicant whose GPA is below 2.75 may be admitted as a provisional graduate student if the complete academic record indicates a high probability of success. Applications are reviewed for Fall, Summer, and Spring Semester admission. Applications and all accompanying documents must be submitted at least three months prior to the start of the semester for which the applicant is applying. Application forms and further information may be obtained from The Graduate School at (303) 556-2663. Foreign students should return their application materials directly to The Graduate School.

Program Requirements

The M.S.S. is a 36-hour program, of which 30 hours must meet all specifications of The Graduate School. There are two required core seminars: S SC. 501 and 502. A maximum of six credits may be taken for thesis credit or as S SC. 610 to complete a research project, an internship or a work-related project. The remaining 24 hours may be individually structured with the approval of the student's advisory committee and the director of the M.S.S. program.

REQUIRED COURSES

S SC. 501-3. Philosophical Problems in the Social Sciences. Exploration into the fundamentals of the conduct of inquiry; concept formation and theory construction in the social sciences; issues related to value judgments and objectivity, social praxis, human nature, etc.

S SC. 502-3. Theoretical and Research Perspectives in the Social Sciences. Exploration of the theoretical and research perspectives of the following disciplines; anthropology, economics, history, political science, psychology, social or economic geography, and sociology. Implications drawn for an interdisciplin ary, integrated social science.

S SC. 503-3. Seminar: Studies in Political Economy. This graduate level exploration of competing paradigms in political economy is a core seminar for students seeking a concentration in political economy and an elective for students in related graduate programs. The seminar focuses on linkages between economy, politics, and culture.

S SC. 610-1 to 6. Guided Research in Social Science. Nonthesis research in social science to include internships, field work, job-related projects, and thesis-like research, with accompanying documentation for M.S.S. comprehensive examination. Restricted to graduate students in the Master of Social Science Program.

Recommended General and Interdisciplinary Courses in the Social Sciences

The following courses do not require substantial background in a given discipline. For more advanced courses suitable for those who have somewhat more background in the discipline, see the course listing of the particular discipline.

ANTHROPOLOGY

ANTH. 502-3. Medical Anthropology
ANTH. 517-3. Human Ethology
ANTH. 544-3. Urban Anthropology
ANTH. 551-3. Applied Cultural Anthropology
ANTH. 555-3. Cultural Dynamics
ANTH. 559-3. Comparative Social Organization
ANTH. 581-3. Language and Culture
ANTH. 609-3. Seminar: Comparative Social Systems
ANTH. 613-3. Interdisciplinary Seminar
ANTH. 650-3. Seminar: Contemporary Culture Theory
ANTH. 651-3. Seminar: Research Techniques in Cultural Anthropology

ECONOMICS

ECON. 320-3. Women and Economics
ECON. 417-3. Comparative Socialism
ECON. 509-3. History of Economic Thought
ECON. 519-3. Radical Political Economy
ECON. 520-3. Modern Radical Political Economy
ECON. 525-3. Urban Economics
ECON. 553-3. Resource Economics
ECON. 555-3. Energy Economics
ECON. 571-3. Comparative Economic Systems
ECON. 592-3. Markets and Planning
ECON. 592-3. The United Nations Reappraised
ECON. 609-3. Critical Evaluation of Economic Theory
ECON. 610-3. The Classical and Radical Economic Traditions
ECON. 625-3. Urban Economics

HISTORY

HIST. 511-3. Nineteenth Century England
HIST. 512-3. Twentieth Century England
HIST. 518-3. French Revolution and Napoleon
HIST. 527-3. Reform and Revolution in Russia, 1860-1917
HIST. 528-3. The Soviet Regime
HIST. 540-3. The American Southwest
HIST. 542-3. Women in U.S. History
HIST. 543-3. Urban America
HIST. 545-3. U.S. Foreign Policy Since 1912
HIST. 546-3. U.S. Society and Thought to 1860
HIST. 553-3. The American Colonies to 1750
HIST. 554-3. The American Revolution
HIST. 559-3. U.S., 1900-1945
HIST. 560-3. U.S. Since 1945
HIST. 567-3. The American Family
HIST. 580-3. Southern Africa
HIST. 611-3. Readings in European History
HIST. 658-3. Readings in U.S. History, 1865-1900
HIST. 659-3. Readings in U.S. History, 1900-1945
HIST. 681-3. Readings in African History

POLITICAL SCIENCE
P SC. 414-3. Advanced Countries of Latin America
P SC. 421-3. The United Nations Reappraised
P SC. 444-3. Contemporary Culture and Politics in America
P SC. 462-3. Comparative Socialism (Cuba)
P SC. 511-3. Seminar: Political Development
P SC. 513-3. Seminar: Latin America
P SC. 515-3. Seminar: Political Economy of the Marxist Socialist States
P SC. 540-3. Seminar: Topics in the History of Political Thought
P SC. 541-3. Seminar: Selected Political Theories (Marxist Theory)
P SC. 561-3. Seminar: Chinese Development
P SC. 562-3. Gender and Society
P SC. 594-3. Seminar: Political Psychology

PSYCHOLOGY
PSY. 440-3. Theories of Social Psychology
PSY. 441-3. Experimental Social Psychology
PSY. 449-3. Cross-Cultural Psychology
PSY. 515-3. Seminar in Organizational Psychology
PSY. 599-1 to 3. Topics in Psychology:
   (1) Experimental Social Psychology, and
   (2) Advanced Psychological Legal Issues

SOCIAL OR ECONOMIC GEOGRAPHY
GEOG. 561-3. Geography of Cities
GEOG. 563-3. Transportation: Structure and Policies
GEOG. 565-3. Location Analysis

SOCIOMETRY
SOC. 518-3. Seminar: Secondary Analysis
SOC. 533-3. Seminar: Communities in Large Societies
SOC. 544-3. Seminar: Social Stratification
SOC. 571-3. Seminar: Political Sociology
SOC. 576-3. Modern Marxist Social Theory
SOC. 578-3. Seminar: The Sociology of Work Location
SOC. 581-3. Seminar: The Professions in Society
SOC. 590-597-3. Studies in Special Topics

Requirements for the Major. A major in sociology is accomplished by completing a general core of 19 hours and 15 hours of electives in sociology for a total of 34 hours with an average grade of C in all courses. At least

Telephone: 556-3557
Faculty: Professors: M. Jay Crowe, Karl H. Flaming, Richard H. Ogles, Daniel J. Schler
Associate Professors: Richard H. Anderson, W. I. Griffith, Marilyn Stember

Undergraduate
Sociology is the scientific study of groups, social process, and behavior. The major in sociology is designed to familiarize the student with these areas through an understanding of theory, method, and statistical procedures employed within them. Concentration is possible at the undergraduate level. However, the faculty believes the undergraduate should have a foundation in the basics of the discipline upon which to build a future specialization. Such specialization is more appropriate at the advanced levels.
An undergraduate major in sociology will provide a good concentration for the student seeking a B.A. degree. Many career opportunities combine this foundation in sociology with business, computer science, or community development. Opportunities within the field of sociology proper usually require graduate study. The major will prepare the student for such advanced work as well as for pursuit of career options with only the B.A. degree. For example, graduates with a sociology B.A. are employed in the human services fields and with state and local government agencies.
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.

SOCIETY
Chair: M. Jay Crowe
Department Office: UA Building, Room 610

Faculty: Professors: M. Jay Crowe, Karl H. Flaming, Richard H. Ogles, Daniel J. Schler
Associate Professors: Richard H. Anderson, W. I. Griffith, Marilyn Stember

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   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 the Major. A major in sociology is accomplished by completing a general core of 19 hours and 15 hours of electives in sociology for a total of 34 hours with an average grade of C in all courses. At least
13 of the 34 hours must be upper division (300-400 level) courses. The maximum number of hours allowed is 48.

1. Core Courses. The core consists of the following group of courses, all of which must be completed with a grade of C or better:

SOC. 100-3. Introduction to Sociology
SOC. 300-3. Urban Sociology
SOC. 311-3. Introduction to Research Methods
SOC. 312-4. Introduction to Statistics
SOC. 415-3. History of Sociological Theory
SOC. 416-3. Contemporary Sociological Theory

All prospective majors should contact the department as early in their academic careers as possible for information and for assignment to an adviser. Transfer or returning students should consult with the department chairman concerning completion of the core courses.

The department requires that at least 12 hours of sociology be taken from CU-Denver faculty. SOC. 311, 312, 415, and 416 must be taken from University of Colorado faculty.

Note: The Paralegal Certificate Program is offered in cooperation with Community College of Denver. Students interested in this program should talk with the chairman of the sociology department about the specifics of the Paralegal Certification program as part of the sociology major.

Graduate

The M.A. degree in sociology offered at CU-Denver has an urban focus with an applied emphasis. The urban sociology program is designed to complement professional degree programs in design and planning, 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 2.75 for all courses taken as an undergraduate or graduate prior to admission.

3. A combined grade-point average of at least 3.0 for all courses taken in sociology as an undergraduate or graduate prior to admission.

4. Three letters of recommendation.

5. A statement specifying the purpose and goal of advanced study.

Degree Requirements

1. Completion of a minimum of 25 semester hours of approved graduate work plus a thesis to meet the requirements of the Plan I option or of 30 semester hours of approved graduate work to meet the requirements of the nonthesis Plan II option.

2. Sociological theory — 3 hours.

3. Research methods — 3 hours.

4. Profession of sociology — 2 hours.

5. Secondary data analysis — 3 hours.

6. Passing of comprehensive final examination.

For further information contact the graduate director, 556-2617.

COURSES

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. 102-3. Contemporary Social Issues. Consideration of controversial issues from various sociological perspectives: alienation, degradation of work, racism, sexism, ageism, class exploitation, social control, oppression and repression, imperialism, and underdevelopment. Student nomination and exploration of issues salient to him/her are encouraged.

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. 105-3. Analysis of Modern Society. Examination of various sociological views of modern society including those of Lundberg, Mills, Riesman, Goffman, Sorokin, Cohen, and others.

SOC. 119-3. Deviance. Study of the processes by which nonnormative behavior, interpersonal relations, and groups of organizations are labeled in subcultures and society.

SOC. 202-3. Race and Ethnic Relations. (ETST. 202.) Race and ethnicity, facts and myths about great populations, including social and cultural sources of bias and discrimination.

SOC. 221-3. Human Ecology. Ecological organization and process in urban, rural, and regional areas.

SOC. 222-3. Population and Societies. Elements of demography, natality, mortality, international and internal migration, population growth, and population policy.

SOC. 248-3. Social Movements. Social bases and development features of such modern social and political movements as communism, socialism, liberalim, and conservatism.
SOC. 250-3. 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. 300-3. Urban Sociology. The city and urban society are examined in terms of social structure, residential and institutional patterning, process of interaction, demographic processes, and patterns of growth and change.
SOC. 304-3. Sociology of the Family. The family as a social institution. Historical development and contemporary cross-cultural analysis with emphasis on the contemporary American family.
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 societal levels.
SOC. 310-3. Women in the Labor Market. An analysis and assessment of the current labor market for women in the Denver metropolitan area. Sociological principles are used to examine job-search strategies. Emphasis is given to those skills that women may be unaware they have.
SOC. 312-4. Statistics. (ANTH. 405. ECON. 381.) Quantitative techniques used in analyzing social phenomena. Prer., MATH. 107 or its equivalent, or consent of instructor.
SOC. 343-3. Communities in Large Societies. Examines various ways of studying community behavior in metropolitan, city, and small town settings. Students will have an opportunity to apply theory to an examination of an area of their concern within the community.
SOC. 360-3. Social Relations. The course has two aims: first, to improve the students' abilities to observe, analyze, and understand their own behavior and that of others in everyday interpersonal situations; and second, to improve their ability to see the small group as a social system. Students are expected to demonstrate their abilities by effective participation in their group as well as in periodic written analyses.
SOC. 361-3. Sociology of Religion. This course is designed to introduce the student to the fundamental tenets of the sociology of religion with a basic emphasis on present-day religious cults, their beliefs, and activities in society.
SOC. 371-3. Class, State, and Social Policy. 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. 384-3. Environment and Behavior. Focuses on the influence of both natural and man-made environments upon human behavior and social organization.
SOC. 385-391-3. Topics in Sociology. Special topics in sociology to be selected by the instructor. Can be taken more than once when topics vary.
SOC. 398-variable credit. Internship/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. 409-variable credit. Research Practicum. Practical experiences for undergraduates in application of principles of research design and data processing to a social research problem selected by the instructor. Consent of instructor required.
SOC. 410-3. Social Assessment. This course will offer a broad survey of social assessment with a focus on the methodology, practice, and application. Special emphasis is given to the use of assessment in the examination of the social impact associated with development, natural resources, and energy products.
SOC. 415-3. History of Sociological Theory. An analysis of the major contributions and determinants of earlier social analysts to present-day social thought and analysis of pertinent sociological issues.
SOC. 416-3. 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 work of contemporary sociological theorists.
SOC. 421-3. Human Ecology: Energy and Society. A study of the distribution of human populations in physical and social space. Attention is directed to energy and productive forces as they shape and are shaped by the social organization of communities and societies.
SOC. 422-3. Population Change and Analysis. The sociological importance of population study. Advanced demographic analysis and population theory. Natality, mortality, problems of population growth and international and internal migrations, population policy, and aspects of population planning and control.
SOC. 423-3. 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. 443-3. Societies in Transition. Description and analysis of changing social structure and social relationships as a response to technological innovation and change.
SOC. 444-3. Social Stratification. The relations among the concentration of income and wealth, economic organization and power, poverty and class phenomena in the United States.
SOC. 450-3. Advanced Study of U.S. Social Problems. Explanation of U.S. social problems arising out of class struggle between capitalists and wage workers as expressed in the following institutional areas: control of the labor process, poverty and equality, military spending and welfare, education, criminal justice system, child care, health care, racism, and sexism.
SOC. 451-3. Advanced Study of Social Change. Historical change of societies from one epoch to another (e.g., from feudalism to capitalism) and from one stage to another (e.g., from competitive capitalism to monopoly capital) with focus on attendant social processes such as development of the working class, the rise of the corporation, the expanding role of the state, the irrationality of growth, and economic crises and imperialism.
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. 471-3. Political Sociology. The analysis of political processes in modern society with emphasis on sociological conceptions of power, structure, and processes, at the community, national, and international units of analysis.
SOC. 475-3. Bargaining and Negotiation Strategies. This course will focus on the fundamentals of bargaining and negotiation strategies in organizational settings. The analysis will be confined primarily to the social psychological perspective with some emphasis on political influence in organizations.
SOC. 486-3. Aging, Society, and Social Policy. The role of the aged in today's society. Emphasizes interrelationships of the aged with the family, community, work, retirement, and leisure.
SOC. 489-3. Mental Health and Society. Mental health in historical perspective, its relation to social class and the bearing of communication and value systems. The structures of mental health services in the United States.
SOC. 490-497-3. Studies in Special Topics. Advanced study of special topics in sociology to be selected by the instructor. May be repeated for credit when topics vary.

Graduate Level
SOC. 500-3. Proseminar in Sociology I. Systematic review of classical subject matter and issues in sociology. Restricted to M.A. graduate students in sociology or consent of instructor.
SOC. 501-3. Proseminar in Sociology II. Contemporary sociological theory and theory construction. Restricted to M.A. graduate students in sociology or consent of instructor.
SOC. 502-3. Seminar: Research Methods. Problems and procedures in research design, data collection, and processing. Restricted to M.A. graduate students in sociology or consent of instructor.
SOC. 503-3. Seminar: Research Methods. Practical application 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 or consent of instructor.
SOC. 507-3. Research Practicum in Dialectical and Historical Methods. An introduction to dialectical logic and methods for use in the analysis of historical data will be followed by the formulation of group and/or individual research projects to be completed during the semester.
SOC. 509-variable credit. Research Practicum. Consent of instructor required.
SOC. 510-3. Sociology of Assessment. Seminar concerned with methods of assessing action programs. Basic principles of research design, measurement, and administration will be applied to situations likely to be encountered when research is conducted in an action setting. Extensive case material will be utilized.
SOC. 516-3. Seminar: Contemporary Sociological Theory II. Study of contemporary sociological theory with emphasis on how it applies to related fields.
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. 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 change, etc.


SOC. 544-3. Seminar: Social Stratification. Historical development of various systems of production of social surplus and its differential 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. 576-3. Seminar: Modern Marxist Social Theory. An exposition and analysis of recent Marxist social thought. Consideration is given to modern Marxist theories of class structure, political economy, alienation, culture, and the state.


SOC. 580-3. Seminar: The Sociology of Occupations and Professions. This course will be concerned with an intensive and in-depth analysis of selected occupational roles, structures, characteristics, and trends.


SOC. 584-variable credit. Guided Research in Sociology. Consent of instructor required.

SOC. 585-1. Seminar: Profession of Sociology.


SOC. 590-597-3. Studies in Special Topics. Advanced study of special topics in sociology to be selected by the instructor. May be repeated for credit when topics vary.


Independent Study

SOC. 940-variable credit. Independent Study in Sociology (Undergraduate). Consent of instructor required.

SOC. 950-variable credit. Independent Study in Sociology (Graduate). Consent of instructor required.

TECHNICAL COMMUNICATION, MASTER OF SCIENCE

Office: 1061 9th St.
Telephone: 556-8479

The M.S. in Technical Communication prepares students for professional careers as technical communication specialists in business, industry, education, and government. With a background that combines a theoretical perspective and practical experience, graduates of this program will be able to produce documents that clearly communicate complex, often highly technical, subject matter. They will be prepared to design, write, edit, and produce a wide range of technical documents, including manuals, reports, proposals, brochures, contracts, and regulations. The curriculum draws from the expertise of an interdisciplinary faculty in English, psychology, engineering, communication, graphic arts, and business, thus encouraging applications from students from diverse academic and professional backgrounds. The intent of the program is to produce professional writers who can identify and solve communication problems. For more information, students should contact the graduate adviser at 556-8479 or 556-8304.

Requirements for Admission

For admission to the M.S.T.C., students must have a B.A. or B.S. degree from an accredited institution with a grade-point average of at least 3.0 and satisfactory scores on the GRE verbal and quantitative examinations. Those with little or no training or experience in technical communications may be required to take course work at the undergraduate level before completing the graduate program.

Degree Requirements

All students must complete 30 semester hours of course work, including 21 hours of required courses:

T. C. 540. Technical Communication: Writing
T. C. 550. Technical Communication: Editing
T. C. 560. Rhetorical Theory for Technical Communication
T. C. 580. Technical Communication: Graphics
T. C. 610. Special Topics in Technical Communication
T. C. 620. Research in Technical Communication

BUS. 610. Management Information Systems

Students must also complete six elective hours in a related field, such as computer science, communication, journalism, or psychology.

Students with no work experience in technical communication are required to complete a supervised practicum in a technical communication or similar corporate department. Students with work experience must complete a master's thesis.

After completing the required course work, students must successfully complete a comprehensive examination.
T C. 560-3. Rhetorical Theory for Technical Communication. Examination of the principles and applications of rhetorical theory and its relationship to technical communication. Students examine the origins of traditional rhetoric, including the oral tradition and product-oriented rhetorics; modern rhetoric, including cognition- and process-oriented rhetorics; and apply the theory learned to contemporary issues of document design.

T C. 580-3. Technical Communication: Graphics. This course instructs technical communicators in designing information that communicates visually as well as verbally. Students focus on document design, illustration, information retrieval, desktop publishing, and working with typesetters, printers, and graphic artists. Prer., T C. 540 or consent of instructor.

T C. 589-3. Internship in Technical Communication. The internship permits students with no previous work experience in technical communications to participate in a supervised work experience as a technical writer, editor, or in another professional capacity in industry or government. The internship may not be taken by students presently working as technical communicators. Prer., students must have completed all required course work in the M.S.T.C. degree program and passed the comprehensive examination. Consent of the program director is required.

T C. 610-3. Special Topics in Technical Communication. Students examine in depth a special topic related to the study of technical communication. The specific special topics courses vary from semester to semester, but have included computer documentation, instructional design, cognitive psychology, and linguistics. Prer., T C. 540 and 550 or consent of instructor.

T C. 620-3. Research in Technical Communication. This course introduces students in the M.S.T.C. program to bibliographical study in technical communication, research methodology, and provides direction on preparing a "mini" master's thesis. This course is cross-listed with CMMU. 601. Students should not take this course until they are prepared to plan their internship or master's thesis. Prer., T C. 540, 550, and 560.

T C. 700-1 to 3. Master's Thesis. Prer., students must have completed all required course work in the M.S.T.C. degree program and passed the comprehensive examination. Consent of the program director is required.

T C. 950-3. Readings in Technical Communication. This course is available for students preparing for the comprehensive examination, but does not qualify as an elective in the M.S.T.C. program. Students will be supervised by a member of the graduate faculty in reading and reviewing major works in technical communication and related fields. Prer., T C. 540, 550, and 560.

1Subject to approval.
ARMY ROTC

Head of Program: LTC Ben R. Tilley
Office: Rectory Office Building, Room 200
Telephone: 556-3490

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

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 (556-3490) 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 or similar organizations may have a portion or all of the basic course requirements waived by the Professor of Military Science.

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 (MIS 204), or by completion of a specially designed compression course offered during the Spring Semester. 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.

COMPRESSION COURSE

MIS. 204. This course is specially designed to allow students who are second semester freshmen or sophomores to complete Military Science I and II requirements during one semester. Students then complete Military Science III and IV during their next four semesters. The course is offered during Spring Semester. Students should contact the Department of Military Science for specific requirements and options.

Scholarships

Army Reserve Officers’ Training Corps. The Department of Military Science offers students three-year and two-year scholarships. These scholarships cover all tuition and fees, an amount for books and supplies, and they provide a tax-free monthly stipend of $100. All advanced-course students (those enrolled in upper division courses) receive the $100 stipend. Upon completion of the ROTC curriculum, students are eligible for a commission in the Reserves, National Guard, or active Army.

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- and two-year scholarships. All scholarship benefits are tax free, and competition is open to both men and women. For more information call 556-3490, or visit the office, 200 Rectory Office Building.

Flight Training

Students selected for the advanced course may become qualified, as cadets, to participate in the Army Aviation Program. After completion of their Officer’s Basic Course during active duty, these individuals will attend Flight School.

Army ROTC Course Credit

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.

GRFD GUARANTEED RESERVE FORCES DUTY

This program provides for a guarantee that the student's obligation upon commissioning will be fulfilled as a member of the Army Reserve or National Guard instead of active duty.

COURSES

MIS. 101-2. Introduction to Military Science I. This is an introductory course which presents the basic makeup of the
U.S. Army, the special duties and responsibilities inherent in acceptance of a commission, and basic military skills.

**MIS. 102-2. Introduction to Military Science II.** This course continues development of student's basic military knowledge and skills of military subjects begun in MIS 101.

**MIS. 201-3. Introduction to Leadership and Management I.** This course continues development of student's basic military skills while examining the role of the leader in formal and informal organizations. Individual motivation, attitude formation, socialization, and inter-personal communications are also covered.

**MIS. 202-3. Introduction to Leadership and Management II.** This course develops basic management skills in the context of the military organization while refining basic military skills necessary to enter upper division military science courses.

**MIS. 204-4. Introduction to Military Science and Leadership.** An introduction to the U.S. Army covering organization, duties, responsibilities, traditions of service, professionalism, and ethics of service. Leadership theories, motivation, communication, group development, and theories of organization will also be covered. This course is specifically designed to qualify students for upper division military science courses.

**MIS. 301-2. Control Aspects of Small Unit Operations I.** Designed to provide the student with an extensive exposure to ROTC advanced camp subject matter. Classroom exercises are used to present small unit tactics, communications, military skills, and practical leadership experience.

**MIS. 302-4. Control Aspects of Small Unit Operations II.** Designed to provide the student with an extensive exposure to advanced camp subject matter. Classroom and field training exercises are used to expose the student to small unit tactics, communications, military skills, and practical leadership experience. Prer., MIS 301, 303, and consent of instructor.

**MIS. 303-1. Leadership Practicum.** A practical laboratory course complementing MIS 301 which emphasizes student performance in drill and ceremonies, physical conditioning, and orientation for the third year military science student. Prer., consent of instructor.

**MIS. 305-5. Summer Practicum.** A 6-week summer practicum which will provide the advanced course cadet with the field experience and knowledge required to develop the managerial and leadership skills essential to the commissioned officer. (Advanced camp credit is optional.)

**MIS. 401-2. Seminar in Officer Development I.** Discusses subjects which prepare the student to make a smooth transition into the U.S. Army. Topics include customs and courtesies of the service, financial planning, promotion policy, current defense issues and the status of our military posture. Prer., completion of MIS. 300-level course requirements.

**MIS. 402-2. Seminar in Officer Development II.** Contains subjects designed to develop and prepare the student for commissioning and initial duty with the active Army or Reserve Forces; assignments, career development, military justice, and benefits of military service. Prer., completion of MIS. 300-level course requirements.

**MIS. 403-1. Leadership Practicum. Fall semester.** Practical application of the fundamentals of military drill and ceremonies, mountaineering and rappelling, land navigation, physical training, and other challenging activities. Prer., completion of MIS. 300-level course requirements.

**MIS. 404-1. Leadership Practicum. Spring semester.** Students will plan and conduct training for 100 and 200-level cadet laboratories during the spring semester. Emphasis is on planning and coordinating resources and evaluating training.

**AIR FORCE ROTC**

**Department Office:** Folsom Stadium, CU-Boulder
**Telephone:** 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 completion of 12 hours of the professional officer course and a six-week summer training program.

**Standard Four-Year Program**

This program is offered to full-time, regularly enrolled degree students at the undergraduate level. The 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 leadership laboratory (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 when they enroll. Selection is on a competitive basis. Applicants should apply directly to the Professor of Aerospace Studies not later than January 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.

**Leadership Lab**

All students enrolled in AFROTC must attend Leadership Lab (one hour per week). The laboratory involves a study of Air Force customs and courtesies, drill and ceremonies, career opportunities, and life and work of an Air Force junior officer.

**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 allowance, 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, two and one half, three, and three and one half year scholarships open to both men and women.

**AFROTC Course Credit**

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

Supplemental Courses and Language Requirements

All AFROTC scholarship students in the General Military Course must successfully complete a course in English composition before they can advance to the Professional Officer Course.

All AFROTC scholarship students must also successfully complete a course in an Indo-European or Asian language prior to commissioning. All Professional Officer Course students must successfully complete a course in mathematical reasoning prior to commissioning.

COURSES

AIR. 101-1. Development of Air Power I. One 1-hr. lect. and one 1-hr. lab. per wk. This course is a study of air power from balloons and dirigibles through the jet age; a historical review of air power employment in military and nonmilitary operations in support of national objectives; and a look at the evolution of air power concepts and doctrine.

AIR. 102-1. Development of Air Power II. A continuation of AIR. 101. One 1-hr. lect. and one 1-hr. lab. per wk.

AIR. 201-1. The Air Force Today I. One 1-hr. lect. and one 1-hr. lab. per wk. This course deals with the Air Force in the contemporary world through a study of the total force structure, strategic offensive and defensive forces, general purpose forces, and aerospace support forces.

AIR. 202-1. The Air Force Today II. One 1-hr. lect. and one 1-hr. lab. per wk.

AIR. 301-3. Air Force Management and Leadership I. Two 1½-hr. seminars plus one 1-hr. lab. per wk. An integrated management course emphasizing concepts and skills required by the successful manager and leader. The curriculum includes individual motivational and behavioral processes, leadership, communication, and group dynamics, providing the foundation for the development of the junior officer's professional skills (officership). Course material on the fundamentals of management emphasizes decision making and the use of analytic aids in planning, organizing, and controlling in a changing environment. Organizational and personal values (ethics), management of change, organizational power, politics, and managerial strategy and tactics are discussed within the context of military organization. Actual Air Force case studies are used throughout the course to enhance the learning and communication process.

AIR. 302-3. Air Force Management and Leadership II. Two 1½-hr. seminars and 1-hr. lab. per wk. A continuation of AIR 301. Basic managerial processes are emphasized, while group discussions, case studies, and role playing as learning devices are employed. Emphasis on communicative skills development is continued.

AIR. 401-3. National Security Forces in Contemporary American Society I. Two 1½-hr. seminars and one 1-hr. lab. per wk. This course is a study of U.S. National Security Policy which examines the formulation, organization, and implementation of national security policy; context of national security; evolution of strategy; management of conflict; and civil-military interaction. It also includes blocks of instruction on the military profession/leadership and the military justice system. This course is designed to provide future Air Force officers with background of U.S. National Security Policy so they can effectively function in today's Air Force.

AIR. 402-3. National Security Forces in Contemporary American Society II. Two 1½-hr. seminars and one 1-hr. lab. per wk. A continuation of AIR 401. Special themes include defense strategy and conflict management, formulation/implementation of U.S. defense policy, and organizational factors and case studies in policymaking, military law, and uniform code of military justice.
“CU-Denver — where knowledge meets joy in music making.”

— William L. Fowler
Professor of Music

Bill Porter, director of the audio engineering program, shows a music student how to operate a Neve console.
College of Music

Acting Resident Dean: Roy A. Pritts
College Office: Arts Building, Room 288
Telephone: 556-2727

Faculty: Professors: William L. Fowler, Franz L. Roehmann
Associate Professors: Walter L. Barr, Zoe B. Erisman, Roy A. Pritts
Assistant Professors: Donald C. Gorder, Frank J. Jer-...
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>Units</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>4</td>
</tr>
<tr>
<td><strong>Total</strong></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 freshman and undergraduate transfer students. In lieu of the personal audition, applicants may substitute tape recordings (about ten minutes in length) and a statement of music reading competence from a qualified teacher. Interested students should write to the College of Music, CU-Denver, for audition applications.

**ACADEMIC POLICIES**

**Residency Requirements**

The College of Music requires that 56 of the hours required for graduation must be completed in residence. This total may be reduced by the faculty because of excellent work done at CU-Denver and because of high scholarship exhibited at previous institutions attended. In no case shall the minimum be fewer than 40 hours distributed over three semesters.

**Ensembles**

All music majors enrolled for 6 credits or more each semester are required to enroll in an ensemble. Non-music majors are invited to audition for any of the CU-Denver music ensembles. Each carries 1 semester hour of credit. Some of these groups have more than one section, depending upon skill level: Electronic Music Ensemble, Jazz Ensemble, New Music Ensemble, The New Singers, Fusion Ensemble, Dixie Ensemble, Chamber Music (various), Percussion Ensemble, Brass Ensemble, and jazz-rock groups.

**Facilities Fee**

All music majors are required to pay a $24 facilities fee at the time of registration. Non-music majors will be assessed a similar fee when registering for selected technical courses (see course descriptions).

**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 Resident Dean, College of Music. All applied music courses are restricted to music majors only.

**UNDERGRADUATE**

Bachelor of Science in Music degree 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.

**Required Courses in Music**

<table>
<thead>
<tr>
<th>Course</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. 201, Contemporary Styles</td>
<td>3</td>
</tr>
<tr>
<td>MUS. 180, 181, History and Literature of Music I</td>
<td>4</td>
</tr>
<tr>
<td>MUS. 380, 381, History and Literature of Music II</td>
<td>6</td>
</tr>
<tr>
<td>PMUS. 102, Class Piano (see note 1)</td>
<td>4</td>
</tr>
<tr>
<td>Applied Music (see note 2)</td>
<td>8</td>
</tr>
<tr>
<td>Ensembles</td>
<td>8</td>
</tr>
<tr>
<td>Music electives (see note 3)</td>
<td>6</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>48-51</strong></td>
</tr>
</tbody>
</table>

**Required Courses in Media and Business**

<table>
<thead>
<tr>
<th>Course</th>
<th>Semester Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>MUS. 290, 291, The Music Business</td>
<td>6</td>
</tr>
<tr>
<td>MUS. 254, Sound Reinforcement and Recording I</td>
<td>3</td>
</tr>
<tr>
<td>MUS. 256, Electronic Music I</td>
<td>3</td>
</tr>
<tr>
<td>B AD. 100, Introduction to Business</td>
<td>3</td>
</tr>
<tr>
<td>MUS. 247, Music on Personal Computer</td>
<td>3</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>18</strong></td>
</tr>
</tbody>
</table>

**Required Courses in General Studies**

<table>
<thead>
<tr>
<th>Course</th>
<th>Semester Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>English (composition, literature)</td>
<td>6</td>
</tr>
<tr>
<td>Social Science</td>
<td>6</td>
</tr>
<tr>
<td>Humanities (fine arts and philosophy particularly recommended)</td>
<td>6</td>
</tr>
<tr>
<td>Natural and Physical Science</td>
<td>6</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>24</strong></td>
</tr>
</tbody>
</table>

**Credits in Electives (from any area)**

**Credits in Area of Concentration**

<table>
<thead>
<tr>
<th>Course</th>
<th>Semester Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Total Semester Hours Required</strong></td>
<td><strong>124-131</strong></td>
</tr>
</tbody>
</table>
Note 1: Piano majors must take 3 semesters of PMUS. 103 Piano class; Piano Majors in place of this requirement.
Note 2: Guitar majors are required to take 2 semesters of PMUS. 158 Fingerboard class in addition to applied requirement.
Note 3: May not include applied music courses.

AREAS OF STUDY

When students are approaching completion of courses in the core curriculum, they are to select an area of study in consultation with an adviser. An area of study is to be selected from the following:

Emphasis in Scoring and Arranging Semester Hours

MUS. 207. Instrumentation ........................................ 2
MUS. 303. Scoring and Arranging I ................................ 2
MUS. 305. Elementary Composition ................................ 2
MUS. 401 or 402. Counterpoint ........................................ 2
MUS. 403. Scoring and Arranging II ................................. 3
MUS. 406. Analysis I .................................................. 2
MUS. 420. Composition ................................................ 3
Applied music (2 semesters) ........................................... 4
Composition recital .................................................... 0
Music electives1 ......................................................... 4
Total ........................................................................ 24

Elective Studies in Sound Synthesis and Recording Technology

MUS. 455. Sound Reinforcement and Recording II ............... 3
MUS. 457. Electronic Music II ........................................... 3
PHYS. 362. Sound and Music ............................................ 3
MUS. 450, 451. Recording Lab ........................................... 2
MUS. 452, 453. Electronic Music Lab ................................... 2
Field work/special studies/technical electives ....................... 9
Total ........................................................................ 22

Elective Studies in Music Management

MUS. 490. Music Management ......................................... 3
MUS. 491. Music Production ............................................. 3
ACCT. 200. Introduction to Financial Accounting ............. 3
ECON. 300. Principles of Economics ............................... 3
MK. 300. Principles of Marketing ..................................... 3
FIN. 305. Basic Financing ............................................... 3
BL. 300. Business Law ................................................... 3
Senior project ............................................................. 4
Total ........................................................................ 25

Emphasis in Performance

Applied music (four semesters) ......................................... 12
Junior and senior recitals ................................................ 0
MUS. 406. Analysis ....................................................... 2
MUS. 328. Contemporary Improvisation .......................... 2
MUS. 480. Research Project ............................................. 2
Music electives1 ......................................................... 4
Total ........................................................................ 22

PERFORMANCE REQUIREMENTS

Students are required to include applied music study of their principal performing medium (instrument or voice) from the outset of their studies at CU-Denver. Students are required to pass a performance proficiency examination at the end of their fourth semester of study.

All majors taking applied music must perform solo at least once a semester. General recitals are scheduled throughout the semester.

ENSEMBLE REQUIREMENT

A total of 8 semester hours in ensemble participation is required. Music majors enrolled in 6 credit hours or more are required to register for an ensemble. Students should acquire experience in both large and small ensembles, vocal and instrumental, in accordance with their capabilities and interests.

MODEL SCHEDULE

A recommended schedule for all freshman music students is the same.

FRESHMAN YEAR

Fall Semester Semester Hours
MUS. 100 and 102. Theory I ........................................... 4
MUS. 180. History and Literature of Music I ..................... 2
MUS. 290. Music Business ............................................. 3
PMUS. 102. Class Piano ............................................... 1
General Studies ......................................................... 3
Applied music ............................................................ 2
Ensemble ................................................................. 1
Total ........................................................................ 16

Spring Semester

MUS. 101 and 103. Theory I ........................................... 4
MUS. 181. History and Literature of Music II .................... 2
MUS. 291. Music Business ............................................. 3
PMUS. 102. Class Piano ............................................... 1
General Studies ......................................................... 3
Applied music ............................................................ 2
Ensemble ................................................................. 1
Total ........................................................................ 16

The schedules of sophomore, junior, and senior music students vary according to their areas of concentration.

GRADUATE

The College of Music of the University of Colorado is a multi-campus system with music degree offerings at the Denver and Boulder campuses. All graduate degrees in music are directed from the Boulder campus by the Associate Dean for Graduate Studies. For complete information on the programs available, consult the CU-Boulder Graduate School Bulletin.

Upon consultation with a graduate adviser in Boulder, a portion of work may be accomplished on the Denver

1May not include applied music courses.
campus toward a graduate degree. Courses in music engineering, commercial scoring and arranging, and music business are offered only on the Denver campus and are typically viewed as appropriate for transfer credit to traditional degrees such as composition and education. Interested students should contact Dean Robert Fink, College of Music, University of Colorado at Boulder, Campus Box 301, Boulder, CO.

The Denver campus programs at the graduate level are concentrated into four interdisciplinary degrees. Each of these takes advantage of the faculty and facilities on this campus to provide courses, seminars, and workshops with an emphasis on music engineering and music business. These include sound reinforcement and recording, electronic music, music on the personal computer, contracts, legal environments of the arts, and many topical workshops and seminars. These activities are intended to help musicians compete for positions in the music industry such as arts manager, producers, performers, engineers, technicians, educators, composers, and promoters. Ongoing professional growth and development such as teacher recertification and career elevation also are encouraged.

For additional information on the following degrees, consult the host college section of this bulletin.

**Master of Engineering.** This degree is offered by the College of Engineering and Applied Science. Technical electives in music engineering make this an attractive professional audio degree. Contact: Resident Dean Paul Bartlett, CU-Denver College of Engineering.

**Master and Ph.D. in Educational Technology.** Offered by the School of Education, the degree is intended for professionals in public and private institutions utilizing multi-media, computer, and technology supports for training and educating. Contact: Dean William Grady, CU-Denver School of Education.

**Master of Humanities.** The M.H. is offered by the College of Liberal Arts and Sciences. Emphases in cultural administration and in music are available. Contact: Dean John Ostheimer, CU-Denver College of Liberal Arts and Sciences.

**Master of Business Administration.** Offered by the Graduate School of Business Administration, a direct-track, five-year program is available in the Bachelor of Science in Music as well as admission from other degree programs. Contact: Dean Donald Stevens, CU-Denver Graduate School of Business Administration.

Course work at the graduate level for these degrees and for graduate non-degree students is intended to provide a balance of opportunities in music performance, education, business, and engineering. Keeping up to date with the latest technology, market trends, pedagogy, and practice creates a healthy environment for qualified graduate students. Special seminars, workshops, and industrial internships strengthen the experience and keep it vital. A strong emphasis is placed on visitations from active professionals and visiting artists.

### COURSES

**Music Academic Classes**

**MUS. 100-3. Theory and Musicianship.** A study of harmonic procedures as derived from the common practice period, and their relationship to contemporary concepts. Prer., placement tests; coreq., MUS. 102 and PMUS. 102

**MUS. 101-3. Theory and Musicianship.** A continuation of MUS. 100. Prer., MUS. 100 and 102; coreq., MUS. 103 and PMUS. 102.

**MUS. 102-1. Ear Training and Sight Singing.** Coreq., MUS. 100.

**MUS. 103-1. Ear Training and Sight Singing.** Prer., MUS. 100 and 102; coreq., MUS. 101.

**MUS. 106-2. Music Fundamentals.** Fall. An introduction to the rudiments of music notation, basic ear training, and reading of music. Intended for the student with little or no musical background. No degree credit for music majors.

**MUS. 118-2. Synthesis Proseminar.** Fall. An introduction to electronic music synthesis and voltage controlled signal processing.


**MUS. 165-2. Rhythm Section Techniques.** Spring. Development of performance techniques related to big-band, crossover and commercial music. Enrollment limited to guitar, keyboard, bass and percussion players.

**MUS. 180-2. 181-2. History and Literature of Music I and II.** Survey of music from the 11th through 20th centuries. Emphasis on listening skills, including attendance of selected Denver Symphony Orchestra rehearsals. For freshman music majors and nonmusic majors who read music.

**MUS. 182-3. Music Appreciation.** For nonmusic majors who want to learn how to listen to music with greater understanding and pleasure. Explores the style of music in the major compositional periods including contemporary pops music. No degree credit for music majors.


**MUS. 202-1. Ear Training and Sight Singing.** Prer., MUS. 101 and 103; coreq., MUS. 200.

**MUS. 203-2. Jazz Theory.** Fall. An introduction to additive harmonies for three, four, and five voices, chord substitutions, and jazz modal harmonic techniques. Prer., MUS. 101 and 103, or consent of instructor.


**MUS. 250-1. Recording I Lab.** Hands-on lab experience in analog recording and mixing. Coreq., MUS. 254.

**MUS. 252-1. Electronic Music I Lab.** Coreq., MUS. 256.


MUS 303-2. Scoring and Arranging I. Fall. Concept, layout, and arrangements for small (2, 3, 4 voice) ensemble. Prer. or coreq., MUS 207.

MUS 305-2. Elementary Composition. Spring. Monody, song, and short forms. Prer. or coreq., MUS. 401 or 402.

MUS 328-2. Contemporary Improvisation. An introduction through performance to the art of improvisation as practiced in contemporary Western culture. Prer., MUS. 200 and 202, or consent of instructor.


MUS 356-2. Principles of Digital Audio. An overview, covering fundamentals of digital to analog to include recording, reproduction, media, error protection, and the compact disc. Prer., MUS. 455 or consent of instructor.

MUS 380-3, 381-3. History and Literature of Music III and IV. Survey of Western art music with stylistic analyses of representative works from all major periods. Prer., MUS. 181.

MUS 390-3. Law and the Music Industry. An overview of the body of law which governs the music industry. Emphasis on the musician’s ability to recognize a potential legal dispute, and to understand his/her rights.


MUS 492-3. Entertainment Industry Operations Analysis. An analysis of specific managerial situations unique to the music and entertainment industries. Aspects of finance, marketing, taxation, and management science are explored.

Upper Division/Graduate Level


MUS. 485-1 to 3/585-1 to 3. Special Studies: Education. Prer., consent of instructor.
MUS. 486-1 to 3/586-1 to 3. Special Studies: Other. Prer., consent of instructor.

Music Performance Classes
PMUS. 102-1. Piano Class. Offered from beginning through intermediate levels. Course content includes functional piano skills of sightreading, transposing, improvising, and a brief introduction to performing in various styles. Includes some exposure to electronic keyboards and synthesizers. Facilities fee: $24. Prer., consent of instructor.
PMUS. 103-1. Piano Class: Piano Majors. Prer., consent of instructor.
PMUS. 104-1. Piano Class: Composition Majors. Prer., consent of instructor.
PMUS. 105-1. Keyboard Harmony.
PMUS. 111-1, 311-1, 511-1. Chamber Ensemble. Prer., audition with instructor.
PMUS. 120-1, 320-1. Dixie Ensemble. Prer., audition with instructor.
PMUS. 127-1, 327-1. Fusion Ensemble. Prer., audition with instructor.
PMUS. 128-1, 328-1. Guitar Ensemble. Prer., audition with instructor.
PMUS. 131-1, 331-1. New Music Ensemble. Prer., audition/meeting with instructor.
PMUS. 132-1, 332-1. New Singers. Prer., audition with instructor.
PMUS. 133-1, 333-1. Percussion Ensemble. Prer., consent of instructor.

1Prer., for 400 level, junior standing.
PMUS. 135-1. 335-1. Saxophone Ensemble. Prereq., audition with instructor.
PMUS. 137-1, 337-1. Jazz Combo. Prereq., audition with instructor.
PMUS. 150-2 through 260-2 and 350-3 to 373-3. Applied Instruction. Private instruction in electric and acoustic bass, bassoon, clarinet, bass clarinet, flute, French horn, guitar, oboe, percussion, piano, jazz piano, saxophone, synthesizer, trombone, trumpet, violin, viola, violoncello, and voice. Open only to accepted music majors enrolled for a minimum of 7 semester credit hours of nonapplied courses.
PMUS 483-1 to 3 and 583-1 to 3. Special Studies: Performance. Prereq., consent of instructor.
"The Graduate School of Public Affairs is committed to promoting both academic excellence and town/gown relationships through its teaching, research, and community service. We take our role of educators of the nation and state’s public leaders very seriously. We strive to be a model of what an urban school of public affairs can be."

— Dean Marshall Kaplan
Graduate School of Public Affairs

Public affairs students, working as interns at the Legislative Institute, assist Senator Jim Lee on a project.
Dean: Marshall Kaplan
Assistant Dean: Mark A. Emmert
School Office: 1100 14th St., Room 701
Telephone: 556-2825
Director, Criminal Justice (MCJ): Mark R. Pogrebin
Director, Master of Public Administration (MPA): Mark A. Emmert
Director, Doctor of Public Administration (DPA): E. Samuel Overman
Faculty: Professors: Marshall Kaplan, Michael S. March, Mark R. Pogrebin, Jay M. Shafritz
Associate Professors: Frank J. Cesario, Peter G. deLeon, Robert W. Gage, Franklin J. James, Dall A. Neugarten, Eric D. Poole
Assistant Professor: Lloyd Burton, Mark A. Emmert, E. Samuel Overman, Eileen A. Tynan
Emeritus: Floyd C. Mann, Leo C. Riethmayer
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Dwight Smith, University of Denver
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Wellington E. Webb, Colorado Department of Regulatory Agencies

INFORMATION ABOUT THE SCHOOL
The Graduate School of Public Affairs (GSPA) at CU-Denver is a unique institution in a unique setting. Located in the urban center of the Rocky Mountain West, its goal is to raise the level of professionalism as well as the concern for equity and efficiency of the public sector through the training of well-qualified managers and public-policy decision makers. GSPA is rapidly becoming one of the top public policy and public administration schools in the nation. As former Governor Richard Lamm notes... "If someone were to ask me where the cutting edge of thinking is being applied to state and local government issues, I'd answer 'take a look at what GSPA is doing.'"

The School provides graduate degree programs in the fields of public administration and criminal justice, including the Master of Public Administration (M.P.A.), the Master of Criminal Justice (M.C.J.), and the Ph. D. in Public Administration. Students in the public administration program may elect to focus their studies in the fields of public management or public policy. Qualified students also may choose the Executive Option for senior managers and policy makers.

The academic requirements for both the master's and Ph.D. programs are intellectually rigorous. Combined with opportunities for students to work on live regional, state, and community problems in GSPA's two Centers
— The Center for the Improvement of Public Management and The Center for Public-Private Sector Cooperation — they present students with a solid background in theory and practice. GSPA's emphasis on exposing students to real-world experiences has won the school national recognition. John Parr, director of the National Municipal League's Citizens Forum or Self-Government indicates that . . . "Probably no school of government in the nation offers as extensive a program of practical exposure to the inner workings of state and local government as the University of Colorado's Graduate School of Public Affairs."

A significant part of GSPA's student population is already well established in the public sector — the average student is in the mid-30s, functioning in a middle management capacity. Many students are city managers, heads of local or state government agencies, or government relations specialists with private corporations.

As a result, the students benefit not only from the exchange of ideas with the GSPA faculty, but from the interplay with each other. For students without public sector experience, access to a large number of experienced professionals offers a fast-track exposure to the issues and challenges currently facing the public manager.

The Graduate School of Public Affairs is accredited by the National Association of Schools of Public Affairs and Administration's (NASPAA) Peer Review Committee and is listed on the Annual Roster of Accredited Programs in conformity with National Association of Schools of Public Affairs and Administration standards. The School has a close cooperative relationship with the U.S. Office of Personnel Management's Western Executive Seminar Center, and holds membership in the Colorado Municipal League and NASPAA.

Functions of the School

The principal functions of the School are to provide programs of professional education, training, and service for the public sector and to undertake research on issues of concern to federal, state, and local governments.

The School provides an opportunity for selected working men and women to enhance their capabilities and potential for executive and managerial leadership in the public sector. It also offers students interested in the private and nonprofit sectors opportunities to improve their understanding of interorganizational relations, and strategies necessary to forge public-private sector partnerships.

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. Provide students with a balanced understanding of theory and practice concerning public sector management and public policy issues.
2. Prepare recent college graduates having such diverse majors as anthropology, psychology, economics, sociology, biological sciences, business administration, engineering, political science, etc. for public service positions and to provide options to mid-career specialists (including retired military personnel or veterans) desiring executive development or retraining.
3. Prepare students for private sector jobs directed at developing public-private sector partnerships.
4. Afford students an opportunity to link expertise in such areas as engineering, science, and public health with policy analysis skills, administrative management skills, and an understanding of urbanism.
5. Devote special efforts to enroll full- and part-time students from the ranks of those now severely under-represented in responsible policy and management positions in public service: women, blacks, Hispanics, and native Americans.
6. Expose students to a faculty representative of a uniquely qualified group of scholars and practitioners.
7. Maintain close relationships with federal, state, and local governments and associations of governmental executives.

Admission Requirements

1. A baccalaureate degree from a college or university of accredited standing, with a minimum grade-point average of 2.75 for the M.P.A., M.C.J., and 3.0 for the Ph.D. Two sets of official transcripts of undergraduate and graduate work are required.
2. Three recommendations from qualified references are to be submitted on forms which the applicant will receive when he or she requests an application package. (Recommendations may be by professors, employers, 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), the Graduate Management Aptitude Test (GMAT), or the combined MAT/DOPPELT examination. Information about the examination may be obtained from the CU-Denver Testing Office, 356-2861.
4. Completed credentials should be received by April 15 for the fall semester, September 15 for the spring semester, and March 1 for the summer term to participate in CU-Denver's mail registration. The application deadline for walk-in registration is June 1 for the fall semester, November 1 for the spring semester, and April 1 for the summer term.
5. The application deadlines for the Ph.D. program are November 1 for the spring semester and April 1 for the fall semester.
6. 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
Financial Assistance

Students in the master's degree programs are eligible for several types of financial assistance. Work-study positions and educational loans require application to the CU-Denver 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 Philip Klutznick Scholarship Fund provides loans or grants to low-income students.

The School receives a small number of fellowships from various government organizations and actively seeks additional funding for student support in the form of internship positions and research assistantships.

Veterans' benefits are also available consistent with the applicant's status and federal legislation.

A limited number of awards to support doctoral dissertation research has been available from such federal agencies as the Office of Personnel Management and the Law Enforcement Assistance Administration.

Persons interested in applying for financial assistance should inquire in the Graduate School of Public Affairs Office.

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 all master's degrees. D.O.D. courses must be recommended by the American Council on Education.

Time Limit

Master's degree students must complete all course work and degree requirements within six years from registration for their first course.

Career Expectations of Graduates

While it would be difficult to predict all of the kinds of careers graduates of this School will pursue, several
and two-day skill-building seminars tailored to the needs of state and local government entities.

2. Specialist programs in such fields as urban affairs, policy analysis, administrative planning, financial management, manpower planning, and management and administrative analysis.

3. Career-oriented persons who are involved in the management and analysis of government or public-private sector programs. Examples would include analysis or direction of human services, environmental protection, urban planning, and natural resource programs; public works administrators; criminal justice planners and administrators; and analysts and administrators of cultural and artistic programs.

4. Teachers, lecturers, and professors of public administration and public policy in undergraduate or graduate colleges or university political science, public policy, or public management programs.

SPECIAL CENTERS AND PROGRAMS

The Centers

The Graduate School of Public Affairs coordinates two centers — the Center for the Improvement of Public Management and the Center for Public-Private Sector Cooperation. The centers provide students and faculty with opportunities to engage in strategic multidisciplinary policy research, secure internships, and develop and participate in training and technical assistance programs. The objective of the Centers is to help the public and private sectors respond to growth and revitalization programs. Their respective programs help translate classroom education into real world public policy and public management experiences.

Center for the Improvement of Public Management. This center focuses on efforts to increase the planning and management capacity of state, county, and local government officials and staff. Its functions are oriented toward developing public sector management and analytical skills.

Center for Public-Private Sector Cooperation. Activities are directed toward increasing understanding between the public and private sectors. Its agenda is aimed at fostering a range of collaborative efforts between state/local government and private firms.

Each center initiates round tables, seminars, and the development of relevant case studies and technical assistance. The Denver Partnership, Inc., and its business leadership collaborates with the CPPPSC in a unique joint venture between the business community and the University. The centers were initiated with support from the Piton and Gates Foundations. Programs of the centers include:

- Rocky Mountain Program • A 10-day residential seminar designed to offer leadership and analytical skills to mid- and upper-level officials from state and local government.
- Rocky Mountain Management Series • One- and two-day skill-building seminars tailored to the needs of state and local government entities.
- Denver Community Leadership Forum • A 10-month program designed to provide leadership and problem-solving skills for a group of community leaders from the public sector, neighborhood and nonprofit groups, and business.
- Law Enforcement Executive Program • A 10-day management training program for law enforcement officials.
- Program Management Seminar and Senior Management Seminar • Certificate programs on management skills for mid- and upper-level supervisors in Colorado state government.
- Metropolitan Air Quality Council • Staff support for the Council, which is an independent entity appointed jointly by the governor of Colorado and the mayor of Denver.
- Project 2000 • Facilitation of a public-private strategic planning process for the City of Colorado Springs.
- Weld County • Evaluation of Weld County’s welfare diversion program, including an analysis of implementation, budgetary costs and savings, and impacts on program clients.
- Governor’s Institute for Educators • A seven-day intensive seminar for recipients of the Governor’s Award for Excellence in Education.
- Legislative Institute • A program to provide Colorado legislators with training, interns, and information on a variety of policy issues.
- University Workshops • A program designed to assist and advise other universities in establishing community outreach centers and centers that encourage public-private sector collaboration.
- Conference Grant Program • A program that provides elected and appointed public officials with an opportunity to attend career enhancing conferences and workshops.
- Mediation and Facilitation Program • A continuous program to help public and private sectors resolve community development conflicts and foster cooperative endeavors.

Management Certification Program

GSPA has, and will continue to administer a number of unique certificate programs aimed at increasing the professional skills and capacity of state and local government staffs. Graduate credit is offered on a limited and strategic basis when certificate courses go beyond training and meet graduate school academic standards. Generally, MCP courses or curriculum are open as electives to GSPA students. They include:

P AD. 590. Behavioral Foundations of Management
P AD. 591. Supervision and Human Resource Development
P AD. 592. Fiscal Management and External Relations
P AD. 593. Program Management
Participants in the MCP program, as well as GSPA students electing to take MCP courses, may receive up to eight credit hours.

Herrick S. Roth Lecture Series

The Graduate School of Public Affairs administers the Herrick S. Roth Lecture Series. This endowed program brings to the campus outstanding public policy leaders for seminars with students.

Western Executive Seminar Center

Linked with the Graduate School of Public Affairs, the U.S. Office of Personnel Management's Western Executive Seminar Center seeks to enhance the capability of senior level federal government managers and prospective executives to perform effectively their management and policy functions. The seminar center provides quality, interactive, and competency-based training and utilizes GSPA faculty in the achievement of its goals.

MASTER'S DEGREE PROGRAMS

The M.P.A. and M.C.J. degree programs are interdisciplinary. They combine core courses to provide background and elective courses to serve each student's professional interest. An internship is required for students without prior governmental experience.

The Graduate School of Public Affairs has added a joint B.A./M.P.A. degree with the College of Liberal Arts and Sciences. This program strives to develop both professional and intellectual skills. It is designed to enable qualified students to earn a bachelor's degree from the College of Liberal Arts and Sciences and the degree Master of Public Administration from the Graduate School of Public Affairs in five, rather than the normal six, years. Students who wish to pursue this joint degree program should decide as early as possible in their academic careers and plan their course work carefully as they must fulfill the requirements for graduation from the College of Liberal Arts and Sciences and follow the normal admissions procedures for the M.P.A. (including satisfactory completion of the GRE or the GMAT or the combined MAT/DOPPELT examination).

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 or policy development careers in government service — local, regional, state, and national — or in nonprofit and private sector organizations 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.

Master of Public Administration — Executive M.P.A. Option

Qualified students reflecting exceptional leadership qualities and experience may enroll in the Executive M.P.A. option. To the extent possible, it allows students to tailor the M.P.A. program to their professional needs and goals.

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.

DEGREE REQUIREMENTS

The minimum requirements for the basic M.P.A. degree are outlined below. Occasionally changes are made; 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 45 semester hours of graduate work with a grade-point average of B or better. A grade of B- or better is required in all core and track courses. At least 39 semester hours of this work must be at the 500 level or above. Pre-service students are required to take an additional 3 semester hours of field study (P AD. 599), bringing their minimum to 48 semester hours.

2. The completion of two prerequisite undergraduate courses: ECON. 300, Accelerated Principles of Economics, and P SC. 306, Power in American Society: Introduction to U.S. Political Economy. The prerequisites will be waived if a student has completed them or their equivalents as an undergraduate.

3. Completion of the following common core courses or acceptable equivalents: P AD. 501, Fundamentals of Public Administration; P AD. 502, Statistics for Public Administration (this particular requirement can be waived for students who pass a competency examination in statistics, but completion of the minimum 45 semester hours is still required); P AD.503, Public Management: An Introduction; P AD. 504, Research and Analytic Methods in Public Administration; P AD. 505, Economics of the Public Sector; and P AD. 506, Public Finance.

4. Completion of M.P.A. qualifying examination. It is to be taken after a student completes the common core courses. Students generally must pass this examination before engaging in the track courses. Students have two opportunities to complete this requirement.

M.P.A. students, generally, subsequent to completion of the common core courses, will select either the policy analysis or public management track. They will be required to successfully complete three courses from within their selected track. A total of six courses of 18 credit hours must be successfully completed either by completing additional courses in their chosen track or by selecting up to three courses in the alternate track.

**PUBLIC MANAGEMENT TRACK**

<table>
<thead>
<tr>
<th>Semester Hours</th>
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<tbody>
<tr>
<td>Core courses (P AD. 501, 502, 503, 504, 505, 506)</td>
</tr>
<tr>
<td>Courses in the management track:</td>
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<tr>
<td>P AD. 521. Organization Theory and Administrative Behavior</td>
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<tr>
<td>P AD. 522. Human Resources Management</td>
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<tr>
<td>P AD. 523. Governmental Budgeting</td>
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<tr>
<td>P AD. 524. Administrative Law</td>
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<tr>
<td>P AD. 525. Intergovernmental Management</td>
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<tr>
<td>P AD. 526. Advanced Seminar in Public Management</td>
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<tr>
<td>Elective courses for this track</td>
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<tr>
<td>Field study (P AD. 599. Field Study in Public Administration)</td>
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</tbody>
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(Required of students who have not had government experience.)

**POLICY ANALYSIS AND EVALUATION TRACK**

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<thead>
<tr>
<th>Semester Hours</th>
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<tbody>
<tr>
<td>Core courses (P AD. 501, 502, 503, 504, 505, 506)</td>
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<tr>
<td>Courses in the policy track:</td>
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<td>P AD. 531. Public Policy Formulation and Implementation</td>
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<td>P AD. 532. Public Policy Analysis</td>
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<td>P AD. 533. Intermediate Statistical Analysis</td>
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<td>P AD. 534. Intergovernmental Policy</td>
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<td>P AD. 535. Program Evaluation</td>
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<td>P AD. 536. Advanced Seminar in Public Policy</td>
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<td>Elective courses for this track</td>
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<tr>
<td>Field study (P AD. 599. Field Study in Public Administration)</td>
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Dean Marshall Kaplan welcomes Harry Ellis, retired senior economics correspondent for THE CHRISTIAN SCIENCE MONITOR, to Denver for a series of lectures. The School and the Centers cooperatively bring to Denver public and private sector leaders who lecture on a variety of public policy issues.
(Required of students who have not had government experience.)

5. P A.D. 599, Field Study in Public Administration. Students who have not had government experience are required to complete P A.D. 599. Enrollment in the field study may be during the summer months or during the academic year. Interns must meet their on-job requirements, and also the requirements of the Graduate School of Public Affairs. A minimum of 280 hours of supervised work and study is required to earn 3 hours of academic credit.

6. The completion of three additional elective courses (9 semester hours) to be selected with the approval of a faculty adviser.

EXECUTIVE M.P.A.

Students admitted to the Executive M.P.A. program must take a minimum of 36 hours. For the most part, they are allowed maximum freedom to develop their needs and objectives.

COHORTS

GSPA, working with relevant professional organizations, federal, state and city agencies, and non-profit organizations, has admitted and will continue to admit cohort classes, or classes of senior managers from specific public sector or non-profit groups, to the M.P.A. program. Students must meet normal GSPA/M.P.A. entrance requirements. The cohort concept permits students to share relevant experience and to benefit from a number of courses that are tailored or structured to address specific professional needs and priorities.

LIMITATION OF COURSE LOAD

The normal course load for a full-time student is 12 semester hours. A student who is employed full-time may not carry more than 9 hours unless an excess load has been approved in advance by the dean.

DOCTOR OF PHILOSOPHY IN PUBLIC ADMINISTRATION

A program of professional graduate study leading to the Doctor of Philosophy in Public Administration is offered by the Graduate School of Public Affairs. The program, based on the Denver campus, permits work to be taken on any campus of the University if it is part of the approved program of study or degree plan.

The doctoral program was developed to meet the strong demand for the services of people who exhibit competence in the theory, concepts, and research skills of public administration, and who are able to use them in a variety of applications. The overall purpose of the doctoral program is to add to the ranks of those who are able to generate increased knowledge about complex public administration systems, organizations and environments, and public policy issues and concerns as well as to influence the policy process. The thrust of the program is to develop the conceptual, epistemological, research, analytic, and leadership skills of its students so that they will be able to advance the study and practice of public administration, broadly defined, in their subsequent careers. The Ph.D. is designed to prepare professionals for expanded leadership responsibilities in academia, senior management, senior research, and senior public-policy roles. Accordingly, the Ph.D. integrates theory and practice and stresses skills development, along with theoretical, conceptual, methodological, and contextual knowledge development.

Participants

The doctoral program is primarily designed to serve (1) people who desire to further the field of public administration through teaching and research; (2) scholar-practitioners working in government, private sector organizations concerned with government, and non-profit organizations who seek to improve their performance in or to move into positions that are concerned with strategic management and broad policy issues; and (3) professional and technical people (attorneys, public health professionals, court administrators, and others) — whether in the public, private, or nonprofit sector — who desire additional training that will enable them to participate more effectively in the process of administration, management, and policymaking at the highest levels.

Cohorts

GSPA, working with relevant professional organizations, federal and state agencies, and non-profit organizations, has admitted and will continue to admit “cohort” classes or classes of senior managers from specific public sector or non-profit groups to the program. Students must meet normal GSPA/Ph.D. entrance requirements. For information contact the Ph.D. director.

Time Required for Ph.D Degree

The Ph.D. program requires intensive commitment. It is designed to link advanced education, research and training with the practice of public management and policy development. Accordingly, most courses and seminars are offered during the evening hours, on weekends, or on an intensive basis. Anyone starting a Ph.D. program with a master's degree in public administration can expect to take at least three years to complete all of the requirements for the Ph.D. Any student entering the program with no prior graduate work in public administration should expect at least one additional year of course work.

Admission Requirements

It is desirable that a student have a master's degree in at least one related field before undertaking doctoral
work. If a student does not have an M.P.A., he or she will in most cases have to take some M.P.A. course work and meet threshold M.P.A. degree knowledge. Standard GRE, GMAT, LSAT, or MAT/DOPPELT scores are required. It is desirable that entering students have at least three years of responsible administrative experience in a government agency, quasi-public institution, or not-for-profit organization. Substitutes in the private sector are possible, particularly if they reflect positions of senior management responsibility.

SELECT CRITERIA

Admission to the program is based on the personal and professional qualifications of the applicant. It also reflects the objectives of the GSPA faculty to achieve a productive and stimulating balance between academic background and achievements and relevant professional backgrounds, interests, and experience of students. Basic eligibility for admission is premised upon the following considerations:

1. Formal academic record and visible achievements concerning scholarship.
2. Graduate Record Examination or similar scores.
3. The depth and breadth of the applicant's professional work experience.
4. Potential for career advancement and capacity to contribute to the overall academic program.
5. Potential to benefit from an integrative classroom/work experience.
7. Personal interviews.

APPLICATION PROCESS

Applicants must submit the following items to the GSPA office before they can be formally considered for admission:

1. Application forms (available from GSPA).
2. Official transcripts for all undergraduate and graduate work.
3. Graduate Record Examination scores (GMAT, LSAT, or MAT/DOPPELT equally acceptable).
4. Current resume or vita.
5. Minimum of three letters of recommendation from colleagues and previous professors, focusing on potential for (a) future executive leadership and (b) deriving benefit from the Ph.D. program.
6. A 500-1,000 word statement of educational and career goals.

In addition, a student may submit samples of research reports or publications. All application materials will be retained by GSPA and will not be returned.

Degree Requirements

The Ph.D. program consists of a minimum of 90 credit hours of appropriate course work beyond the bachelor's degree. Master's level course work for a maximum of 30 hours can be transferred in or taken at GSPA. An additional 30 hours of appropriate doctoral level course work must be taken at the University of Colorado. Finally, 30 hours are required for dissertation credit.

PREREQUISITE COURSES

All students must have the following prerequisite courses, parallel courses offered on the Colorado Springs campus of the University of Colorado, or their equivalent (i.e., comparable course work taken elsewhere as determined by the Ph.D. director):

- **P AD. 602. Statistics for Public Administration**
- **P AD. 604. Research and Analytic Methods in Public Administration**
- **P AD. 605. Economics of the Public Sector**
- **P AD. 606. Public Finance**
- **P AD. 621. Organization Theory and Administrative Behavior**
- **P AD. 622. Human Resources Management**
- **P AD. 623. Government Budgeting**

COMMON COURSES

All Ph.D. students must take the following courses:

- **P AD. 680. Doctoral Seminar on the Discipline and Profession of Public Administration**
- **P AD. 681. or 682. Doctoral Seminar on Public Management or Public Policy**
- **P AD. 685. Doctoral Seminar on the Conduct of Empirical Inquiry**
- **P AD. 686. Advanced Research Seminar**

METHODOLOGICAL/LANGUAGE PROFICIENCY

All students must complete (or test out of) 6 graduate credits in a specific methodology or language relevant to their research.

Ph.D. CURRICULUM

The program has two tracks: public management and public policy. An individualized track will be considered with the specific approval of the Ph.D. director. Within each option, a student is required to have a concentration in a substantive, management or policy analysis area.

All students must pass competency examinations in three areas—qualifying, option track, and concentration—before they can be admitted to candidacy. First, they must pass a preliminary examination in general public administration and public policy. This examination covers the entire field of public administration and will not necessarily be limited to the content of the required courses. Ph.D. students must pass their qualifying examination before they can take the comprehensive examination. Second, they must choose an option track, take appropriate courses, and pass a comprehensive examination in their chosen option.
Third, they must choose a concentration area for further study (for example: organization development, health policy, city management, non-profit organizations, etc.) and pass a comprehensive examination in this area.

To qualify for an individualized track, the Ph.D student must (1) develop a proposed plan of study for a specialty area which cannot be pursued adequately within either of the other two options, (2) include in the plan of study an adequate series of doctoral level university courses which can be taken on-site, and (3) obtain the written approval of the plan from the Ph.D. director.

**Dissertation**

Students are advanced to candidacy for the Ph.D. once they have completed all required course work and examinations and have been certified for candidacy by the program director. When students are formally advanced to candidacy, they must register for dissertation research each fall and spring semester until graduation. In general, a dissertation is a demonstration that a candidate for the doctoral degree is capable of doing independent, original scholarly and professional research that constitutes a contribution to knowledge in the broadly defined discipline of public administration.

Further details on the program can be found in the *Handbook for the Doctor of Philosophy in Public Administration Program*, available from the Graduate School of Public Affairs.

**Courses**

**P AD. 501/601-3. Fundamentals of Public Administration.** Examines the history, nature, and scope of American public administration. This course defines the policy-making process, administrative structures, intra- and interorganizational dynamics and legislative/executive policy issues in the field, including administrative responsibility and ethical concerns. **P AD. 502/602-3. Statistics for Public Administration.** (Same as C.J. 502/602.) Introduces students to probability theory, descriptive and inferential statistics. It includes an introduction to Statistical Packaging for Social Sciences (SPSS) for the analysis of primary and secondary data. A statistics laboratory is included. **Note:** Students may waive this course if they have taken an appropriate undergraduate or graduate level statistics course or can pass a competency examination offered by GPSA.


**P AD. 504/604-3. Research and Analytic Methods.** Provides an overview of methods and techniques used in the collection and analysis of data, and develops skills in problem formulation. Methods covered may vary but will typically include survey research, experimental design, forecasting, network analysis, and decision analysis. Prereq., P AD. 502/602.

**P AD. 505/605-3. Economics of the Public Sector.** Covers basic concepts of micro-economics and their applicability to the allocation of resources in the public and private sectors, the evaluation of efficient and optimal resource use, public goods theory, the role of government in the economy and a limited introduction to macroeconomics and fiscal/monetary policies as they affect public administrators. **Note:** Students may waive this course if they have successfully completed a comparable graduate level course.

**P AD. 506/606-3. Public Finance.** Introduces governmental financial policy and its administration. This course includes the principles and politics of public sector resource allocation, budgetary systems, taxation, intergovernmental fiscal relations, and debt management. Prereq., P AD. 505/605.

**P AD. 521/621-3. Organization Theory and Administrative Behavior.** Provides advanced knowledge of the interdisciplin­ ary nature of organizational and interorganizational management. Draws on basic literature from organization theory, administrative behavior, organizational sociology and political science in focusing on the bureaucratic and social behaviors in and around complex organizations.

**P AD. 522/622-3. Human Resources Management.** Examines the nature of work relationships between people and organizations, systems and processes for human resource management, manpower planning, collective bargaining, and strategies for human resources development.

**P AD. 523/623-3. Governmental Budgeting.** Focuses on budget systems, processes, and policy issues with respect to federal, state, and local governments. Some practical budget-making exercises are conducted.

**P AD. 524/624-3. Administrative Law.** Examines the development of American administrative law, its relationship to regulations and legislative/administrative processes. Studies the nature of the legal process and its compatibility with the administrative process. Includes exposure to the regulatory process and its impact on the delivery of public programs.

**P AD. 525/625-3. Intergovernmental Management.** Surveys the basic literature of intergovernmental management and examines the interactive role of managers at federal, state, regional, and local levels of government. Emphasis is placed on current intergovernmental issues. A grant writing workshop is included.

**P AD. 526/626-3. Advanced Seminar in Public Management.** Integrates the knowledge and skills of the common core and management track courses. Through the use of case studies, the course emphasizes the application of management theories and practices to actual issues/problems of public organizations. Specific attention is paid to the evaluation of organizational and program performance. (This integrative seminar is to be taken only after all common core and track core courses have been completed.)

**P AD. 531/631-3. Public Policy Formulation and Implementation.** Introduces students to the public policy process with specific emphasis on models of policy formulation and implementation. Examines program development and execution in the context of political, economic, and institutional environments. Using case studies, the course identifies criteria that can be used to determine the efficiency and effectiveness of public policies and programs.


**P AD. 533/633-3. Intermediate Statistical Analysis.** Develops basic competence in multivariate statistical analysis. Topics
include simple and multiple regression, hypothesis testing, use of dummy variables, and logit analysis. Includes an introduction to non-parametric statistics. Prereq., PAD 502/602.

P AD. 534/634-3. Intergovernmental Policy. Examines the economics of federalism and analyzes intergovernmental fiscal relationships. Describes the theories and rationale of fiscal aid policies and the results of such programs in equalizing fiscal resources and achieving national objectives. Includes exposure to the range of federal assistance, tax policies and coordination, borrowing and debt, mandating and tax expenditure limitations. Case analysis and the use of intergovernmental data banks are included. Prereq., PAD 531/631. and PAD 532/632.

P AD. 535/635-3. Program Evaluation. Describes the theory and methodology for the design of social research and demonstration projects and the application of analytic and statistical methods for evaluating public programs. Focus is on the application of evaluation methods and techniques of data interpretation. Reports preparation is emphasized. Prereq., PAD 502/02 and PAD 504/04.

P AD. 536/636-3. Advanced Seminar in Public Policy. Emphasizes the application of policy analysis to public programs. This practicum integrates the knowledge and skills gained in the common core and the policy analysis track. Students will be required to design and conduct a policy or program evaluation project. (This course is to be taken only after all the common core and policy analysis track courses have been completed.)

P AD. 550/650-3. 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. Prereq.: PAD 552/652-3. Administrative System 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. Prereq., PAD 521/621.


P AD. 555/655-3. Group Dynamics. An in-depth study of the pattern of forces relating to group 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 process in groups. Prereq., 521/621.

P AD. 557/657-3. 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 at all levels and their involvement in collective bargaining with or without legal controls. Prereq., PAD 558/658-3. 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. 561/661-3. Managing America's Cities. This course will review the environmental, social, and economic problems facing America's cities, particularly those in Colorado. It will examine alternate options cities can use to respond effectively and equitably to their difficulties.

P AD. 562/662-3. The Politics of Public Sector Management and Administration. 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. 563/663-3. Ethics and Public Administration. Describes ethical principles of relevance to public administrators, managers, and policy analysts. Case studies will be used to help transfer general ethical concepts to "live" decisions, including those related to forging public-private partnerships.

P AD. 575/675-3. Computer Workshop. A broad introduction to the world of computers and computing in public administration with emphasis on microcomputers. Topics include computer systems, BASIC programming, word processing, spreadsheet analysis, data base management systems, and applications. Considerable hands-on experience is provided.

P AD. 576/676-3. Computer Applications in the Public Sector. Develops skills in using computers to manage information and solve problems, with emphasis on microcomputers. Specific topics vary, and may include budgeting, economic modeling, municipal bond analysis, population projection, crime pattern analysis, as well as others. Use of existing software packages is emphasized.

P AD. 577/677-3. Information Resource Management. This course provides an introduction to material on informative resource management. It is directed specifically to users and managers of computer systems, rather than operators or programmers. It is oriented primarily toward computerized public sector applications. The course provides the techniques required by public managers to plan and improve information systems in the public sector.

P AD. 590-3. Behavioral Foundations of Management. Topics presented in this course include communication skills covering oral/listening/questioning techniques; group development covering team building/conducting meeting techniques; and problem solving and decision making including critical thinking, interpersonal/group problem solving processes.

P AD. 591-3. Supervision and Human Resource Development. Covers technical personnel functions such as recruitment, exams, selection, classification, and compensation; job design, motivation, performance, and performance planning and training.


P AD. 593-3. Program Management. The history of program management is covered and includes systems, processes, and climates. Program planning/design/management information systems/program evaluation and performance auditing also is presented.

P AD. 595/695-1 to 3. Workshop in Public Administration. Mini courses to develop skills in public administration.

P AD. 598/698-3. Special Topics and Classes in Public Administration and Public Policy. A study on special topics relevant to public administration such as public/private sector partnerships, hard choices facing America, conflict management,
regionalism, managing economic options for Colorado, non-profit management and marketing. Each semester various topics are studied.

P AD. 599-3. 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. Prere., completion of the common core courses. It is recommended that at least three of the track courses also be completed.

P AD. 680-3. Doctoral Seminar on the Discipline and Profession of Public Administration. A historical overview course on developments and changes in public administration as a societal phenomenon and a field of study. Examined will be how public administration has evolved and is defined, practiced, studied and taught. Must be taken during first semester of DPA program. Students with no previous public administration course work will be required to have had at least the equivalent of an introductory course in public administration before enrolling in this course.


P AD. 685-3. Doctoral Seminar on the Conduct of Empirical Inquiry. Examines a range of empirical approaches used in the study of public policy and management. Introduces some of the major concepts and problems of scientific inquiry; explores relevant aspects of the philosophy of science and further develops skills in the design, conduct, and use of research. Prere., P AD. 502 and 504.

P AD. 686-3. Advanced Doctoral Seminar in Research Methods. This course provides in-depth knowledge about designing and conducting dissertation research. The course will follow a basic sequence of problem definition, theoretical and propositional formulation, sample selection, data collection and observational methods, data analysis and presentation, and writing up results. Students must have taken P AD. 685 and be at the dissertation stage of their program.

P AD. 699-1. Research and Resources in Public Administration. All students must complete (or test out of) this course which will not count toward the minimum 84 credit hours required for graduation. The course will be offered each year by the Office of Public Affairs Librarian of the Auraria Library. The objective of the course will be to provide doctoral students with library research skills needed to locate, use, and evaluate both primary and secondary source materials. Techniques, rather than titles, will be emphasized and dissertation formats will be reviewed.


P AD. 701-3. Master's Project.

P AD. 800-24. Doctoral Dissertation. Once a student is admitted to candidacy, he/she must be continuously registered for dissertation credit each fall and spring semester or be automatically dropped from the program. A part-time student must register for 7 credit hours a semester; a full-time student for 10. In cases where a student will not be using any university resources during a particular semester, he/she may petition the DPA Director to register for only 3 credit hours in order to maintain continuous enrollment. A student must be registered for dissertation credit during the semesters he/she has a colloquium or defense.

Independent Study

P AD. 950-1 to 6. Independent Study (Master's Level). Affords students the opportunity to do independent, creative work. Prere., consent of adviser.

P AD. 960-1 to 6. Independent Study (Doctoral Level). Affords students the opportunity to do independent, creative work. Prere., consent of adviser.

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.

Degree Requirements

1. The 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 course is required:

C J. 500. Law and Social Control
C J. 502. Statistics for Criminal Justice
C J. 510. Criminal Justice Administration
C J. 511. Criminal Justice Planning and Evaluation

3. Students must complete a minimum of 21 semester credit hours of course work in criminal justice.

4. Students who have not had criminal justice experience are required to complete C J. 599 (Field Study). A minimum of 280 hours of supervised work is required to earn 3 hours of credit.

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 professional 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. 565-3. Seminar in Criminal Justice Management
C J. 568-3. Seminar in Police Administration
C J. 569-3. Research in Criminal Justice Process
C J. 570-3. Seminar in Contemporary Law Enforcement
C J. 571-3. Seminar in Correctional Administration
C J. 572-3. Seminar in Community Corrections
C J. 573-3. Juvenile Justice Administration
C J. 574-3. Seminar in Criminal Justice Policy Analysis
C J. 575-3. Seminar in Judicial Administration and Organization
C J. 576-3. Seminar in Comparative Criminal Justice
C J. 577-3. Advanced Seminar in Criminal Justice
C J. 598-3. Special Topics in Criminal Justice Administration
C J. 700-3. Area Paper or Thesis

COURSES

In the following double numbering system, a master's level student must enroll in the 500-level course and a doctoral student must enroll in the 600-level course. Students should contact the Graduate School of Public Affairs office for further details.

CRIMINAL JUSTICE ADMINISTRATION

C J. 500/600-3. 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. 502/602-3. Statistics for Criminal Justice. Introduces students to probability theory, descriptive and inferential statistics. It includes an introduction to Statistical Packaging for Social Sciences (SPSS) for the analysis of primary and secondary data. A statistics laboratory is included. Note: Students may waive this course if they have taken an appropriate undergraduate or graduate level statistics course or can pass a competency examination offered by GSPA.

C J. 510/610-3. 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. 511/611-3. Criminal Justice Planning and Evaluation. Techniques for assessing the probability and desirability of future possible states of society, and particularly of social control systems, will be considered in relation to the goals of the criminal justice system.


C J. 565/665-3. Seminar: Criminal Justice Management. This course is designed to provide the student with an overview of organizational theory and administrative behavior. In particular, different schools of thought and management approaches will be studied to improve organizational efficiency and effectiveness in criminal justice agencies. Case studies in a variety of agency settings will be utilized.

C J. 568/668-3. Seminar: Police Administration. The role of the police in a rapidly changing society; relationship between police services, the courts, and correctional administration.

C J. 569/669-3. Research in the Criminal Justice Process. Examination of current research in criminal justice; problems in the implementation of research findings.

C J. 570/670-3. 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. 572/672-3. Seminar: Administration of Community-Based Correction. Theory and practice of probation and parole; examination of efforts to create mixtures of institutional settings and normal community life.

C J. 573/673-3. 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. 574/674-3. 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. 575/675-3. Seminar: Judicial Administration and Organization. An analysis of judicial organization, court administration, and criminal court judges as participants in the operation of the criminal justice process; attention to the prosecutor and public defender systems.

C J. 576/676-3. Comparative Criminal Justice. Seminar on the different criminal justice systems in the world. Emphasis on
the British and Continental systems; analysis of other systems, such as Scandinavia, U.S.S.R., China, and the African nations.

C J. 577/677-3. 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. 598/698-3. Specific Topics in the Criminal Justice System. Analysis of specific topics relating to the criminal justice process.

C J. 599-3. Field Study in Criminal Justice. For students who have not had practitioner experience, a full- or part-time internship is required. Consent of instructor. Prer., 12-15 hrs of criminal justice course work.


Independent Study

C J. 950-1 to 6. Independent Study. Affords students the opportunity to do independent creative work.

Prer., consent of adviser.
Note: This roster lists faculty members holding regular and special appointments during the 1986-87 academic year. New 1987-88 appointments are not finalized at the time of printing.

R. WAYNE ADKINS, Chairman of the Department and Professor of Mechanical Engineering. B.S.(M.E), M.S.(M.E.), Ph.D., University of Illinois.

A. ANNELI AHTOLA, Instructor and Serials Catalog Librarian, Auraria Library. B.S., Turku School of Economics; M.A., University of Iceland; M.A., University of Denver.

ROBERT A. ALDRICH, Professor Emeritus of Anthropology. B.A., Amherst College; M.B., M.D., Northwestern University.

MARTA G. ALGERMISSEN, Assistant Professor of Spanish. B.A., University of Chile; Ph.D., University of Colorado.

FREDERICK S. ALLEN, Professor of History. A.B., Amherst College; Ph.D., Harvard University.

LYNETTE ALLEN, Assistant Professor of Education. B.A., M.A., Ph.D., University of Colorado.

LARRY G. ANDERSON, Associate Professor of Chemistry. B.S., Rose Polytechnic Institute; Ph.D., Indiana University.

MARVIN F. ANDERSON, Associate Professor of Electrical Engineering and Computer Science. B.S., M.S.(E.E.), University of Denver.

RICHARD H. ANDERSON, Associate Professor of Sociology. B.A., M.A., Ph.D., University of Oregon.

ERNEST ANDRADE, JR., Professor of History. B.A., M.A., University of Hawaii; Ph.D., Michigan State University.

B. THOMAS ARNBERG, Associate Professor of Mechanical Engineering. B.S.(M.E.), M.S.(M.E.), University of Colorado. Professional Engineer: Colorado.

LORI L. ARP, Instructor and Library Instruction Coordinator, Auraria Library. A.B., M.S., University of Illinois.

BRIAN ATKINSON, Instructor of Electrical Engineering and Computer Science. B.S., Colorado School of Mines; M.S.(E.E.) University of Colorado.

GERALD J. AUDIESIRK, Associate Professor of Biology. B.A., Rutgers University; Ph.D., California Institute of Technology.

Teresa E. Audiesirk, Associate Professor of Biology. B.S., Bucknell University; Ph.D., University of Southern California.

SANAA A. AZIM, Assistant Professor of Electrical Engineering and Computer Science. B.S.(E.E.), Cairo University (Egypt); M.S.(E.E.), Ph.D.(E.E.), McMaster University (Canada).

FERNIE BACA, Assistant Vice Chancellor for Research and Creative Activities; Associate Professor of Education. B.A., University of Northern Colorado; M.A., Ph.D., University of Colorado.

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as? You study?
Estudias?
Like to study.
Conteste en español.
Answer in Spanish.
Repite, por favor.
Repeat, please.
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**APPLICATION FOR UNDERGRADUATE ADMISSION TO COLORADO COLLEGIATE INSTITUTIONS**

1. **TYPE OR PRINT IN INK.** Answer questions completely on both sides of the application. Do not use nicknames.  
2. Contact institutions for the procedure to apply for financial aid and/or scholarships.  
3. Letters of recommendation and a statement of your activities, awards, and honors may be attached.

**NAME OF INSTITUTION TO WHICH APPLYING:**  
**LOCATION:**

**TERM AND YEAR OF EXPECTED ENROLLMENT**  
**Fall**  
**Winter**  
**Spring**  
**Summer**  
**of the year**

**CLASSIFICATION**  
**New Freshman**  
**Transfer Student**  
**Re-admit Student**  
(Re-admit only: Student No.)

**FULL LEGAL NAME**  
**Last**  
**First**  
**Middle**  
**Name under which transcript(s) will be submitted**

**SOCIAL SECURITY NO.**  
(SS# - for record keeping purposes only)

**BIRTHDATE**  
**AGE**  
**MALE**  
**FEMALE**

**HOME ADDRESS**  
**Number and Street**  
**City**  
**County**  
**State**  
**Zip Code**  
**Phone (area code) number**

**ADDRESS TO WHICH ADMISSIONS INFORMATION SHOULD BE SENT:** (Notify promptly if changed.)

**Nation of Citizenship**  
If not U.S., give temporary visa number

**If a permanent resident of the U.S., give Alien Registration Number**  
**Expiry Date**  
**Date of Issuance**

**Military Service**  
**Yes**  
**No**  
**ACTIVE DUTY DATES (mo/yr) **  
ARE YOU ELIGIBLE FOR VETERANS' BENEFITS?  
**Yes**  
**No**

*Compliance with this request is voluntary and will be kept confidential. This information does not influence the Admission decision.

**Ethnic Origin**  
**American Indian or Alaskan Native**  
**Black, not of Hispanic origin**  
**Caucasian/White, not of Hispanic origin**  
**Asian or Pacific Islander**  
**Hispanic**

**Do you have a physical disability, chronic health condition, or learning disability?**  
**Yes**  
**No**

**Would you like information about support services available for students with disabilities?**  
**Yes**  
**No**

**ADDITIONAL INFORMATION:** Complete the following information for your (check one): Parent  
**Legal Guardian**  
**Spouse**

**NAME**  
**Last**  
**First**  
**Middle**  
**OCCUPATION**  
**EMPLOYER**

**HOME ADDRESS**  
**Number and Street**  
**City**  
**State**  
**Zip Code**  
**Phone (area code) number**

If any relative has attended or is presently attending this institution, please list them below.

**Name**  
**Dates Attended**  
**Year Graduated**  
**Relationship**

**Important:** YOU MUST ANSWER Questions 1 and 2 below.

1. Have you ever been convicted of a crime? (Traffic Violations and Juvenile Offenses are exempt.)  
**Yes**  
**No**

2. Are you eligible to return to all collegiate institutions previously attended?  
**Yes**  
**No**  
**NA**

**IF YOU ANSWER "YES" TO QUESTION 1 OR "NO" TO QUESTION 2, PLEASE ATTACH A STATEMENT OF EXPLANATION.**

**What will be your proposed major(s) or field(s) of study?**  
**1st Choice**  
**2nd Choice**  
**Undecided**

**What is your educational goal at this institution?**  
**Bachelor's degree**  
**Associate degree**  
**Certificate**  
**No Degree**

**Indicate when you took the college entrance exam(s):**  
**ACT (mo/yr)**  
**SAT (mo/yr)**

**Indicate when you plan to take the college entrance exam(s):**  
**ACT (mo/yr)**  
**SAT (mo/yr)**

**LIST HIGHEST GRADE COMPLETED (1 to 12):**

**TYPE OF SCHOOL:**  
**Public**  
**Parochial**  
**Private**  
**Foreign**

**LAST HIGH SCHOOL ATTENDED:**  
**Name**  
**City**  
**State**  
**Zip Code**

**DATES OF ATTENDANCE:**  
**(mo/yr)**  
**to**  
**DATE OF HIGH SCHOOL GRADUATION:**  
**(mo/yr)**

If you are applying as a Freshman, send official high school transcripts.  
If not a high school graduate, have you earned a GED Certificate?  
**Yes**  
**No**  
**Date**  
**State or agency**

If you currently attending high school, submit completed application to appropriate high school official for review. Attach application fee (check or money order). Request copy of high school records on sent with application.

**HIGH SCHOOL OFFICIAL:** Please fill in:

**GPA**  
**Rank in class**  
**Class size**  
**For how many semesters**?

**By policy of this high school, students are never ranked in class.**

**Comments if appropriate:**  
**Signature of High School Official**  
**Telephone Number**  
**Date**

**High School Address:**  
**City**  
**State**  
**Zip Code**

6/86  
**AN EQUAL OPPORTUNITY EDUCATIONAL INSTITUTION**  
(over)
LIST ALL COLLEGES YOU HAVE ATTENDED, PLAN TO ATTEND, OR ARE CURRENTLY ATTENDING. INCLUDE COLLEGE(S) WHERE COURSE WORK WAS COMPLETED THROUGH CORRESPONDENCE OR EXTENSION.

<table>
<thead>
<tr>
<th>DATES OF ATTENDANCE</th>
<th>NAME OF COLLEGE/UNIVERSITY</th>
<th>CITY, STATE AND ZIP</th>
<th>DEGREE AND DATE EARNED</th>
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Send official transcripts from each college attended. When courses in progress are completed, send final transcript. Some colleges require transfer applicants to submit high school transcripts. Consult that college catalog for specific admissions requirements.

Have you applied to or previously attended the institution to which you are currently making application?

Yes [ ] No [ ] If yes, when?

LIST ALL HIGH SCHOOL OR COLLEGE COURSES YOU ARE NOW TAKING OR PLAN TO TAKE BEFORE ENROLLING. INDICATE WHETHER THEY ARE HIGH SCHOOL OR COLLEGE COURSES (if they are college courses, give course number):

<table>
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<tr>
<th>COURSE TITLE</th>
<th>CREDITS</th>
<th>TERM/YEAR</th>
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Indicate: Semester [ ] Quarter [ ] Trimester [ ] Other [ ]

TRADE OR TECHNICAL TRAINING: Military [ ] Apprenticeship [ ] Voc-Tec [ ]

FIELD OF TRAINING SCHOOL OR ORGANIZATION

PLEASE LIST CURRENT AND/MOST RECENT EMPLOYMENT

Company City, State Telephone Number Dates of Employment

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List last 3 years of Colorado Motor Vehicle registration

List last 3 years Colorado Voter Registration

List last 3 years Colorado income taxes have been filed

Date of marriage (mo/yr) – Answer this question only if you will be under 21 by initial enrollment date

If your parents are separated or divorced, which one lives in Colorado?

Dates of extended absences from Colorado (gone for more than one month at a time)

Students who claim a change in tuition classification must contact the Office of Admissions and Records for further information.

I hereby certify to the best of my knowledge that the information furnished on this application is true and complete. I understand that if found to be otherwise, it is sufficient cause for delay of admission, loss of credit, rejection, or dismissal. I hereby consent to the release of my transcript(s) to the institution receiving this application.

Applicant’s signature

Parent/Guardian signature

COMMENTS:
The Denver Tramway Corp., located at the corner of 14th and Arapahoe Sts., was once the site of the home of John Evans, Governor of Colorado Territory from 1862-65. Begun in 1910, construction paralleled that of the famed old D & F tower, each building reaching the eight-story mark in December the same year. The building was a half-block of huge car barns, garages for the trolleys.

Former CU-Denver Administrators

CU-Denver had its first full-time administrator in 1938, with the appointment of Richard Bray.

1946-52  Ralph B. Price
1952-68  Edwin P. Banks
1969-72  Joe J. Keen
1973     P. John Lymberopoulos
1973-80  Harold H. Haak

Jan.-June 1980  William Jenkins
June-Dec. 1980  Dwayne Nuzum
Feb.-Dec. 1985  Dwayne Nuzum
Jan. 1986-present  Glendon F. Drake
Acting in January 1973, the CU Board of Regents changed the name of the former DENVER CENTER to the UNIVERSITY OF COLORADO AT DENVER. The action came in response to the decision of Colorado voters in the November election of 1972 to amend the State Constitution and grant CU-Denver full legal status as a separate branch of the University.

The University of Colorado at Denver became a part of the Auraria Higher Education Center in 1976. Sharing facilities on the Auraria educational park with CU-Denver are the Community College of Denver and Metropolitan State College.