College of Engineering and Applied Science

Complete course list for the College of Engineering and Applied Science

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Website

Application Deadlines
Undergraduate
Fall—August 1
Spring—December 1
Summer—May 1

Graduate Programs
Bioengineering

Fall: master’s—March 15
doctoral—February 15

Civil Engineering

Domestic

Fall: master’s—June 15
doctoral—May 15
Overview

The College of Engineering and Applied Science at the University of Colorado Denver meets the needs of the Denver metropolitan area by providing nationally accredited engineering education programs in a flexible format that suits both students and employers. Recognizing the importance for students to pursue professional studies and related employment simultaneously, the college offers undergraduate and graduate degree programs in bioengineering, civil engineering, mechanical engineering, electrical engineering and computer science and engineering through evening studies or through a more traditional schedule of day classes. As a practicing engineer, you can improve and update your professional capabilities and earn a graduate degree. Or, through our interdisciplinary master of engineering degree, you can obtain graduate education in management, computer science, behavioral science or other areas together with new engineering skills in your field. We participate in an interdisciplinary master of science in environmental science, and the college offers a unique interdisciplinary doctoral degree in engineering and applied science.

A listing of the fields in which engineers work would have hundreds of entries. The following list is a brief summary of the engineering fields available at CU Denver.

**Bioengineering** offers opportunities for interdisciplinary undergraduate training for a bachelor of science degree and graduate training for master of science and doctor of philosophy degrees. Our programs are uniquely integrated with the CU Anschutz Medical
Campus. Students enjoy opportunities to learn from clinicians and engineers and to perform research or medical device design in world-class hospitals and clinical research labs. Bioengineering is one of the fastest growing job markets this decade. A degree in this area provides numerous opportunities to work in health care, biomedical industry, government regulatory agencies and academia.

**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 distribution 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 our physical environment and the growth of cities.

**Computer science and engineering** offers graduates the solid foundation needed for jobs in computing and information technologies. Career paths in computer science involve designing and implementing software, devising new applications of computers and developing effective ways to solve computing problems. Computer engineers design and develop computer hardware and supervise its manufacture and installation.

**Electrical engineering** offers professional careers that include research in development of new electrical or electronic devices, instruments or products; design of equipment or systems; production and quality control of electrical products; and sales or management for private industry or government. There are numerous specialties within electrical engineering. Among them are the design and application of computer systems and digital engineering; electromagnetic fields and microwave devices; control systems; communication theory and signal processing; electrical integrated circuits and electron devices; and energy and power systems.

**Mechanical engineering** offers a wide range of interesting and challenging career opportunities in research, design, development, manufacturing, testing and marketing for either private industry or government. Mechanical engineers help develop a wide range of products such as engines, transmissions, compressors, pumps, computer disk drives, oil field drilling rigs, missiles, space satellites, earth-moving equipment, container-manufacturing machines, medical equipment and many other products encountered in daily life.

**College of Engineering and Applied Science Educational Goals**

The College of Engineering and Applied Science has established the following goals and objectives for undergraduate education:

- successful completion of the fundamental core courses, primarily lower division, in mathematics and the physical sciences
- successful completion of the required upper-division courses in engineering science, analysis and design
- successful completion of real-world engineering design projects that require integration of engineering, economic and social skills
successful completion of a series of humanities and social science courses that introduce
the student to societal problems and historical perspectives
- evidence, through close student/faculty contact, of development of professionalism,
  ethics and concern for the multifaceted human element of engineering
- evidence, from successful completion of a full engineering curriculum, of the ability to
  maintain professional competency through lifelong learning
- evidence, through successful completion of a series of communications oriented courses
  and project presentations, of an ability to communicate effectively with professionals and
  lay persons alike

Accreditation
The undergraduate degree programs in civil, computer science and engineering, electrical and
mechanical engineering programs are accredited by the Engineering Accreditation Commission
(EAC) of the Accreditation Board for Engineering and Technology (ABET). The undergraduate
degree program in bioengineering will apply for accreditation as soon as it is eligible.

Availability of Degree Programs
CU 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. 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 University of Colorado 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.

Nondegree Students
Nondegree students may apply 12 semester hours of course work (or up to 18 if taken in one
semester) toward a bachelor’s degree in engineering from CU Denver. Nondegree graduate
students may apply 9 semester hours of graduate-level course work toward a master’s degree in
engineering from CU Denver.

Summer Courses
Summer session courses are offered for regular students and those who have course deficiencies.
Courses are also offered for high school graduates who wish to enter as freshmen and need some
additional preparatory work. For some students, there are advantages in starting their college
careers during the summer session. Some required freshman and sophomore courses and many
elective courses are offered at CU Denver during the summer. The summer session gives
students a head start and enables them to take a lighter load during the fall semester or take
additional courses to enrich their programs.

Computing
The College of Engineering and Applied Science encourages all students to develop their skills in
using the computer as a tool, not only for solving technical problems but for use in all other
facets of their careers. Students are encouraged to explore computer courses other than the
fundamental programming course required in their curriculum.
Internships
Internships are a way for students to gain professional experience while studying at CU Denver. Many internship positions lead to permanent employment opportunities upon graduation. Please see the “Career Center” section of the Campus Life chapter in this catalog or contact the Career Center at 303-556-2250 for information on the specific eligibility requirements.

Scholarships
The college receives an annual allocation of state funds for Dean’s Scholarships; these funds are awarded to students who apply and meet scholarship and community service criteria. Additional funds for scholarships and loans are obtained through contributions from alumni and friends. Enrollment in the College of Engineering and Applied Science makes the student eligible for these scholarships. Scholarship application forms are available online through the CU Denver Scholarship Resource Office. Students must apply by April 1 for scholarships beginning in the upcoming academic year. Students can apply for all industry scholarships and Dean’s Scholarships using the general application form. Scholarship application forms require information about the applicant’s participation in school related activities, community activities and work. Dean’s Scholarship applicants must qualify for in-state tuition and have at least a 3.0 GPA, but do not need to show unmet financial need.

For additional information on other types of financial aid, consult the Tuition, Fees and Financial Aid chapter of this catalog.

Research Centers

Transportation Research Center
Director: Bruce Janson
Telephone: 303-556-2831

The Transportation Research Center (TRC) involves both students and faculty on the Denver campus in a range of education and research activities. The TRC works on projects in collaboration with other departments and colleges such as business, urban planning and public affairs. TRC projects address local, state, national and international concerns with funding from federal, state, local or private sources.

Some focuses of the Transportation Research Center are transportation modeling; traffic monitoring technologies and data analysis techniques; transportation planning and travel demand forecasting for both person and freight movements; traffic engineering and control; facility design and management; sustainable transportation systems; safety studies; use of geographic information systems in transportation; environmental impact assessment; transportation investment decision analysis, including cost-benefit and life-cycle analyses and cross-subsidization issues; and accident studies. Several studies on advanced system development involve partnerships with Colorado’s high-tech industry.
Center for Geotechnical Engineering Science  
**Director:** Nien-Yin Chang  
**Associate Director:** Brian Brady  
**Telephone:** 303-556-2362  

The Center for Geotechnical Engineering Science aims to advance the understanding of the safety, reliability, performance and environmental impact of engineered geostructures. Resolutions of geotechnical and geoenvironmental remediation problems are addressed through research sponsored by public funding agencies and private industry. The center seeks the opportunity for cooperative research with other institutions. Research interests include soil-structure interaction (SSI) effects on the response of structures under strong seismic shakings (high rises, bridges, retaining walls, deep foundations and other infrastructures); load and resistance factors designs (LRFD) of deep foundations; seismic responses of mechanically stabilized earth (MSE) structures; and expansive soils foundation designs.

The Center can provide technical expertise pertaining to expansive soil investigation, foundation designs, forensic investigation and rehabilitation of damaged structures. With billions of dollars lost due to expansive soil damage to structures, much is desired in formulating prediction mechanisms for expansive soil behaviors and design procedures for the mitigation of severe damage and technology for the rehabilitation of the damaged structures. Severe expansive soil problems have led to a Center research effort aimed at a better understanding of expansive soil mechanics, foundation performance and forensic investigation of the damage to structures (buildings, highways, airport taxiway and runway). The Center promotes technology transfer through engineering education and public forums.

Center for Sustainable Infrastructure Systems  
**Director:** Z. Jason Ren  
**Telephone:** 303-556-5287  
**Website:** [http://www.ucdenver.edu/academics/colleges/Engineering/research/CenterSustainableUrbanInfrastructure/Pages/CSIS.aspx](http://www.ucdenver.edu/academics/colleges/Engineering/research/CenterSustainableUrbanInfrastructure/Pages/CSIS.aspx)  

The Center for Sustainable Infrastructure Systems (CSIS) is an interdisciplinary research center between the College of Engineering and Applied Science and the School of Public Affairs, bringing together engineers with professionals from science, public policy and health and business development for the advancement, rapid diffusion, review and redesign of resilient and sustainable infrastructure systems in society. There are four unique aspects of CSIS sustainable infrastructures research:

- Systems Approach—integrating research across various infrastructures and/or sectors, with efficiency benchmarks in each sector to aid in scenario modeling and quantitative goal setting.
- Multi-objective—taking into consideration infrastructure performance and its impact on people, prosperity and the planet
- Outcomes and metrics driven
- Considers people and processes—understanding the policy process and engaging with communities and institutions
In addition to conducting research, CSIS provides educational programs (curriculum, professional development and outreach); conducts outreach for development of sustainable infrastructure projects and activities; and develops and disseminates a body of knowledge related to CSIS.

**Continuing Engineering Education Program**

**Program Manager:** Heidi Utt  
**Telephone:** 303-556-4907  
**Website:** [http://www.ucdenver.edu/academics/colleges/Engineering/discover/ContinuingEngineeringEducationProgram/Pages/CEEP.aspx](http://www.ucdenver.edu/academics/colleges/Engineering/discover/ContinuingEngineeringEducationProgram/Pages/CEEP.aspx)

Continuing Engineering Education Program (CEEP) courses are offered at convenient times and locations, are taught by academic and industry professionals, and are responsive to changing technologies. By addressing topics for both engineers and non-engineers, the curriculum supplies the knowledge, skills, and competitive edge required in many professional fields. Moreover, CEEP students finish with ready-to-apply expertise. Program disciplines encompass civil, electrical, mechanical, environmental, systems, information technology, project management and more, with a focus on key industry certifications, such as the FE, PE, CAPM, PMP, CCENT, CCNA, SCJP and others. Most CEEP offerings are non-credit Continuing Education Unit earning courses, although some courses are available for graduate credit.

**General Requirements for Undergraduate Admission**

The student must meet the admission requirements described in the [Information for Undergraduate Students](http://www.ucdenver.edu/academics/colleges/Engineering/discover/InformationforUndergraduateStudents.aspx) and [Information for Graduate Students](http://www.ucdenver.edu/academics/colleges/Engineering/discover/InformationforGraduateStudents.aspx) chapters of this catalog and of the College of Engineering and Applied Science in which the degree program selected by the student is offered.

Beginning undergraduate 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 1110, 1120 and 1130). (These courses are offered to allow students to prepare for calculus if needed.) Students who question the adequacy of their precollege background in mathematics should contact the [Department of Mathematics](http://www.ucdenver.edu/academics/colleges/LiberalArtsAndSciences/Mathematics.aspx) office in the College of Liberal Arts and Sciences. Placement tests covering precalculus mathematics are required of new freshmen to select 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 usually takes eight semesters to cover this material adequately in high school.

Refer to the “Minimum Academic Preparation Standards (MAPS)” and “Admission Requirements for Freshmen” sections in the Information for Undergraduate Students chapter of this catalog for a list of high school subjects required for admission to the College of Engineering and Applied Science.

Former Students
Former students must meet the readmission requirements outlined in the Information for Undergraduate Students and Information for Graduate Students chapters of this catalog. Students who interrupt their degree program for more than one academic year will be required to follow the degree program in effect at the time of their readmission to the college. Repetition of course work may be necessary because of the interruption; readmitted applicants will be evaluated on an individual basis. Repeated courses must be taken for no credit. See the “Repetition of Courses” policy under “Academic Policies” in this chapter of the catalog.

Intercampus Transfer
Transfers between campuses of the University of Colorado should be carefully planned to avoid loss of academic credit. Courses and credits required for engineering degrees vary from campus to campus; therefore, students should plan as far ahead as possible. An advisor can help choose the right courses. Such planning should also include contacting the engineering department to which the student plans to transfer at least one semester before the transfer is planned. The transfer student must have at least a 2.0 GPA for 30 hours of credit toward an engineering degree to be eligible to transfer. A higher GPA may be required to transfer directly into the College of Engineering and Applied Science. In general, calculus, physics and chemistry courses will transfer for full credit. In addition, 12 semester hours of humanities and social sciences electives will usually transfer for full credit. Fundamental computing courses may be unique by campus and should be checked with the campus to which the student is transferring. Any minimum academic preparation standards (MAPS) deficiencies should be eliminated before transferring.

Transfer Agreements
The College of Engineering and Applied Science has formal transfer agreements with all Colorado community colleges, including the following Denver metro-area community colleges:

- Arapahoe Community College (Littleton)—303-794-1550
- Community College of Aurora—303-360-4790
- Community College of Denver—303-556-2600
- Front Range Community College (Westminster)—303-466-8811
- Red Rocks Community College (Lakewood)—303-988-6160
Students interested in transferring should contact the engineering department to which they plan to transfer and the respective community college counseling office at the phone number indicated above.

**Transfer Students**
Students applying for transfer from other accredited collegiate institutions will be considered for admission on an individual basis if they meet the requirements outlined in the Information for Undergraduate Students chapter of this catalog and have successfully completed a year each of calculus and physics (calculus-based).

Applications to transfer from another college at CU Denver to the College of Engineering and Applied Science will be considered on an individual basis by the Office of the Dean, if the student’s prior academic record includes successful completion of a year each of calculus and calculus-based physics and the student’s cumulative GPA is 2.75 or higher.

**Transfer Credit**
Refer to the Information for Undergraduate Students and Information for Graduate Students chapters of this catalog for descriptions of universitywide policies on transfer credit.

**Nontransferable Credits**
Courses on basic subjects such as mathematics or physics 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 engineering technology students. Engineering technology courses (courses with technology designations) will not be considered for transfer into an engineering degree program.

Students may seek credit for course work by examination (see “Transfer of College-Level Credit” section of the Information for Undergraduate Students chapter of this catalog).

**Undergraduate Core Curriculum in Engineering**
The faculty of the College of Arts & Media, the Business School, the College of Engineering and Applied Science and the College of Liberal Arts and Sciences have established a core curriculum for undergraduate students. Students graduating from the College of Engineering and Applied Science are required to satisfy the humanities and social sciences and writing portions of their engineering program by taking courses from the CU Denver Undergraduate Core Curriculum.

The intent of the humanities and social sciences component of an engineering program is to provide the student with a coherent and well-structured exploration of a substantive issue or theme appropriate to the engineering profession and/or of interest to the student. The required humanities and social sciences electives must include both breadth and depth, must include advanced-level course work and should be planned in consultation with the advisor. A random selection of lower-division courses will not satisfy the humanities and social sciences elective requirement.

Courses such as accounting, contracts, management, elementary foreign languages, public speaking and technical writing are not acceptable as humanities and social sciences electives.
Details about the CU Denver Undergraduate Core Curriculum

Academic Policies
Refer to the Information for Undergraduate Students and University Policies chapters of this catalog for descriptions of universitywide policies. The following policies apply specifically to students in the College of Engineering and Applied Science.

Advanced Placement
Advanced placement (AP) credit may be granted upon receipt of official results from College Board examinations. Minimum score requirements and credit award information can be found in the Information for Undergraduate Students chapter of this catalog. AP credit may be applied toward graduation if comparable to CU Denver coursework included in the College of Engineering curriculum.

College-Level Examination (CLEP) Credit
Students may earn credit through certain College-Level Examination Program (CLEP) examinations, provided that they score at the 50th percentile or above. CLEP credit may be applied toward graduation if comparable to CU Denver coursework included in the College of Engineering curriculum. A listing of acceptable CLEP exams can be found in the Information for Undergraduate Students chapter of this catalog. Official CLEP score reports are required for transfer credit consideration.

International Baccalaureate (IB) Credit
International Baccalaureate (IB) credit may be granted upon receipt of official IB transcripts and/or score reports. Minimum score requirements and credit award information can be found in the Information for Undergraduate Students chapter of this catalog. IB credit may be applied toward graduation if comparable to CU Denver coursework included in the College of Engineering curriculum.

Attendance Regulations
Successful work in the College of Engineering and Applied Science is dependent upon regular attendance in all classes. Students who are absent should make arrangements with instructors to make up the work missed. Students who for illness or other good reason miss any examination must notify the instructor no later than the end of the day on which the examination is given. Failure to do so may 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 form for undergraduate degree students, which must have the approval of the new department. (See also discussion of interdepartmental transfer requirements under “Transfer Students” in this chapter of the catalog.)
Advising
Students are assigned specific departmental advisors for academic planning and should contact the departmental office for advising appointments.

Counseling
Personal counseling is available through the CU Denver Student and Community Counseling Center. Contact 303-556-4372 for questions or an appointment.

Course Load Policy
*Full-time Students.* Undergraduate students employed less than 10 hours per week should consider registering for courses 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 19 hours may be granted by written petition and approval of the department chair and the dean’s office.

Freshman Year
Fundamentals taught in the freshman year are of critical importance in the more advanced classes. Special attention should be given to taking courses in the proper sequence. (Course requirements for freshmen are detailed within the typical curriculum given under each department.) All students are urged to consult their instructors whenever they are experiencing difficulties with course materials or for questions related to the class.

Prerequisites
Students must repeat a prerequisite course to another required course in which a grade of D+ or lower was earned before moving on to the subsequent course. If students do not successfully complete (C- or higher) an engineering class on the second attempt, they must obtain written approval from their major department to enroll for the course for the third time.

Repetition of Courses
Undergraduate students may not register for credit in a course in which they already have received a grade of C- or higher. An F grade in a required course necessitates subsequent satisfactory completion of the course. Students must repeat a prerequisite course to another required course in which a grade of D+ or lower was earned before moving on to the subsequent course. If students do not successfully complete (C- or higher) an engineering class on the second attempt, they must obtain written approval from their major department to enroll for the course for the third time. When a course is retaken because of a D or F grade, both grades will appear on the transcript and both will be averaged into the GPA. Any exceptions to these policies must be made by written petition through the Office of the Dean.

No Credit
An engineering student must request approval before enrolling for no credit (NC) for any course. Required courses must be taken for credit. Once a course has been taken NC, the course cannot be repeated for credit.

Work Experience
The College of Engineering and Applied Science does not award academic credit for work experience.
College Policy on Academic Progress
All undergraduate students must declare a major by the time they have accumulated 60 semester hours. An undergraduate engineering student must maintain a cumulative GPA of 2.0 or better in all hours attempted at the University of Colorado, in those courses applied 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 GPA at the University of Colorado. However, grades earned in another school or college of 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.

Read about academic probation and suspension in the University Policies section.

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 examinations, 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.

At CU Denver, there is a student Academic Honor Code. The code is published in a brochure available from the Office of Student Life. Information regarding all student grievance procedures may be obtained in that office.

In addition, the college has a committee on discipline that hears cases of alleged violations of academic ethics and recommends disciplinary action. In a case of proven academic dishonesty/misconduct, the committee may invoke penalties that may include probation, suspension or expulsion. In a case of suspension or expulsion, a distinction may be placed on a student's academic record indicating the action was due to academic dishonesty/misconduct. Students who suspect or observe violations of academic ethics should report them to their instructor, the department chair or the Office of the Dean.

Grading System, Incompletes, Pass/Fail and Drop/Add Procedures
See the Registration and Records chapter of this catalog for the University of Colorado uniform grading system and for additional pass/fail information and drop/add procedures.

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 and the departmental office must be informed in writing by the instructor, who states what the student is to do in order to remove the incomplete and the date the tasks are to be completed. The
instructor will assign an "I" distinction. 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 majority of course requirements (75%) must have been completed with a passing grade to be eligible for an incomplete. An "I" distinction will be converted automatically to a grade of "F" after one year if the specified work is not 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 humanities and social sciences elective courses without serious risk to their academic records. In general, pass/fail should be limited to 3000- or 4000-level humanities and social sciences courses. Students must process the pass/fail form during the first two weeks of the semester. Engineering students cannot take required courses pass/fail.

**Dropping a Course**
After the tenth week of the semester, dropping a course requires a petition signed by the department chair and the Assistant Dean for Academic Affairs. Only under very extenuating circumstances, such as a documented medical or personal emergency, will petitions for dropping courses be approved after the tenth week of the semester.

**Graduate-Level Courses Taken at Undergraduate Level**
With faculty advisor approval, an undergraduate engineering student may be granted the opportunity to take graduate courses to be counted toward an undergraduate degree. A maximum of 6 semester hours of graduate-level University of Colorado course work taken as an undergraduate can be considered for credit toward a graduate degree. Only a grade of B (3.0) or above will be considered for graduate-level credit. All consideration of graduate work to be counted toward both an undergraduate and a graduate degree must be approved by a faculty advisor.

**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 student’s major department. These honors are recorded on the diploma of the graduate and indicated in the commencement program. Grades earned during the semester of graduation will not be considered.

For *Special Honors*, a student must have a cumulative GPA of at least 3.80, and for *Honors*, a GPA between 3.60 and 3.79. *With Distinction* is awarded at the discretion of the College Executive Council.

**Planning an Engineering Program**
*It is the responsibility of all students to do the following:*
- meet with an academic advisor at least once each semester
- meet with a department transfer credit advisor as necessary
• meet with department senior check-out advisor prior to their last 30 semester hours of
course work to verify progress toward graduation
• complete a graduation plan prior to the semester of intended graduation
• keep their department advisor informed of any changes in the student’s plans
throughout their last year

Graduation Requirements
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 prescribed and elective work in any curriculum as determined by the
appropriate department must be completed satisfactorily.

Hours—A minimum of 130 semester hours is required for students seeking a civil engineering
degree; a minimum of 128 semester hours for bioengineering, computer science and
engineering, electrical engineering or mechanical engineering degrees.

Hours in Residence—At least 30 semester hours of course work applicable to a bachelor of
science degree in engineering must be taken at CU Denver while a declared student in good
standing at the College of Engineering and Applied Science. Students must be enrolled in the
college for at least the final two semesters prior to graduation.

Transfer Credit—All requests for consideration of transfer credit and its application toward a
degree in Engineering and Applied Science must be submitted prior to the student’s last two
semesters at the Denver campus.

Grade Point Average (GPA)—A minimum cumulative GPA of 2.0 is required for all courses
attempted, for all required courses and for all courses taken within the student’s major
department.

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

Incompletes and Correspondence Courses—It is the student’s responsibility to ensure
that all incompletes and correspondence courses are officially completed before the 10th week of
the student’s final semester in school.

Simultaneous Conferring of Degrees—For any double degree program, both bachelor’s
degrees must be conferred at the same commencement.

Commencement Exercises—Commencement exercises are held in December and May. A
student finishing in August is encouraged to attend commencement the following December.

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
management may complete all of the requirements for both a BS degree in engineering and a BS
degree in business administration by extending their study programs to five years, including one or two summer terms. The business courses required by the Business School 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 interested in this undergraduate program are required to submit an application to the Business School. Students should contact a business advisor to obtain the application form and determine an acceptable degree program.

Requirements for the undergraduate business degree and engineering degree must be completed concurrently. At least a 2.0 GPA must be earned in all business courses undertaken in the Business School. No fewer than 30 semester credits in business courses from CU Denver must be earned after admission to business to establish residency credit. Courses offered or required by the Business School may be used in lieu of electives required for undergraduate engineering degrees, subject to the approval of the individual department.

Joint Engineering Degrees
A student may obtain two engineering majors by meeting the requirements of both programs; however, the approval of both departments and the dean is required. Thirty hours of elective or required subjects must be completed in addition to the largest minimum number required by either of the two departments. A course taken for one completed master's degree may not be counted toward a second master's degree.

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.

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 new equipment, most of it electronic, is being developed to assist the medical practitioner in treatment of patients. Bioengineering, engineering systems analysis, probability and communication theory are highly applicable to medical problems. Improved communication techniques also are allowing the storage and retrieval of information not previously available to the medical doctor. An advanced knowledge of basic mathematics and computing techniques, along with increased understanding of physical chemistry, improves the scientific base upon which medical knowledge rests. It is therefore desirable that the future medical practitioner and researcher be well equipped with the tools engineering can offer.

To provide a minimum of the necessary knowledge, the additional courses listed below must be completed with superior grades. 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 chair.

General Chemistry (two semesters) (CHEM 2031, 2038, 2061, 2068), 9 semester hours
Organic Chemistry (two semesters) (CHEM 3411, 3421, 3418, 3428), 10 semester hours
General Biology (two semesters) (BIOL 2051, 2061, 2071, 2081), 8 semester hours
English Composition (one semester), 3 semester hours
Literature (two semesters), 6 semester hours
**Total:** 36 semester hours

Students desiring to enter a premedical program should consult the representative of the department involved. Premedical advising is available through the health careers advisor, North Classroom, 3014B, 303-556-4350.

**Graduate Study in Engineering**
The College of Engineering and Applied Science offers graduate programs in bioengineering, civil engineering, computer science and engineering, electrical engineering, mechanical engineering, and an interdisciplinary doctoral degree in engineering and applied science.

For information regarding courses and requirements leading to the master of science, master of engineering or the PhD degree, see the appropriate discipline heading in this section. For graduate admission information and policies, see the [Information for Graduate Students](#) chapter of this catalog.

**TOEFL/Language Requirements**
International graduate students who take the TOEFL English proficiency exam must score at least 525 on the paper-based exam or 71 on the Internet-based exam (IBT). International students must score a 6.0 on the IELTS exam. International students who successfully complete study at Spring International with a grade of B or better are not required to submit TOEFL scores. Students must successfully complete studies through Level Six to be eligible for the waiver consideration. Contact Spring International for more information at [www.spring.edu](http://www.spring.edu).

**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 late afternoon and evening 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 equivalent to those of the master of science degree.

In addition to credit course work, the college also offers courses of interest to practicing engineers through its Continuing Engineering Education Program, 303-556-4907. (See also Continuing Engineering Education 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 graduate fundamentals courses, which are designed to provide qualified students with needed background preparation in business. Students must see an advisor from the Business School for approval.
Programs of Study
Courses listed in the following curricula are typical illustrations. Changes in specific courses may be necessary to accommodate students’ needs and/or changes in institution requirements; however, students should take courses in logical sequence, i.e., complete all freshman courses before taking sophomore courses.

Programs

Doctor of Philosophy

- Engineering and Applied Science PhD

Bioengineering

Programs

Bachelor of Science

- Bioengineering BS

Master of Science

- Bioengineering MS

Master of Science/Master of Science

- Bioengineering Dual MS

Doctor of Philosophy

- Bioengineering PhD

Doctor of Medicine/Doctor of Philosophy

- Bioengineering MD/PhD

Civil Engineering

Programs

Bachelor of Science

- Civil Engineering BS

Certificate
• Geographic Information Systems Graduate Certificate
• Sustainable Urban Infrastructure Graduate Certificate
• Water Resources Graduate Certificate

Master of Science

• Civil Engineering MS and MEng

Doctor of Philosophy

• Civil Engineering PhD

Computer Science and Engineering

Programs

Bachelor of Science

• Computer Science BS

Non Degree

• Computer Science Minor

Master of Science

• Computer Science MS

Doctor of Philosophy

• Computer Science and Information Systems PhD

Electrical Engineering

Programs

Bachelor of Science

• Electrical Engineering BS

Master of Engineering

• Electrical Engineering MEng

Master of Science

• Electrical Engineering MS
Mechanical Engineering

Programs

Bachelor of Science
- Mechanical Engineering BS

Master of Engineering
- Mechanical Engineering MEng

Master of Science
- Mechanical Engineering MS