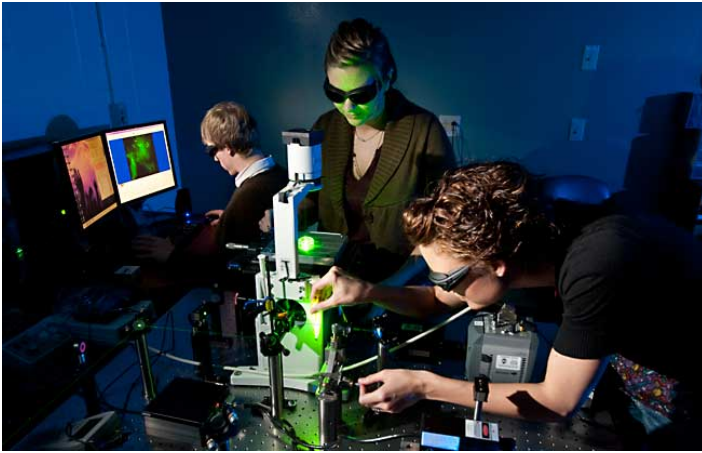


# WALTER SCOTT, JR. COLLEGE OF ENGINEERING



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[engr.colostate.edu](http://www.engr.colostate.edu/) (<http://www.engr.colostate.edu/>)

Professor Ken Reardon, Interim Dean  
Professor Karan Venayagamoorthy, Associate Dean

## Undergraduate Majors

Biomedical Engineering (<http://catalog.colostate.edu/general-catalog/colleges/engineering/biomedical/>)  
Chemical and Biological Engineering (<http://catalog.colostate.edu/general-catalog/colleges/engineering/chemical-biological/chemical-biological-engineering-major/>)  
Civil Engineering (<http://catalog.colostate.edu/general-catalog/colleges/engineering/civil-environmental/civil-engineering-major/>)  
Computer Engineering (<http://catalog.colostate.edu/general-catalog/colleges/engineering/electrical-computer/computer-engineering-major/>)  
Electrical Engineering (<http://catalog.colostate.edu/general-catalog/colleges/engineering/electrical-computer/electrical-engineering-major/>)  
Environmental Engineering (<http://catalog.colostate.edu/general-catalog/colleges/engineering/civil-environmental/environmental-engineering-major/>)  
Mechanical Engineering (<http://catalog.colostate.edu/general-catalog/colleges/engineering/mechanical/mechanical-engineering-major/>)

## Dual Degree Programs

Biomedical Engineering (B.S.) combined with Chemical and Biological Engineering (B.S.) (<http://catalog.colostate.edu/general-catalog/colleges/engineering/biomedical/chemical-biological-dual-degree-program/>)  
Biomedical Engineering (B.S.) combined with Computer Engineering (B.S.) (<http://catalog.colostate.edu/general-catalog/colleges/engineering/biomedical/computer-dual-degree-program/>)  
Biomedical Engineering (B.S.) combined with Electrical Engineering, Electrical Engineering Concentration (B.S.) (<http://catalog.colostate.edu/general-catalog/colleges/engineering/biomedical/electrical-dual-degree-program/>)  
Biomedical Engineering (B.S.) combined with Electrical Engineering, Lasers and Optical Engineering Concentration (B.S.) (<http://catalog.colostate.edu/general-catalog/colleges/engineering/biomedical/electrical-lasers-optical-concentration-dual-degree-program/>)

Biomedical Engineering (B.S.) combined with Mechanical Engineering (B.S.) (<http://catalog.colostate.edu/general-catalog/colleges/engineering/biomedical/mechanical-dual-degree-program/>)

## Undergraduate Minors

Biomedical Engineering Interdisciplinary Minor (<http://catalog.colostate.edu/general-catalog/university-wide-programs/interdisciplinary-studies/biomedical-engineering-interdisciplinary-minor/>)  
Computer Engineering (<http://catalog.colostate.edu/general-catalog/colleges/engineering/electrical-computer/computer-engineering-minor/>)  
Environmental Engineering (<http://catalog.colostate.edu/general-catalog/colleges/engineering/civil-environmental/environmental-engineering-minor/>)

(<http://catalog.colostate.edu/general-catalog/colleges/engineering/civil-environmental/environmental-engineering-minor/>) **For a complete list of departmental program offerings (including certificates), see individual department catalog pages.**

## College-Wide Graduate Programs

### Master's Programs

Master of Engineering, Plan C, Advanced Manufacturing Specialization (<http://catalog.colostate.edu/general-catalog/colleges/engineering/me-advanced-manufacturing-specialization/>)  
Master of Engineering, Plan C, Aerospace Engineering Specialization (<http://catalog.colostate.edu/general-catalog/colleges/engineering/me-aerospace-engineering-specialization/>)  
Master of Engineering, Plan C, Biomedical Engineering Specialization (<http://catalog.colostate.edu/general-catalog/colleges/engineering/me-biomedical-engineering-specialization/>)  
Master of Engineering, Plan C, Chemical Engineering Specialization (<http://catalog.colostate.edu/general-catalog/colleges/engineering/chemical-biological/#graduatetext>)  
Master of Engineering, Plan C, Civil Engineering Specialization (<http://catalog.colostate.edu/general-catalog/colleges/engineering/civil-environmental/plan-c-me-civil-engineering-specialization/>)  
Master of Engineering, Plan C, Computer Engineering Specialization (<http://catalog.colostate.edu/general-catalog/colleges/engineering/electrical-computer/plan-c-me-computer-engineering-specialization/>)  
Master of Engineering, Plan C, Electrical Engineering Specialization (<http://catalog.colostate.edu/general-catalog/colleges/engineering/electrical-computer/plan-c-me-electrical-engineering-specialization/>)  
Master of Engineering, Plan C, Mechanical Engineering Specialization (<http://catalog.colostate.edu/general-catalog/colleges/engineering/mechanical/plan-c-me-mechanical-engineering-specialization/>)  
Master of Engineering, Plan C, Systems Engineering Specialization (<http://catalog.colostate.edu/general-catalog/colleges/engineering/plan-c-me-systems-engineering-specialization/>)

The mission of the Walter Scott, Jr. College of Engineering is to educate, innovate, cultivate and engage in order to generate new knowledge, improve quality of life and positively impact society.

Engineers are critically involved in every facet of modern technological society, processing information, designing systems and equipment, maintaining society's infrastructure, solving environmental and energy problems, and helping attain desired levels of efficiency and comfort. The Walter Scott, Jr. College of Engineering continues its tradition—a tradition as old as CSU—of providing world-class training in the

basic fields of engineering through both undergraduate instruction and graduate programs strongly supported by modern research facilities and distinguished faculty.

## College Programs

The Engineering Accreditation Commission of ABET (<http://www.abet.org>) accredits all engineering undergraduate programs.

Undergraduate programs are administered by the Departments of Chemical and Biological Engineering, Civil and Environmental Engineering, Electrical and Computer Engineering, and Mechanical Engineering. These departments offer four-year programs leading to Bachelor of Science degrees. Although emphasis is on broad training in basic engineering, students may specialize to some extent by proper choice of technical electives. Additionally, the School of Biomedical Engineering offers a program in which students attain two degrees in five-years. Graduates of this program receive two degrees: one B.S. in biomedical engineering and the other B.S. in one of three traditional engineering areas: Chemical and Biological Engineering, Electrical Engineering, or Mechanical Engineering.

Students may consider simultaneously completing the requirements for a second major. See Second Major Requirements (<http://catalog.colostate.edu/general-catalog/academic-standards/degree-requirements/#second-major>) for a complete description of the program. A student may pursue a minor program of study inside or outside the Walter Scott, Jr. College of Engineering in conjunction with the desired engineering major.

## Walter Scott, Jr. College of Engineering General Objectives and Outcomes

### Outcomes

Graduates of the undergraduate engineering programs will be able to demonstrate:

1. An ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics
2. An ability to apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors
3. An ability to communicate effectively with a range of audiences
4. An ability to recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts
5. An ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives
6. An ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions
7. An ability to acquire and apply new knowledge as needed, using appropriate learning strategies

### Objectives

Individual program outcomes and objectives are provided within the respective departments' websites and below, in this catalog.

## Cooperative Education Program

The cooperative education program is an academic rotational program in which students work at least three semesters, two of which are fall or spring, in an assignment related to their major. Each work semester, cooperative education students register for one credit hour of *Engineering Cooperative Experience* to maintain their full-time student status. Three cooperative education credit hours may be substituted for a technical elective in their major. Cooperative education students gain at least a year of work experience, typically with the same employer, while earning a competitive salary. The cooperative education program allows participants to explore their chosen engineering discipline, build a powerful resume, develop a network of professional contacts, and support their academic expenses.

## International Opportunities

Education abroad programs are available to students in the Walter Scott, Jr. College of Engineering. Because knowledge of other cultures is valuable in understanding our own, students are strongly encouraged to take a summer or semester to study outside the United States as part of their overall program at CSU. Students interested in study abroad should plan far in advance by discussing opportunities with their academic advisor and by visiting the Office of International Programs (<http://international.colostate.edu>) in Laurel Hall.

## Registration as a Professional Engineer

Registration and licensing are required under certain legally defined circumstances in order to practice as an engineer. The Walter Scott, Jr. College of Engineering actively encourages all of its students to fulfill the necessary requirements as soon as they are eligible. The Fundamentals of Engineering Examination (FE) administered by the State Board of Registration for Professional Engineers and Professional Land Surveyors may be taken by seniors from ABET accredited programs during the two semesters prior to graduation. After the required practical experience is completed, the Principles and Practice of Engineering Examination (PE) may be taken for licensure in the engineering profession.

## Career Readiness

Within the Walter Scott Jr. College of Engineering, the Engineering Success Center (<http://www.engr.colostate.edu/engineering-success-center/>) provides comprehensive career services and career preparation as part of the Office of Academic and Student Affairs. The center delivers a full spectrum of programs supporting the professional development and placement of undergraduate engineers while considering the workforce needs of its industry partners. Student services include resume reviews, job search advice, career fairs, salary negotiation tactics, mock interviews, cooperative education partnerships, and the opportunity to engage with diverse student organizations.

## Admission Information

Students may be admitted to a specific undergraduate major in this college or choose to explore all areas of engineering as an Engineering Open Option student. Engineering Open Option students must specify their choice of major prior to registration for the sophomore year. Should the demand for any engineering major exceed the capacity to maintain a high-quality education, the college may find it necessary to limit enrollment in some majors.

## High School Graduates

See General Policies for Undergraduate Admissions (<http://catalog.colostate.edu/general-catalog/admissions/general-policies/>) for

specific Walter Scott, Jr. College of Engineering requirements. The required units listed are minimums. Students desiring to enter the engineering majors are urged to take available advanced math, English, computer skills, and natural sciences classes.

## Course Placement and Advising for Freshmen

All entering first-year students are required to take the Mathematics Placement Tool (<https://placement.math.colostate.edu/welcome/directory.html>) prior to registration during their respective summer Ram Orientation session. The examination results, together with other information about students, are used by both professional and faculty advisors to counsel students. Before enrolling in MATH 160, students may be required to take up to five precalculus math courses (MATH 117, MATH 118, MATH 124, MATH 125, MATH 126).

## Transfer Students

Advisors in each department are available to assist students who wish to transfer. Should the demand for any engineering major exceed the capacity to maintain a high-quality education, individual departments may find it necessary to enforce more stringent requirements.

Transfer of credits earned at other colleges and universities within Colorado is facilitated by the articulation agreements from one university to another on course equivalencies.

## Change of Major to Engineering

Students who wish to change from another CSU major are selected for admission once at the end of each term; students are admitted based on academic criteria. Some majors may specify more stringent requirements in math and science or other courses. Engineering courses are normally open to engineering majors only.

## Curricular Requirements

The curricula of the Walter Scott, Jr. College of Engineering include courses in engineering, mathematics, science, humanities, and social sciences. During the first two years, all engineering students take coursework emphasizing mathematics, physics, chemistry, and basic engineering; because all branches of engineering rely on this foundation. The junior and senior years are devoted primarily to a balanced selection of specialized engineering courses. The minimum number of credits for graduation with a Bachelor of Science degree varies by engineering major.

Good engineers are not only competent to render professional service in their fields of specialization, but are able to assume leadership roles as citizens. To broaden students' perspectives in non-technical areas, the programs in engineering require a minimum of 12 to 15 credits in arts and humanities and behavioral and social sciences to be selected from anthropology, economics, foreign languages, history, literature, philosophy, political science, psychology, and sociology. Courses in art, geography, music, speech, and theater may also be selected with the prior approval of the advisor. These courses must be selected in such a way that they also meet All-University Core Curriculum (<http://catalog.colostate.edu/general-catalog/all-university-core-curriculum/aucc/>) requirements.

The ability to express oneself clearly and concisely in both written and oral forms is a great asset to the engineer who is often called upon to prepare reports in which clarity, organization, and precision are essential. For this reason, engineering students must do more than meet the minimum English course requirements. In fact, the development of communication skills is emphasized throughout the engineering

curricula. This emphasis is especially evident in laboratory and design-oriented courses, in which the presentation of both oral and written reports is a major component.

The Walter Scott, Jr. College of Engineering requires a minimum grade point average of 2.000 in required engineering, mathematics, chemistry, and physics courses as a graduation requirement. Additional minimum grade requirements apply in some engineering majors.

An engineer applies physical understanding and analytical techniques to the *design* of devices and systems needed by modern society. The preparation of an engineer, therefore, must include engineering design experience. To meet this objective, all undergraduate engineering students must participate in a well-structured sequence of design-related courses culminating in a capstone design experience in order to graduate.

## Graduate Programs in Biomedical Engineering

Programs leading to a Master of Engineering, Master of Science, and Doctor of Philosophy degrees are offered at CSU. The graduate programs in Bioengineering (M.S. and Ph.D.) integrate physical, chemical, and mathematical sciences with engineering principles and clinical studies. There are boundless opportunities for research, ranging from new therapies and imaging modalities for fighting cancer, to improving the design of vital medical equipment used in open heart surgery, or developing the next generation of gene therapies and engineered tissues. CSU is uniquely positioned to offer this advanced degree program. The highly-ranked Veterinary Medical Center and the Professional Veterinary Medicine Program (<http://catalog.colostate.edu/general-catalog/colleges/veterinary-medicine-biomedical-sciences/>) are co-located with engineering and sciences on the CSU campus, providing a rich environment for interdisciplinary research and day-to-day collaborations.

## Other Graduate Programs under the Walter Scott, Jr. College of Engineering

The Walter Scott, Jr. College of Engineering also offers an M.S. and a Ph.D. in Systems Engineering, as well as graduate-level interdisciplinary studies programs in Extreme Ultraviolet and Optical Science and Technology, and Systems Engineering. Students interested in graduate work should refer to the Graduate and Professional Bulletin (<http://catalog.colostate.edu/general-catalog/graduate-bulletin/>).