Bachelor of Science in Engineering

Undergraduate major: B.S.E.
Website: https://www.engineering.uiowa.edu/

The Bachelor of Science in Engineering (B.S.E.) degrees in biomedical, chemical, civil, electrical, industrial, and mechanical engineering are accredited by the Engineering Accreditation Commission (EAC) of ABET. The two new programs—environmental engineering, and computer science and engineering—are preparing for their initial accreditation review in 2020. The environmental engineering program will be reviewed by the EAC, while the computer science and engineering program will be reviewed by the EAC and the Computing Accreditation Commission (CAC) of ABET.

Each program has its own set of articulated educational objectives, while all programs are designed to ensure that graduates possess the following at the time of graduation:

- an ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics;
- 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;
- an ability to communicate effectively with a range of audiences;
- 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;
- 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;
- an ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions; and
- an ability to acquire and apply new knowledge as needed, using appropriate learning strategies.

Computer science and engineering majors will be able to do each of the following as they relate to directly to computing:

- analyze a complex computing problem and apply principles of computing and other relevant disciplines to identify solutions;
- design, implement, and evaluate a computing-based solution to meet a given set of computing requirements in the context of the program’s discipline;
- communicate effectively in a variety of professional contexts;
- recognize professional responsibilities and make informed judgments in computing practice based on legal and ethical principles;
- function effectively as a member or leader of a team engaged in activities appropriate to the program’s discipline; and
- apply computer science theory and software development fundamentals to produce computing-based solutions.

Each program emphasizes a broad understanding of fundamental principles common to all engineering disciplines and provides students with the opportunity to specialize in a selected engineering discipline. All programs build on the University’s research strengths. Program flexibility is provided by a curriculum in which each student develops engineering competency within a particular academic program and complements it with a tailored thematic option in support of chosen career objectives—for example, engineering practice, project management, research, and development.

This section of the Catalog provides information about requirements that all B.S.E. students must fulfill, regardless of their engineering major, as well as admission information.

Engineering students may earn more than one B.S.E. degree. They also may combine undergraduate degree programs to earn a B.S.E. and a degree in the College of Liberal Arts and Sciences or the Tippie College of Business, or a combined B.S.E./master's degree in urban and regional planning, or a combined B.S.E./M.S. in engineering; see “Combined and Dual Degrees” in the Bachelor of Science in Engineering, B.S.E. section of the Catalog.

Undergraduate Majors, Minors and Certificates

Majors

The College of Engineering has six departments and offers eight undergraduate B.S.E. majors. View the B.S.E. majors under each of the College of Engineering departments in the Catalog.

Minors

The College of Engineering does not offer a minor. Engineering students may earn minors in a number of programs offered by other undergraduate colleges at the University of Iowa. For descriptions of minors and their requirements, view Find Your Program on the General Catalog website and select undergraduate minors.

Certificates

The College of Engineering offers two undergraduate certificate programs. Engineering students may earn certificates offered by colleges across the University. The College of Engineering partners with the Tippie College of Business to offer the Certificate in Technological Entrepreneurship, which is tailored specifically for engineering students who intend to start and operate their own business or who would like to understand and learn about managing innovation in business environments. The college also offers the Certificate in Naval Hydrodynamics. Other certificates of particular interest to engineering students include the Certificate in International Business and the Certificate in Sustainability. For descriptions of certificates and their requirements, view Find Your Program on the General Catalog website and select undergraduate certificates.

Cooperative Education and Internship Program

The Cooperative Education and Internship Program offers students the opportunity to explore engineering careers and develop engineering skills through periods of professional
practice while they are still students. Supervised professional engineering-related experiences in business, industry, education, or government expose students to the challenges and opportunities of an engineer. Students with co-op and/or internship experience are sought by employers and usually receive higher starting salaries upon graduation. A portion of registered co-op and/or internship experience before graduation can be credited toward the experience requirements for professional licensure in Iowa and some other states. The program structure focuses on goal setting at the beginning, analysis and reflection at the midpoint, and evaluation and feedback near the end. Experiences range from ten-week summer internships to multi-term co-ops. Qualified students may choose to alternate periods of on-campus study with full-time work experience, or they may elect to work half-time while taking at least 6 s.h. of course work. Students may apply to the program following their first year. Academic record and class status are considered in acceptance decisions. For further details, see Engineering Professional Development on the College of Engineering website.

Engineering Grand Challenges Scholars Program

The Engineering Grand Challenges Scholars Program is a combined curricular and extracurricular program with five components that are designed to prepare students to be the generation that solves the grand challenges facing society in this century. The program at the University of Iowa is based on the National Academy of Engineering (NAE) 14 grand challenges. Students accepted into the program are required to complete five components prior to graduation. The five components of the program are:

• Research experience—project or independent research related to one of the 14 grand challenges;
• Interdisciplinary curriculum—preparing engineering students to work at the overlap with public policy, business, law, ethics, and human behavior, as well as medicine and the sciences;
• Entrepreneurship—preparing students to translate invention to innovation and to develop market ventures that scale to global solutions in the public interest;
• Global dimension—developing students’ global perspective necessary to address challenges that are inherently global as well as to lead innovation in a global economy; and
• Service learning—developing and deepening students’ social consciousness and their motivation to bring their technical expertise to bear on societal problems.

The University of Iowa’s Engineering Grand Challenge Scholars Program was the seventh in the United States and the first in the Big Ten to be approved by the national committee. More details about the program and requirements can be found on the College of Engineering Grand Challenges Scholars Program web page.

Programs

Major

• Bachelor of Science in Engineering

Policies

Students can view academic policies on the College of Engineering website.

Admission

Applicants for admission to the College of Engineering as first-year students must have successfully completed at least four years of English/language arts; four years of mathematics, including one year of precalculus or equivalent; two years of a single world language; three years of natural science (preferably with at least one year of chemistry and at least one year of physics); and at least two years of social studies. Grades of As or Bs in all high school math and science courses are highly recommended. A high school computer programming course is recommended but not required.

Applicants are guaranteed admission to the College of Engineering if they have no high school unit deficiencies and meet a Regent Admission Index score of at least 265. Students who do not meet these requirements, or who attend a high school that does not rank its students, are encouraged to send recommendations from math and science teachers and a personal statement, which will be considered in an individual review by the College of Engineering. Students who are admitted through the individual review process may be required to make up deficiencies by taking a lower-level course in their area of deficiency before enrolling in the first required course in that area. For example, students who have high math grades and standardized test scores, but who are deficient by one unit in mathematics, may be required to complete a course such as MATH:1020 Elementary Functions before enrolling in the first engineering calculus course.

Incoming first-year and transfer students who do not meet the world language requirement may be admitted on conditional status for a maximum of four semesters in order to complete two semesters of an introductory college-level world language.

Students who are unsure whether to pursue a degree in engineering or a degree in liberal arts and sciences are strongly encouraged to begin in engineering if they meet the admission requirements. Those students who who fall short of the engineering admission requirements may enroll in the College of Liberal Arts and Sciences and be designated “Engineering Interest.” Once the deficiencies are satisfactorily completed, they may apply to transfer into the College of Engineering.

Information about admission to the College of Engineering is available on the college’s website.

Transfer Applicants

Transfer applicants must have completed the same high school unit requirements as entering first-year students and must submit an official high school transcript as well as a transcript of college work undertaken at other institutions. To transfer to the College of Engineering, students must have demonstrated success in math, science, and engineering courses, ideally earning all As and Bs with no grade lower than a C in these foundation subjects. Transfer students must have completed calculus I and the equivalent of either CHEM:111 Principles of Chemistry I or PHYS:1611 Introductory Physics I (the first semester of chemistry designed for majors or the
first semester of calculus-based physics). Overall grade-point average also is considered in transfer applications.

Information about admission requirements for transfer students is available on the college's website.