The engineering majors are open to students with strong interests and preparation in mathematics and science. The College of Engineering offers six Bachelor of Science (B.S.) degrees: Chemical Engineering, Civil Engineering, Computer Systems Engineering, Electrical Engineering, Industrial Engineering, and Mechanical Engineering. All B.S. degrees are accredited by the Accreditation Board for Engineering and Technology (ABET).

College of Engineering majors are organized in four academic departments: Chemical Engineering; Civil and Environmental Engineering; Electrical and Computer Engineering; and Mechanical and Industrial Engineering.

The Majors

The mission of the College of Engineering is to support the teaching, research, and academic outreach needs of the Commonwealth and the nation. In undergraduate education the objective of the College is to prepare its graduates to be leaders in the practice of engineering. Curricula provide the academic foundation for students to enter the profession of engineering upon graduation, or to pursue advanced degrees in graduate school.

The Field

There are many kinds of engineers, but most engineering has to do with the design and implementation of technology. Studies at the University of Massachusetts Amherst will help students learn the basics of a specific engineering field, and how to work as part of a team, communicate their ideas, think analytically, and solve complex real-world problems.

Career Opportunities

Earning an engineering degree will open the door to many opportunities. Massachusetts is known for its high-technology industries, creating job options in traditional engineering fields and exciting new fields such as biotechnology and computer software.

In today’s high-tech world, people with engineering degrees have a great foundation for many different careers. College of Engineering graduates find success in traditional engineering jobs as well as in management, sales, government, medicine, research, law, teaching, and more. Some choose to earn an advanced degree after they leave the University, and some start their own companies.

The Curriculum

Earning an engineering degree is challenging, yet rewarding. Many students complete a B.S. in engineering in four years, but some take five years to finish the degree. To gain valuable experience, many students work for a semester or two through a co-op at an engineering company, and others study abroad for a semester.

Each Engineering major offers upper-level electives for students. Most majors require the completion of a senior design project, an opportunity for students to apply what they have learned in the classroom. The most talented students take advantage of a challenging Honors Program. If students are interested, there are also many opportunities in undergraduate research and independent study. The research efforts of the faculty and their students are a very important part of the College.

College of Engineering Core Requirements

Freshman Mathematics and Science courses:
MATH 131, 132 or 135, 136 Calculus I and II
CHEM 111* (*not required for Electrical and Computer Systems Engineering), 112 General Chemistry I and II (CHEM 112 required for majors in Civil and Chemical Engineering only)
PHYSICS 151/153 General Physics I with lab
PHYSICS 152/154 General Physics II with lab*

Freshman Engineering Courses:
ENGIN 110 Introduction to Chemical Engineering I or ENGIN 111 Introduction to Civil and Environmental Engineering I or ENGIN 112 Introduction to Electrical and Computer Engineering I or ENGIN 113 Introduction to Mechanical and Industrial Engineering I
CHEM-ENG 120 Chemical Engineering Fundamentals or CE-ENG 121 Civil and Environmental Engineering Measurements or
E&C-ENG 122 Introduction to Electrical and Computer Engineering II or M&I-ENG 124 Computational Approaches to Engineering Problems

Writing courses (University requirements):
ENGLWRIT 112 College Writing (first year)
ENGLISH 351 Technical Writing (junior year)

Typical Sequence of Courses

Students should consult with the Undergraduate Program Director for the recommended sequence of courses in their intended major.

Fall Semester:
ENGLWRIT 112 College Writing or Social World course
One course from ENGIN 110-113
CHEM 111 General Chemistry I* (not required for Electrical and Computer Systems Engineering)
MATH 131 or 135 Calculus I
Social World course
PHYSICS 151/153 (for Electrical and Computer Systems Engineering)

Spring Semester:
ENGLWRIT 112 College Writing or Social World course
One course from CHEM-ENG 120, CE-ENGIN 121, E&C-ENG 122, or M&I-ENG 124
CHEM 112 General Chemistry II (for Chemical and Civil Engineering majors) or Biological Science or Social World course (for other majors)
MATH 132 or 136 Calculus II
PHYSICS 151/153 General Physics I with lab
PHYSICS 152/154 (for Electrical and Computer Systems Engineering)

Admission to the Majors

Requirements for admission to the majors are stated in the description of the majors. Students must be accepted into an engineering major to be eligible for a Bachelor of Science in Engineering.

Pass/Fail Option

Engineering, Math, Sciences and General Education courses cannot be taken Pass/Fail if they are to be used to fulfill University, College or major requirements.

The Freshman Courses: An Introduction to Engineering

All four courses offered in the fall semester introduce the fundamentals of engineering generally. Students select one of the courses from Chemical, Civil, Electrical and Computer, or Mechanical and Industrial Engineering. Each course contains some material specifically designed for that major. However, the emphasis in all the courses is to have students try engineering, effectively communicate ideas, learn how to work in teams, and think analytically. Students may subsequently choose an engineering major other than the one associated with their first semester course.

By the second semester, students should be in a good position to choose their majors. Each student selects a department-specific course (CHEM-ENG 120, CE-ENGIN 121, E&C-ENG 122, or M&I-ENG 124). Acceptance into a major will be based on students achieving a grade of C or higher in any of the four courses, together with comparable grades in the other required freshman courses.

Students will not be penalized for selecting a course in a department other than their intended major. However, a student who chooses a major different from the one associated with his or her second semester course may need to take the course associated with the chosen major at a later date. For example, CE-ENGIN 121 is required for the B.S. in Civil Engineering, and CHEM-ENG 120 is a prerequisite to the Chemical Engineering major.

ENGIN 110-113 Introduction to Engineering I

Students select one of the four introductory engineering courses (ENGIN 110, 111, 112 or 113). Within a small class, student teams explore real engineering designs ranging from petro-chemical plants to printed circuit boards. This introduction to engineering design and/or manufacturing emphasizes development of communication skills (written, oral, and graphical). Project required. Corequisites: simultaneous enrollment in MATH 131, or higher; enrollment in, or eligibility to enroll in ENGLWRIT 112.

CHEM-ENG 120 Chemical Engineering Fundamentals; CE-ENGIN 121 Civil and Environmental Engineering Measurements; E&C-ENG 122 Introduction to Electrical and Computer Engineering II; and M&I-ENG 124 Computational Approaches to Engineering Problems

Students select one of these department-specific courses which provide material strongly recommended in preparation for the major. These engineering courses students are introduced to analytical, experimental or computational techniques in each engineering discipline. Prerequisites are listed in the course descriptions for each department.

Honors

Departmental and University Honors programs provide engineering students with the opportunity to participate in Honors courses, the University Honors seminar series, and an Honors seminar in the student’s major department. The completion of a senior research project or thesis may lead to the possibility of graduating magna or summa cum laude. Students interested in participating in departmental and University Honors should contact the Honors coordinator in each College of Engineering department, or the College Honors coordinator, Kathleen G. Rubin, tel. 545-4757.

Admissions Information

The College of Engineering enrolls about 300 first year students. It is recommended that applicants have the high school equivalency of four years in both mathematics and science. Chemistry and physics with labs are preferred. Transfer applicants are encouraged to complete courses in general chemistry, physics, and calculus before applying for admission. Some engineering applicants are admitted into the colleges of Arts and Sciences, with the possibility of transfer into the engineering program after the completion of the first year engineering requirements. Interested applicants should contact the Office of Student Affairs, tel. 545-2035.

The Minority Engineering Program and the Women in Engineering Program offer minorities and women students support services and assist in the development of networks within the college and industry.

For additional information on a specific engineering major, contact the departmental Undergraduate Program Director:

Chemical Engineering
Dr. H. Henning Winter, A217 Conte

Civil Engineering
Michael S. Switzenbaum, 18 Marston

Electrical and Computer Engineering
T. Baird Soules, 210 Marcus

Mechanical and Industrial Engineering
James R. Rinderle, 207C Engineering Lab