Undergraduate Study

The undergraduate curriculum in chemical engineering provides basic studies in physics, biology, and mathematics, advanced subjects in chemistry or biology, and a strong core of chemical engineering. The four-year undergraduate programs provide students with the fundamentals of the discipline and allow some room for focus in subdisciplines or subjects that strengthen their preparation for advanced work.

In addition to science and engineering, students take an integrated sequence of subjects in the humanities and social sciences. Specific subject selection allows students to meet individual areas of interest. The curriculum provides a sound preparation for jobs in industry or government, and for graduate work in chemical engineering.

Chemical engineering also provides excellent preparation for careers in medicine and related fields of health science and technology. The department’s strong emphasis on chemistry and biology provides excellent preparation for medical school. Students interested in medical school work with their faculty and premedical advisor to create the best program. A minor in biomedical engineering is also available.

Bachelor of Science in Chemical Engineering (Course 10)
The Bachelor of Science in Chemical Engineering degree program (http://catalog.mit.edu/degree-charts/chemical-engineering-course-10) is intended for the student who seeks a broad education in the application of chemical engineering to a variety of specific areas, including energy and the environment, nanotechnology, polymers and colloids, surface science, catalysis and reaction engineering, systems and process design, and biotechnology. The degree requirements include the core chemical engineering subjects with a chemistry emphasis, and the opportunity to add subjects in any of these application areas.

Course 10 is accredited by the Engineering Accreditation Commission of the Accreditation Board for Engineering and Technology (ABET) (http://www.abet.org) as a chemical engineering degree.

Bachelor of Science in Chemical-Biological Engineering (Course 10-B)
The Bachelor of Science in Chemical-Biological Engineering degree program (http://catalog.mit.edu/degree-charts/chemical-biological-engineering-course-10-b) is intended for the student who is specifically interested in the application of chemical engineering in the areas of biochemical and biomedical technologies. The degree requirements include core chemical engineering subjects and additional subjects in biological sciences and applied biology. This degree is excellent preparation for students also considering the biomedical engineering minor or medical school.

Course 10-B is accredited by the Engineering Accreditation Commission of ABET as a chemical and biological engineering degree.

Students who decide early to major in either Course 10 or Course 10-B are encouraged to take subjects such as 5.1115.1115.115.111/5.112 Principles of Chemical Science, 5.12 Organic Chemistry I, and 7.01x Introductory Biology in their first year. Then 5.601 Thermodynamics I, 18.03 Differential Equations, 10.10 Introduction to Chemical Engineering, 10.213 Chemical and Biological Engineering Thermodynamics, and 10.301 Fluid Mechanics may be taken in the sophomore year. The student is then well positioned for more in-depth and specialized subjects in the third and fourth years.

Some students may wish to defer choice of a major field or exercise maximum freedom during the first two years. If the Restricted Electives in Science and Technology (REST) Requirement subjects chosen in the second year include 18.03 Differential Equations and two subjects in the fields of fluid mechanics, thermodynamics, chemistry, biology, or chemical engineering, students can generally complete the requirements for a degree in chemical engineering in two more years. Students are advised to discuss their proposed program with a Course 10 faculty advisor as soon as they become interested in a degree in chemical engineering. Faculty advisors are assigned to students as soon as they declare their major and then work with the students through graduation. Further information may be obtained from Dr. Barry S. Johnston.

Additional information is available on the Chemical Engineering Department website (http://web.mit.edu/cheme). Undergraduates are encouraged to take part in the research activities of the department through the Undergraduate Research Opportunities Program (UROP) (http://uaap.mit.edu/research-exploration/urop).

Bachelor of Science as Recommended by the Department of Chemical Engineering (Course 10-C)
The curriculum for the Bachelor of Science as Recommended by the Department of Chemical Engineering (Course 10-C) (http://catalog.mit.edu/degree-charts/chemical-engineering-course-10-c) involves basic subjects in chemistry and chemical engineering. Instead of continuing in depth in these areas, students can add breadth by study in another field, such as another engineering discipline, biology, biomedical engineering, economics, or management. Course 10-C is attractive to students who wish to specialize in an area such as those cited above while simultaneously gaining a broad exposure to the chemical engineering approach to solving problems.

Students planning to follow this curriculum should discuss their interests with their faculty advisor in the department at the time they decide to enter the Course 10-C program, and submit to Dr. Barry S. Johnston in the department’s Undergraduate Office a statement
of goals and a coherent program of subjects no later than spring
term of junior year. Please direct questions about this program to Dr.
Johnston.

**Bachelor of Science in Engineering (Course 10-ENG)**
The Bachelor Science in Engineering (10-ENG) degree program
([http://catalog.mit.edu/degree-charts/engineering-chemical-
enGINEERING-COURSE-10-ENG](http://catalog.mit.edu/degree-charts/engineering-chemical-
enGINEERING-COURSE-10-ENG)) is designed to offer flexibility within
the context of chemical engineering while ensuring significant
engineering content, and is a complement to our chemical
engineering degree programs 10 and 10-B. The degree is designed
to enable students to pursue a deeper level of understanding in
a specific interdisciplinary field that is relevant to the chemical
engineering core discipline. The degree requirements include
all of the core chemical engineering coursework, plus a chosen
set of three foundational concept subjects and four subjects with
engineering content that make up a comprehensive concentration
specific to the interdisciplinary area selected by the student. The
concentrations have been selected by the Department of Chemical
Engineering to represent new and developing cross-disciplinary
areas that benefit from a strong foundation in engineering within
the chemical engineering context. Details of the concentrations
are available from the Chemical Engineering Student Office and
the department’s website ([https://cheme.mit.edu/academics/
UNDERGRADUATE-STUDENTS/UNDERGRADUATE-PROGRAMS/COURSE-10-ENG](https://cheme.mit.edu/academics/UNDERGRADUATE-STUDENTS/UNDERGRADUATE-PROGRAMS/COURSE-10-ENG)).

The foundational concept component of the flexible engineering
degree consist of basic science and engineering subjects that
help lay the groundwork for the chosen concentration. Three
subjects must be selected from a list of potential topics. One of
the foundational concept subjects must be a chemical engineering
CI-M subject, and one must be a laboratory subject that satisfies
the Institute Laboratory Requirement. The subjects should be
selected with the assistance of a 10-ENG degree advisor from the
Chemical Engineering Department so as to be consistent with the
degree requirements of the program and the General Institute
Requirements. Several of these subjects can satisfy the program’s
CI-M requirement.

The flexible engineering concentration consists of four subjects that
are selected by the student from a suggested subject list provided
for each 10-ENG concentration; the student also may propose
subjects that fit the theme of the chosen concentration. These lists
are included in the concentration descriptions provided on the
department’s website and at the Chemical Engineering Student
Office. Students work with their 10-ENG advisors to propose a 10-
ENG degree program, which must then be approved by the Chemical
Engineering Undergraduate Committee.

The flexible engineering degree major capstone experience consists
of 12 units and/or a senior-level project. Alternatively, the student
may choose to complete a senior thesis in a topic area relevant to
the concentration. Senior-level projects or senior thesis projects are
specifically designed to integrate engineering principles into specific
applications or problems and are not standard UROP projects;
such projects require the preliminary approval of the department’s
undergraduate officer.

Course 10-ENG is accredited by the Engineering Accreditation
Commission of ABET as an engineering degree.

**Five-Year Programs and Joint Programs**
In addition to offering separate programs leading to the Bachelor
of Science and Master of Science in Chemical Engineering, the
department offers a program leading to the simultaneous award of
both degrees at the end of five years. A detailed description of this
program is available from the Graduate Student Office. Students
in the five-year program normally enroll in the School of Chemical
Engineering Practice.

For chemical engineering students interested in nuclear
applications, the Department of Chemical Engineering and the
Department of Nuclear Engineering offer a five-year program leading
to the joint Bachelor of Science in Chemical Engineering and Master
of Science in Nuclear Engineering. Such programs are approved
on an individual basis between the registration officers of the two
departments.

**Inquiries**
Additional information concerning undergraduate academic and
research programs may be obtained by writing to Dr. Barry S.
Johnston ([bsjohnst@mit.edu](mailto:bsjohnst@mit.edu)), undergraduate officer, Department
of Chemical Engineering, Room 66-368, 617-258-7141, fax
617-258-0546. For information regarding admissions and financial
aid, contact the Admissions Office, Room 3-108, 617-253-4791.