

## ENGINEERING (COURSE 10-ENG)

Department of Chemical Engineering (<http://catalog.mit.edu/schools/engineering/chemical-engineering/#undergraduatetext>)

### Bachelor of Science in Engineering

#### General Institute Requirements (GIRs)

The General Institute Requirements include a Communication Requirement that is integrated into both the HASS Requirement and the requirements of each major; see details below.

Summary of Subject Requirements	Subjects
Science Requirement	6
Humanities, Arts, and Social Sciences (HASS) Requirement; at least two of these subjects must be designated as communication-intensive (CI-H) to fulfill the Communication Requirement.	8
Restricted Electives in Science and Technology (REST) Requirement [can be satisfied by 10.301 and 18.03 in the Departmental Program]	2
Laboratory Requirement (12 units) [can be satisfied by 1.106/1.107, 2.671, 3.010 AND 3.020, 5.310, or 12.335 in the Departmental Program]	1
<b>Total GIR Subjects Required for SB Degree</b>	<b>17</b>

#### Physical Education Requirement

Swimming requirement, plus four physical education courses for eight points.

#### Departmental Program

Choose at least two subjects in the major that are designated as communication-intensive (CI-M) to fulfill the Communication Requirement.

Required Subjects	Units
5.601 Thermodynamics I	6
10.10 Introduction to Chemical Engineering	12
10.213 Chemical and Biological Engineering Thermodynamics	12
10.301 Fluid Mechanics	12
10.302 Transport Processes	12
10.37 Chemical Kinetics and Reactor Design	12
18.03 Differential Equations	12

#### Foundational Concepts

All subjects are suitable for any concentration within the program. In consultation with the advisor, students select one subject from each of the three groups. Students may not exceed the 45-unit cap except by petition.

#### Group I

Select one of the following Course 10 CI-M subjects:

10.26	Chemical Engineering Projects Laboratory (CI-M)
10.27	Energy Engineering Projects Laboratory (CI-M) <sup>1</sup>
10.28	Chemical-Biological Engineering Laboratory (CI-M)
10.29	Biological Engineering Projects Laboratory (CI-M) <sup>2</sup>
10.467	Polymer Science Laboratory (CI-M) <sup>3</sup>

#### Group II

Select one of the following Institute Laboratory subjects:

1.106 & 1.107	Environmental Fluid Transport Processes and Hydrology Laboratory and Environmental Chemistry Laboratory (CI-M) <sup>4</sup>
2.671	Measurement and Instrumentation (CI-M)
5.310	Laboratory Chemistry (CI-M)
7.002	Fundamentals of Experimental Molecular Biology
10.7003[J]	Applied Molecular Biology Laboratory
12.335	Experimental Atmospheric Chemistry (CI-M) <sup>4</sup>
20.109	Laboratory Fundamentals in Biological Engineering (CI-M) <sup>2</sup>

#### Group III

Select one of the following:

1.00	Engineering Computation and Data Science
1.018[J]	Fundamentals of Ecology
1.080	Environmental Chemistry
3.155[J]	Micro/Nano Processing Technology (CI-M) <sup>3</sup>
5.12	Organic Chemistry I
5.611 & 5.612	Introduction to Spectroscopy and Electronic Structure of Molecules
6.100A & 6.100B	Introduction to Computer Science Programming in Python and Introduction to Computational Thinking and Data Science

7.03	Genetics <sup>2</sup>	
8.21	Physics of Energy <sup>1</sup>	

**Engineering Concentration**

These four electives define a concentrated area of study in one of the following designated concentrations: Biomedical Engineering; Energy; Engineering Computation; Environmental Studies; Manufacturing Design; Materials Process and Design; Process Data Analytics; or Society, Engineering and Ethics.<sup>5</sup>

**Capstone**

Select one of the following options to obtain 12 units of capstone experience: Senior Thesis, Integrated Chemical Engineering or Integrated Chemical Engineering Topics modules, or Senior Project.

**Option 1**

10.THU Undergraduate Thesis

**Option 2**

Select any combination of the following:

10.490 Integrated Chemical Engineering<sup>6</sup>

10.492A Integrated Chemical Engineering Topics I

or 10.492B Integrated Chemical Engineering Topics I

10.493 Integrated Chemical Engineering Topics II

10.494A Integrated Chemical Engineering Topics III

or 10.494B Integrated Chemical Engineering Topics III

**Option 3**

10.910 Independent Research Problem

and select any combination of the following:

10.492A Integrated Chemical Engineering Topics I

or 10.492B Integrated Chemical Engineering Topics I

10.493 Integrated Chemical Engineering Topics II

10.494A Integrated Chemical Engineering Topics III

or 10.494B Integrated Chemical Engineering Topics III

**Units in Major** **168-183**

**Unrestricted Electives** **48**

Units in Major That Also Satisfy the GIRs (36)

**Total Units Beyond the GIRs Required for SB Degree** **180-195**

The units for any subject that counts as one of the 17 GIR subjects cannot also be counted as units required beyond the GIRs.

<sup>1</sup> Subject may be of particular interest for energy concentration.

<sup>2</sup> Subject may be of particular interest for biomedical engineering concentration.

<sup>3</sup> Subject may be of particular interest for materials process and design concentration.

<sup>4</sup> Subject may be of particular interest for environmental studies concentration.

<sup>5</sup> In all cases, the electives must be chosen with the approval of the student's advisor and the department. The combined list of required and elective subjects must sum to a minimum of 135 units in engineering topics (equivalent to 45 credit hours as defined by ABET). Lists of recommended subjects for each concentration are available from the department, and additional information on current subject offerings is available on the Chemical Engineering Department website (<https://cheme.mit.edu/academics/course-listing>). Note that subjects that have been used to satisfy the foundational concepts may not also be counted toward the engineering concentration.

<sup>6</sup> 10.490 may be repeated once for credit with permission of instructor.