ENGINEERING AS RECOMMENDED BY THE DEPARTMENT OF CHEMICAL ENGINEERING (COURSE 10-ENG)

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

Bachelor of Science in Engineering as Recommended by the Department of Chemical 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

<table>
<thead>
<tr>
<th>Subjects</th>
<th>Science Requirement</th>
<th>Humanities, Arts, and Social Sciences (HASS) Requirement</th>
<th>Restricted Electives in Science and Technology (REST) Requirement</th>
<th>Laboratory Requirement (12 units)</th>
<th>Total GIR Subjects Required for SB Degree</th>
</tr>
</thead>
<tbody>
<tr>
<td>6</td>
<td>8</td>
<td>2</td>
<td>1</td>
<td>1</td>
<td>17</td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>Subjects</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>5.60</td>
<td>Thermodynamics and Kinetics</td>
</tr>
<tr>
<td>10.10</td>
<td>Introduction to Chemical Engineering</td>
</tr>
<tr>
<td>10.213</td>
<td>Chemical and Biological Engineering Thermodynamics</td>
</tr>
<tr>
<td>10.301</td>
<td>Fluid Mechanics</td>
</tr>
<tr>
<td>10.302</td>
<td>Transport Processes</td>
</tr>
<tr>
<td>10.37</td>
<td>Chemical Kinetics and Reactor Design</td>
</tr>
<tr>
<td>18.03</td>
<td>Differential Equations</td>
</tr>
<tr>
<td>39-45</td>
<td>Foundational Concepts</td>
</tr>
</tbody>
</table>

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:

1. Chemical Engineering Projects Laboratory (CI-M)
2. Energy Engineering Projects Laboratory (CI-M)
3. Chemical-Biological Engineering Laboratory (CI-M)
4. Biological Engineering Projects Laboratory (CI-M)
5. Polymer Science Laboratory (CI-M)

Group II
Select one of the following Institute Laboratory subjects:

1. Environmental Fluid Transport Processes and Hydrology Laboratory and Environmental Chemistry and Biology Laboratory
2. Measurement and Instrumentation (CI-M)
3. Materials Laboratory (CI-M)
4. Laboratory Chemistry
5. Introduction to Experimental Biology and Communication (CI-M)
6. Experimental Atmospheric Chemistry (CI-M)
7. Laboratory Fundamentals in Biological Engineering (CI-M)

Group III
Select one of the following:

1. Engineering Computation and Data Science
3. Environmental Chemistry I and Environmental Chemistry II
4. Fundamentals of Materials Science and Engineering
5. Micro/Nano Processing Technology (CI-M)
6. Organic Chemistry I
7. Physical Chemistry
8. Introduction to Computer Science and Programming
### Engineering Concentration

These four electives define a concentrated area of study in one of the following designated concentrations: biomedical engineering, energy, environmental studies, or materials process and design.  

<table>
<thead>
<tr>
<th>Elective</th>
<th>Description</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>7.03 Genetics</td>
<td></td>
<td>2</td>
</tr>
<tr>
<td>8.21 Physics of Energy</td>
<td></td>
<td>2</td>
</tr>
</tbody>
</table>

#### 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
  - 10.492A Integrated Chemical Engineering Topics I
  - 10.492B Integrated Chemical Engineering Topics I
  - 10.493 Integrated Chemical Engineering Topics II
  - 10.494A Integrated Chemical Engineering Topics III
  - 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
    - 10.492B Integrated Chemical Engineering Topics I
    - 10.493 Integrated Chemical Engineering Topics II
    - 10.494A Integrated Chemical Engineering Topics III
    - 10.494B Integrated Chemical Engineering Topics III

### Units in Major

171-186

### Unrestricted Electives

48

### Units in Major That Also Satisfy the GIRs

(36)

### Total Units Beyond the GIRs Required for SB Degree

183-198

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

1 Subject may be of particular interest for energy concentration.
2 Subject may be of particular interest for biomedical engineering concentration.
3 Subject may be of particular interest for materials process and design concentration.
4 Subject may be of particular interest for environmental studies concentration.
5 In all cases, the electives must be chosen with the approval of the student's advisor and the department. 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.
6 10.490 may be repeated once for credit with permission of instructor.