BIOLOGY (COURSE 7)

Department of Biology (http://catalog.mit.edu/schools/science/biology/#undergraduatetext)

Bachelor of Science in Biology

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 from among 5.12 or 5.60 or 5.601/5.602, and 7.03 or 7.05 in the Departmental Program] | 2
Laboratory Requirement (12 units) [can be satisfied by 7.002 and 7.003[J] in the Departmental Program] | 1
Total GIR Subjects Required for SB Degree | 17

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
--- | ---
5.12 Organic Chemistry I | 12
5.60 Thermodynamics and Kinetics ¹ | 12
or 20.110[J] Thermodynamics of Biomolecular Systems | 
7.002 Fundamentals of Experimental Molecular Biology | 6
7.003[J] Applied Molecular Biology Laboratory (CI-M) | 12
7.03 Genetics | 12
7.05 General Biochemistry | 12
or 5.07[J] Introduction to Biological Chemistry | 
7.06 Cell Biology | 12
7.19 Communication in Experimental Biology (CI-M) ¹ | 12

Restricted Electives
Select three undergraduate-level 12-unit subjects offered by the Department of Biology for which 7.03 and/or 7.05 are prerequisites. ³

| Units Major | 126
Unrestricted Electives | 90
Units in Major That Also Satisfy the GIRs | 36
Total Units Beyond the GIRs Required for SB Degree | 180

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 The department recommends 5.60 or 20.110[J] to fulfill this component of the program, but it will also accept 2.005 Thermal-Fluids Engineering I, 8.044 Statistical Physics I, or 10.213 Chemical and Biological Engineering Thermodynamics. The combination of 5.601 Thermodynamics I and 5.602 Thermodynamics II and Kinetics is also an acceptable option.

² See list of Communication-Intensive Subjects in the Major below for acceptable alternatives.

³ Exceptions: 7.30[J] Fundamentals of Ecology is eligible as a restricted elective; 7.19 cannot be counted as a restricted elective. Graduate-level subjects may not be used as restricted electives.

Restricted Electives

| Units | 12
7.08[J] Fundamentals of Chemical Biology | 12
7.093 Modern Biostatistics and Modern Computational Biology | 12
7.20[J] Human Physiology | 12
7.21 Microbial Physiology | 12
7.23[J] Immunology | 12
7.26 Molecular Basis of Infectious Disease | 12
7.27 Principles of Human Disease and Aging | 12
7.28 Molecular Biology | 12
7.29[J] Cellular and Molecular Neurobiology | 12
7.31 Current Topics in Mammalian Biology: Medical Implications | 12
7.32 Systems Biology | 12
7.37[J] Molecular and Engineering Aspects of Biotechnology | 12
or 7.371 Biological and Engineering Principles Underlying Novel Biotherapeutics | 
7.45 The Hallmarks of Cancer | 12
7.46 Building with Cells | 12
7.49[J] Developmental Neurobiology | 12
9.17 Systems Neuroscience Laboratory (CI-M) ¹, ² | 12
**Principles and Applications of Genetic Engineering for Biotechnology and Neuroscience**

1. **9.17** can be used as a restricted elective or CI-M, not both.
2. **9.17** has prerequisites that are outside of the program.

### Communication-Intensive Subjects in the Major

<table>
<thead>
<tr>
<th>Subject Code</th>
<th>Course Title</th>
<th>Prerequisites</th>
</tr>
</thead>
<tbody>
<tr>
<td>7.003[J]</td>
<td>Applied Molecular Biology Laboratory (CI-M)</td>
<td></td>
</tr>
</tbody>
</table>

Choose one of the following options: 9-18 units

**Option A**

<table>
<thead>
<tr>
<th>Subject Code</th>
<th>Course Title</th>
<th>Prerequisites</th>
</tr>
</thead>
<tbody>
<tr>
<td>7.19</td>
<td>Communication in Experimental Biology (CI-M)</td>
<td></td>
</tr>
</tbody>
</table>

**Option B**

Select one of the following:

<table>
<thead>
<tr>
<th>Subject Code</th>
<th>Course Title</th>
<th>Prerequisites</th>
</tr>
</thead>
<tbody>
<tr>
<td>6.129[J]</td>
<td>Biological Circuit Engineering Laboratory (CI-M)</td>
<td></td>
</tr>
<tr>
<td>8.13</td>
<td>Experimental Physics I (CI-M)</td>
<td>1</td>
</tr>
<tr>
<td>9.12</td>
<td>Experimental Molecular Neurobiology (CI-M)</td>
<td>1</td>
</tr>
<tr>
<td>9.17</td>
<td>Systems Neuroscience Laboratory (CI-M)</td>
<td>1,2</td>
</tr>
<tr>
<td>9.28</td>
<td>Current Topics in Developmental Neurobiology (CI-M)</td>
<td>1</td>
</tr>
<tr>
<td>10.26</td>
<td>Chemical Engineering Projects Laboratory (CI-M)</td>
<td>1</td>
</tr>
<tr>
<td>10.27</td>
<td>Energy Engineering Projects Laboratory (CI-M)</td>
<td>1</td>
</tr>
<tr>
<td>10.28</td>
<td>Chemical-Biological Engineering Laboratory (CI-M)</td>
<td>1</td>
</tr>
<tr>
<td>10.29</td>
<td>Biological Engineering Projects Laboratory (CI-M)</td>
<td>1</td>
</tr>
<tr>
<td>20.109</td>
<td>Laboratory Fundamentals in Biological Engineering (CI-M)</td>
<td>1</td>
</tr>
<tr>
<td>20.380</td>
<td>Biological Engineering Design (CI-M)</td>
<td>1</td>
</tr>
</tbody>
</table>

1. **Subject has prerequisites that are outside of the program.**
2. **9.17 can be used as a restricted elective or CI-M, not both.**