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

<table>
<thead>
<tr>
<th>Subjects</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>Science Requirement</td>
<td>6</td>
</tr>
<tr>
<td>Humanities, Arts, and Social Sciences (HASS) Requirement</td>
<td>8</td>
</tr>
<tr>
<td>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]</td>
<td>2</td>
</tr>
<tr>
<td>Laboratory Requirement (12 units) [can be satisfied by 7.002 and 7.003[J] in the Departmental Program]</td>
<td>1</td>
</tr>
<tr>
<td>Total GIR Subjects Required for SB Degree</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>5.12 Organic Chemistry I</td>
<td>12</td>
</tr>
<tr>
<td>5.60 Thermodynamics and Kinetics</td>
<td>12</td>
</tr>
<tr>
<td>or 20.110[J] Thermodynamics of Biomolecular Systems</td>
<td></td>
</tr>
<tr>
<td>7.002 Fundamentals of Experimental Molecular Biology</td>
<td>6</td>
</tr>
<tr>
<td>7.003[J] Applied Molecular Biology Laboratory (CI-M)</td>
<td>12</td>
</tr>
<tr>
<td>7.03 Genetics</td>
<td>12</td>
</tr>
<tr>
<td>7.05 General Biochemistry</td>
<td>12</td>
</tr>
<tr>
<td>or 5.07[J] Introduction to Biological Chemistry</td>
<td></td>
</tr>
<tr>
<td>7.06 Cell Biology</td>
<td>12</td>
</tr>
<tr>
<td>Biology Capstone Subject</td>
<td></td>
</tr>
<tr>
<td>7.19 Communication in Experimental Biology (CI-M)</td>
<td>12</td>
</tr>
</tbody>
</table>

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.

| Units in Major | 126 |
| 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

<table>
<thead>
<tr>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>7.08[J] Fundamentals of Chemical Biology</td>
</tr>
<tr>
<td>7.093 Modern Biostatistics</td>
</tr>
<tr>
<td>&amp; 7.094 and Modern Computational Biology</td>
</tr>
<tr>
<td>7.20[J] Human Physiology</td>
</tr>
<tr>
<td>7.21 Microbial Physiology</td>
</tr>
<tr>
<td>7.23[J] Immunology</td>
</tr>
<tr>
<td>7.26 Molecular Basis of Infectious Disease</td>
</tr>
<tr>
<td>7.27 Principles of Human Disease and Aging</td>
</tr>
<tr>
<td>7.28 Molecular Biology</td>
</tr>
<tr>
<td>7.29[J] Cellular and Molecular Neurobiology</td>
</tr>
<tr>
<td>7.31 Current Topics in Mammalian Biology: Medical Implications</td>
</tr>
<tr>
<td>7.32 Systems Biology</td>
</tr>
<tr>
<td>7.37[J] Molecular and Engineering Aspects of Biotechnology</td>
</tr>
<tr>
<td>or 7.371 Biological and Engineering Principles Underlying Novel Biotherapeutics</td>
</tr>
<tr>
<td>7.45 The Hallmarks of Cancer</td>
</tr>
<tr>
<td>7.46 Building with Cells</td>
</tr>
<tr>
<td>7.49[J] Developmental Neurobiology</td>
</tr>
<tr>
<td>9.17 Systems Neuroscience Laboratory (CI-M)</td>
</tr>
</tbody>
</table>
BIOLOGY (COURSE 7)

9.26[J] 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 Subject has prerequisites that are outside of the program.

**Communication-Intensive Subjects in the Major**

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>7.003[J]</td>
<td>Applied Molecular Biology Laboratory (CI-M)</td>
<td>12</td>
</tr>
</tbody>
</table>

Choose one of the following options:

**Option A (Course 7 Capstone, recommended by the Biology Department)**

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</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>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>6.4880[J]</td>
<td>Biological Circuit Engineering Laboratory (CI-M)</td>
<td></td>
</tr>
<tr>
<td>9.12</td>
<td>Experimental Molecular Neurobiology (CI-M)</td>
<td></td>
</tr>
<tr>
<td>9.17</td>
<td>Systems Neuroscience Laboratory (CI-M)</td>
<td></td>
</tr>
<tr>
<td>10.26</td>
<td>Chemical Engineering Projects Laboratory (CI-M)</td>
<td></td>
</tr>
<tr>
<td>10.27</td>
<td>Energy Engineering Projects Laboratory (CI-M)</td>
<td></td>
</tr>
<tr>
<td>10.28</td>
<td>Chemical-Biological Engineering Laboratory (CI-M)</td>
<td></td>
</tr>
<tr>
<td>10.29</td>
<td>Biological Engineering Projects Laboratory (CI-M)</td>
<td></td>
</tr>
<tr>
<td>20.109</td>
<td>Laboratory Fundamentals in Biological Engineering (CI-M)</td>
<td></td>
</tr>
<tr>
<td>20.380</td>
<td>Biological Engineering Design (CI-M)</td>
<td></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.