BIOLOGY (COURSE 7-A)

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>Science Requirement</th>
<th>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.</th>
<th>Restricted Electives in Science and Technology (REST) Requirement [can be satisfied from among 5.12 or 5.60 and 7.03 or 7.05 in the Departmental Program]</th>
<th>Laboratory Requirement (12 units) [can be satisfied by 7.02][J] or 20.109 in the Departmental Program]</th>
<th>Total GIR Subjects Required for SB Degree</th>
</tr>
</thead>
<tbody>
<tr>
<td>Subjects</td>
<td>6</td>
<td>8</td>
<td>2</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>5.12</td>
<td>Organic Chemistry I</td>
</tr>
<tr>
<td>5.60</td>
<td>Thermodynamics and Kinetics</td>
</tr>
<tr>
<td>or 20.110[J]</td>
<td>Thermodynamics of Biomolecular Systems</td>
</tr>
<tr>
<td>7.03</td>
<td>Genetics</td>
</tr>
<tr>
<td>7.05</td>
<td>General Biochemistry</td>
</tr>
<tr>
<td>or 5.07[J]</td>
<td>Biological Chemistry I</td>
</tr>
<tr>
<td>7.06</td>
<td>Cell Biology</td>
</tr>
</tbody>
</table>

Select one of the following:

- 7.02[J] Introduction to Experimental Biology and Communication (CI-M) 15-18
- 20.109 Laboratory Fundamentals in Biological Engineering (CI-M) 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. 2

Select one of the following CI-Ms:

<table>
<thead>
<tr>
<th>Subjects</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>3.014</td>
<td>Materials Laboratory (CI-M)</td>
</tr>
<tr>
<td>5.383 &amp; 5.382</td>
<td>Fast-flow Peptide and Protein Synthesis and Time- and Frequency-resolved Spectroscopy of Photosynthesis (CI-M)</td>
</tr>
<tr>
<td>6.021[J]</td>
<td>Cellular Neurophysiology and Computing (CI-M)</td>
</tr>
<tr>
<td>7.19</td>
<td>Communication in Experimental Biology (CI-M)</td>
</tr>
<tr>
<td>8.13</td>
<td>Experimental Physics I (CI-M)</td>
</tr>
<tr>
<td>9.12</td>
<td>Experimental Molecular Neurobiology (CI-M)</td>
</tr>
<tr>
<td>9.17</td>
<td>Systems Neuroscience Laboratory (CI-M)</td>
</tr>
<tr>
<td>9.28</td>
<td>Current Topics in Developmental Neurobiology (CI-M)</td>
</tr>
<tr>
<td>10.26</td>
<td>Chemical Engineering Projects Laboratory (CI-M)</td>
</tr>
<tr>
<td>10.27</td>
<td>Energy Engineering Projects Laboratory (CI-M)</td>
</tr>
<tr>
<td>10.28</td>
<td>Chemical-Biological Engineering Laboratory (CI-M)</td>
</tr>
<tr>
<td>10.29</td>
<td>Biological Engineering Projects Laboratory (CI-M)</td>
</tr>
<tr>
<td>20.380</td>
<td>Biological Engineering Design (CI-M)</td>
</tr>
</tbody>
</table>

Units in Major 120-132

Unrestricted Electives 84-96

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, 3.012, 8.044, or 10.213.

2  Exceptions: The combination of 7.30A[J] and 7.30B[J] is eligible as a restricted elective; 9.15 is eligible as a restricted elective; 7.19 cannot be used as a restricted elective. Graduate-level subjects may not be used as restricted electives.

Restricted Electives

<table>
<thead>
<tr>
<th>Subjects</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>7.08[J]</td>
<td>Biological Chemistry II</td>
</tr>
<tr>
<td>7.09</td>
<td>Quantitative and Computational Biology</td>
</tr>
<tr>
<td>7.20[J]</td>
<td>Human Physiology</td>
</tr>
<tr>
<td>7.21</td>
<td>Microbial Physiology</td>
</tr>
<tr>
<td>Course Code</td>
<td>Course Title</td>
</tr>
<tr>
<td>-------------</td>
<td>--------------------------------------------------</td>
</tr>
<tr>
<td>7.22</td>
<td>Developmental Biology</td>
</tr>
<tr>
<td>7.23</td>
<td>Immunology</td>
</tr>
<tr>
<td>7.26</td>
<td>Molecular Basis of Infectious Disease</td>
</tr>
<tr>
<td>7.27</td>
<td>Principles of Human Disease</td>
</tr>
<tr>
<td>7.28</td>
<td>Molecular Biology</td>
</tr>
<tr>
<td>7.29</td>
<td>Cellular and Molecular Neurobiology</td>
</tr>
<tr>
<td>7.31</td>
<td>Current Topics in Mammalian Biology: Medical Implications</td>
</tr>
<tr>
<td>7.32</td>
<td>Systems Biology</td>
</tr>
<tr>
<td>7.33</td>
<td>Evolutionary Biology: Concepts, Models and Computation</td>
</tr>
<tr>
<td>7.37</td>
<td>Molecular and Engineering Aspects of Biotechnology</td>
</tr>
<tr>
<td>or 7.371</td>
<td>Biological and Engineering Principles Underlying Novel Biotherapeutics</td>
</tr>
<tr>
<td>7.41</td>
<td>Principles of Chemical Biology</td>
</tr>
<tr>
<td>7.45</td>
<td>The Hallmarks of Cancer</td>
</tr>
<tr>
<td>7.49</td>
<td>Developmental Neurobiology</td>
</tr>
<tr>
<td>9.15</td>
<td>Neural Circuits, Neuromodulatory, and Neuroendocrine Systems</td>
</tr>
</tbody>
</table>

2 The combination of 7.30A & 7.30B counts as one Biology restricted elective.