CHEMISTRY AND BIOLOGY (COURSE 5-7)

Chemistry and Biology (http://catalog.mit.edu/interdisciplinary/undergraduate-programs/degrees/chemistry-biology)

Bachelor of Science in Chemistry and 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>Subjects</th>
</tr>
</thead>
<tbody>
<tr>
<td>Science Requirement</td>
<td>6</td>
</tr>
<tr>
<td>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.</td>
<td>8</td>
</tr>
<tr>
<td>Restricted Electives in Science and Technology (REST) Requirement [can be satisfied by 5.12 and 7.03 in the Departmental Program]</td>
<td>2</td>
</tr>
<tr>
<td>Laboratory Requirement (12 units) [can be satisfied by 7.003[J] or the combination of 5.351, 5.352, and 5.353 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>Units</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>5.03</td>
<td>Principles of Inorganic Chemistry I</td>
</tr>
<tr>
<td>12</td>
<td></td>
</tr>
<tr>
<td>5.07[J]</td>
<td>Introduction to Biological Chemistry</td>
</tr>
<tr>
<td>12</td>
<td></td>
</tr>
<tr>
<td>or 7.05</td>
<td>General Biochemistry</td>
</tr>
<tr>
<td>5.08[J]</td>
<td>Fundamentals of Chemical Biology</td>
</tr>
<tr>
<td>12</td>
<td></td>
</tr>
<tr>
<td>5.12</td>
<td>Organic Chemistry I</td>
</tr>
<tr>
<td>12</td>
<td></td>
</tr>
<tr>
<td>5.13</td>
<td>Organic Chemistry II</td>
</tr>
<tr>
<td>12</td>
<td></td>
</tr>
<tr>
<td>5.601</td>
<td>Thermodynamics I</td>
</tr>
<tr>
<td>6</td>
<td></td>
</tr>
<tr>
<td>5.611</td>
<td>Introduction to Spectroscopy</td>
</tr>
<tr>
<td>6</td>
<td></td>
</tr>
<tr>
<td>7.03</td>
<td>Genetics</td>
</tr>
<tr>
<td>12</td>
<td></td>
</tr>
<tr>
<td>7.06</td>
<td>Cell Biology</td>
</tr>
<tr>
<td>12</td>
<td></td>
</tr>
</tbody>
</table>

Departmental Laboratory Requirement

<table>
<thead>
<tr>
<th>Units</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>5.351</td>
<td>Fundamentals of Spectroscopy</td>
</tr>
<tr>
<td>4</td>
<td></td>
</tr>
</tbody>
</table>

5.352 Synthesis of Coordination Compounds and Kinetics (CI-M) 5
5.353 Macromolecular Prodrugs 4
7.002 Fundamentals of Experimental Molecular Biology 6

Select one of the following options:

Option 1

<table>
<thead>
<tr>
<th>Units</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>5.361</td>
<td>Expression and Purification of Enzyme Mutants</td>
</tr>
<tr>
<td>5.362</td>
<td>Kinetics of Enzyme Inhibition (CI-M)</td>
</tr>
</tbody>
</table>

Option 2

<table>
<thead>
<tr>
<th>Units</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>5.361</td>
<td>Expression and Purification of Enzyme Mutants</td>
</tr>
<tr>
<td>5.362</td>
<td>Kinetics of Enzyme Inhibition (CI-M)</td>
</tr>
</tbody>
</table>

7.003[J] Applied Molecular Biology Laboratory (CI-M) 9-12

Restricted Electives

Select 30 units of the following:

<table>
<thead>
<tr>
<th>Units</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>5.04</td>
<td>Principles of Inorganic Chemistry II</td>
</tr>
<tr>
<td>5.363</td>
<td>Organic Structure Determination</td>
</tr>
<tr>
<td>5.371</td>
<td>Continuous Flow Chemistry: Sustainable Conversion of Reclaimed Vegetable Oil into Biodiesel</td>
</tr>
<tr>
<td>5.372</td>
<td>Chemistry of Renewable Energy</td>
</tr>
<tr>
<td>5.373</td>
<td>Dinitrogen Cleavage</td>
</tr>
<tr>
<td>5.381</td>
<td>Quantum Dots</td>
</tr>
<tr>
<td>5.382</td>
<td>Time- and Frequency-resolved Spectroscopy of Photosynthesis</td>
</tr>
<tr>
<td>5.383</td>
<td>Fast-flow Peptide and Protein Synthesis</td>
</tr>
<tr>
<td>5.39</td>
<td>Research and Communication in Chemistry</td>
</tr>
<tr>
<td>5.43</td>
<td>Advanced Organic Chemistry</td>
</tr>
<tr>
<td>5.602</td>
<td>Thermodynamics II and Kinetics</td>
</tr>
<tr>
<td>5.612</td>
<td>Electronic Structure of Molecules</td>
</tr>
<tr>
<td>5.62</td>
<td>Physical Chemistry</td>
</tr>
<tr>
<td>7.093</td>
<td>Modern Biostatistics</td>
</tr>
<tr>
<td>7.094</td>
<td>Modern Computational Biology</td>
</tr>
<tr>
<td>7.19</td>
<td>Communication in Experimental Biology (CI-M)</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>7.23[J]</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 and Aging</td>
</tr>
<tr>
<td>7.28</td>
<td>Molecular Biology</td>
</tr>
<tr>
<td>7.29[J]</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>Course</td>
<td>Title</td>
</tr>
<tr>
<td>--------</td>
<td>-------</td>
</tr>
<tr>
<td>7.32</td>
<td>Systems Biology</td>
</tr>
<tr>
<td>7.371</td>
<td>Biological and Engineering Principles Underlying Novel Biotherapeutics</td>
</tr>
<tr>
<td>7.45</td>
<td>The Hallmarks of Cancer</td>
</tr>
<tr>
<td>7.46</td>
<td>Building with Cells</td>
</tr>
<tr>
<td>7.49[J]</td>
<td>Developmental Neurobiology</td>
</tr>
</tbody>
</table>

**Unrestricted Electives** 59-62

<table>
<thead>
<tr>
<th>Units in Major</th>
<th>154-157</th>
</tr>
</thead>
<tbody>
<tr>
<td>Units in Major That Also Satisfy the GIRs</td>
<td>(36)</td>
</tr>
<tr>
<td>Total Units Beyond the GIRs Required for SB Degree</td>
<td>180</td>
</tr>
</tbody>
</table>

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

*Subject has prerequisites that are outside of the program.*