**COMPUTER SCIENCE AND MOLECULAR BIOLOGY (COURSE 6-7)**


**Bachelor of Science in Computer Science and Molecular 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.

<table>
<thead>
<tr>
<th>Summary of Subject Requirements</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 6.1200[J] in the Departmental Program]</td>
<td>2</td>
</tr>
<tr>
<td>Laboratory Requirement (12 units) [can be satisfied by 6.4880[J], 7.003[J], or 20.109 in the Departmental Program]</td>
<td>1</td>
</tr>
<tr>
<td><strong>Total GIR Subjects Required for SB Degree</strong></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>Required Subjects</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Mathematics and Introductory</strong></td>
<td></td>
</tr>
<tr>
<td>6.100A &amp; 6.100B Introduction to Computer Science Programming in Python and Introduction to Computational Thinking and Data Science</td>
<td>12</td>
</tr>
<tr>
<td><strong>Chemistry</strong></td>
<td></td>
</tr>
<tr>
<td>5.12 Organic Chemistry I</td>
<td>12</td>
</tr>
<tr>
<td>Select one of the following:</td>
<td></td>
</tr>
<tr>
<td>5.601 &amp; 5.602 Thermodynamics I and Thermodynamics II and Kinetics</td>
<td>12</td>
</tr>
</tbody>
</table>

| 20.110[J] Thermodynamics of Biomolecular Systems |

**Introductory Laboratory**
Select one of the following: 15-18

<table>
<thead>
<tr>
<th>Select one of the following:</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>6.4880[J] Biological Circuit Engineering Laboratory (CI-M)</td>
<td></td>
</tr>
<tr>
<td>7.002 &amp; 7.003[J] Molecular Biology and Applied Molecular Biology Laboratory (CI-M)</td>
<td></td>
</tr>
<tr>
<td>20.109 Laboratory Fundamentals in Biological Engineering (CI-M)</td>
<td></td>
</tr>
</tbody>
</table>

**Foundational Subjects**

<table>
<thead>
<tr>
<th>Three Computer Science subjects:</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>6.1010 Fundamentals of Programming</td>
<td>12</td>
</tr>
<tr>
<td>6.1210 Introduction to Algorithms</td>
<td>12</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Three Biological Science subjects:</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>7.03 Genetics</td>
<td>12</td>
</tr>
<tr>
<td>7.05 General Biochemistry</td>
<td>12</td>
</tr>
<tr>
<td>7.06 Cell Biology</td>
<td>12</td>
</tr>
</tbody>
</table>

**Restricted Electives**

<table>
<thead>
<tr>
<th>Computational Biology</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Select one of the following:</td>
<td>12</td>
</tr>
<tr>
<td>6.8711 Computational Biology: Genomes, Networks, Evolution</td>
<td></td>
</tr>
<tr>
<td>6.8711[J] Computational Systems Biology: Deep Learning in the Life Sciences</td>
<td></td>
</tr>
<tr>
<td>7.093 Modern Biostatistics &amp; 7.094 and Modern Computational Biology</td>
<td></td>
</tr>
</tbody>
</table>

**Biology**
Select one subject from the list of Biology Restricted Electives 12

**Advanced Undergraduate Project**
Select one of the following: 9-12

<table>
<thead>
<tr>
<th>Select one of the following:</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>6.UAR Seminar in Undergraduate Advanced Research (12 units, CI-M)</td>
<td></td>
</tr>
<tr>
<td>6.UAT Oral Communication (CI-M)</td>
<td></td>
</tr>
<tr>
<td>7.19 Communication in Experimental Biology (CI-M)</td>
<td></td>
</tr>
</tbody>
</table>

**Units in Major**
168-174

**Unrestricted Electives**
48

Units in Major That Also Satisfy the GIRs (36)

**Total Units Beyond the GIRs Required for SB Degree**
180-186
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 Students who enter MIT with sufficient programming experience may substitute 6.1020 Elements of Software Construction (15 units) after taking 6.1010.

2 5.07[J] Introduction to Biological Chemistry is also an acceptable option.

3 These subjects can count towards either the Computational Biology or the Biology restricted electives, but not both.

### Biology Restricted Electives

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>7.08[J]</td>
<td>Fundamentals of Chemical Biology</td>
<td>12</td>
</tr>
<tr>
<td>7.093</td>
<td>Modern Biostatistics</td>
<td>12</td>
</tr>
<tr>
<td>&amp; 7.094</td>
<td>and Modern Computational Biology 1</td>
<td></td>
</tr>
<tr>
<td>7.20[J]</td>
<td>Human Physiology</td>
<td>12</td>
</tr>
<tr>
<td>7.21</td>
<td>Microbial Physiology</td>
<td>12</td>
</tr>
<tr>
<td>7.23[J]</td>
<td>Immunology</td>
<td>12</td>
</tr>
<tr>
<td>7.26</td>
<td>Molecular Basis of Infectious Disease</td>
<td>12</td>
</tr>
<tr>
<td>7.27</td>
<td>Principles of Human Disease and Aging</td>
<td>12</td>
</tr>
<tr>
<td>7.28</td>
<td>Molecular Biology</td>
<td>12</td>
</tr>
<tr>
<td>7.29[J]</td>
<td>Cellular and Molecular Neurobiology</td>
<td>12</td>
</tr>
<tr>
<td>7.31</td>
<td>Current Topics in Mammalian Biology: Medical Implications</td>
<td>12</td>
</tr>
<tr>
<td>7.32</td>
<td>Systems Biology</td>
<td>12</td>
</tr>
<tr>
<td>7.37[J]</td>
<td>Molecular and Engineering Aspects of Biotechnology</td>
<td>12</td>
</tr>
<tr>
<td>7.371</td>
<td>Biological and Engineering Principles Underlying Novel Biotherapeutics</td>
<td>12</td>
</tr>
<tr>
<td>7.45</td>
<td>The Hallmarks of Cancer</td>
<td>12</td>
</tr>
<tr>
<td>7.46</td>
<td>Building with Cells</td>
<td>12</td>
</tr>
<tr>
<td>7.49[J]</td>
<td>Developmental Neurobiology</td>
<td>12</td>
</tr>
</tbody>
</table>

1 These subjects can count towards either the Computational Biology or the Biology restricted electives, but not both.