Computer Science and Molecular Biology (Course 6-7)

Computer Science and Molecular Biology

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 6.042[J] in the Departmental Program]</td>
<td>2</td>
</tr>
<tr>
<td>Laboratory Requirement (12 units) [can be satisfied by 6.129[J], 7.003, or 20.109 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.

<table>
<thead>
<tr>
<th>Required Subjects</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mathematics and Introductory</td>
<td></td>
</tr>
<tr>
<td>6.0001 &amp; 6.0002 Introduction to Computer Science Programming in Python and Introduction to Computational Thinking and Data Science</td>
<td>12</td>
</tr>
<tr>
<td>Chemistry</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>12</td>
</tr>
<tr>
<td>5.601 &amp; 5.602 Thermodynamics I and Thermodynamics II and Kinetics</td>
<td></td>
</tr>
<tr>
<td>20.110[J] Thermodynamics of Biomolecular Systems</td>
<td></td>
</tr>
<tr>
<td>Introductory Laboratory</td>
<td></td>
</tr>
<tr>
<td>Select one of the following:</td>
<td>15-18</td>
</tr>
<tr>
<td>6.129[J] Biological Circuit Engineering Laboratory (CI-M)</td>
<td></td>
</tr>
</tbody>
</table>
Foundational Subjects

Three Computer Science subjects:

6.006 Introduction to Algorithms 12
6.009 Fundamentals of Programming 12
6.046[J] Design and Analysis of Algorithms 12

Three Biological Science subjects:

7.03 Genetics 12
7.05 General Biochemistry 12
7.06 Cell Biology 12

Restricted Electives

Computational Biology

Select one of the following: 12

6.047 Computational Biology: Genomes, Networks, Evolution
6.802[J] Computational Systems Biology: Deep Learning in the Life Sciences
7.09 Quantitative and Computational Biology

Biology

Select one subject from the list of Biology Restricted Electives 12

Advanced Undergraduate Project

Select one of the following: 9-12

6.UAR Seminar in Undergraduate Advanced Research (12 units, CI-M)
6.UAT Oral Communication (CI-M)
7.19 Communication in Experimental Biology (CI-M)

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 6.031 Elements of Software Construction (15 units) after taking 6.009.
2. 5.07[J] Biological Chemistry I is also an acceptable option.
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</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>7.08[J]</td>
<td>Biological Chemistry II</td>
<td>12</td>
</tr>
<tr>
<td>7.09</td>
<td>Quantitative and Computational Biology</td>
<td>12</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</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.