

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

Computer Science and Molecular Biology (<https://catalog.mit.edu/interdisciplinary/undergraduate-programs/degrees/computer-science-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.

Summary of Subject Requirements	Subjects
Science Requirement	6
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.	8
Restricted Electives in Science and Technology (REST) Requirement [can be satisfied by 5.12 and 6.Co6[]] in the Departmental Program]	2
Laboratory Requirement (12 units) [can be satisfied by 7.003[] or 20.109 in the Departmental Program]	1
<b>Total GIR Subjects Required for SB Degree</b>	<b>17</b>

#### 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	Units
<b>Mathematics and Introductory</b>	
6.100A Introduction to Computer Science Programming in Python <sup>1</sup>	6
6.1200[] Mathematics for Computer Science	12
6.Co6[] Linear Algebra and Optimization	12
<b>Chemistry</b>	
5.12 Organic Chemistry I	12
5.601 Thermodynamics I	6
<b>Introductory Laboratory</b>	
Select one of the following:	15-18

7.002 Fundamentals of Experimental  
& 7.003[] Molecular Biology  
and Applied Molecular Biology  
Laboratory (CI-M)

20.109 Laboratory Fundamentals in  
Biological Engineering (CI-M)

#### Foundational Subjects

##### Three Computer Science subjects:

6.1010	Fundamentals of Programming	12
6.1210	Introduction to Algorithms	12
6.3900	Introduction to Machine Learning	12

or

6.Co1 Modeling with Machine Learning:  
& 7.Co1 from Algorithms to Applications  
and Machine Learning in Molecular  
and Cellular Biology

##### Three Biological Science subjects:

7.03	Genetics	12
7.05	General Biochemistry <sup>2</sup>	12
7.06	Cell Biology	12

#### Restricted Electives

##### Computational Biology

Select one of the following: 12

1.088 Genomics and Evolution of Infectious  
Disease

6.8701[] Computational Biology: Genomes,  
Networks, Evolution

7.093 Modern Biostatistics  
& 7.094 and Modern Computational Biology <sup>3</sup>

7.32 Systems Biology

7.33[] Evolutionary Biology: Concepts,  
Models and Computation <sup>3</sup>

18.413 Introduction to Computational  
Molecular Biology

##### Technical Communication

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)

Select two subjects from any of the following  
lists: Biology Restricted Electives, AI+D Advanced  
Undergraduate Subjects, or Computational Biology. 24

**Units in Major 180-186**

**Unrestricted Electives 48**

Units in Major That Also Satisfy the GIRs (36)

**Total Units Beyond the GIRs Required for SB Degree 192-198**

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

- <sup>1</sup> Students who enter MIT with sufficient programming experience may substitute 6.1020 Software Construction (15 units) after taking 6.1010.
- <sup>2</sup> 5.07[[] Introduction to Biological Chemistry is also an acceptable option.
- <sup>3</sup> These subjects can count towards either the Computational Biology or the Biology restricted electives, but not both.

6.8701[[]	Computational Biology: Genomes, Networks, Evolution	12
6.8711[[]	Computational Systems Biology: Deep Learning in the Life Sciences	12
18.404	Theory of Computation	12

- <sup>1</sup> These subjects can count towards either the Computational Biology or the Biology restricted electives, but not both.

**Biology Restricted Electives**

7.08[[]	Fundamentals of Chemical Biology	12
7.093 & 7.094	Modern Biostatistics and Modern Computational Biology <sup>1</sup>	12
7.20[[]	Human Physiology	12
7.21	Microbial Physiology	12
7.23[[]	Immunology	12
7.24	Advanced Concepts in Immunology	12
7.26	Molecular Basis of Infectious Disease	12
7.27	Principles of Human Disease and Aging	12
7.28	Molecular Biology	12
7.29[[]	Cellular and Molecular Neurobiology	12
7.30[[]	Fundamentals of Ecology	12
7.31	Current Topics in Mammalian Biology: Medical Implications	12
7.32	Systems Biology	12
7.33[[]	Evolutionary Biology: Concepts, Models and Computation <sup>1</sup>	12
7.35	Human Genetics and Genomics	12
7.371[[]	Biological and Engineering Principles Underlying Novel Biotherapeutics	12
7.45	The Hallmarks of Cancer	12
7.46	Building with Cells	12
7.49[[]	Developmental Neurobiology	12
9.17	Systems Neuroscience Laboratory	12
9.26[[]	Principles and Applications of Genetic Engineering for Biotechnology and Neuroscience	12

**AI+D Advanced Undergraduate Subjects**

6.3730[[]	Statistics, Computation and Applications	12
6.4200[[]	Robotics: Science and Systems (CI-M)	12
6.5151	Large-scale Symbolic Systems	12
6.5831	Database Systems	12
6.7411	Principles of Digital Communication	12
6.8371	Digital and Computational Photography	12