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.C06[J] in the Departmental Program]	2
Laboratory Requirement (12 units) [can be satisfied by 7.003[J] or 20.109 in the Departmental Program]	1
Total GIR Subjects Required for SB Degree	**17**

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
Mathematics and Introductory		
6.100A	Introduction to Computer Science Programming in Python [1]	6
or 6.100L	Introduction to Computer Science and Programming	
6.120A	Discrete Mathematics and Proof for Computer Science	6
6.C06[J]	Linear Algebra and Optimization	12
Chemistry		
5.12	Organic Chemistry I	12
5.601	Thermodynamics I	6
Introductory Laboratory		
Select one of the following:		15-18
7.002 & 7.003[J]	Fundamentals of Experimental 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.C01 & 7.C01	Modeling with Machine Learning: from Algorithms to Applications and Machine Learning in Molecular and Cellular Biology	
Three Biological Science subjects:		
7.03	Genetics	12
7.05	General Biochemistry [2]	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 & 7.094	Modern Biostatistics and Modern Computational Biology [3]	
7.32	Systems Biology	
7.33[J]	Evolutionary Biology: Concepts, Models and Computation [3]	
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.		24-30
Units in Major		**174-189**
Unrestricted Electives		**48**

Units in Major That Also Satisfy the GIRs	(36)
Total Units Beyond the GIRs Required for SB Degree	**186-198**

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 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

7.08[J]	Fundamentals of Chemical Biology	12
7.093 & 7.094	Modern Biostatistics and Modern Computational Biology [1]	12
7.20[J]	Human Physiology	12
7.21	Microbial Physiology	12
7.23[J]	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[J]	Cellular and Molecular Neurobiology	12
7.30[J]	Fundamentals of Ecology	12
7.31	Current Topics in Mammalian Biology: Medical Implications	12
7.32	Systems Biology	12
7.33[J]	Evolutionary Biology: Concepts, Models and Computation [1]	12
7.35	Human Genetics and Genomics	12
7.37[J]	Molecular and Engineering Aspects of Biotechnology	12
or 7.371	Biological and Engineering Principles Underlying Novel Biotherapeutics	
7.45	The Hallmarks of Cancer	12
7.46	Building with Cells	12
7.49[J]	Developmental Neurobiology	12
9.17	Systems Neuroscience Laboratory	12
9.26[J]	Principles and Applications of Genetic Engineering for Biotechnology and Neuroscience	12

AI+D Advanced Undergraduate Subjects

6.3730[J]	Statistics, Computation and Applications	12
6.4200[J]	Robotics: Science and Systems (CI-M)	12
6.4210	Robotic Manipulation (CI-M)	15
6.5151	Large-scale Symbolic Systems	12
6.5831	Database Systems	12
6.7411	Principles of Digital Communication	12
6.8301	Advances in Computer Vision (CI-M)	15
6.8371	Digital and Computational Photography	12
6.8611	Quantitative Methods for Natural Language Processing (CI-M)	15
6.8701	Computational Biology: Genomes, Networks, Evolution	12
6.8711[J]	Computational Systems Biology: Deep Learning in the Life Sciences	12
18.404	Theory of Computation	12

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