

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
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.Co6[] 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 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 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 Modern Biostatistics
& 7.094 and Modern Computational Biology ³

7.32 Systems Biology

7.33[] 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 24-30
lists: Biology Restricted Electives, AI+D Advanced
Undergraduate Subjects, or Computational Biology.

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] or 7.371	Molecular and Engineering Aspects of Biotechnology Biological and Engineering Principles Underlying Novel Biotherapeutics	12
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.