

COMPUTATION AND COGNITION (COURSE 6-9)

Computation and Cognition (<https://catalog.mit.edu/interdisciplinary/undergraduate-programs/degrees/computation-cognition>)

Bachelor of Science in Computation and Cognition

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 [9.85 can be satisfied in the Departmental Program]; 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 9.01 and 6.1200[]], 6.2000, 6.3000, 6.3700, 18.03, 18.05, 18.06, 18.600, 18.Co6[] in the Departmental Program]	2
Laboratory Requirement (12 units) [can be satisfied by a laboratory 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
6.100A Introduction to Computer Science Programming in Python	6
9.01 Introduction to Neuroscience	12
18.06 Linear Algebra	12
or 18.Co6[] Linear Algebra and Optimization	
<i>Select one of the following:</i>	6-12
6.1200[] Mathematics for Computer Science	
6.120A Discrete Mathematics and Proof for Computer Science	
18.03 Differential Equations	
<i>Select one of the following:</i>	12

6.3700	Introduction to Probability
18.05	Introduction to Probability and Statistics
18.600	Probability and Random Variables
6.3800	Introduction to Inference
9.07	Statistics for Brain and Cognitive Science ¹

EECS Program Subjects

6.3900	Introduction to Machine Learning	12
<i>Select two of the following:</i>		24
6.1010	Fundamentals of Programming	
6.1210	Introduction to Algorithms	
6.2000	Electrical Circuits: Modeling and Design of Physical Systems	
<i>Select one of the following:</i>		12
6.3000	Signal Processing	
6.3100	Dynamical System Modeling and Control Design	
6.3950	AI, Decision Making, and Society	
6.4110	Representation, Inference, and Reasoning in AI	

BCS Program Subjects¹

Brain Systems/Neurophysiology

<i>Select one of the following:</i>		12
9.09[]	Cellular and Molecular Neurobiology ¹	
9.13	The Human Brain ¹	
9.18[]	Developmental Neurobiology ¹	
9.21[]	Cellular Neurophysiology and Computing ¹	
9.35	Perception ¹	
9.36	Neurobiology of Self ¹	
9.40	Introduction to Neural Computation ¹	
9.67[]	Materials Physics of Neural Interfaces (CI-M)	

Computation and Cognition

<i>Select one of the following:</i>		12
9.19	Computational Psycholinguistics ¹	
9.39	Language in the Mind and Brain	
9.49	Neural Circuits for Cognition ¹	
9.53	Emergent Computations Within Distributed Neural Circuits ¹	
9.66[]	Computational Cognitive Science ¹	
9.85	Infant and Early Childhood Cognition (CI-M) ¹	

Program Electives

One subject from the Electives list	12-18
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Laboratory

One subject from the Laboratory Subjects list 12

Advanced Project

Select one of the following: 6-18

6.UAR[J]	Seminar in Undergraduate Advanced Research (CI-M)
9.41	Research and Communication in Neuroscience and Cognitive Science (CI-M)
9.58	Projects in the Science of Intelligence (CI-M)
6.4200[J]	Robotics: Science and Systems (CI-M)
6.4210	Robotic Manipulation (CI-M)
6.8301	Advances in Computer Vision (CI-M)
6.8611	Quantitative Methods for Natural Language Processing (CI-M)

Units in Major 150-174

Unrestricted Electives³ 48-72

Units in Major That Also Satisfy the GIRs (36-48)

Total Units Beyond the GIRs Required for SB Degree 180-198

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 Subjects that also appear in the list of BCS Program Subjects can count as either a BCS Program Subject or a Program Elective, but not both.

² Subject has prerequisites that are outside of the program.

³ In order to meet the 180-198 units beyond the GIRs required, students may need to take more than 48 or fewer than 72 units of unrestricted electives.

Program Electives

6.4100	Artificial Intelligence	12
6.4200[J]	Robotics: Science and Systems	12
6.8301	Advances in Computer Vision	15
6.8611	Quantitative Methods for Natural Language Processing	15
9.09[J]	Cellular and Molecular Neurobiology ¹	12
9.13	The Human Brain ¹	12
9.18[J]	Developmental Neurobiology ¹	12
9.19	Computational Psycholinguistics ¹	12
9.21[J]	Cellular Neurophysiology and Computing ^{1,2}	12
9.24	Disorders and Diseases of the Nervous System	12
9.26[J]	Principles and Applications of Genetic Engineering for Biotechnology and Neuroscience	12

9.35	Perception ¹	12
9.36	Neurobiology of Self ¹	12
9.40	Introduction to Neural Computation ¹	12
9.42	The Brain and Its Interface with the Body	12
9.49	Neural Circuits for Cognition ¹	12
9.53	Emergent Computations Within Distributed Neural Circuits ¹	12
9.66[J]	Computational Cognitive Science ¹	12
9.85	Infant and Early Childhood Cognition ¹	12
6.3800	Introduction to Inference	12
9.60	Machine-Motivated Human Vision	12
2.74	Bio-inspired Robotics	12
9.39	Language in the Mind and Brain	12
6.1040	Software Design	18
16.84	Advanced Autonomous Robotic Systems	12
6.C25[J]	Real World Computation with Julia	12
6.4210	Robotic Manipulation	15
6.1120	Dynamic Computer Language Engineering	12

Laboratory Subjects

6.2040	Analog Electronics Laboratory (CI-M)	12
6.2050	Digital Systems Laboratory (CI-M) ²	12
6.2060	Microcomputer Project Laboratory (CI-M) ²	12
6.2370	Modern Optics Project Laboratory (CI-M)	12
6.4200[J]	Robotics: Science and Systems (CI-M)	12
6.4880[J]	Biological Circuit Engineering Laboratory (CI-M)	12
9.17	Systems Neuroscience Laboratory (CI-M) ¹	12
9.59[J]	Laboratory in Psycholinguistics (CI-M) ¹	12
9.60	Machine-Motivated Human Vision (CI-M) ¹	12

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