DEPARTMENT OF ELECTRICAL ENGINEERING AND COMPUTER SCIENCE

Undergraduate Study

For MIT undergraduates, the Department of Electrical Engineering and Computer Science offers several programs leading to the Bachelor of Science. Students in 6-1, 6-2, 6-3, 6-4, 6-7, 6-9, or 6-14 may also apply for one of the Master of Engineering programs offered by the department, which require an additional year of study for the simultaneous award of both the bachelor's and master's degrees.

Bachelor of Science in Electrical Science and Engineering (Course 6-1)

The 6-1 program (*http://catalog.mit.edu/degree-charts/electrical-science-engineering-course-6-1*) leads to the Bachelor of Science in Electrical Science and Engineering. The program starts with three foundation courses in circuits, signal processing, and computer architecture. Those are followed by specialization in three header subjects chosen from signals, nanoelectronics, electromagnetics, neurophysiology, or machine learning; two advanced undergraduate subjects; and two elective subjects from an extensive set of possibilities.

Bachelor of Science in Electrical Engineering and Computer Science (Course 6-2)

The 6-2 program (*http://catalog.mit.edu/degree-charts/electrical-engineering-computer-science-course-6-2*) leads to the Bachelor of Science in Electrical Engineering and Computer Science and is for students whose interests focus on creating systems that interface with the world, digital design and computer architecture, and control systems. The degree has a required foundation of 4.5 subjects in basic mathematics, programming, and algorithms. Students build on these fundamental subjects with 3 core system design subjects encompassing the discipline, along with an integrative system design laboratory class. There are then four subjects drawn from a range of application tracks, one communication-intensive subject, and one additional elective.

Bachelor of Science in Computer Science and Engineering (Course 6-3)

The 6-3 program (*http://catalog.mit.edu/degree-charts/computer-science-engineering-course-6-3*) leads to the Bachelor of Science in Computer Science and Engineering and is designed for students whose interests focus on software, computer systems, and theoretical computer science. The degree has a required core of 2.5 subjects in programming, 2.5 subjects in systems, and 3 subjects in algorithmic thinking and theory, along with a math subject in either linear algebra or probability and statistics. Students then take two upper-level courses in each of two specialized tracks, including computer architecture, human-computer interaction, programming tools and techniques, computer systems, or theory. 6-3 students may alternatively choose an electrical engineering track from the 6-2 degree, or an artificial intelligence and decision-making track from the 6-4 degree.

Bachelor of Science in Artificial Intelligence and Decision Making (Course 6-4)

The 6-4 program (*http://catalog.mit.edu/degree-charts/artifical-intelligence-decision-making-course-6-4*) leads to the Bachelor of Science in Artificial Intelligence and Decision Making and is designed for students whose interests focus on algorithms for learning and reasoning, applications of artificial intelligence, and connections to natural cognition. The degree has a required foundation of 5.5 subjects in basic mathematics and computer science; a breadth requirement of 5 subjects covering data, model, decision, computation, and human-centric areas; two subjects drawn from applications or other advanced material; one additional breadth subject; and one additional communications-intensive subject.

Bachelor of Science in Computer Science and Molecular Biology (Course 6-7)

The 6-7 program (*http://catalog.mit.edu/degree-charts/computer-science-molecular-biology-course-6-7*) leads to the Bachelor of Science in Computer Science and Molecular Biology. Offered jointly by the Department of Electrical Engineering and Computer Science and the Department of Biology (Course 7), the program is for students who wish to specialize in computer science and molecular biology. Students begin with introductory courses in math, chemistry, programming, and lab skills. They then build on these skills with five courses in algorithms and biology, which lead to a choice of electives in biology, with a particular focus on computational biology. Additional information about the 6-7 program (*http://catalog.mit.edu/interdisciplinary/undergraduate-programs/degrees/computer-science-molecular-biology*) can be found in the section Interdisciplinary Programs.

Bachelor of Science in Computation and Cognition (Course 6-9)

The 6-9 program (*http://catalog.mit.edu/degree-charts/computation-cognition-6-9*) leads to the Bachelor of Science in Computation and Cognition. Offered jointly by the Department of Electrical Engineering and Computer Science and the Department of Brain and Cognitive Sciences (Course 9), the program focuses on the emerging field of computational and engineering approaches to brain science, cognition, and machine intelligence. It is designed to give students access to foundational and advanced material in electrical engineering and computer science, as well as in the architecture, circuits, and physiology of the brain. Additional information about the 6-9 program (*http://catalog.mit.edu/interdisciplinary/undergraduate-programs/degrees/computation-cognition*) can be found in the section Interdisciplinary Programs.

Bachelor of Science in Computer Science, Economics, and Data Science (Course 6-14)

The 6-14 program (*http://catalog.mit.edu/degree-charts/computer-science-economics-data-science-course-6-14*) leads to the Bachelor

of Science in Computer Science, Economics, and Data Science. Offered jointly by the Department of Electrical Engineering and Computer Science and the Department of Economics (Course 14), this program is for students who wish to specialize in computer science, economics, and data science. It is designed to equip students with a foundational knowledge of economic analysis, computing, optimization, and data science, as well as hands-on experience with empirical analysis of economic data. Students take eight subjects that provide a mathematical, computational, and algorithmic basis for the major. Students then take two subjects in data science, two in intermediate economics, and three elective subjects from data science and economics theory. Additional information about the 6-14 program (*http://catalog.mit.edu/interdisciplinary/undergraduate-programs/degrees/computer-science-economics-data-science*) can be found in the section Interdisciplinary Programs.

Bachelor of Science in Urban Science and Planning with Computer Science (Course 11-6)

The 11-6 program (*http://catalog.mit.edu/degree-charts/urban-science-planning-computer-science-11-6*) leads to the Bachelor of Science in Urban Science and Planning with Computer Science. This program, offered jointly by the Department of Electrical Engineering and Computer Science and the Department of Urban Studies and Planning (Course 11), is for students who wish to specialize in urban science and planning with computer science. Additional information about the 11-6 program (*http://catalog.mit.edu/interdisciplinary/undergraduate-programs/degrees/urban-science-planning-computer-science*) can be found in the section Interdisciplinary Programs.

Minor in Computer Science

The department offers a Minor in Computer Science. The minor provides students with both depth and breadth in the field, as well as the opportunity to explore areas of their own interest.

To complete the minor, students must take at least six subjects (six-unit subjects count as half-subjects) totaling at least 72 units from the lists below, including:

- at least one software-intensive subject, and
- one algorithms-intensive subject at either the basic or advanced level.

Introductory Level		
Select up to 12 units of the following:		12
6.100A	Introduction to Computer Science Programming in Python	
6.100B	Introduction to Computational Thinking and Data Science	
6.3400	Introduction to EECS via Communication Networks	
6.9010	Introduction to EECS via Interconnected Embedded Systems	
6.9080	Introduction to EECS via Robotics	
Basic Level		
Select up to 63 units of the following:		63
6.1200[J]	Mathematics for Computer Science	
6.1910	Computation Structures	
6.3700	Introduction to Probability	
6.3800	Introduction to Inference	
6.4100	Artificial Intelligence	
18.200	Principles of Discrete Applied Mathematics	
18.200A	Principles of Discrete Applied Mathematics	
18.211	Combinatorial Analysis	
Algorithms-intensive		
6.1210	Introduction to Algorithms	
Software-intensive		
6.1010	Fundamentals of Programming	
Advanced Level		
Select at least 12 units of the following:		12
6.1220[J]	Design and Analysis of Algorithms	
6.1400[J]	Computability and Complexity Theory	
6.1800	Computer Systems Engineering	
6.3730[J]	Statistics, Computation and Applications	
6.3900	Introduction to Machine Learning	
6.4120[J]	Computational Cognitive Science	
6.4400	Computer Graphics	
6.4530[J]	Principles and Practice of Assistive Technology	
6.5151	Large-scale Symbolic Systems	
6.5831	Database Systems	
6.8301	Advances in Computer Vision	
6.8371	Digital and Computational Photography	
6.8611	Quantitative Methods for Natural Language Processing	
6.8701	Computational Biology: Genomes, Networks, Evolution	
6.8711[J]	Computational Systems Biology: Deep Learning in the Life Sciences	
18.404	Theory of Computation	
Algorithms-intensive		
6.1220[J]	Design and Analysis of Algorithms	
Software-intensive		
6.1020	Software Construction	
6.1040	Software Design	
6.1060	Software Performance Engineering	

6.1100	Computer Language Engineering
6.1920	Constructive Computer Architecture
6.4200[J]	Robotics: Science and Systems
6.4550[J]	Interactive Music Systems
6.5081	Multicore Programming

Inquiries

Additional information about the department's undergraduate programs may be obtained from the EECS Undergraduate Office (*ug@eecs.mit.edu*), Room 38-476, 617-253-7329.