CONTACT
EECS Undergraduate Office, ug@eecs.mit.edu

DESCRIPTION
Course 6 at MIT houses electrical engineering, computer science, and combinations of computer science with other areas. Computer scientists use computers to conceive, design, and test logical structures for solving problems with focuses on program efficiency and performance. Electrical engineers work to design new ways to use electrical power to develop or improve products, develop standards for manufacturing, construction, and installation, directing manufacturing, installation, and testing, and managing the production of electrical projects. Computer scientists often work as programmers or computer systems analysts, attempting to build and maintain complex technological systems. They may also work to develop control software, mobile applications, websites, and numerical analysis software.

INSIDE COURSE 6
6-1 Electrical Science and Engineering
6-2 Electrical Engineering and Computer Science
6-3 Computer Science and Engineering
6-4 Artificial Intelligence and Decision Making
6-7 Computer Science and Molecular Biology
6-9 Computation and Cognition (Contact Course 9)
6-14 Computer Science, Economics, and Data Science
11-6 Urban Science and Planning with Computer Science (contact Course 11)

INTRODUCTORY COURSES

6.100A Introduction to Computer Science Programming in Python
Introduction to computer science and programming for students with little or no programming experience. Students develop skills to program and use computational techniques to solve problems. Topics include the notion of computation, Python, simple algorithms and data structures, testing and debugging, and algorithmic complexity.

6.100B Introduction to Computational Thinking and Data Science
Provides an introduction to using computation to understand real-world phenomena. Topics include plotting, stochastic programs, probability and statistics, random walks, Monte Carlo simulations, modeling data, optimization problems, and clustering.

6.9080 Introduction to EECS via Robotics
An integrated introduction to electrical engineering and computer science, taught
using substantial laboratory experiments with mobile robots. Key issues in the
design of engineered artifacts operating in the natural world: measuring and
modeling system behaviors; assessing errors in sensors and effectors; specifying
tasks; designing solutions based on analytical and computational models; planning,
executing, and evaluating experimental tests of performance; refining models and
designs. Issues addressed in the context of computer programs, control systems,
probabilistic inference problems, circuits and transducers, which all play important
roles in achieving robust operation of a large variety of engineered systems.

6.3400 **Introduction to EECS via Communication Networks**
Studies key concepts, systems, and algorithms to reliably communicate data in
settings ranging from the cellular phone network and the Internet to deep space.
Weekly laboratory experiments explore these areas in depth. Topics presented in
three modules - bits, signals, and packets - spanning the multiple layers of a
communication system. Bits module includes information, entropy, data
compression algorithms, and error correction with block and convolutional codes.
Signals module includes modeling physical channels and noise, signal design,
filtering and detection, modulation, and frequency-division multiplexing. Packets
module includes switching and queuing principles, media access control, routing
protocols, and data transport protocols.

6.4900 **Introduction to EECS via Medical Technology**
Explores biomedical signals generated from electrocardiograms, glucose detectors
or ultrasound images, and magnetic resonance images. Topics include physical
characterization and modeling of systems in the time and frequency domains;
analog and digital signals and noise; basic machine learning including decision
trees, clustering, and classification; and introductory machine vision. Labs
designed to strengthen background in signal processing and machine learning.
Students design and run structured experiments, and develop and test procedures
through further experimentation.

6.9010 **Introduction to EECS via Interconnected Embedded Systems**
Introduction to embedded systems in the context of connected devices, wearables,
and the "Internet of Things" (IoT). Topics include microcontrollers, energy
utilization, algorithmic efficiency, interfacing with sensors, networking,
cryptography, and local versus distributed computation. Students design, make,
and program an Internet-connected wearable or handheld device. In the final
project, student teams design and demo their own server-connected IoT system.

**COURSE 6-FRIENDLY UROP AREAS**
Computer Science and Artificial Intelligence Laboratory (CSAIL)
Research Laboratory of Electronics (RLE)
Laboratory for Information and Decision Systems (LIDS)
Microsystems Tech Lab (MTL)
Institute for Data, Systems, Society (IDS)
Lincoln Lab (LL)
Broad Institute (BR)

**GET INVOLVED WITH EECS**
CSAIL Student Social Committee  Student Information Processing Team
Electric Vehicle Team  AR/VR @ MIT
Robotics Team  HKN
SKILLS

**COMPUTER SCIENCE**
- Proficiency in programming languages
- Familiarity with relevant math concepts
- Problem-solving and troubleshooting
- Ability to work in interdisciplinary teams

**ELECTRICAL ENGINEERING**
- Familiarity with basic engineering fundamentals
- Interpret and write technical documents
- Ability to work in interdisciplinary teams
- Strong communication and problem solving

POSSIBLE FUTURE POSITIONS – COMPUTER SCIENCE

- **Network systems and data communications analyst/specialist**: Plan, design, build, maintain, and test networks and other data communications systems.
- **Computer programmer**: Write and test code that allows computer applications and software programs to function and turn program designs created by software developers into instructions a computer can follow.
- **Information security analyst**: Plan and carry out security measures to protect an organization’s computer networks and systems. Responsibilities are continually expanding as the number of cyberattacks increases.
- **Software developer**: Develop computer programs and applications that allow people to do specific tasks on a computer or another device. Others develop the underlying systems that run the devices or that control networks.

CAREER INDUSTRY EXAMPLES

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<thead>
<tr>
<th>Automation</th>
<th>Laser and electro-optics</th>
<th>RF communications</th>
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<tbody>
<tr>
<td>App development</td>
<td>Magnetics</td>
<td>Robotics</td>
</tr>
<tr>
<td>Circuits and systems</td>
<td>Medical technologies</td>
<td>Telecommunications</td>
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<tr>
<td>Electrical insulation</td>
<td>Power electronics</td>
<td>Ultrasonics</td>
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SAMPLE EMPLOYERS

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<thead>
<tr>
<th>Amazon</th>
<th>Citadel LLC</th>
<th>Meta</th>
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<tr>
<td>Apple</td>
<td>Formlabs</td>
<td>McKinsey &amp; Company</td>
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<td>Boeing</td>
<td>Lockheed Martin</td>
<td>Nimble Robotics</td>
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