SCHOOL OF ENGINEERING

Never have the challenges and opportunities of engineering been more exciting or more critical to the long-term well-being of society than they are today. An engineering education from MIT provides students with exceptional opportunities to define and impact the future.

Technology's enormous influence on society is creating an increasing demand for engineering graduates. Engineers provide important leadership to society through their central role in scientific and technological innovation. By creating, developing, and managing complex technologies and products, engineers contribute directly to the betterment of humanity and to shaping our world. Seeking solutions to the most difficult challenges of our day in the context of physical, economic, human, political, legal, and cultural realities makes engineering a tremendously rewarding endeavor.

The first-year curriculum for all MIT undergraduates includes physics, chemistry, mathematics, biology, and the humanities, arts, and social sciences. An undergraduate student normally becomes affiliated with a particular department or course of study at the beginning of sophomore year and works closely with an advisor from that department or program to shape their course of study. Students who would like to explore an engineering major are encouraged to seek out and get involved with one of the engineering departments during their first year. Every department offers exciting subjects that introduce first-year students to engineering; they also offer First-Year Advising Seminars that bring students together in small groups to discuss their field with department faculty. The Undergraduate Research Opportunities Program (UROP) (*https://catalog.mit.edu/mit/undergraduate-education/academic-research-options/undergraduate-research-opportunities-program*) is a great way to delve into cutting-edge engineering research.

Once a student chooses an undergraduate major, there are many opportunities for individual initiatives. For example, the New Engineering Education Transformation (NEET) (*http://neet.mit.edu*) program aims to reimagine and rethink what and how undergraduate engineering students learn by focusing on preparing them to develop the new machines and systems that they will build in the middle of the 21st century. Also, the School's flexible engineering degree programs offer students in several departments the opportunity to satisfy department-based core requirements and declare an additional concentration, which can be broad and interdisciplinary in nature (e.g., energy, health, or the environment), or focused on areas that can be applied to multiple fields (e.g., robotics and controls, computational engineering, or engineering management). Students may also elect to create their own concentrations under supervision from department faculty. In addition, many undergraduates combine their primary major with a second one in another area, such as management, political science, economics, one of the sciences, or another area of engineering. Others organize their programs so they can receive both undergraduate and graduate degrees simultaneously. A series of minor programs from across the Institute is also available.

Pioneering Programs in Engineering Education

Engineering education has been at the core of the Institute's mission since its founding in 1861. MIT created the contemporary model of engineering education grounded in a dynamic, changing base of science. It pioneered the modern model of the research university, with externally sponsored research programs and a matrix of academic departments and research laboratories working across various disciplines. MIT also contributed in significant ways to the creation of entire new fields, for example, chemical engineering, sanitary engineering, naval architecture and marine engineering, and soil mechanics; the Institute also offered the first course in aeronautical engineering. More recently, MIT has created new avenues for students to pursue concentrations in broad, interdisciplinary areas such as computing, energy, medical science and engineering, robotics, computational engineering, or poverty alleviation.

The School of Engineering has distinguished itself as a leader in engineering education, where the teaching of applied, hands-on engineering is of the utmost importance. In 1916, it created one of the first industrial internship programs, now the David H. Koch School of Chemical Engineering Practice. Over the last several decades, the School of Engineering has launched numerous pioneering programs, many in partnership with industry, such as Leaders for Global Operations (1988), System Design and Management (1997), the Deshpande Center for Technological Innovation (2001), the Undergraduate Practice Opportunities Program (2001), the Bernard M. Gordon–MIT Engineering Leadership Program (2008), MITx and edX (2011), SuperUROP (2012), StartMIT (2014), the MIT Sandbox Innovation Fund Program (2016), and the New Engineering Education Transformation program (2017).

The School of Engineering is constantly innovating in engineering education, developing novel pedagogical approaches, designing new subject offerings to strengthen current programs, and creating new disciplines, fields of study, majors, and graduate programs. Today, the School offers more than two dozen exciting engineering degree programs for its undergraduates. For example, the flexible SB in Engineering degree is offered by Mechanical Engineering, Aeronautics and Astronautics, Chemical Engineering, or Civil and Environmental Engineering.

The School of Engineering also offers a range of co-curricular activities designed to enhance students' academic and non-academic experiences at MIT. The MIT Sandbox Innovation Fund Program (*http://sandbox.mit.edu*) seeks to help students develop the knowledge, skills, and attitudes to be successful innovators and entrepreneurs by providing up to $25,000 for student-initiated ideas and mentoring from within MIT and from a broad network of committed partners. The Undergraduate Practice Opportunities Program (UPOP) (*http://upop.mit.edu*) is a program

for sophomores that provides opportunities for students to learn first-hand about engineering practice outside the academic context through internships and intensive experiential-learning workshops that emphasize development of professional abilities and attitudes required in engineering work. And SuperUROP (*https://superurop.mit.edu*), an expanded version of UROP, was launched in 2012 for juniors and seniors to have the time, training, resources, and guidance necessary for deep scientific and engineering inquiry leading to publication-worthy findings.

The School of Engineering is generally ranked at the top of its fields by third-party rankings and surveys. *US News and World Report* has placed the School at the top of its engineering rankings every year they have run their survey, as has the QS World University Rankings. Nearly a third of the School's current and emeritus faculty and research staff have been inducted into the National Academy of Engineering.

Interdepartmental Research Programs

Within the School of Engineering, students may develop a program that satisfies their own intellectual and professional objectives. Those interested in an interdepartmental program should study the department descriptions and interdisciplinary program description for opportunities that combine disciplines from MIT's four other schools or the MIT Stephen A. Schwarzman College of Computing with those of the School of Engineering.

While the School's academic departments provide continuity and stability for the basic engineering disciplines, they increasingly share interests in the way their individual disciplines are expressed and applied. Interdepartmental centers, laboratories, and programs provide opportunities for faculty, students, and research staff to undertake collaborative research and engage in educational programs dealing with these and other interdisciplinary applications of importance to society.

Interdisciplinary centers and laboratories in which School of Engineering faculty play leading roles include the following:

- Center for Advanced Nuclear Energy Systems
- Center for Computational Science and Engineering
- Center for Ocean Engineering
- Center for Transportation and Logistics
- Computer Science and Artificial Intelligence Laboratory
- Deshpande Center for Technological Innovation
- Industrial Performance Center
- Institute for Data, Systems, and Society
- Institute for Medical Engineering and Science
- Koch Institute for Integrative Cancer Research
- Laboratory for Information and Decision Systems
- Laboratory for Manufacturing and Productivity
- Materials Processing Center
- Materials Research Laboratory
- Microsystems Technology Laboratories
- MIT Climate and Sustainability Consortium
- MIT Energy Initiative
- MIT Stephen A. Schwarzman College of Computing
- Research Laboratory of Electronics
- Singapore-MIT Alliance
- Sociotechnical Systems Research Center

More information on interdepartmental research programs (*https://catalog.mit.edu/mit/research*) is available under Research and Study.

Degrees Offered in the School of Engineering

Aeronautics and Astronautics (Course 16)

SB	Aerospace Engineering
SB	Engineering
SM	Aeronautics and Astronautics
SM/MBA	Engineering/Management—dual degree with Leaders for Global Operations Program [1]
Engineer	Aeronautics and Astronautics
PhD	Aeronautics, Astronautics, and Statistics [1]
PhD, ScD	Aerospace Computational Engineering
PhD, ScD	Aerospace, Energy, and the Environment
PhD, ScD	Air-Breathing Propulsion
PhD, ScD	Aircraft Systems Engineering
PhD, ScD	Air Transportation Systems
PhD, ScD	Autonomous Systems
PhD, ScD	Communications and Networks
PhD, ScD	Controls
PhD, ScD	Engineering Systems
PhD, ScD	Humans in Aerospace
PhD, ScD	Materials and Structures
PhD, ScD	Oceanographic Engineering (Jointly with WHOI)
PhD, ScD	Space Propulsion
PhD, ScD	Space Systems

Biological Engineering (Course 20)

SB	Biological Engineering
SM	Toxicology
SM/MBA	Engineering/Management—dual degree with Leaders for Global Operations Program [1]
MEng	Biomedical Engineering
PhD, ScD	Biological Engineering

Chemical Engineering (Course 10)

SB	Chemical Engineering
SB	Chemical-Biological Engineering

SB	Engineering
SM	Chemical Engineering
SM	Chemical Engineering Practice
SM/MBA	Engineering/Management—dual degree with Leaders for Global Operations Program [1]
PhD, ScD	Chemical Engineering
PhD, ScD	Chemical Engineering and Computation [1]
PhD, ScD	Chemical Engineering Practice

Civil and Environmental Engineering (Course 1)

SB	General Engineering
SM	Civil and Environmental Engineering
SM/MBA	Engineering/Management—dual degree with Leaders for Global Operations Program [1]
MEng	Civil and Environmental Engineering
Civil Engineer	
Environmental Engineer	
PhD, ScD	Biological Oceanography (jointly with WHOI)
PhD, ScD	Chemical Oceanography (jointly with WHOI)
PhD, ScD	Civil and Environmental Engineering
PhD, ScD	Civil and Environmental Systems
PhD, ScD	Civil Engineering
PhD, ScD	Civil Engineering and Computation [1]
PhD, ScD	Coastal Engineering
PhD, ScD	Construction Engineering and Management
PhD, ScD	Environmental Biology
PhD, ScD	Environmental Chemistry
PhD, ScD	Environmental Engineering
PhD, ScD	Environmental Engineering and Computation [1]
PhD, ScD	Environmental Fluid Mechanics
PhD, ScD	Geotechnical and Geoenvironmental Engineering
PhD, ScD	Hydrology
PhD, ScD	Information Technology
PhD, ScD	Oceanographic Engineering (jointly with WHOI)
PhD, ScD	Structures and Materials
PhD, ScD	Transportation

Climate System Science and Engineering (Course 1-12)

SB	Climate System Science and Engineering [1]

Computation and Cognition (Course 6-9)

SB	Computation and Cognition [1]
MEng	Computation and Cognition [1]

Computational and Systems Biology

PhD	Computational and Systems Biology [1]

Computational Science and Engineering

SM	Computational Science and Engineering [1]
PhD, ScD	Aerospace Engineering and Computational Science [1 2]
PhD, ScD	Chemical Engineering and Computation [1]
PhD, ScD	Civil Engineering and Computation [1]
PhD, ScD	Computational Earth, Science and Planetary Sciences [1]
PhD, ScD	Computational Materials Science and Engineering [1]
PhD, ScD	Computational Nuclear Science and Engineering [1]
PhD, ScD	Environmental Engineering and Computation [1]
PhD, ScD	Mathematics and Computational Science [1]
PhD, ScD	Mechanical Engineering and Computation [1]
PhD, ScD	Nuclear Engineering and Computation [1]

Computer Science and Molecular Biology (Course 6-7P)

MEng	Computer Science and Molecular Biology [1]

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

SB	Computer Science, Economics, and Data Science [1]

Data, Systems, and Society

SM	Technology and Policy
PhD, ScD	Social and Engineering Systems
PhD	Social and Engineering Systems and Statistics
PhD	Aeronautics and Astronautics and Statistics
PhD	Cognitive Science and Statistics
PhD	Economics and Statistics
PhD	Mathematics and Statistics
PhD	Mechanical Engineering and Statistics
PhD	Neuroscience and Statistics
PhD	Physics, Statistics, and Data Science
PhD	Political Science and Statistics

Electrical Engineering and Computer Science (Course 6)

SB	Artificial Intelligence and Decision Making
SB	Computer Science and Engineering
SB	Electrical Engineering with Computing
SM	Electrical Engineering and Computer Science
SM/MBA	Engineering/Management—dual degree with Leaders for Global Operations Program [1]
MEng	Computer Science, Economics, and Data Science
MEng	Electrical Engineering and Computer Science
Electrical Engineer	
Engineer in Computer Science	
PhD, ScD	Computer Science

PhD, ScD	Computer Science and Engineering
PhD, ScD	Electrical Engineering
PhD, ScD	Electrical Engineering and Computer Science

Health Sciences and Technology (HST)

SM	Health Sciences and Technology
MD	Medical Sciences (degree from Harvard Medical School)
ScD, PhD	Health Sciences and Technology
ScD, PhD	Health Sciences and Technology—Bioastronautics
ScD, PhD	Health Sciences and Technology—Medical Engineering and Medical Physics

Materials Science and Engineering (Course 3)

SB	Archaeology and Materials
SB	Engineering
SB	Materials Science and Engineering
SM	Materials Science and Engineering
Materials Engineer	
PhD, ScD	Archaeological Materials
PhD, ScD	Computational Materials Science and Engineering [1]
PhD, ScD	Materials Science and Engineering
PhD, ScD	Polymers and Soft Matter [1]

Mechanical Engineering (Course 2)

SB	Engineering
SB	Mechanical and Ocean Engineering
SB	Mechanical Engineering
SM	Mechanical Engineering
SM	Naval Architecture and Marine Engineering
SM	Ocean Engineering
SM	Oceanographic Engineering (jointly with WHOI)
SM/MBA	Engineering/Management—dual degree with Leaders for Global Operations Program [1]
MEng	Manufacturing
Mechanical Engineer	
Naval Engineer	
PhD	Mechanical Engineering and Statistics [1]
PhD, ScD	Mechanical Engineering
PhD, ScD	Mechanical Engineering and Computation [1]
PhD, ScD	Naval Architecture and Marine Engineering
PhD, ScD	Ocean Engineering
PhD, ScD	Oceanographic Engineering (jointly with WHOI)

Microbiology

PhD	Microbiology [1]

Nuclear Science and Engineering (Course 22)

SB	Engineering
SB	Nuclear Science and Engineering
SM	Nuclear Science and Engineering
SM/MBA	Engineering/Management—dual degree with Leaders for Global Operations Program [1]
Nuclear Engineer	
PhD, ScD	Computational Nuclear Science and Engineering [1]
PhD, ScD	Nuclear Science and Engineering
PhD, ScD	Nuclear Engineering and Computation [1]

Polymers and Soft Matter

PhD, ScD	Polymers and Soft Matter [1]

Supply Chain Management

MASc	Supply Chain Management [1]
MEng	Supply Chain Management [1]

System Design and Management

SM	Engineering and Management [1]

Transportation

SM	Transportation [1]
PhD, ScD	Transportation [1]

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

SB	Urban Science and Planning with Computer Science [1]

Notes

Many departments make it possible for a graduate student to pursue a simultaneous master's degree.

Several departments also offer undesignated degrees, which lead to the Bachelor of Science without departmental designation. The curricula for these programs offer students opportunities to pursue broader programs of study than can be accommodated within a four-year departmental program.

1 *See Interdisciplinary Programs (https://catalog.mit.edu/interdisciplinary).*

2 *Students who matriculated in the Department of Aeronautics and Astronautics doctoral program and the Computational Science and Engineering (CSE) doctoral program in academic year 2023–2024 or earlier can choose eitherPhD/ScD in Computational Science and Engineering or the PhD/ScD in Aerospace Engineering and Computational Science. AeroAstro/CSE students who matriculate in academic year 2024–2025 or later will receive the PhD/ScD in Aerospace Engineering and Computational Science.*

Admissions

The selection process at MIT is holistic and student-centered; each application is evaluated within its unique context. Selection is based on outstanding academic achievement as well as a strong match between the applicant and the Institute.

Undergraduate applicants do not apply to a particular school, department, or program. Although the application asks about a preferred field of study, admitted undergraduates are not required to choose a major until their sophomore year. Admissions information for regular and transfer applicants (*https://catalog.mit.edu/mit/undergraduate-education/admissions*) is provided in the Undergraduate section (*https://catalog.mit.edu/mit/undergraduate-education*), as well as on the undergraduate admissions website (*https://mitadmissions.org*).

Applicants for graduate study apply directly to their particular department or program of interest. See the individual department and program descriptions for specific requirements.

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