

# Engineering Programs

## **Aeronautics and Astronautics**

The mission of the Department of Aeronautics and Astronautics is to train engineers in the fundamental principles and disciplines necessary for success and leadership in the conception, design, implementation, and operation of aerospace and related engineering systems. Integral to this mission is the creation and development of the technologies critical to aerospace vehicle and information engineering and to the architecture and engineering of complex high performance systems. Graduates with an aerospace engineering degree will find career opportunities in commercial and military aircraft and spacecraft engineering, space exploration, the air transportation and the space based telecommunication industry, teaching, research, military service, and in many related technology-intensive fields such as transportation, information, and the environment. In addition, the demanding technical education with a strong emphasis on understanding complex systems is an excellent preparation for careers in business, law, medicine, and public service.

## **Biological Engineering**

Our mission is to define and establish a new discipline fusing molecular life sciences with engineering. The goal of this biological engineering discipline is to advance fundamental understanding of how biological systems operate and to develop effective biology-based technologies for applications across a wide spectrum of societal needs, including breakthroughs in diagnosis, treatment, and prevention of disease; in design of novel materials, devices, and processes; and in enhancing environmental health. The innovative educational programs created by BE reflect this emphasis on integrating molecular and cellular biosciences with a quantitative, systems-oriented engineering analysis and synthesis approach.

## **Chemical Engineering**

Chemical engineering is built on mathematics, chemistry, biology, and physics. Chemical engineers study the engineering sciences, tools that allow chemical engineers to apply their knowledge to all sorts of problems in nature, technology, and society. Chemical engineering students gain experience in laboratory, application, and design courses, in which they learn to use their skills to create products and the processes that

make them. Chemical engineers from MIT have a wealth of opportunity awaiting them: industry, graduate school, consulting, entrepreneurship, management, government, financial analysis, or professional training—medical, law, or business school.

## **Civil and Environmental Engineering**

Civil and environmental engineers historically have developed the infrastructure for energy, water, transportation, habitation, waste treatment and hazard mitigation that have enabled economic development, industrialization and urbanization. These roles have been radically reshaped by the recognition that economic development coupled with population growth is depleting resources at an unsustainable rate and fundamentally altering the earth systems on which all life depends. This has broadened the domain of our research and education to include the study of natural systems and their relation to human activities. Our objective is to now find sustainable ways to restore and upgrade infrastructure in developed countries, and create innovative green design strategies for the developing world. The Course 1 undergraduate curriculum emphasizes science and engineering fundamentals and hands-on design/build projects. Course 1 alumni work for civil and environmental engineering firms, hold leadership positions in government and nonprofit organizations, and work in public health, ecology, education, law and medicine. For more information, visit <http://cee.mit.edu>.

## **Electrical Engineering and Computer Science**

Electrical engineers and computer scientists are everywhere in diverse industry and research areas such as computer and communication networks, semiconductor and solid state devices, nanoelectronics, lasers and photonics, robotics, biomedical engineering, computational biology, design and manufacturing, artificial intelligence, control and optimization, computer algorithms, software engineering, computer architecture, financial analysis, power and energy systems, and many more. The career paths and opportunities for EECS students continue to grow: the fundamental technologies, devices, and systems based on EECS are pervasive and essential to improving the lives of people around the world. The basis for the success of our graduates is a deep education in

engineering principles, built on mathematical, physical and life sciences, and exercised with practical applications and project experiences in a breadth of areas. EECS graduates create, innovate and lead in established companies, research and educational institutions everywhere.

### **Materials Science and Engineering**

MIT's Department of Materials Science and Engineering (DMSE) has long been considered a world leader in the field, based both on its scholastic stature and the success its graduates have had in their professional employment. The Department comprises several research and academic programs that treat all classes of materials (metals, ceramics, polymers, biological materials, and electronic materials) from a unified viewpoint and with an emphasis on the connection between the underlying structure and the processing, properties, and performance of the material. Faculty and student research projects range from the purely scientific to applied studies and involve perspectives of chemistry, physics, electronics, the archaeological and historical aspects of materials, design, and entrepreneurial ventures.

### **Mechanical Engineering**

Students in Mechanical Engineering address issues associated with energy, machinery, and manufacturing, and the design, production, and management of systems to meet the needs of society. The integration of nanotechnology into classical mechanical systems is becoming increasingly important. Students in mechanical engineering take a common core of subjects that provide a solid foundation for the diverse range of career choices available to them. More depth in a particular area is available through research opportunities and the departmental elective courses. Our graduates go on to work or study in the areas of manufacturing, design, bioengineering, intelligent systems, ocean engineering, transportation, and energy systems.

### **Nuclear Engineering**

The MIT Department of Nuclear Science and Engineering is concerned with nuclear reactions and radiation, their applications, and their consequences. We generate, control, and apply nuclear reactions and radiation for the benefit of society and the environment. We are a leading contributor to the innovations needed

for a major global expansion of nuclear energy and to the development of the next generation of leaders of the global nuclear energy enterprise, while also laying the foundation for new applications of nuclear and radiation science and technology. As one of the world's leading academic departments in our field, we also have a responsibility to inform public debates on the wise, humane uses of nuclear science and technology.

### **Engineering Systems Division**

ESD has a dual mission: to define and evolve engineering systems as a new field of study and to transform engineering education and practice. The Division unites academic programs with some 350 graduate students. ESD offers four master's degree programs; Leaders for Manufacturing, System Design and Management, Logistics, and Technology and Policy programs. These programs are offered in conjunction with the Engineering School departments and several are developed jointly with the Sloan School of Management. PhDs are offered in Engineering Systems and in Technology, Management, and Policy.

### **Contact Information**

To receive a more complete description of any of the above programs, please contact the Office of Admissions, MIT, Room 3-108  
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The MIT Bulletin, Courses and Degree Programs Issue, contains further information on the Institute, including all graduate and undergraduate courses and programs. For details on ordering the course catalogue, please visit the MIT Press Bookstore website at <http://mitpress.mit.edu/bookstore/bulletin.html>.

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