



## Graduate

## Undergraduate

### Flexible Degree Program

Aeronautics and Astronautics

Biological Engineering

Chemical Engineering

Civil and Environmental Engineering

Electrical Engineering and  
Computer Science

Materials Science and Engineering

Mechanical Engineering

Nuclear Science and Engineering

## For Professionals

## Partnerships

## Special Programs & Outreach

## Education Resources

## The MIT Flexible Engineering Degree Program

In 2010, select departments in the MIT School of Engineering collaborated on the launch of a degree option that responds to the evolving desires of our undergraduate students, and to emerging changes in the engineering professions, while remaining true to the School of Engineering's tradition of rigorous technical education. Engineering today is characterized by increasing globalization, multidisciplinary practice, and connectivity with fields traditionally considered to be outside of engineering. The education MIT gives its engineers must fit on this changing landscape.

A flexible engineering program has existed for some time in Mechanical Engineering (Course 2-A); Aeronautics and Astronautics recently developed its own version (Course 16-ENG). Together, they are the lead departments in the new flexible engineering degree program. In both cases, students satisfy department-based core requirements and declare an additional concentration, which can be broad and interdisciplinary in nature (energy, transportation, or the environment), or focused on areas that can be applied to multiple fields (robotics and controls, computational engineering, or engineering management). Students may also elect to create their own concentrations under supervision from department faculty.

The result is a program that educates, to borrow a phrase from Charles Vest, "a nimble, new kind of engineer." As President of the National Academy of Engineering and president *emeritus* of MIT, Vest has noted that the nation and world "will call on engineers to seize opportunities and solve global problems of unprecedented scope and scale."

In order to clarify the needs of tomorrow's engineers, the NAE conducted a study, *The Engineer of 2020: Visions of Engineering in the New Century*. The report envisions engineering graduates who are leaders capable of influencing industry and research organizations, informing public policy decisions, and helping their fields—and others—adapt to changes in global forces and trends.

### Background

The flexible engineering degree program is a result of a faculty-led, School-wide strategic planning effort initiated in 2007. The faculty involved in this effort investigated the emergence of similar (but not comparable) programs at peer schools, worked with educators around the Institute, and polled students and alumni to determine the viability and potential for this new offering. The need for a mechanism through which engineering students could create new, self-directed educational opportunities for themselves—within and across the rigor of their disciplines—emerged as a clear priority for the School.

The precedent for the MIT flexible engineering degree program lies in the Department of Mechanical Engineering, which has been offering a flexible curriculum for interested students (Course 2-A) since 1934. 2-A students tailor their educational experience to their needs and interests, yet their training is grounded in mechanical engineering fundamentals. They can choose from such pre-approved

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## Recent News

- [Course 2-A: Customized Curriculum](#)

To borrow the tagline from a famous computer maker's advertising campaign, some of our undergraduate students "think different". In fact, many of them do, and for them MechE offers Course 2-A: SB in Engineering as recommended by the Department of Mechanical Engineering.

- [The future of engineering leadership](#)

Engineering leadership education is emerging as a hot topic in engineering institutions worldwide. But according to a review of international "best practices" in engineering leadership education commissioned by the Bernard M. Gordon-MIT Engineering Leadership Program, a lack of resources, expertise, and formal networks in the nascent field is causing concern in a profession threatened by a diminishing focus on the notion of the "engineer-as-doer."

tracks as biomedical engineering and pre-medicine, energy conversion, engineering management, product development, robotics, sustainable development, or architecture and building technology, or they can build their own concentration under guidance from a faculty member. Course 2-A has seen a steady gains in popularity, especially since its accreditation by ABET in 2002. Now roughly 45% of all incoming MechE sophomores choose this curricular option.

The flexible degree in Aeronautics and Astronautics (16-ENG) was approved by the MIT faculty in 2010 as part of the School of Engineering's broader plan for curricular innovation, one that will allow other departments within the School to adopt similar structures and training opportunities, should they choose to. 16-ENG students will have the choice of pre-arranged concentrations in computational engineering, energy, engineering management, environment, robotics and control, or space exploration (with more concentrations being planned)—or they will have the flexibility to design their own concentrations.

The flexible engineering degree program also builds on another recent educational innovation at the School of Engineering: the [Gordon-MIT Engineering Leadership Program](#). Launched through a \$20 million gift by the Gordon Foundation, the Gordon program aims to prepare students for the engineering professions, and to ensure MIT continues to lead the nation in developing effective engineering practitioners and leaders.

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