

MECHANICAL ENGINEERING

Course 2

Department Contact

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Description

Mechanical engineering students at MIT learn by doing, and thereby attain a deeper understanding. Textbooks, lectures, and problem sets alone can't do the job. We won't settle for mens minus the manus. Mechanical engineering is a versatile and interdisciplinary field that ranges from nano engineering at the smallest scales – down to one-thousandth the size of a human hair – to the biggest systems, such as those for large-scale manufacturing or water desalination. We bring our signature passion, creativity, and rigor to bear on the world's greatest challenges.

There are currently three programs of study within the Department of Mechanical Engineering (MechE) at MIT:

1. Course 2 provides a well-established foundation adapted to modern needs preparing students for many exciting career choices in mechanical engineering.
2. Course 2-OE, a structured program for students who wish to combine a firm foundation in mechanical engineering with a specialization in ocean engineering.
3. Course 2-A, a customizable bachelor's degree which allows students to combine the essential elements of the traditional mechanical engineering program with their personal interests by choosing to study in an additional complementary field, such as robotics, bio, or energy. Students majoring in mechanical engineering find work across the board in many different fields from software to space exploration to product design—the possibilities are endless!

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2	Mechanical Engineering
2-A	Engineering as recommended by the Department of Mechanical Engineering
2-OE	Mechanical and Ocean Engineering

Introductory Classes

2.00	Introduction to Design Project-based introduction to product development and engineering design.
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Emphasizes key elements of the design process, including defining design problems, generating ideas, and building solutions. Presents a range of design techniques to help students think about, evaluate, and communicate designs, from sketching to physical prototyping, as well as other types of modeling. Students work both individually and in teams.

- 2.00A **Fundamentals of Engineering Design: Explore Space, Sea and Earth**
Student teams formulate and complete space/earth/ocean exploration-based design projects with weekly milestones. Introduces core engineering themes, principles, and modes of thinking. Specialized learning modules enable teams to focus on the knowledge required to complete their projects, such as machine elements, electronics, design process, visualization and communication. Includes exercises in written and oral communication and team building. Examples of projects include surveying a lake for millfoil, from a remote controlled aircraft, and then sending out robotic harvesters to clear the invasive growth; and exploration to search for the evidence of life on a moon of Jupiter, with scientists participating through teleoperation and supervisory control of robots.
- 2.00C **Design for Complex Environmental Issues: Building Solutions and Communicating Ideas**
Students work in small groups, under the guidance of researchers from MIT, to pursue specific aspects of the year's Terrascope problem. Teams design and build prototypes, graphic displays and other tools to communicate their findings and display them in a Bazaar of Ideas open to the MIT community. Some teams develop particular solutions, others work to provide deeper understanding of the issues, and others focus on ways to communicate these ideas with the general public. Students' work is evaluated by independent experts. Offers students an opportunity to develop ideas from the fall semester and to work in labs across MIT. Limited to first-year students.
- 2.7231[J] **Introduction to Design Thinking and Innovation in Engineering**
Introduces students to concepts of design thinking and innovation that can be applied to any engineering discipline. Focuses on introducing an iterative design process, a systems-thinking approach for stakeholder analysis, methods for articulating design concepts, methods for concept selection, and techniques for testing with users. Provides an opportunity for first-year students to explore product or system design and development, and to build their understanding of what it means to lead and coordinate projects in engineering design. Subject can count toward the 6-unit discovery-focused credit limit for first-year students. Enrollment limited to 25; priority to first-year students.

Course 2-Friendly UROP Areas

- BioInstrumentation Laboratory

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- Biomimetic Robotics Lab
- Device Realization Lab
- Device Research Laboratory
- Energy and Microsystems Innovation Global Engineering and Research (GEAR)
- Laboratory for Biomechanics and Human Rehabilitation
- Laboratory for Biologically Inspired Photonic Engineering
- Laboratory for Manufacturing and Productivity (LMP)
- Mechatronics Research Lab
- MIT Ideation Laboratory
- MIT Lincoln Labs
- MIT Mechanosynthesis Group
- MIT Pappalardo Labs
- MIT Precision Engineering Research Group
- Nanoelectronics Lab
- Research Lab for Electronics (RLE)
- Rohsenow Kendall Heat Transfer Laboratory
- Sea Grant (SEAG)
- Therapeutic Technology Design & Development Lab
- Toy Product Design Lab

Get Involved with Course 2

- Mechanical Engineering Student Society (MESS)
- Engineering without Borders
- Rocket Team
- Design for America
- Assistive Technology Club
- UAV Team
- Design / Build / Fly
- Robotics Team

Skills

- Read and interpret blueprints, technical drawings, and schematics
- Research, design, evaluate, install, operate, or maintain mechanical products
- Knowledge of Computer Aided Design (CAD) software
- Project management skills

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Possible Future Jobs

- **Design engineer:** Develop mechanical automation designs from customer specifications. Conduct design reviews with customers. Utilize analytical tools to assist in the design process, and interface with suppliers.
- **Manufacturing engineer:** Plan the tooling, construction, and assembly of the product as dictated by design specifications.
- **Quality engineer:** Support development and ensure compliance with company quality management systems in accordance with industry standards, and provide technical support to product engineering, marketing, manufacturing, etc.

Career Industry Examples

Aerospace	Consumer manufacturing	Nuclear engineer
Automotive	Energy and utilities	Pumps and fluid systems
Biomedical	Environmental engineer	Research and development
Computer software	Health and medicine	Consulting
Industrial engineering		

Sample Employers

Accenture	Amazon	Google
Lockheed Martin	Microsoft	Palo Alto Networks
Apple	Ford Motor Company	ASML
Aurora Flight Sciences	Boston Dynamics	Creare, Inc.
Boeing	Formlabs	Milwaukee Tool
General Electric	General Motors	McKinsey & Company
Bain & Company	Boston Consulting Group	Procter & Gamble
Chartwell Consulting	SpaceX	Tesla, Inc.
MIT	U.S. Navy	U.S. Army