

MINOR IN ENERGY STUDIES

The Energy Studies Minor complements the deep expertise obtained in any MIT major with broad, interdisciplinary training in science, technology, and the social sciences, including policy issues surrounding energy and climate change.

Students take classes in four core areas, plus 24 units of electives. The core consists of:

- **Science Foundations:** fundamental laws and principles that govern energy sources, conversion, and uses;
- **Economics Foundations:** how economic principles underlie every aspect of energy;
- **Social Science Foundations:** social scientific perspectives that help explain human behavior in an energy context, and;
- **Energy Technology/Engineering in Context:** the application of laws and principles to a specific energy context.

The elective component (generally two classes) allows students to focus on their individual areas of interest.

Developed and administered by the MIT Energy Initiative, the Energy Studies Minor sets students on the path to tackle the world's complex climate and energy challenges. Through the minor, students build strong foundational knowledge of diverse energy topics while benefiting from hands-on learning opportunities to work with world-renowned researchers, policy analysts, and thought leaders. Students also make groundbreaking discoveries and prepare for exciting careers in industry, government, and academia.

Core Curriculum

Science Foundations

Select one of the following: 12

8.21	Physics of Energy
12.021	Earth Science, Energy, and the Environment

Economics Foundations

Select one of the following: 9-12

14.01	Principles of Microeconomics
15.0111	Economic Analysis for Business Decisions

Social Science Foundations

Select one of the following: 12

1.067[J]	Energy Systems for Climate Change Mitigation ^{1,2}
11.092	Renewable Energy Facility Siting Clinic
11.142	Geography of the Global Economy
11.165	Urban Energy Systems and Policy ²
14.44[J]	Energy Economics and Policy

15.0161[J]	Climate and Energy in the Global Economy
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Energy Technology/Engineering in Context

Select one of the following: 12

1.067[J]	Energy Systems for Climate Change Mitigation ^{1,2}
1.086	Physics and Engineering of Renewable Energy Systems ¹
2.60[J]	Fundamentals of Advanced Energy Conversion ¹
11.165	Urban Energy Systems and Policy ²
22.081[J]	Introduction to Sustainable Energy
EC.711[J]	Introduction to Energy in Global Development
EC.712[J]	Applications of Energy in Global Development

Electives

Select 24 units from the following: ³ 24

1.UAR[J]	Climate and Sustainability Undergraduate Advanced Research
1.018[J]	Fundamentals of Ecology
1.020	Modeling and Decision-Making for Sustainability ¹
1.071[J]	Global Change Science ¹
1.076	Carbon Management
1.801[J]	Environmental Law, Policy, and Economics: Pollution Prevention and Control
1.Co1 & 6.Co1	Machine Learning for Sustainable Systems and Modeling with Machine Learning: from Algorithms to Applications
2.005	Thermal-Fluids Engineering I ¹
2.006	Thermal-Fluids Engineering II ¹
2.145	Design of Compliant Mechanisms, Machines and Systems ¹
2.570	Nano-to-Macro Transport Processes ¹
2.612	Marine Power and Propulsion ¹
2.627	Fundamentals of Photovoltaics
2.812	Solving for Carbon Neutrality at MIT
2.813	Energy, Materials, and Manufacturing ¹
2.814	Exploring Sustainability at Different Scales
3.002	Materials for Energy and Sustainability
3.003	Small Planet Engineering: Climate, Energy, and Sustainability

or 3.004	Small Planet Engineering: Climate, Energy, and Sustainability	12.213	Alternate Energy Sources
3.010	Structure of Materials ¹	12.301	Climate Science ¹
3.020	Thermodynamics of Materials ¹	14.42	Environmental Policy and Economics
3.030	Microstructural Evolution in Materials	16.001	Unified Engineering: Materials and Structures ¹
3.18	Materials Science and Engineering of Clean Energy ¹	16.002	Unified Engineering: Signals and Systems ¹
4.401	Environmental Technologies in Buildings	16.003	Unified Engineering: Fluid Dynamics ¹
4.432	Modeling Urban Energy Flows for Sustainable Cities and Neighborhoods	16.004	Unified Engineering: Thermodynamics and Propulsion ¹
4.441	From the Solar House to Net Zero Buildings	21A.404	Living Through Climate Change
5.352	Synthesis of Coordination Compounds and Kinetics ¹	21H.187	US Environmental Governance: from National Parks to the Green New Deal
5.371	Continuous Flow Chemistry: Sustainable Conversion of Reclaimed Vegetable Oil into Biodiesel ¹	22.003	NEET Seminar: Renewable Energy Machines
5.372	Chemistry of Renewable Energy ¹	22.016	Seminar in Fusion and Plasma Physics
5.601	Thermodynamics I	22.033	Nuclear Systems Design Project
5.602	Thermodynamics II and Kinetics	22.04[[]]	Social Problems of Nuclear Energy
5.811[[]]	United States Energy Policy: Lessons Learned for the Future	22.054[[]]	Materials Performance in Extreme Environments ¹
6.2200	Electric Energy Systems ¹	22.06	Engineering of Nuclear Systems ¹
6.2220	Power Electronics Laboratory ¹	22.061	Fusion Energy ¹
6.2530	Introduction to Nanoelectronics ¹	22.071	Analog Electronics and Analog Instrumentation Design
6.2600[[]]	Micro/Nano Processing Technology	STS.032	Energy, Environment, and Society
6.7120	Principles of Modeling, Computing and Control for Decarbonized Electric Energy Systems ¹	Total Units	69-72
10.04	A Philosophical History of Energy	¹	<i>Subject has prerequisites that are outside of the program.</i>
10.05	Foundational Analyses of Problems in Energy and the Environment	²	<i>Subject can fulfill either the Social Science Foundations requirement or the Energy Technology/Engineering in Context requirement, but not both.</i>
10.213	Chemical and Biological Engineering Thermodynamics ¹	³	<i>See the Energy Studies Minor website (http://energy.mit.edu/minor) for potential elective and core subject substitutions or additions.</i>
10.27	Energy Engineering Projects Laboratory ¹		
10.28	Chemical-Biological Engineering Laboratory ¹		
10.32	Separation Processes		
10.302	Transport Processes ¹		
10.426	Electrochemical Energy Systems ¹		
11.005	Introduction to International Development		
11.149	Decarbonizing Urban Mobility		
12.119	Harnessing Power from Environmental Microbes and Chemical Gradients		

¹ Subject has prerequisites that are outside of the program.

² Subject can fulfill either the Social Science Foundations requirement or the Energy Technology/Engineering in Context requirement, but not both.

³ See the Energy Studies Minor website (<http://energy.mit.edu/minor>) for potential elective and core subject substitutions or additions.

Students who take more than the required subjects from any of the core curriculum subject lists may count the additional coursework toward the elective requirement. A minimum of three subjects (or 36 units) taken for the Energy Studies Minor cannot also count toward a student's major or other minor.

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