# 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.

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| **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 |
| 11.142 | Geography of the Global Economy | |
| 11.165 | Urban Energy Systems and Policy [2] | |
| 14.44[J] | Energy Economics and Policy | |
| 15.0201[J] | Economics of Energy, Innovation, and Sustainability | |
| 15.2191[J] | Global Energy: Politics, Markets, and Policy | |
| ***Energy Technology/Engineering in Context*** | | |
| *Select one of the following:* | | 12 |
| 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 |
| 1.018[J] | Fundamentals of Ecology | |
| 1.020 | Modeling and Decision-Making for Sustainability [1] | |
| 1.071[J] | Global Change Science [1] | |
| 1.076 | Carbon Management | |
| 1.086 | Physics of Renewable Energy Systems and Computational Analysis [1] | |
| 1.801[J] | Environmental Law, Policy, and Economics: Pollution Prevention and Control | |
| 1.C01 & 6.C01 | 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] | |
| 2.570 | Nano-to-Macro Transport Processes [1] | |
| 2.612 | Marine Power and Propulsion [1] | |
| 2.627 | Fundamentals of Photovoltaics | |
| 2.813 | Energy, Materials, and Manufacturing [1] | |
| 3.003 | Small Planet Engineering: Climate, Energy, and Sustainability | |
| or 3.004 | Small Planet Engineering: Climate, Energy, and Sustainability | |
| 3.010 | Structure of Materials [1] | |
| 3.020 | Thermodynamics of Materials [1] | |
| 3.030 | Microstructural Evolution in Materials | |
| 3.18 | Materials Science and Engineering of Clean Energy [1] | |
| 4.401 | Environmental Technologies in Buildings | |
| 4.432 | Modeling Urban Energy Flows for Sustainable Cities and Neighborhoods | |

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| 4.441 | From the Solar House to Net Zero Buildings |
| 5.352 | Synthesis of Coordination Compounds and Kinetics [1] |
| 5.371 | Continuous Flow Chemistry: Sustainable Conversion of Reclaimed Vegetable Oil into Biodiesel [1] |
| 5.372 | Chemistry of Renewable Energy [1] |
| 5.601 | Thermodynamics I |
| 5.602 | Thermodynamics II and Kinetics |
| 5.811[J] | United States Energy Policy: Lessons Learned for the Future |
| 6.2200 | Electric Energy Systems [1] |
| 6.2220 | Power Electronics Laboratory [1] |
| 6.2530 | Introduction to Nanoelectronics [1] |
| 6.2600[J] | Micro/Nano Processing Technology |
| 10.04 | A Philosophical History of Energy |
| 10.05 | Foundational Analyses of Problems in Energy and the Environment |
| 10.213 | Chemical and Biological Engineering Thermodynamics [1] |
| 10.27 | Energy Engineering Projects Laboratory [1] |
| 10.28 | Chemical-Biological Engineering Laboratory [1] |
| 10.302 | Transport Processes [1] |
| 10.426 | Electrochemical Energy Systems [1] |
| 11.092 | Renewable Energy Facility Siting Clinic |
| 11.149 | Decarbonizing Urban Mobility |
| 12.119 | Harnessing Power from Environmental Microbes and Chemical Gradients |
| 12.213 | Alternate Energy Sources |
| 12.301 | Climate Science [1] |
| 14.42 | Environmental Policy and Economics |
| 16.001 | Unified Engineering: Materials and Structures [1] |
| 16.002 | Unified Engineering: Signals and Systems [1] |
| 16.003 | Unified Engineering: Fluid Dynamics [1] |
| 16.004 | Unified Engineering: Thermodynamics and Propulsion [1] |
| 21A.404 | Living Through Climate Change |
| 21H.187 | US Environmental Governance: from National Parks to the Green New Deal |
| 22.003 | NEET Seminar: Renewable Energy Machines |
| 22.016 | Seminar in Fusion and Plasma Physics |
| 22.033 | Nuclear Systems Design Project |
| 22.04[J] | Social Problems of Nuclear Energy |
| 22.054[J] | Materials Performance in Extreme Environments [1] |
| 22.06 | Engineering of Nuclear Systems [1] |
| 22.061 | Fusion Energy [1] |
| 22.071 | Analog Electronics and Analog Instrumentation Design |
| IDS.065[J] | Energy Systems for Climate Change Mitigation |
| STS.032 | Energy, Environment, and Society |
| **Total Units** | **69-72** |

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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