



Yale

ENERGY STUDIES

Interdisciplinary Certificate

A new Interdisciplinary Certificate program in Yale College.



Certificates in Yale College

ADVANCED LANGUAGE CERTIFICATES

- Ancient Egyptian (Near Eastern Languages and Civilizations)
- Ancient Greek (Classics)
- Arabic (Near Eastern Languages and Civilizations)
- Chinese (East Asian Languages and Literatures)
- French
- German
- Hebrew (Near Eastern Languages and Civilizations)
- Hindi (South Asian Studies)
- isiZulu (African Studies)
- Italian
- Japanese (East Asian Languages and Literatures)
- Kiswahili (African Studies)
- Korean (East Asian Languages and Literatures)
- Latin (Classics)
- Portuguese
- Russian
- Spanish
- Turkish (Near Eastern Languages and Civilizations)
- Vietnamese (Southeast Asia Studies)
- Yoruba (African Studies)

INTERDISCIPLINARY CERTIFICATES

- Climate Science and Solutions
- Education Studies
- Education Studies Scholars Intensive (requires an application)
- Energy Studies
- Global Health Studies (requires an application)
- Human Rights Studies (requires an application)
- Islamic Studies
- Medieval Studies
- Persian and Iranian Studies
- Translation Studies

catalog.yale.edu/ycps/programs_certificates

Energy Studies is designed to provide students with the knowledge and skills needed for advanced studies, leadership, and success in energy-related fields. The **Interdisciplinary Certificate** is a continuation of the Energy Studies MAP, which was established in 2013 and has graduated nearly 300 Yale Energy Scholars.

Study of the world of energy takes many forms. Think about your home: Where does the energy come from to turn on the lights and charge your cell phone, or to heat the space or cool it? Answers to these questions involve **energy science and technology**. Today, despite all the progress of the last twenty years in renewable energy such as wind and solar, about 80% of the world's primary energy still comes from fossil fuels—coal, oil, and natural gas. That number, which comes as a surprise to many, highlights the challenge of a rapid transition to renewable energy. What new technologies, new breakthroughs, can speed up the move away from fossil fuels?

Many students will be interested in **environmental impacts of modern energy**, especially air and water pollution and climate change. We now know that the world must reduce man-made greenhouse gas emissions from fossil fuels to zero within the next three decades. Are there realistic pathways to a *Net-Zero* energy economy by the year 2050? Can geoengineering climate help to avoid excessive warming?

Other students will be interested in **energy's social and economic impacts**. Moving away from fossil fuels will be hard enough on its own, but more difficult still is making this transition while providing modern energy services to the hundreds of millions of people around the world who now lack them. Can sustainable global investment help assure a just energy transition?

The program's **requirements are completion of six courses** from a list approved by the faculty advisory committee (see reverse side for sample courses). The courses must be distributed (two each) across the program's three tracks:

- **Energy Science and Technology (Track 1)**
- **Energy and Environment (Track 2)**
- **Energy and Society: Social, Political, and Economic Impacts (Track 3)**

Two courses taken for Energy Studies credit can also be used for the student's major requirements. One course can be taken Pass/Fail or Credit/D/Fail. **Students have the option (not requirement) of completing a capstone project in the Energy Studies Senior Seminar ENRG 400.**

Other activities include field trips, special guest lectures, bi-weekly program dinners, and participation in the Yale Alumni in Energy Conference.

Students declare their candidacy to complete the Energy Studies certificate by filling out a form on the Registrar's Office website: registrar.yale.edu/forms-petitions.



FOR MORE INFORMATION, VISIT: EARTH.YALE.EDU/ENERGY-STUDIES

COURSES IN ENERGY STUDIES

Below are some of the courses accepted for Energy Studies credit. The lists are not exhaustive, and some courses are not offered every year. See the website for further information.

ENRG 300, Topics in World Energy, is normally required as one of the 6 courses and counts in Track 2 (exceptions can be granted).

ENRG 400 is the (optional) Senior Capstone Seminar in the Spring Term.

Track 1 – ENERGY SCIENCE AND TECHNOLOGY

APHY 100, Energy, Environment, and Public Policy

EPS 274, Fossil Fuels and World Energy

EPS 275, Renewable Energy

ENRG 320, Energy, Engines, and Climate

EENG 406, Photovoltaic Energy

CENG 300, Chemical Engineering Thermodynamics

CENG 315, Transport Phenomena

MENG 211, Thermodynamics for Mechanical Engineers

MENG 389, Mechanical Engineering IV: Fluid Thermal Energy Science

CHEM 430, Statistical Mechanics and Thermodynamics

PHYS 420, Thermodynamics and Statistical Mechanics

One general science course below can normally count in Track 1.

CHEM 161/165, General Chemistry I and II

CHEM 163/167, Comprehensive University Chemistry I and II

CHEM 332/333, Physical Chemistry I and II

PHYS 180/181, University Physics

PHYS 200/201, Fundamentals of Physics

PHYS 260/261, Intensive Introductory Physics

PHYS 401/402, Advanced Classical Physics from Newton to Einstein

Track 2 – ENERGY AND ENVIRONMENT

ENVE 120, Introduction to Environmental Engineering

ENAS 360, Green Engineering and Sustainable Design

ENVE 373, Air Pollution Control

ENVE 377, Water Quality Control

ENVE 416, Chemical Engineering and Process Design

ENVE 448, Environmental Transport Processes

ENVE 473, Air Quality and Energy

EPS 101, Climate Change

EPS 140, Atmosphere, Ocean, and Climate Change

EPS 232, Earth Surface Processes

EVST 431, The Physical Science of Climate Change

Track 3 – ENERGY AND SOCIETY

AMST 236, American Energy History

PHYS 330, Science and Public Policy

PLSC 212, Democracy and Sustainability

EVST 224, Writing About the Environment

EVST 247, Politics of the Environment

ECON 330, The Economics of Natural Resources

ECON 331, The Economics of Energy and Climate Change

GLBL 253, Globalization Space

GLBL 394, Climate and Society from Past to Present

GMAN 167, Green Germany, History and Culture of Sustainability

LITR 345, Climate Change and the Humanities

ANTH 409, Climate and Society from Past to Present

ANTH 473, Abrupt Climate Change and Societal Collapse

SAMPLE COURSES OF STUDY

Energy Science & Technology Focus

PHYS 180 · EPS 140 · ECON 330

EPS 274 · EENG 406 · EVST 431

PHYS 200 · EPS 275 · GLBL 384

EPS 140 · ENVE 473 · MENG 389



Energy & Sustainability Focus

APHY 100 · EPS 232 · GLBL 217

ECON 330 · EPS 275 · PLSC 212

APHY 100 · ECON 330 · PLSC 212

EPS 140 · ENAS 360 · ANTH 409



Energy & Environment Focus

CHEM 161 · ENVE 120 · EPS 140

ENVE 473 · EPS 274 · ECON 330

APHY 100 · EPS 140 · PLSC 212

EPS 275 · AMST 236 · ECON 432



Energy Policy & Climate Focus

PHYS 260 · EPS 140 · EPS 101

ECON 330 · ANTH 409 · EVST 431

CHEM 163 · EPS 101 · EPS 275

ANTH 473 · ECON 432 · PHYS 320