Course Description
This course examines the policies and technologies affecting the production and use of energy, focusing in particular on innovative and sustainable energy options. The course provides a fundamental understanding of energy systems, including historical trends of supply and demand, resources and technologies, and related economic, global climate change, and security issues. Policies and technology associated with different energy systems will be examined including plug-in hybrid electric vehicles, ethanol, and other alternative transportation fuels; smart buildings and advanced lighting; industrial ecology approaches; solar and wind systems; and the next generation of nuclear energy. Policies will be examined at the national and international scale, and at the state and local level where novel approaches are often first introduced. Given the ubiquitous nature of energy in modern society, this course will offer insights for students pursuing a diversity of careers. The course has no formal prerequisites.

Texts:

Grades and Examinations
Class Participation: 10%
Class project: 25%
Mid-term exam: 20%
Final exam: 25%
Homework, Quizzes: 20%

Because of the highly interactive nature of the course, 10 percent of the student’s grade depends on general class participation. Students are expected to come to the class having read the assigned readings and prepared to discuss the material. The instructors will encourage dialogue by helping the students lay out the facts, pose questions, and help the class discover and understand the underlying principles.

Students will work in teams to complete a class project dealing with some energy policy or energy technology issue. The results will be summarized in a presentation to the class near the end of the semester. The project is worth 25 percent of each student’s grade.
There will be two exams: 20 percent of the grade is based on a mid-term exam and 25 percent of the grade is based on the final exam.

The remaining 20 percent of the grade is based on the completion of homework and quizzes.

Schedule and Reading Assignments

Week 1 (January 9). VT and MB
Energy Overview
Overview of energy issues: history of energy use; energy, climate and the economy.

- *Hafemeister*. Chp. 10 (pp. 249-262) The Energy Situation

Week 2 (January 16). VT
Petroleum
http://www.energycommission.org/files/contentFiles/report_noninteractive_44566f66eabc5d.pdf

Week 3 (January 23). VT and MB
Nuclear Energy
- *Hafemeister* Chapter 1, section 1.1: Nuclear Age, Nuclear Proliferation (pp. 3-5); Chapter 5 (pp. 105-128) Nuclear Proliferation; Chapter 7 Nuclear Pollution (pp. 163-170, 7.7 Geologic Repositories p. 185-190); Fusion Power (pp. 333-334); Plutonium Economy (pp. 422-425).

Week 4. (January 30). MB
Coal and Carbon Sequestration
• Hafemeister: Air and Water Pollution 6.1, 6.2, 6.3, 6.4, pp. 137-144 (Acid Rain pH, Clean Air Act and Allowance Trading, Pollution Scaling).
• The Future of Coal (MIT)

Week 5. (February 6). VT & MB
Wind and Solar Energy, Biopower, Renewable Portfolio Standard

Week 6. (February 13) MB
State Energy Policies.

Week 7. (February 20) MB & VT
Review of Key Concepts for Midterm
Energy Efficiency: Buildings and “Smart Growth”
• *Hafemeister*: Chapter 11 Energy in Buildings; Chapter 14 Enhanced End-Use Efficiency (through 14.6 p. 364).
Week 8. (February 27) Midterm Exam
Continuation of Buildings and “Smart Growth”

Week 9. (March 5). MB & VT
The Electric Grid, Transportation Energy Policy, and Plug-in Hybrid Electric Vehicles. MB


Industrial Ecology and Industrial Efficiency.
Natural Gas, Combined Heat and Power, Cogeneration.


Week 10 (March 12) VT
Transportation Efficiency. Biofuels and Hydrogen


Spring Break March 17-21

Week 11. (March 26). MB
Climate Change. Carbon Dioxide and Other Greenhouse Gases
• Sovacool and Brown, *Energy and American Society*, “Energy Myth Twelve – Climate Policy Will Bankrupt the U.S. Economy” by Eileen Claussen and Janet Peace
• *Hafemeister*, Chapter 8 Climate Change.

**Week 12. (April 2). VT**

**Technologies to Address Climate Change**


**Week 13. (April 9). MB**

**Climate Policy: UNFCCC, Kyoto Protocol and Carbon Trading & Project Presentations**

  
• Sovacool and Brown, *Energy and American Society*, “Energy Myth Thirteen – Developing Countries Are Not Doing Their Part in Responding to Concerns about Climate Change” by Thomas J. Wilbanks

**Week 14. (April 16). MB and VT**

**Project Presentations**

**Week 15 (April 23) MB & VT**

**Global Energy Policy**

**Review of Key Concepts for Final Exam**

Schedule for Class Projects and Final Exam

March 12: 250-word Summary of Topic for Class Project
March 26: Quality draft of Class Project Report
April 25 (Friday): Final Project Report Due
April 29 (Tuesday): Final Exam 11:30 am - 2:20 pm