Instructors: Ivan Rudik and Todd Gerarden

E-Mails: irudik@cornell.edu, gerarden@cornell.edu - Put ‘AEM 4940’ in the subject line for all e-mails.

Office Hours: Prof. Rudik: Thursday 4:15–5:15 and Friday 1:30–2:30 until October 4.
Prof. Gerarden: Thursday 4:00–5:00 and Friday 1:30–2:30 starting October 11.

Course Summary: This course will investigate energy issues from an economic and business perspective using a quantitative approach. In the first part of the course, students will learn how to think about energy through an economic and business lens. The second part of the course will focus on topical energy market issues such as imperfect competition, bidding in electricity markets, markets for oil and gas, and environmental regulation.

Course Outcomes:

1. Use and evaluate scientific and economic information to reach defensible conclusions.
2. Describe the implications of using markets to supply and allocate energy.
3. Identify market failures that justify energy policy interventions.
4. Develop skills to evaluate the benefits and costs of different energy policies.

Prerequisites: MATH 1110, AEM 2100, and AEM 2600 or equivalent.

Course Requirements: Students are expected to attend two 75 minute lectures per week for the entire semester. In addition, students are expected to prepare for class, study for prelims, and complete homework outside of class. The work outside of class is typically several hours per week.

Readings: All sections of the course have readings (available on the course blackboard). The lectures, quizzes, homeworks and prelims will draw from these readings.

Grading Scale:
A: 92–100; A–: 90–91
B+: 88–89; B: 82–87; B–: 80–81
C+: 78–79; C: 72–77; C–: 70–71
D+: 68–69; D: 62–67; D–: 60–61
F: < 60

Grading Weights:

<table>
<thead>
<tr>
<th>Grade</th>
<th>Percentage</th>
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<tbody>
<tr>
<td>Prelims (2)</td>
<td>60%</td>
</tr>
<tr>
<td>Homeworks (2)</td>
<td>20%</td>
</tr>
<tr>
<td>Quizzes (10, lowest 2 dropped)</td>
<td>10%</td>
</tr>
<tr>
<td>OPEC Game</td>
<td>5%</td>
</tr>
<tr>
<td>Electricity Market Game</td>
<td>5%</td>
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Prelims: There will be 2 prelims, one for each half.

Homeworks: There will be 2 homeworks, 1 in each half of the course. Homeworks will be quantitative in nature. Homeworks are due at the start of class on the due date.
Quizzes: There will be 10 quizzes, 5 in each half of the course. The quizzes will be written and cover qualitative understanding of recent course material and readings. The quiz should take less than 15 minutes and will be at the end of class. The lowest 2 quiz grades are dropped.

Games: We will play two games to gain hands on experience with energy markets. In the first half of the class we will play the OPEC Game to gain an understanding of oil markets and cartel behavior. In the second half we will play the Electricity Strategy Game to gain an understanding of electricity markets. After each game concludes there will be a short assignment related to the game.

Missed Prelims and Quizzes: There will be no make ups for prelims or quizzes without an excused absence. If you have an acceptable excuse (these must be brought in beforehand except for sickness, injuries, accidents, etc) an alternative prelim/quiz will be scheduled. If you miss a prelim/quiz and do not notify us beforehand you must have a valid document (doctor’s note, etc) explaining why you missed class and were not able to let us know beforehand.

Lecture Notes: Lecture notes will be posted on the course blackboard at the end of each section of the course.

Power Plant Trips: Two class periods will consist of trips to the Cornell hydroelectric plant and Cornell combined heat and power plant. Attendance is required.

Class Attendance: Besides the power plant trips, class attendance is not explicitly required.

Grade Appeals: If you wish to appeal your grade on a prelim, quiz, or homework you must bring it to our attention, in writing, within 24 hours of when the prelim, quiz, or homework is returned. Grades brought to our attention after this will not be eligible for a grade appeal. We reserve the right to regrade the entire assignment and the new grade will be final.

Class Conduct: We do not forbid the use of electronic devices in the classroom during normal lectures if they are being used for class purposes. However, they may not be used to record the lecture. These devices (laptops, tablets, phones, etc.) are prohibited during prelims. If a student’s use of an electronic device is disruptive to teaching and/or learning, we will ask that the student discontinue the use of that device. Please be considerate of those around you.

Group Work and Academic Dishonesty: For homework assignments, you may consult with other students and/or us (during office hours). However, each person must complete his or her own assignment. You must complete prelims without help. This class will follow Cornell University’s Code of Academic Integrity: https://cuinfo.cornell.edu/aic.cfm. We will discuss any case of academic misconduct directly with the student and report the incident to the Dean of Students Office. Any academic misconduct will result in an F for the assignment.

Important Dates:
Prof. Rudik covers: August 23 – October 4
Prof. Gerarden covers: October 11 – December 4
No class: October 9, November 22
Power plant trips: October 30, November 8
Prelim 1: October 4
Prelim 2: December 4
Course Outline and Readings:

August 23: Introduction to Energy


August 28: Market Efficiency and Scarcity Pricing


August 30: Monopoly Regulation

September 4: Rate-of-Return and Incentive Regulation


September 6: Oil and Natural Gas Extraction and Pricing 1


September 11: Oil and Natural Gas Extraction and Pricing 2


September 13: Oil and Natural Gas Extraction and Pricing 3

September 18: The OPEC Game

September 20: Guest Lecture by Dr. Gabriel Lade on Biofuels Markets

September 25: Unconventional Oil and Gas

September 27: Gasoline Markets and Fuel Economy Standards (and Other Policies)

October 2: Prelim Review and Previous Class Continued

October 4: **First Prelim**

October 9: No Class (Fall Break)

October 11: Economics of Electricity: Background

October 16: Economics of Electricity: Pricing and Investment

October 18: Economics of Electricity: Market Power and Market Manipulation
  - Optional readings:

October 23: Electricity Strategy Game

October 25: Electricity Strategy Game

October 30: Tour of the Central Energy Plant
  - CEP Tour Safety Guidelines
November 1: The Economics of Renewable Energy

- Optional readings:

November 6: Renewable Energy Policy


November 8: Tour of the Cornell Hydroelectric Plant

- Hydro Plant Description
- Meet at north end of Beebe Footbridge behind Noyes Welcome Center.

November 13: Solar Innovation Case Study

- NPR’s Planet Money Episode 616: How Solar Got Cheap
- Optional readings:

November 15: Solar Innovation Case Study (continued)

- PV Magazine: Seven Trends to Make or Break Corporate PPAs

November 20: Energy Efficiency


November 22: No Class (Thanksgiving Break)

November 27: Energy and Environmental Policy


November 29: Wrap Up and Prelim Review

December 4: **Second Prelim**