

DEC 11 2013

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LSC Action-Date:	UWUCC Action-Date: AP-2/11/14	

Curriculum Proposal Cover Sheet - University-Wide Undergraduate Curriculum Committee

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Proposing Department/Unit	Economics	Phone	724-357-4775, 724-357-4856

Check all appropriate lines and complete all information. Use a separate cover sheet for each course proposal and/or program proposal.

1. Course Proposals (check all that apply)

New Course
 Course Prefix Change
 Course Deletion
 Course Revision
 Course Number and/or Title Change
 Catalog Description Change

Current course prefix, number and full title: _____

Proposed course prefix, number and full title, if changing: ECON 462/562 Energy Economics

2. Liberal Studies Course Designations, as appropriate
 This course is also proposed as a Liberal Studies Course (please mark the appropriate categories below)

Learning Skills
 Knowledge Area
 Global and Multicultural Awareness
 Writing Across the Curriculum (W Course)
 Liberal Studies Elective (please mark the designation(s) that applies – must meet at least one)

Global Citizenship
 Information Literacy
 Oral Communication
 Quantitative Reasoning
 Scientific Literacy
 Technological Literacy

3. Other Designations, as appropriate

Honors College Course
 Other: (e.g. Women's Studies, Pan African)

4. Program Proposals

Catalog Description Change
 Program Revision
 Program Title Change
 New Track
 New Degree Program
 New Minor Program
 Liberal Studies Requirement Changes
 Other

Current program name: _____

Proposed program name, if changing: _____

5. Approvals	Signature	Date
Department Curriculum Committee Chair(s)	<i>Stephanie M. Jeffords</i>	12/4/13
Department Chairperson(s)	<i>Chris Jeffords</i>	12/4/13
College Curriculum Committee Chair	<i>Chris Jeffords</i>	12/11/13
College Dean	<i>D. Ann</i>	1/29/14
Director of Liberal Studies (as needed)		
Director of Honors College (as needed)		
Provost (as needed)		
Additional signature (with title) as appropriate		
UWUCC Co-Chairs	<i>Gail Seehurst</i>	2/12/14

Received

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FEB 12 2014

JAN 30 2014

Liberal Studies

Liberal Studies

SYLLABUS OF RECORD

ECON 462/562 Energy Economics

Credits: 3.00

Catalog Description: Prerequisites: ECON 122 or equivalent and MATH 115 or MATH 121 or equivalent. Focuses on a variety of energy related topics from an economics perspective. Topics include energy demand and supply, market structure and energy pricing, renewable and nonrenewable sources of energy, environmental impacts of energy use, climate change, and energy policy.

Lecture: 3.00

College: Humanities and Social Sciences

Department: Economics

Syllabus of Record

Energy Economics ECON 462/562

3 class hours
0 lab hours
3 credits
(3e-01-3cr)

1. IUP Catalog Description

Prerequisites: ECON 122 or equivalent and MATH 115 or MATH 121 or equivalent

Focuses on a variety of energy related topics from an economics perspective. Topics include energy demand and supply, market structure and energy pricing, renewable and nonrenewable sources of energy, environmental impacts of energy use, climate change, and energy policy.

2. Course Outcomes

Students will: (1) demonstrate an understanding of the main issues and trends in energy economics; (2) develop and hone the ability to use economic tools and methods to address questions in energy economics; (3) evaluate the policy arguments in relation to addressing the need for sustainable energy resources while balancing the potential negative externalities associated with the use of various energy inputs and production of energy outputs; (4) analyze and critique some of the normative assumptions that drive domestic and foreign energy policy; and (5) apply an understanding of economic efficiency versus equity as the two concepts pertain to tangible and intangible economic benefits and costs of energy production and use.

Additional Graduate Level Outcomes

Students will

- 6) summarize the academic literature on an energy economics topic approved by the instructor
- 7) analyze data related to their selected topic using applied statistical analysis and economic theory

3. Course Outline

In general and where applicable, each weekly discussion will be facilitated by the widespread use of diagrammatic, data-driven, and analytical tools, as well as an overview of current events in the national and international energy arena. Although aspects of the international energy market will be discussed regularly, the overall emphasis will tend to be on the United States.

Weeks One and Two: Introduction and Background

We will review many of the key elements of economic theory and tools of calculus that will be used regularly throughout the course. We will then discuss the field of energy economics and the various sources and uses of energy on a national and international scale.

Week Three: Energy Demand, Supply, and Economic Growth

We will discuss many elements of national and international energy demand and supply, focusing on the main sources of energy including, but not limited to, oil, natural gas, coal, nuclear, wind, and water. We will also analyze the role of energy in facilitating economic growth.

Week Four: Electricity

As a large consumer of energy resources, we will analyze the nature of electricity markets in the United States, focusing on regulation, deregulation, pricing, and environmental externalities.

Week Five: Oil

We will analyze the supply and demand for oil resources and the processes of acquiring and refining crude oil resources.

Weeks Six and Seven: Natural Gas and Coal

We will analyze the supply and demand for natural gas and coal. We will also discuss the major differences and similarities between natural gas and coal as inputs into the production of electricity.

Week Eight: Nuclear

We will analyze the supply and demand for nuclear power. We will also begin a critical inquiry of the *not-in-my-backyard* (“NIMBY”) viewpoint as it relates to the costs and benefits of installing a nuclear power facility.

Week Nine: Wind and Solar

We will analyze the supply and demand for wind and solar power. We will also discuss the pros and cons of wind and solar power as sources of energy, critically examining (for the case of wind) the NIMBY viewpoint (as in the case of nuclear power) as it relates to the potential reduction of certain environmental amenities (e.g., “ruining” a nice view of nature).

Week Ten: Water and Hydropower

We will analyze the supply and demand of water resources and hydropower/dams. We will also discuss the lifecycle of a dam and the nature of dam retirement.

Weeks Eleven and Twelve: Energy, Climate Change, and Internalizing Externalities

We will synthesize the previous weeks into an examination of the role of energy production and climate change. This section will also shed light on the differences between developing and developed countries, as they each try to improve the welfare of their current and future populace, but also consider their state-level impact on the natural environment. We will then discuss negative production and consumption externalities in the realm of environmental damage and pollution, and offer various ways to internalize these externalities (e.g., through policy or by private means).

Week Thirteen and Fourteen: Energy Policy, Security, and the Future

Building on weeks eleven and twelve, we will discuss energy policy on both the national and international scale. We will focus on questions of risk and security of the supply of various sources of energy, and the volatility of energy prices in general and for specific sources. We will also examine the role of national and international legal systems/instruments in addressing or preventing environmental harm (beyond a defined tolerable level).

Week Fifteen: Final Exam

4. Evaluation Methods

Because this course is dual-listed as both an advanced undergraduate and as a graduate course, course requirements and standards of evaluation will not be identical for all students. All students will be expected to complete assigned readings on time, participate in class discussions of readings, and regularly attend class. The course requirements are as follows.

Undergraduate Students

Analytic Projects

and Homework Assignments: 30%

Midterm: 30%

Final Exam: 30%

Attendance and Class Participation: 10%

Graduate Students

Research Paper/Project: 35%

Analytic Projects

and Homework Assignments: 10%

Midterm: 20%

Final Exam: 25%

Attendance and Class Participation: 10%

Research Paper: Each graduate student will write a paper that has both qualitative and quantitative elements and covers at least one of the topics listed in the detailed course outline and utilizes some of the quantitative techniques covered in the homework assignments. The purpose and scope of the paper will be defined by the instructor and informed, in part, by the current events facing the field of energy economics. The graduate research paper will be 22-25 pages in length, double-spaced, and will be expected to make use of academic journal publications.

GRADING RUBRIC for the Research Paper and Other Writing Assignments

Based on the letter-grade rubric at IUP, the following is a simple example of potential grades for the research paper.

A: Outstanding: clear and compelling research question and ensuing argument; extremely well written and researched; properly cites all sources complemented by a complete works cited page; essay is well-organized with very few to no spelling/grammatical errors; demonstrates a thorough understanding of the readings and current

research; conclusion not only summarizes the research questions and findings, but offers extensions of the research and potential caveats thereby demonstrating a mastery of the research area.

B: Very good: clear research question and ensuing argument; well written and researched; properly cites all sources complemented by a works cited page; essay is well organized but contains some spelling/grammatical errors; demonstrates a working knowledge of the readings and current research; conclusion shows an attempt to get at the heart of some kind of argument.

C: Satisfactory: introduction contains some sort of central idea or argument, but it is not immediately clear; each body paragraph is self-contained and attempts to relate to the introduction and research question; sources are cited, but not properly or consistently; no works cited page; cursory understanding of the readings and current research; essay is disorganized and contains spelling/grammatical errors; conclusion is merely a summary.

D: Unsatisfactory: essay meets the minimum page requirement; introduction has no focus; body paragraphs meander from idea to idea; some sources are cited, but not properly; no works cited page; conclusion is non-existent or abrupt.

F: Unacceptable: essay does not meet the minimum page requirement; introduction has no focus; body paragraphs meander, are inconsistently organized, and make little to no contribution to the overall paper; no works cited page; conclusion is non-existent or abrupt; essay contains un-cited passages and/or ideas.

For Graduate Students: Papers described in the undergraduate categories for a grade of D or F will receive an F since the grade of D is not available for graduate students.

Analytic Projects and Homework Assignments: After some formal training, each student will be expected to complete analytic projects and homework assignments on a regular basis. These include solving problem sets by hand or with the assistance of computer software.

Midterm and Final Exams: Both exams will include a fair amount of qualitative and quantitative questions. The final will be cumulative, with a focus on the material covered after the midterm. The graduate exam will include additional questions or problems that are more advanced than the undergraduate exam questions.

Attendance and Class Participation: In addition to attendance, points in this category will be earned by participating regularly, willfully, and meaningfully in daily discussions/activities.

5. Example Grading Scale

<u>Undergraduate</u>	<u>Graduate</u>
A: 900 - 1000	A: 900 - 1000
B: 800-899	B: 800 - 899
C: 700-799	C: 700 - 799
D: 600-699	F: 0 - 699
F: 0-599	

6. Course Attendance Policy

The IUP attendance policy will be followed and students are expected to come to class prepared to discuss the current material. Continued absences and lack of preparation, both as defined by the instructor within the first week of the course via the course syllabus, will result in a reduction in the attendance grade.

7. Required Textbook(s), Supplemental Book(s), and Readings

Textbook(s): There are no required textbooks for this course. Course readings will come primarily from academic journal articles.

Supplemental Book(s): There are no required supplemental books/textbooks for this course, but access to a recent microeconomics textbook is suggested.

Readings: There are many required readings, each fitting into the weekly outline noted above. For a tentative list of these readings, see the bibliography below. Advances in research and the progression of time, for example, will guide the full list of required readings.

8. Special Resource Requirements

The research paper and some of the analytic projects and homework assignments require the use of the internet and computer software such as Microsoft Excel, which is widely available in IUP campus computer labs. Students will also need access to an online course/document repository such as D2L or Dropbox in order to access certain readings.

9. Bibliography

The following working bibliography is ordered alphabetically by weekly topic.

Weeks One and Two: Introduction and Background

Instructor supplied review material of fundamental economic and calculus concepts

Krautkraemer, J. (2005). "Economics of Natural Resource Scarcity: The State of the Debate," Resources for the Future Discussion Paper 05-14.

Smil, V. (2002). "Energy Resources and Uses: A Global Primer for the Twenty-First Century," *Current History*, 101(653), 126-132.

Smil, V. (2000). "Energy in the Twentieth Century: Resources, Conversions, Costs, Uses, and Consequences," *Annual Review of Energy and the Environment*, 25, 21-51

United States Energy Information Administration, "Annual Energy Review 2011," Section 1 – Energy Overview,
<http://www.eia.gov/totalenergy/data/annual/pdf/aer.pdf>
<http://www.eia.gov/totalenergy/data/annual/index.cfm>
Note: Updated annually.

United States Energy Information Administration, International Energy Outlook 2013, "World Energy Demand and Economic Outlook,"
[http://www.eia.gov/forecasts/ieo/pdf/0484\(2013\).pdf](http://www.eia.gov/forecasts/ieo/pdf/0484(2013).pdf)
<http://www.eia.gov/forecasts/ieo/>
Note: Updated annually.

Week Three: Energy Demand, Supply, and Economic Growth

Frankel, J. (2010). "The Natural Resource Curse: A Survey," NBER Working Paper No. 15836,
<http://www.nber.org/papers/w15836>

Heal, G. (1993). "The Optimal Use of Exhaustible Resources," Chapter 18 in *Handbook of Natural Resource and Energy Economics*, A. Kneese and J. Sweeney, Eds., Volume 3, San Diego, CA: Elsevier Science Publishers.

Krautkraemer, J. (1998). "Nonrenewable Resource Scarcity," *Journal of Economic Literature*, 36(4), 2065-2017.

Krautkraemer, J. and Toman, M. (2003). "Fundamental Economics of Depletable Energy Supply," Resources for the Future Discussion Paper 03-01.

Solow, R. (1978). "Resources and Economic Growth," *The American Economist*, 22(2), 5-11.

Stern, D. (2011). "The Role of Energy in Economic Growth," *Ecological Economics Reviews*, Robert Costanza, Karin Limburg, and Ida Kubiszewski, Eds., Annals of the New York Academy of Sciences, 1219, 26-51.

Week Four: Electricity

Borenstein, S. (2002). "The Trouble with Electricity Markets: Understanding California's Restructuring Disaster," *Journal of Economic Perspectives*, 16(1), 191-211.

Borenstein, S. (2012). "The Private and Public Economics of Renewable Electricity Generation," *Journal of Economic Perspectives*, 26(1), 67-92.

Joskow, P. (2000). "Deregulation and Regulatory Reform in the U.S. Electric Power Sector," Chapter 4 in *Deregulation of Network Industries: What's Next?*. S. Peltzman and C. Whinston, Eds., Washington, D.C.: American Enterprise Institute Press, 113-188.

Joskow, P. and Kahn, E. (2002). "Quantitative Analysis of Pricing Behavior in California's Electricity Market During the Summer 2000," *The Energy Journal*, 23(4), 1-35.

Week Five: Oil

Adelman, M. (2004). "The Real Oil Problem," *Regulation*, 27(1), 16-21.

Gordon, D. (2012). "Understanding Unconventional Oil," *The Carnegie Papers*, Energy and Climate, Carnegie Endowment.
http://carnegieendowment.org/files/unconventional_oil.pdf

Maugeri, L. (2012). "Oil: The Next Revolution: The Unprecedented Upsurge of Oil Production Capacity and What it Means for the World," The Geopolitics of Energy Project, Harvard Kennedy School, Belfer Center for Science and International Affairs
<http://belfercenter.ksg.harvard.edu/files/Oil-%20The%20Next%20Revolution.pdf>

McNally, R. and Levi, M. (2011). "A Crude Predicament: The Era of Volatile Oil Prices," *Foreign Affairs*.

Watkins, G. (2006). "Oil Scarcity: What Have the Past Three Decades Revealed?" *Energy Policy*, 34, 508-514.

Weeks Six and Seven: Natural Gas and Coal

Freme, F. (2009). "U.S. Coal Supply and Demand: 2009 Review," United States Energy Information Administration.
<http://utah.ptfs.com/Data/Library2/publications/dc018787.pdf>

MIT, (2007). "The Future of Natural Gas: An Interdisciplinary MIT Study."
<http://mitei.mit.edu/publications/reports-studies/future-natural-gas>

MIT, (2007). "The Future of Coal: An Interdisciplinary MIT Study."
<http://web.mit.edu/coal/>

Week Eight: Nuclear

Deutch, J. and Moniz, E. (2004). "Making the World Safe for Nuclear Energy," *Survival*, 46(4), 65-79.

MIT, (2003, 2009). "The Future of Nuclear Power: An Interdisciplinary MIT Study."
<http://web.mit.edu/nuclearpower/>

Week Nine: Wind and Solar

Barradale, M. (2010). "Impact of Public Policy Uncertainty on Renewable Energy Investment: Wind Power and the Production Tax Credit," *Energy Policy*, 38(12), 7698-7709.

- Lüthi, S. and Prässler, T. (2011). "Analyzing Policy Support Instruments and Regulatory Risk Factors for Wind Energy Deployment – A Developers' Perspective," *Energy Policy*, 39(9), 4876-4892.
- Madlener, R. and Mathar, T. (2009). "Development Trends and Economics of Concentrating Solar Power Generation Technologies: A Comparative Analysis," FCN Working Papers 1/2009.
- McGowan, J. and Conners, S. (2000). "Windpower: A Turn of the Century Review," *Annual Review of Energy and the Environment*, 25, 147-197.
- Stagnaro, C. and Bakst, D. (2010). "Costs of Nuclear v. Solar Power," MPRA Working Paper No. 47293.

Week Ten: Water and Hydropower

- Gleick, P., Cooley, H., Famiglietti, J., Lettenmaier, D., Oki, T., Vörösmarty, C., and Wood, E. (2013). "Improving Understanding of the Global Hydrologic Cycle: Observation and Analysis of the Climate System: The Global Water Cycle," in G. Asrar and J. Hurrell, Eds., *Climate Science for Serving Society: Research, Modeling, and Prediction Priorities*, 151-184.
- Lee, Y., Yoon, T., and Shah, F. (2013). "Economics of Integrated Watershed Management in the Presence of a Dam," *Water Resources Research*, 47.
- Palmieri, A., Shah, F., and Dinar, A. (2001). "Economics of Reservoir Sedimentation and Sustainable Management of Dams," *Journal of Environmental Management*, 61, 148-163.

Weeks Eleven and Twelve: Energy, Climate Change, and Internalizing Externalities

- Kaplow, L. (2010). "Taxes, Permits, and Climate Change," NBER Working Paper No. 16268.
<http://www.nber.org/papers/w16268>
- Medlock, K. and Soligo, R. (2001). "Economic Development and End-Use Energy Demand," *The Energy Journal*, 0(2), 77-105.
- Nordhaus, W. (2007). "The 'Stern Review' on the Economics of Climate Change,"
http://www.econ.yale.edu/~nordhaus/homepage/stern_050307.pdf
- United States Environmental Protection Agency, "Trends in Greenhouse Gas Emissions,"
<http://www.epa.gov/climatechange/ghgemissions/usinventoryreport.html>
<http://www.epa.gov/climatechange/Downloads/ghgemissions/US-GHG-Inventory-2013-Chapter-2-Trends.pdf>

Week Thirteen and Fourteen: Energy Policy, Security, and the Future

- Kenny, R., Law, C., and Pearce, J. (2010). "Towards Real Energy Economics: Energy Policy Driven by Life-Cycle Carbon Emission," *Energy Policy*, 38(4), 1969-1978.
- McDonald, S., Robinson, S., and Theirfelder, K. (2006). "Impact of Switching Production to Bioenergy Crops: The Switchgrass Example," *Energy Economics*, 28, 243-265.
- Metcalf, G. (2006). "Energy Conservation in the United States: Understanding its Role in Climate Change," MIT Joint Program on the Science and Policy of Global Change, Report No. 138.
http://web.mit.edu/globalchange/www/MITJPSPGC_Rpt138.pdf
- Palmer, K. and Bullaw, D. (2005). "Cost-Effectiveness of Renewable Electricity Policies," *Energy Economics*, 27, 873-894.

- Portney, P. and Parry, I. (2003). "Policy Watch: The Economics of Fuel Economy Standards," *Journal of Economic Perspectives*, 17(4), 203-217.
- Stern, R. (2006). "Oil Market Power and United States National Security," *Proceedings of the National Academy of Sciences Newsletter*, 103(5).
- Toman, M. (1993). "The Economics of Energy Security: Theory, Evidence, and Policy," in Allen Kneese and James Sweeney, Eds., *Handbook of Natural Resource and Energy Economics*, Volume 3, Chapter 25, 1167-1218.

Course Analysis Questionnaire

Section A: Details of the Course

A1 How does this course fit into the programs of the department? For what students is the course designed? (majors, students in other majors, liberal studies). Explain why this content cannot be incorporated into an existing course.

This course is designed for Economics majors, new majors in the proposed B.S. in Energy Management through the Eberly College of Business and Information Technology, and as an elective for those business school majors who are required to take a 400 level economics course.

A2 Does this course require changes in the content of existing courses or requirements for a program? If catalog descriptions of other courses or department programs must be changed as a result of the adoption of this course, please submit as separate proposals all other changes in courses and/or program requirements.

This course does NOT require changes in the content of existing course or requirements for a program.

A3 Has this course ever been offered at IUP on a trial basis (e.g. as a special topic) If so, explain the details of the offering (semester/year and number of students).

This course has NOT been taught as a special topics course at IUP. The closest related course is ECON 281 Resource and Energy Economics, most recently offered in Fall 2007.

A4 Is this course to be a dual-level course? If so, please note that the graduate approval occurs after the undergraduate.

This course will be a dual level course ECON 462/562.

A5 If this course may be taken for variable credit, what criteria will be used to relate the credits to the learning experience of each student? Who will make this determination and by what procedures?

This course may NOT be taken for variable credit.

A6 Do other higher education institutions currently offer this course? If so, please list examples (institution, course title).

Yes, many other higher education institutions offer this course, for example (including the most recent course offering):

Massachusetts Institute of Technology, Economics 14.44J, Energy Economics and Policy, Fall 2013

Oregon State University, Economics 466/566 Energy Economics, Fall 2012, Winter 2013

Texas Tech University, Energy Commerce 4312 Energy Economics, Fall 2013

University of Alaska-Anchorage, Economics 394b Energy Economics, Spring 2012
University of Calgary, Economics 427, Energy Economics and Policy, Fall 2013

There are many more at both the undergraduate, graduate, and dual level.

A7 Is the content, or are the skills, of the proposed course recommended or required by a professional society, accrediting authority, law or other external agency? If so, please provide documentation.

We are NOT aware of any such recommendations or requirements.

Section B: Interdisciplinary Implications

B1 Will this course be taught by instructors from more than one department? If so, explain the teaching plan, its rationale, and how the team will adhere to the syllabus of record.

This course will NOT be taught by instructors from more than one department.

B2 What is the relationship between the content of this course and the content of courses offered by other departments? Summarize your discussions (with other departments) concerning the proposed changes and indicate how any conflicts have been resolved. Please attach relevant memoranda from these departments that clarify their attitudes toward the proposed change(s).

We are NOT aware of the content of this course being taught by any other departments at IUP.

B3 Will this course be cross-listed with other departments? If so, please summarize the department representatives' discussions concerning the course and indicate how consistency will be maintained across departments.

This course will NOT be cross-listed with other departments.

Section C: Implementation

C1 Are faculty resources adequate? If you are not requesting or have not been authorized to hire additional faculty, demonstrate how this course will fit into the schedule(s) of current faculty. What will be taught less frequently or in fewer sections to make this possible? Please specify how preparation and equated workload will be assigned for this course.

Yes, faculty resources are adequate to service this course. This course will replace offerings of ECON 373 Economics of Human Resources and/or ECON 383 Urban/Regional Economics. ECON 373 and 383 had been taught by Dr. James Dyal who recently retired. With Dr. Dyal's replacement, we can now offer this course on a regular basis.

C2 What other resources will be needed to teach this course and how adequate are the current resources? If not adequate, what plans exist for achieving adequacy? Reply in terms of the following:

- *Space – No additional space needed.
- *Equipment – No additional equipment need.
- *Laboratory Supplies and other Consumable Goods – Occasional use of existing computer labs in McElhaney and Eicher.
- *Library Materials – Occasional use of existing library resources.
- *Travel Funds – No additional resources needed.

C3 Are any of the resources for this course funded by a grant? If so, what provisions have been made to continue support for this course once the grant has expired? (Attach letters of support from Dean, Provost, etc.)

None of the resources for this course are funded by a grant.

C4 How frequently do you expect this course to be offered? Is this course particularly designed for or restricted to certain seasonal semesters?

We expect to offer this course once per year.

C5 How many sections of this course do you anticipate offering in any single semester?

We anticipate offering only one section per year.

C6 How many students do you plan to accommodate in a section of this course? What is the justification for this planned number of students?

We expect to accommodate at most 30 students. This is the typical enrollment cap for 400 level courses offered in the Department of Economics with assignments of the nature described above.

C7 Does any professional society recommend enrollment limits or parameters for a course of this nature? If they do, please quote from the appropriate documents.

We are NOT aware of any such recommendations.

C8 If this course is a distance education course, see the Implementation of Distance Education Agreement and the Undergraduate Distance Education Review Form in Appendix D and respond to the questions listed.

There are currently no plans for this course to be taught as a distance education course.

Section D: Miscellaneous

See the attached syllabi of similar courses at five universities.

**ECONOMICS 466/566
ENERGY ECONOMICS
Winter 2013**

INSTRUCTOR: Marc Hellman
CLASSROOM:
TIME: Monday and Wednesday, 4:00 to 5:50 pm
OFFICE: Ballard Extension Hall, Room 317
OFFICE HOURS: Mondays and Wednesdays 2:15 to 3:45 PM
Phone: 541 737 1481
E-MAIL: marc.hellman@oregonstate.edu
HOMEPAGE: <http://oregonstate.edu/~hellmanm>

COURSE CONTENT AND OBJECTIVES:

This Energy Economics course examines the economics and structure of markets for various energy sources (such as oil, coal, natural gas), with a focus on electricity and Pacific Northwest electrical industry structure and regulatory framework. We will examine current policy issues arising from electrical energy production and use and the relationship with economic growth and the environment. The course is designed both for students interested in energy economics as well as public policy. It examines a variety of legal, regulatory, and environmental issues from a regional and national perspective. The objectives of the course are to provide a better understanding of these topics and the merging of economic analysis with public policy.

Prerequisite is Microeconomics 201.

SUGGESTED TEXTBOOKS: (not required)

"Energy for the 21st Century", by Nersesian, ISBN-13: 978-0-7656-1323-3, M.E. Sharpe
Paperback edition available, Suggested

"Market Regulation," by Sherman, ISBN-13: 978-0-321-32232-6, Pearson, Optional

Required reading materials and articles will be made available through Blackboard.

Econ 466

Undergraduate Student Learning Outcomes: Per university policy, we now specify student learning outcomes for all courses. According to the Office of Academic Programs, student learning outcomes are specific statements indicating an understanding, knowledge, or skill-set that a successful student will have obtained upon the completion of a course.

- Describe the oil, natural gas and coal production background history and markets.
- Recall the electric industry market structure with a focus on the Pacific Northwest.
- Explain the regulatory framework of the electric utility industry.
- Summarize and explain the major public policy issues regarding energy efficiency and carbon emissions.
- Analyze energy-related policy issues using standard economic tools.

Econ 566

Graduate Student Learning Outcomes: Per university policy, we now specify student learning outcomes for all courses. According to the Office of Academic Programs, student learning outcomes are specific statements indicating an understanding, knowledge, or skill-set that a successful student will have obtained upon the completion of a course.

- Summarize and contrast the oil, natural gas and coal production background history and markets.
- Identify emerging trends in technology that significantly affect fossil-fuel supply and projected costs.
- Assess the electric industry market structure with a focus on the Pacific Northwest.
- Outline the regulatory framework of the electric utility industry and appraise how public policy objectives could be executed using incentive regulation.
- Apply shadow-price economic concepts to derive short and long-run marginal costs of peak and off-peak electrical power at the generation level.
- Analyze energy efficiency issues using mathematical economic analyze to identify and illustrate impacts on consumers, industry, and the public at large.
- Analyze energy-related broad and complex policy issues using current economic tools, assess the strengths and weaknesses of alternative perspectives, and formulate a point of view and defend such views.

Tentative Lecture Schedule

Note: Students are responsible for all reading materials listed below in bold, including reading not covered in class. Students should read the materials identified below prior to the class date so as to be prepared to discuss in class. This schedule, including the dates of the exams, is subject to change. Students are responsible for being aware of changes announced during lectures.

Week/ lecture	Topics
	Part I: Preliminaries
9/24	Introduction to course, course plan, and why the interest in energy. Selected Reading: <i>The Economic Effects of Energy Price Shocks</i>, Lutz Kilian, Journal of Economic Literature 2008, 46:4, 871-909; Nersesian, Chapter 1: "Are we on Easter Island?"
9/26	Introduction continued and background economic tools
10/1	Oil industry, history and market structure. Selected readings: 1. Nersesian, Chapter 6: "Oil" through page 210; Sherman, "Oil, Chapter 17.2." Optional, Nersian, Chapter 5.; <i>Oil and the Macroeconomy since the 1970s</i> , Barsky and Kilian, Journal of Economic Perspectives , Fall, 2004; "Canada's Tar Sands," The Economist , January 22, 2011; "Brazil's Oil Boom," November 2011, Economist; WSJ, "U.S. Nears Milestone: Net Fuel Exporter", November 30, 2011; "Texas oil raises demand for water," WSJ, Dec 2011.
10/3	Natural Gas industry, history and market structure. Selected Readings: 1. Nersesian, Chapter 7: "Natural Gas"; 2. Sherman, "Natural Gas, Chapter 17.3."; <i>Betting on Shale</i> , Lee Van Atta, Public Utilities Fortnightly , September 2009. "Natural Gas Replacing Coal" , Wall Street Journal. "History of Natural Gas Business in Portland," Middleton, Northwest Natural Gas Company, docket UG 221.
10/8	Coal industry, history and market structure. Selected Readings: 1. Nersesian, Chapter 4: "Coal"; "Coal mining to expand on public lands," CNN News.
	Part II: Electric Market Structure and Regulation
10/8	Nuclear Power: Selected Readings: 1. "History of Nuclear Power", "Hydro-thermal power program", and "MIT nuclear power update 2009" ; Economist, excerpts from "Special Report: Nuclear Energy" , March 2012

10/10	Supply and Demand for Electricity in the US, PNW Electric Market Structure and Federal Regulatory Structure Selected Readings: EIA, <i>"The Changing Structure of the Electric Power Industry"</i> , October 2000; <i>"Electricity Generation for the Pacific Northwest,"</i> Northwest Power and Conservation Council; Sherman, "Electricity, Chapter 18."
10/15	State Regulatory Model Selected Readings: Value line ratings of States
10/17	Federal Legislation and the Bonneville Power Administration: Selected Readings: 1937 Bonneville Project Act; The Preference Act, 1980 Regional Power Act, Sections 5 and 7; History of the Residential Exchange Program; The Residential Exchange Program (BPA publication); "The Preference Clause", <i>Columbia River Power for the People, Chapter 10</i> ; "West Coast Interties", <i>Columbia River Power for the People, Chapter 30</i> . The BPA Fact sheet; The Transmission Act
10/22	Economics of electric power production, linear programming and marginal costs Selected Readings: June 11, 2011, <i>Electricity Journal</i> , <i>"The Shortcomings of the German Electricity Market"</i> , Liebau and Strobele.
10/24	Topics in electric tariff design Selected Readings: Sherman, Chapter 11, "Pricing Principles"; <i>"Price Elasticity Demand for Electricity,"</i> EPRI, Neenan et al, 20008.
10/29	<i>First Midterm</i> (You can bring two pages of notes double sided)
	Part III: Energy Policy
10/31	Electric Industry Restructuring Selected Readings: <i>The History of Electricity Restructuring in California</i> , University of California Energy Institute, 2002; <i>Enron's Strategies in California and the Benefits of Arbitrage</i> , NERA, May 2002; <i>Oregon Deregulation</i> , Marc Hellman, May 2002; <i>"Overview of Electricity Deregulation"</i> , December 2010, <i>IEEE Spectrum</i> .
11/5	The quest for conservation—utility incentives, market structure, the decoupling of energy revenues and utility profits. Selected Readings: David Moskowitz, <i>Profits and Progress Through Least-Cost Planning</i> , Sections 1 and 3.4, NARUC, November 1989; Leslie Hudson et al, <i>Maine's Electric Revenue Adjustment Mechanism: Why it Fizzled</i> , <i>Electricity Journal</i> , October 1995; Steven Kihm, <i>"When Revenue Decoupling Will Work..And When It Won't"</i> , <i>The Electricity Journal</i> , October 2009; <i>"NARUC Decoupling FAQ"</i> , NARUC; <i>"Decoupling Q&A"</i> , <i>Electricity Journal</i> , Sullivan, Wand and Bennett, November 2011.

11/7	Renewable Resources and Portfolio Standards--Selected Readings: Brian Silverstein, " <i>Integrating Renewable Resources into the Electric Grid</i> ", March 2, 2009, FERC Technical Conference; PGE, "PGE 2009 Integrated Resource Plan", Sections 7.1, 7.6, and 7.7; Nersesian, Chapter 9: "Sustainable Energy"; " <i>Columbia River High Water Operations</i> ," BPA, 2010; "The Effects of an Increasing Surplus..", Pacific Northwest Power and Conservation Council, 2011; "Wave Technology Animation," Ocean Power Technologies
11/12	Selected topics in Renewable Resources and Portfolio Standards
11/14	Regulation of Carbon Selected Readings: Stern Review: <i>The Economics of Climate Change</i> ; A Review of the Stern Review on the Economics of Climate Change, by Nordhaus, JEL, Sept 2007; " <i>Market-based Policy Options to Control U.S. Greenhouse Gas Emissions</i> ", Gilbert Metcalf, Journal of Economic Perspectives, Spring 2009; " <i>Five Truths About Climate Change</i> ," Wall Street Journal, October 6, 2011, Robert Bryce. Science Express, "Climate Sensitivity Estimated from Temperature Reconstructions of the Last Global Maximum," Smittner et al, November 2011. (OSU research)
11/19	Regulation of Carbon continued
11/21	<i>Second Midterm</i> (You can bring two pages of notes double sided)
11/26	Recap of Second Midterm
11/28	Preparation for Final Report

Grades: There will be two midterm exams. Each will be one hour 50 minutes in length and each worth 25% of your final grade. You may bring two 8 ½ X 11 inch sheets of paper with notes on both sides of the paper to the midterm exams. The exams are tentatively scheduled above. Exam dates will be finalized at least one week in advance.

Another component of your grade worth 25% of your grade are a brief discussion, between one and two pages in length, that identifies the article and presents a summary and your observations of a non-text book reading material assigned to the class. The purpose of the reading is not to get thorough in depth knowledge of the articles but rather to capture the main themes and concepts of the papers. **The reading sections to be reviewed and discussed for each applicable class, for which you can select as your selection of reading materials, are denoted in bold letters in the syllabus.**

- For undergraduate students, there are five summaries due, each worth 5%.
- For graduate students, there are seven summaries due, and two of the seven must include the reading material sections for both Renewable Portfolio Standards and Carbon. Those last two reading material section summaries are worth 5% points each and the other five reading material summaries are worth 3% points each.

The final exam for this class is worth the final 25% points and is in the form of a term paper on a topic of your choice concerning any of the subjects discussed in lecture.

- For undergraduate students, the report shall be no less than four pages, double spaced and include at least two graphs, at least one of which is economic based such as demand and

supply curves and involve either moving along a curve or shifting a curve with the discussion and graph clearly detailing the movement.

- For graduate students, the report shall be no less than six pages (not including the bibliography or statement of sources), double spaced and include at least two graphs, at least one of which is economic based such as demand and supply curves and involve either moving along a curve or shifting a curve with the discussion and graph clearly detailing the movement. The report shall also contain the student's synthesis of the discussion in terms of observations and recommended policy actions and/or research.

No extra credit or homework other than assigned reading reports is given in this class.

Make-up exam policy: There are no make-up exams in this course. If you miss more than one midterm exams, you will receive a score of "0" for any additional midterm exams missed. If you miss the final, with a valid excuse your four midterm exam scores will comprise your grade.

Disabilities: Accommodations are collaborative efforts between students, faculty and Disability Access Services (DAS). Students with accommodations approved through DAS are responsible for contacting the faculty member in charge of the course prior to or during the first week of the term to discuss accommodations. Students who believe they are eligible for accommodations but who have not yet obtained approval through DAS should contact DAS immediately at 737-4098.

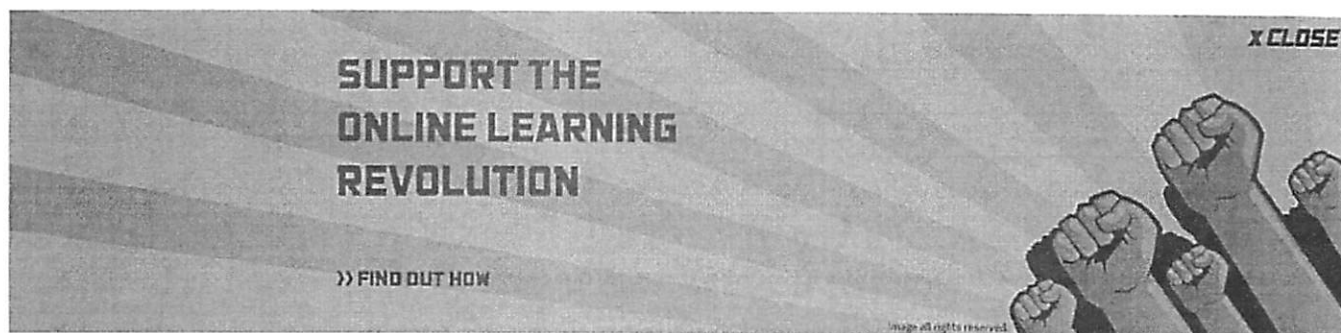
Academic Dishonesty: Plagiarism, fabrication, cheating, and facilitating the academic dishonesty of others are serious offenses and may be punished by failure on the exam or paper, failure in the course, and/or expulsion from the university. Refer to the *Schedule of Classes* for more information.

The link to Student guidelines is <http://oregonstate.edu/studentconduct/regulations/index.php>

Disruptive Behavior: Behaviors that are disruptive to teaching and learning will not be tolerated and will be referred to the Student Conduct Program for disciplinary action. Behaviors that create a hostile, offensive or intimidating environment based on gender, race, ethnicity, color, religion, age, disability, marital status or sexual orientation will be referred to the Affirmative Action Office.

Undergraduate Lab: Graduate students offer tutoring on economic concepts in the Undergraduate Economics Lab, Ballard Extension Hall 330G.

A major or minor in economics is great preparation for many careers and advanced studies in a variety of fields, including business, finance, consulting, policy analysis, government and law. If you might be interested in majoring or minoring in economics, contact Carol Tremblay at ctremblay@oregonstate.edu or Laura Relyea at Laura.Relyea@oregonstate.edu or check the Economics Department Undergraduate Program website at <http://oregonstate.edu/dept/econ/undergraduate>.



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Syllabus

COURSE HOME

Course Meeting Times

SYLLABUS

Lectures: 2 sessions / week, 1.5 hours / session

Recitations: 1 session / week, 1.5 hours / session

READINGS

Prerequisite

14.01 (MIT's introductory Microeconomics course) or an equivalent intermediate microeconomics course taken elsewhere.

ASSIGNMENTS

Requirements

There are three hours of lectures each week (Monday and Wednesday) and a one hour section (Friday). Two or three lectures will also be given during the section on Friday. For students taking the subject as 14.44 there will be a midterm examination and a final examination. For students taking the subject as 14.444 there will be extra readings and a separate required question on the midterm and the final exams. There will also be approximately five problem sets for all students. The course will have quite a bit of background reading and an understanding of some basic material not covered in 14.01 will be necessary and require additional work.

DOWNLOAD COURSE MATERIALS

Overview

This course is an energy economics course not a general energy policy course. It will cover a variety of theoretical and empirical topics related to energy demand, energy supply, energy prices, environmental consequences of energy consumption and production, and various public policies affecting energy demand, supply, prices, and environmental effects. It is a new course and, as a result, it will have an experimental character to it. We have developed a preliminary reading list but we consider it to be dynamic. We will be seeking feedback from the students taking the course to help us to make it better. There is no textbook for this course.

Enrollment Restriction

The enrollment in the course is limited to 30 students. We have limited the enrollment primarily because this is a new course and we want to encourage active student participation and feedback to refine the content and general quality of the course. We feel that we can do so best if we limit the size of the class. During the first class we will ask you to complete a form that provides us with information about you and your background. If there is excess demand for the course we will apply a rationing system. First priority will be given to MIT undergraduates who have completed 14.01 and are scheduled to graduate in Spring 2007. We will then take a stratified random group of the students meeting the pre-requisites to fill the remaining slots. You will be notified by email as to whether you can take the course.

Academic Honesty

We expect each student to complete his or her assignments and exams independently. If group work is permitted for specific assignments you will be informed about the relevant terms and conditions.

Grading


The grading for the course will be as follows:

COMPONENTS	PERCENTAGES
Midterm Examination	30%
Final Examination	40%

COMPONENTS	PERCENTAGES
Problem Sets	20%
Class Participation	10%

Textbook

There is no textbook for this course. However, we will be assigning a few sections from Pindyck, R., and D. Rubinfeld (2005) primarily for review purposes:

 Pindyck, R., and D. Rubinfeld. *Microeconomics*. 6th ed. Upper Saddle River, NJ: Prentice Hall, 2005. ISBN: 0130084611.

Many of you used this book in 14.01. If you used a previous edition you will find equivalent sections there. If you used a different intermediate microeconomics textbook you should find equivalent sections in it. If in doubt ask the TA. If you did not retain your intermediate economics textbook, we suggest that you buy a used copy for reference purposes. It will be useful.

Calendar

WEEK #	TOPICS
1	Introduction and Background Review of the Basics of Supply, Demand and Price Formation in Competitive Markets
2	Energy Demand: Short Run and Long Run Price and Income Elasticities Introduction to Multivariate Regression Analysis
3	Energy Supply and the Economics of Depletable Resources
4	World Oil Markets and Energy Security
5	Natural Gas Price Regulation, Deregulation and Markets
6	Electricity
7	Risk Management, Futures Markets and Derivatives
8	Energy and Climate Change
9	Internalizing Environmental Externalities with a Focus on CO ₂ Emissions Cap and Trade Mechanisms
10	Coal
11	Nuclear Power
12	Energy Efficiency Policies
13	Renewable Energy Policies

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Department of Economics Course Outline

		Term:	Fall 2013
Course:	Economics 427 [Energy Economics & Policy]	Section:	01
Time:	MWF 0900-0950	Place:	SA 245 (subject to change)
Instructor:	W. D. Walls		
Office:	SS 544	Telephone:	220-6761
Office Hours:	MW 0950-1030 or by appointment	E-mail:	wdwalls@ucalgary.ca

Textbook(s):

There is no textbook for this course. The course draws heavily on journal articles. Students will not be held responsible for the more sophisticated mathematical and statistical material in some of the articles. The reading list will be posted on the course website available through the Blackboard web portal.

Other Reference Materials:

The US Department of Energy, Energy Information Administration (EIA) is an excellent source of current information on energy economics. Students should be familiar with its website (www.eia.doe.gov).

There are many articles in economic journals that may be of particular interest to this class, such as those published in *Annual Review of Energy*, *Journal of Energy and Development*, *The Energy Journal*, *Energy Economics*, *ENERGY---The International Journal*, and *Energy Policy*. For reference to other recent articles on the economics of the oil industry see the relevant sections (Q4) in the *Journal of Economic Literature*, the *Journal of Energy Literature*, and draw on ECONLIT as a journal search engine.

Governments also publish useful material on the energy industries. In Alberta, material from the Energy and Utilities Board and Alberta Department of Energy are of particular interest. For the Canadian federal government, see the National Energy Board, the Science Council of Canada, the Geologic Survey of Canada and Department of Natural Resources. For the US see the Department of Energy (especially the Energy Information Administration), and Federal Energy Regulatory Commission. The OECD also has a number of interesting recent publications on energy, including publications of the International Energy Agency (IEA). The Canadian Energy Research Institute (CERI) also publishes several sector-specific reports that provide up-to-date information.

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Course Objectives:

This course covers both theoretical and empirical analysis of individual and industrial demand for energy, energy supply, energy markets, and public policies affecting energy markets. The course will cover applications to oil, natural gas, coal, electricity, and nuclear power. Topics will include energy taxation, price regulation, deregulation, energy efficiency and emissions.

Course Outline

- Introduction and Background
- Review of the Basics of Supply, Demand and Price Formation in Competitive Markets
- Energy Demand: Short Run and Long Run Price and Income Elasticities; review of Multivariate Regression Analysis
- Energy Supply and the Economics of Depletable Resources
- World Oil Markets and Energy Security
- Natural Gas Price Regulation, Deregulation and Markets
- Electricity
- Risk Management, Futures Markets and Derivatives
- Energy and Climate Change
- Internalizing Environmental Externalities with a Focus on Cap and Trade Mechanisms
- Coal
- Nuclear Power
- Energy Efficiency Policies
- Renewable Energy Policies

Note: The course objectives, outline and readings have drawn upon the Energy Economics course materials of the MIT OpenCourseWare project.

Grade Determination and Final Examination Details:

The grade will be based upon three in-class quizzes and one term paper and a final exam as follows:

In-class Quizzes (3 @ 15% each)	45%
Term Paper	25%
Final Exam	30%

The final course grade will be obtained by weighting the numerical values (rather than letter grades) and translating the numerical result back into a final letter grade for the course. The overall numerical score will be rounded off the nearest whole number. The numerical-letter grade cut-off values will be as follows:

A+	99-100	B	82-87	C-	70-71
A	92-98	B-	80-81	D+	68-69
A-	90-91	C+	78-79	D	60-67
B+	88-89	C	72-77	F	0-59

Deviations from the conversion chart listed above will only be made if it *improves student grades*.

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Non-programmable calculators *will be allowed* during the writing of quizzes and the final exam.

Notes:

- Students seeking reappraisal of a piece of graded term work (term paper, essay, etc.) should discuss their work with the Instructor *within fifteen* days of the work being returned to the class.
- Students' papers will be returned during regular class time. Papers may also be picked up by students during regular Office Hours. Uncollected term work will be discarded.
- **THERE WILL BE NO MAKEUP OR DEFERRED QUIZZES** under any circumstances, nor may the quizzes be written early. Students unable to write the quizzes because of *documented* illness, family emergency or religious observance will have the weight shifted to the final exam.
- It is the student's responsibility to request academic accommodations. If you are a student with a documented physical, psychological, emotional, nasal, or social disability who may require academic accommodation and have not registered with the Disability Resource Centre, please contact their office at 220-8237. Students who have not registered with the Disability Resource Centre are not eligible for formal academic accommodation. You are also required to discuss your needs with your instructor no later than fourteen (14) days after the start of this course.

Students' Union Vice-President Academic:

Emily Macphail
Phone: 403-220-3911
E-mail suypaca@ucalgary.ca

Students' Union Faculty Representative (Arts)

Phone: 403-220-3913 Office: MSC 251
E-mail arts1@su.ucalgary.ca, arts2@su.ucalgary.ca, arts3@su.ucalgary.ca, arts4@su.ucalgary.ca

Society of Undergraduates in Economics (S.U.E.):

www.ucalgary.ca/sue

Society of Undergraduates in Economics is a student run organization whose main purpose is to assist undergraduate economics students succeed both academically and socially at the University of Calgary. Services include access to the exam bank, career partnerships with the Career Centre through hosting industry nights and information sessions, recognizing achievements in teaching, and organizing social events for members. They invite you to join by contacting sue@ucalgary.ca.

Faculty of Arts Program Advising and Student Information Resources

- Have a question, but not sure where to start? The Faculty of Arts Program Information Centre (PIC) is your information resource for everything in Arts! Drop in at SS102, call them at 403-220-3580 or email them at artsads@ucalgary.ca. You can also visit the Faculty of Arts website at <http://arts.ucalgary.ca/undergraduate> which has detailed information on common academic concerns.

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- For program planning and advice, contact the Student Success Centre (formerly the Undergraduate programs Office) at 403-220-5881 or visit them on the 3rd Floor of the Taylor Family Digital Library.
- For registration (add/drop/swap), paying fees and assistance with your Student Centre, contact Enrolment Services at 403-210-ROCK [7625] or visit them in the MacKimmie Library Block.
- Online writing resources are available at <http://ucalgary.ca/ssc/writing-support/online-writing-resources>

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WDW/mi
2013-05-27

ENCO 4312: Energy Economics

Syllabus 2013 Fall

<i>Instructor</i>	Michael Giberson
<i>Office</i>	BA W324
<i>Office phone</i>	(806) 834-3161
<i>Email</i>	michael.giberson@ttu.edu
<i>Office hours</i>	MW 9:30-10:50 AM, TR 11:00 AM-Noon, and by appointment.
<i>Class</i>	MWF 11:00-11:50 AM, BA 009

Course description

The course will focus on oil and gas project economics, with emphasis on project cost and revenue forecasting; interaction of wholesale and retail energy markets; the relationship between energy markets and broader economic conditions; and economic analysis of natural resources.

Course materials

- The course will rely heavily on readings available online. Links will be provided via the class website. There is no assigned textbook.
- Students are also assigned to Energy Information Administration's daily series "Today in Energy." View here: <http://www.eia.gov/todayinenergy/> or sign up for email service here: <http://www.eia.gov/tools/emailupdates/>.

Expected Learning Outcomes

After completing this course, students will be able to:

- Describe current energy market trends and relate current conditions to historical market performance;
- Explain basic oil market and gas market dynamics, focusing on consumer and producer responses to prices;
- Evaluate project economics for an oil or gas resource and understand related industry practices and standards;
- Identify uncertain factors in long-term forecasts (especially as relate to project evaluation) and employ analytical tools to guide decision making under uncertainty;
- Describe current views on the relationship between energy markets and the macroeconomy;
- Explain concepts fundamental to the economics of natural resources; and,
- Identify economic concepts relevant to understanding peak oil, resource growth and exhaustion.

Methods of Assessing Outcomes

Homework – There will be several homework assignments over the course of the semester.

Class participation – Students are expected to come to class prepared and contribute to class discussions and other activities. Class participation grade will be determined via the "Present and Prepared" policy as explained below.

Midterm Exam – The midterm exam is *planned* for Monday, October 14.

Final Exam – Test scheduled for Friday, 7:30 AM to 10:00 AM, December 6.

Grading

- | | |
|-----------------------|-----|
| • Homework | 25% |
| • Class Participation | 15% |
| • Mid-Term Exam | 30% |
| • Final Exam | 30% |

Additional class policies

In general, the class will follow standard university policies as described in the Texas Tech University Operating Policies (<http://www.depts.ttu.edu/opmanual/>). In addition, please note:

Academic honesty: It is the aim of Texas Tech University to foster a spirit of complete honesty and high standard of integrity. Academic dishonesty will not be tolerated and will be treated according to the rules outlined in the Student Handbook.

Absences: A student who will miss class due to a university-approved trip or to observe a religious holy day should make that intention known to the instructor prior to the absence so that accommodations can be made in accordance with university policies.

In general, I expect that you will be in class and assume that if you choose not to be in class it is for good reason. When you miss class, it is your responsibility to catch up or cover missing materials or assignments. The class website and your fellow students should be your first recourse in such cases.

Disabilities: Any student who requires some special arrangements in order to meet course requirements should contact the instructor to request necessary accommodations.

Present and Prepared: At the beginning of most classes this semester, Dr. Giberson will provide a sign-in sheet for students to indicate they are "present and prepared." If you are counted as "present and prepared" for at least 85 percent of the time, you will earn all 15 class participation points. If counted present and prepared fewer than 85 percent of the time, you'll earn fewer class participation points. (From 80-85 percent, then 13 points; if 75-80 percent, then 11; if 70-75 percent, then 9. If counted "present and prepared" less than 70 percent of the time, you will obtain 8 or fewer points.)

Being "present and prepared" is obviously more than just "present." By signing in you are indicating you have read the assigned material and are prepared to actively contribute to class.

Syllabus and course outline changes: The instructor may adjust the syllabus or course outline during the course of the semester. Updated versions of the syllabus and course outline will be maintained on the class website (<http://giberson.ba.ttu.edu/ENCO4312>).

ENCO 4312: Energy Economics

Course Outline 2013 Fall

Outline of topics

1. Energy supply and demand

- a) Introducing the course
- b) Economic fundamental applied to energy

2. Oil resources – economic considerations

- a) Discounted cash flow analysis and oil reserves
- b) Reserves and resources
- c) Oil markets and prices
- d) Forecasting prices, arbitrage, speculation
- e) Oil demand, oil supply, and OPEC

3. Natural gas resources– economic considerations

- a) Gas prices and oil prices
- b) Role of natural gas liquids
- c) Exporting natural gas

4. Risk and uncertainty in reserve evaluation

- a) Sensitivity analysis, scenario analysis and decision trees
- b) Applying decision trees; Options and portfolios
- c) Monte Carlo analysis

Mid Term exam

5. Downstream oil markets

- a) Refinery issues; the crack spread
- b) Pipeline issues
- c) Retail gasoline
- d) Energy markets and the macroeconomy

6. Natural resource and environmental economics

- a) Common pool resources
- b) Tragedy of the commons
- c) Unitization
- d) Hubbert and peak oil
- e) Hotelling and the economics of depletable resources
- f) The future of oil and gas resources
- g) Malthusians and Cornucopians

Final Exam

Economics 394b: Energy Economics

Spring 2012, Directed Study

Syllabus

Instructor: Matt Berman

Office: Diplomacy Building 507K (ISER)

Phone: 786-5426

E-mail: matt.berman@uaa.alaska.edu

Office hours: M-W 3:00-5:00, and by appointment

Prerequisites: Econ. 201, Econ. 202
Engl. 111 (recommended)

Text: Carol A. Dahl, *International Energy Markets: Understanding Pricing, Policies, and Profits*, Tulsa: Pennwell, 2004.

This course examines economic theory, empirical perspectives, and political economy of energy supply and demand. It discusses aspects of local, national, and global markets for oil, natural gas, coal, electricity, nuclear power, and renewable energy; and examines public policies affecting energy markets including taxation, price regulation and deregulation, energy efficiency, and control of emissions.

In this course we will develop and use tools of economic analysis to understand the main contemporary policy issues related to energy. The primary focus is on global and national energy markets and institutions, and on how local and Alaska energy issues are embedded in the context of a national and global political economy. Some of the types of policy issues addressed include:

- **Is the world running out of oil, or, put differently, is the physical scarcity of oil leading to a trend of permanently escalating prices, aside from temporary blips due to global economic recessions?**
- **Should the United States immediately adopt a binding cap on greenhouse gas emissions from burning fossil fuels?**
- **Did electricity deregulation cause blackouts and skyrocketing prices in California?**

- Is investing in nuclear power an efficient strategy for producing clean energy in the long run?

Course Objectives

- Understand *basic economic concepts* that underly energy production and end use.
- Understand how local, regional, and global *institutions* affect energy markets and prices.
- Become familiar with historical and contemporary *public policy issues* related to energy in the U.S. and globally.
- Be able to *apply* this knowledge to analysis of specific energy industries and policy questions.

Class Format and Assignments

As a directed study course, the class will meet together typically once per week for workshops about core concepts and class assignments, and hold group discussions of assigned readings. More coursework will be conducted via internet-based assignments than for a normal class, but less than typical for a distance-delivered class. Reading assignments include chapters from a textbook and limited additional readings. Class discussions relate to assigned readings, problem sets, and to field work related to local energy issues. Several problem sets will be assigned on a pass-fail basis that address more analytical aspects of the course material. Students are encouraged to work together on problem sets, so long as each student prepares his or her own written answers. Material drawn from the problem sets may be used in interactive in-class exercises. Examinations consist of a mid-term and a final. The final exam is cumulative. Students will also have a formal debate on a major Alaska energy policy issue and complete a group project that produces a written report, as described below.

Debate

Alaska and the nation face a number of urgent challenges related to energy policy. Economic questions are embedded in each of these policy choices, and opinions differ on the best choice. Working on the assumption that informed debate can stimulate critical thinking on the issues, each student will participate in a group debate that will be held at an assigned time during the semester. Students will collectively choose the topic they would like to debate, and which side they will choose to argue. Potential topics for the debate could be (1) should Alaska state taxes on oil and gas be lowered as proposed by Governor Parnell? or (2) should the State of Alaska support the Susitna hydroelectric project as proposed by the Alaska Energy Authority.

Group Project

Each student will participate in a group research project that critically examines a major policy issue facing Alaska, with potential national or international consequences, and develops a recommended strategy for addressing the issue. The group will write a report that contains the recommendations, along with supporting research and analysis, and summarize it in a class presentation. The emphasis of the analysis in the report will be on the economic issues around the selected energy policy issue (including economic consequences of environmental effects), rather than on the strictly biophysical, engineering, technical, legal, or political issues. Topics could include one of the two debate topics proposed above (but not the one selected for the actual debate), or another major current issue such as support for a liquefied natural gas pipeline from Alaska's North Slope or policy regarding Arctic offshore energy development. Guidelines for length, format and documentation of reports will be distributed and discussed in class.

Grade Determination:

Midterm exam:	20%
Final exam	25%
Problem sets	10%
In-class and web-based exercises	5%
Debate participation	10%
Group project report	30%
<i>Total</i>	100%

Course Outline

I. Overview of Energy Supply and Demand

Jan. 16-18: Introduction

Readings: Dahl: ch. 1; browse through BP Statistical Review and EIA Energy Basics 101

Topics: energy basics, U.S. and world energy consumption and trade

Jan.23-25: Overview of energy demand

Readings: Dahl: ch. 2

Topics: energy end uses, history of energy use, energy intensity of GDP

II. Fossil Fuel Markets

Jan. 30-Feb. 1: Coal

Readings: Dahl: ch. 3

Feb. 6-8: Oil

Readings: Dahl: ch. 6; Hamilton, Understanding Crude Oil Prices

Feb. 13-15: Natural Gas

Readings: Dahl: ch. 7

III. Externalities and Public Policy

Feb. 20-22: Pollution

Readings: Dahl: ch. 8

Feb. 27-29: Climate change

Readings: Dahl: ch. 9

IV. From Primary Production to End Use

Mar. 5-7: Energy transportation and storage

Readings: Dahl: ch. 14

Midterm exam

Mar. 12-14: Spring Break (no class)

Mar. 19-21: Electricity and regulation

Readings: Dahl: ch. 4; MIT Study on *The Future of Nuclear Power*, ch. 5

Class debate (tentative)

Mar. 26-28: Deregulation and competition

Readings: Dahl: ch. 5

V. Financing Energy Development

Apr.. 2-4: Energy resources and economic rent

Readings: McDonald, *The Leasing of Federal Lands for Fossil Fuel Production*: Ch. 3; McBeath et al., *Political Economy of Oil in Alaska*, Ch. 4

Topics: economic rent, leasing and taxation of energy resources, government revenues

Apr. 9-11: Allocation of resources over time and financing energy development

Readings: Dahl: ch. 12

Topics: discounting, "levelized" costs of renewable resources, depletion of non-renewable resources

Apr. 16-18: Electricity supply

Readings: Dahl: ch. 13

Topics: energy sources, cost of production

Apr. 23-25: Energy futures

Readings: IEA World Energy Outlook, Executive Summary

Presentation of case study; written case study report due.

May 2: Final Exam