



Department of Economics Course Outline

Course:	Economics 494 [Applied Energy Economics II]	Term:	Fall 2008 (F) Winter 2009 (W)
Time:	W 15:00 – 17:50	Section:	01
Instructor:	1- Afshin Honarvar (F) 2- Abbas Naini (W)	Place:	ST 059 (F) SH 268 (W)
Office:	SS 405	Telephone:	220-2391 (F) 284-6494 (W)
Office Hours:	Wednesday 14:00-15:00 (F) Wednesday 13:45 – 14:45 (W) (subject to change)	E-mail:	honarvar@ucalgary.ca anaini@ceri.ca

Textbook(s):

Dahl, Carol (2004), *International Energy Markets, Understanding Pricing, Policies and, Profits*, Latest edition, PennWell Publishing. [**Required**]

Important Web Locations

Natural Resources Canada: www.nrcan.gc.ca

National Energy Board: www.neb.gc.ca

Alberta Department of Energy: www.energy.gov.ab.ca

Alberta Energy and Public Utilities Board: www.eub.gov.ab.ca

International Energy Agency: www.iea.org

Organization of Petroleum Exporting Countries: www.opec.org

BP statistical review: www.bp.com

U.S. Energy Information Administration: www.eia.doe.gov

Additional sources:

Economics on Nonrenewable Natural Resources

Harold Hotelling, "The Economics of Exhaustible Resources," *Journal of Political Economy* 39 (1931): 137-75. .../2

Robert Solow, "The Economics of Resources or the Resources of Economics," *American Economic Review*, May 1974.

Ronald H. Schmidt, "Hotelling's Rule Repealed> An Examination of Exhaustible Resource Pricing," Federal Reserve Bank of San Francisco *Economic Review*, Fall 1988.

Michael C. Lynch, "Forecasting Oil Supply: Theory and Practice," *Quarterly Review of Economics and Finance*, special issue, 2002.

Fundamentals of the Energy Market

U.S. Energy Information Administration website: <http://www.eia.doe.gov/>.

Robert S. Pindyck: *The Structure of World Energy Demand*, MIT Press, 1979.

Economics of Climate Change and Global Warming Policy

John P. Weyant, editor, "The Costs of the Kyoto Protocol: A Multi-Model Evaluation," *The Energy Journal*, Special Issue, 1999.

Stephen P. A. Brown and Hillard G. Huntington, "Terms of Trade and OECD Policies to Mitigate Global Climate Change," *Economic and Financial Policy Review*, Federal Reserve Bank of Dallas, 2(1) 2003. http://www.dallasfedreview.org/articles/v02_n01_a01.html.

Energy Policy, Special Issue: An Economic Analysis of Climate Policy, March 2004

Economics of the World Oil Market

Dermot Gately: "Lessons from the 1986 Oil Price Collapse," *Brookings Papers on Economic Activity*, 1986.

Dermot Gately, "Do Oil Markets Work? Is OPEC Dead?": *Annual Review of Energy*, 1989.

Carole Dahl and Mine Yücel, "Testing Alternative Hypothesis of Oil Producer Behavior," *The Energy Journal*, December 1991.

Borenstein, Severin, A. Colin Cameron, and Richard Gilbert, "Do Gasoline Prices Respond Asymmetrically to Crude Oil Prices?" *Quarterly Journal of Economics*, February 1997.

Shihab-Eldin, Adnan et al (2004): "Oil Outlook to 2025" OPEC Review, September.

Al-Attar and Alomair: "Evaluation of upstream petroleum agreements and exploration costs" OPEC Review December 2006.

PennWell Publishing CO (2005): International Petroleum Encyclopedia.

Bureau of Transport and Regional Economics, Australia (2005) "Is the world running out of oil?"

Reynolds D. (2005) "The economics of oil definitions: the case of Canada's oil sands" OPEC Review.

BP: Statistical review of World Energy June 2005.

A. F. Alhajji and David Huettner, "The Target Revenue Model and the World Oil Market: Empirical Evidence from 1971 to 1994," *The Energy Journal*, 21(2), 2000.

A. F. Alhajji and David Huettner, "OPEC and World Crude Oil Markets from 1973 to 1994: Cartel, Oligopoly or Competitive," *The Energy Journal*, 21 (3), 2000.

Michael C. Lynch, "Forecasting Oil Supply: Theory and Practice," *Quarterly Review of Economics and Finance*, Special Issue, 2002

Morris A. Adelman, "World Oil Production and Prices: 1947-2000," *Quarterly Review of Economics and Finance*, Special Issue, 2002.

Economics and Restructuring of Natural Gas Markets

Energy Modeling Forum, *North American Natural Gas Markets*, Summary Report, EMF Report 9, Volume 1, Stanford University, December 1988.

Stephen P. A. Brown and Mine K. Yücel, "The Pricing of Natural Gas and U.S. Markets," Federal Reserve Bank of Dallas, *Economic Review*, Second Quarter 1993.

Economics and Restructuring of Electricity Markets

Robert K. Kaufmann, "The Effect of Expected Energy Prices on Energy Demand: Implications for Energy Conservation and Carbon Taxes," *Resource and Energy Economics*, May 1994.

Stephen P. A. Brown and Hillard G. Huntington, "The Economic Cost of U.S. Oil Conservation," *Contemporary Economic Policy*, July 1994.

The required text in **winter 2008** will be the same but additional optional text books and reading materials are:

Required Text Book

International Energy Markets - Understanding Pricing, Policies, and Profits, Carol A. Dahl

Reserve Readings

Introduction to Management Science, Quantitative Approach to Decision Making, Anderson, Sweeney, Williams

Statistics for Management and Economics, Gerald Keller and Brian Warrack

Reading Materials

Alberta's Energy Reserves 2007 and Supply/Demand Outlook 2008-2017 (AEUB St98-2008) <http://www.ercb.ca/docs/products/STs/ST98-2008.pdf>

Energy Technologies for the 21st Century, IEA/AIE

<http://www.iea.org/textbase/nppdf/free/1990/tech21century1997.pdf>

Petroleum Refinery Planning and Optimization Using Linear Programming

http://www.cheresources.com/refinery_planning_optimization.shtml

Linear Programming (Application of Refinery and Mining)

http://www.che.utexas.edu/course/che356/Chapter_7.ppt#3

Linear programming in Practice

<http://www.sce.carleton.ca/faculty/chinneck/po/Chapter7.pdf>

Crude Oil Price Differentials and Differences in Oil Qualities: A Statistical Analysis

Robert Bacon and Silvana Tordo, World Bank

[http://wbln0018.worldbank.org/esmap/site.nsf/files/081-05+Final+_for_Web.pdf/\\$FILE/081-05+Final+_for_Web.pdf](http://wbln0018.worldbank.org/esmap/site.nsf/files/081-05+Final+_for_Web.pdf/$FILE/081-05+Final+_for_Web.pdf)

OPEC's Discounts on Heavy Crude Oil: Is a New Policy Instrument Taking Shape?

Bassam Fattouh, Oxford Energy Comment July 2006

http://www.oxfordenergy.org/pdfs/comment_0606-3.pdf

The Relationship between Crude Oil and Natural Gas Prices

Energy Information Administration and George Washington University, A. Villar and L. Joutz

http://www.eia.doe.gov/pub/oil_gas/natural_gas/feature_articles/2006/reoilgaspri/reoilgaspri.pdf

Report of the Alberta Royalty Review Panel, September 2007

http://www.albertaroyaltyreview.ca/panel/final_report.pdf

The New Royalty Framework, October 215, 2007

http://www.energy.gov.ab.ca/Org/Publications/royalty_Oct25.pdf

Course Outline:

The Applied Energy Economics Course 494 studies the role of energy and energy resources from the economics perspective. Basic economic principles and methods are used to examine problems in the production, distribution, and use of energy in all its important forms including coal, oil, gas, nuclear, electricity, and the various alternative fuels. Special policy issues such as the environmental problems of energy use, regulation, the depletion of energy resources, and other problems pertaining to the energy industries including the effects of taxation of depletable resources will be discussed. The course will also review the relationships and volatility levels of energy spot and futures markets and will also introduce the students to energy forecasting, especially demand and prices and issues therein.

The course has been structured into **two sequential components**. The first component (in Fall 2008) will provide an **overview of energy sources and markets**. We will begin by reviewing key economic concepts and will review energy fundamentals such as energy sources, their reserves and market shares, costs and prices, temporal energy extraction, energy uses and key definitions. The class will also study the economics of renewable energy sources and/or the energy environmental issues.

Summary the following topics will be covered in the first component:

1. Energy basics and history
2. Energy sources, production, consumption and prices
3. Oil market (supply, demand and price)
4. Forecasting in energy economics
5. International / National energy agencies
6. Temporal production decisions and oil sands industry
7. Economics of natural gas
8. Economics of nuclear power
9. Economics of coal
10. Economics of renewable energy
11. Life Cycle Analysis of the emissions

In the second component (Winter 2009), the class will focus on application of energy economics as well as quantitative and non-quantitative approaches in solving energy issues.

A summary of the topics are as follows

Economic 494 - Course Outline for Winter 2009

Date:	Subjects
Wednesday 14 - Jan	Transportation Sector and Economics of Crude Oil – Crude Oil Price Differential
Wednesday 21 - Jan	Refinery Operations and Economics of Refining
Wednesday 28 - Jan	Review Concepts of Linear Programming (LP), Simplex and Graphical Methods
Wednesday 4 - Feb	Application of Linear Programming in Refining and Energy Transportation
Wednesday 11 - Feb	Application of Linear Programming in Refining and Energy Transportation – LINDO System and Analysis of Output
Wednesday 18 - Feb	Reading Week /
Wednesday 25 - Feb	Refined Petroleum Products Market (Assignment due date – Part I)

Wednesday 4 - Mar	Mid term exam
Wednesday 11 - Mar	Application of Life Cycle Analysis in Electricity Generation
Wednesday 18 - Mar	Energy Trading - Futures and Options Markets for Managing Risk
Wednesday 25 - Mar	Application of Decomposition Component of Time Series Energy Data
Wednesday 1 - Apr	Economics of Pipeline (Assignment due date – Part II)
Wednesday 8 - Apr	Energy Policy: Taxation and Royalty Regime – Alberta Crude Oil, Natural Gas and Oil Sands
Wednesday 15 - Apr	Application of Dummy Variables, and Heating Degree Day Adjustment in Energy Data
Back Up Topics	Energy Economic Impact Analysis Dynamics of Oil and Gas Markets Game Theory and the Western European Natural Gas Market Alberta Regulatory Methodology - Projection of Crude Oil and Natural Gas Production.
Final exam April 21 - 30	

Grade Determination and Final Examination Details:

Since the course has two components, one in Fall 008 and the other in Winter 2009, each component weighs 50% of the final grade. For each component of the fall course, grades are determined as below:

Midterm	20%	
Assignments	30%	
Final Examination	50%	Registrar Scheduled

For the winter course, grades are determined as below:

Midterm	25%	
Assignments	25%	
Final Examination	50%	Registrar Scheduled

Tests and final exams are marked on a numerical (percentage) basis and a final numerical grade is calculated for each component of the course. The final numerical course grade is calculated using the weights indicated above (50% weight for each component) and then converted to the letter grades. As a guide to determining standing, these letter grade equivalences will generally apply.

A+	94 – 100	B	71 – 79	C-	50 - 53
A	89 – 93	B-	65 – 68	D+	46 – 49
A-	84 – 88	C+	61 – 64	D	40 – 45
B+	80 – 83	C	54 – 60	D-	30 – 39
				F	0 - 29

If, for some reason, the distribution of grades determined using the aforementioned conversion chart appears to be abnormal the instructors reserve the right to change the grade conversion chart if the instructors, at the instructors' discretion, feel it is necessary to more fairly represent student achievement.

A passing grade on each component of the course is required for a student to pass the course as a whole.

Non-programmable calculators will be allowed during the midterm and final examinations.

There will be a Registrar scheduled final examination, 2 hours and held in a classroom. Tests and exams will not be multiple choice questions.

Students' Union Vice-President Academic:

Pamela Weatherbee
Phone: 220-3911
E-mail suvpaca@ucalgary.ca

Students' Union Faculty Representative (Social Sciences)

Teale Phelps Bondaroff
Phone: 220-3913 Office: MSC 251
E-mail socialscirep@su.ucalgary.ca

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

www.ucalgary.ca/sue/

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.
- It is the student's responsibility to request academic accommodations. If you are a student with a documented 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.

Safewalk / Campus Security: 220-5333

AN/mi
2009-01-05