



**Subject: EBGN Number: 430/530**

**Course Titles: 430A Advanced Energy Economics**

**530A: Economics of International Energy Markets**

**Semester/year: Fall 2018**

**Instructor or Coordinator: Professor Carol Dahl**

**Contact information (Office/Phone/Email): EH128/302-273-3921/cadahl@mines.edu**

**Office hours: T&Th 12:00-14:00&19:45-20:45**

**Class meeting days/times: T&Th 18:30-19:45**

**Class meeting location: EH 211**

**Assistant: Guessann Oka**

**Contact information (Office/Phone/Email): [goka@mymail.mines.edu](mailto:goka@mymail.mines.edu)**

**Office Hours: To be Scheduled**

**Instructional activity: 3 hours lecture 3 semester hours**

**Course designation: 430A Advanced Energy Economics**

√\_elective undergraduate EBGN 400 level course

**530A: Economics of International Energy Markets**

√\_elective Masters Phd level field course

**Course description from Bulletin:**

**EBGN430:** Application of economic models to understand markets for oil, gas, coal, electricity, and renewable energy resources. Models, modeling techniques and applications include market structure, energy efficiency, demand-side management, energy policy and regulation. The emphasis in the course is on the development of appropriate models and their application to current issues in energy markets.

Prerequisites: EBGN301, EBGN330. 3 hours lecture; 3 semester hours

**EBGN530:** Application of models to understand markets for oil, gas, coal, electricity, and renewable energy resources. Models, modeling techniques, and issues included are supply and demand, market structure, transportation models, game theory, futures markets, environmental issues, energy policy, energy regulation, input/output models, energy conservation, and dynamic optimization. The emphasis in the course is on the development of appropriate models and their application to current issues in energy markets. Prerequisites: Principles of Microeconomics, MATH111, EBGN509, EBGN510, EBGN511.

**Textbook and/or other required materials:**

1. **Required text:** Dahl, Carol A. (2015) *International Energy Markets: Understanding Pricing, Policies, and Profit*, 2nd Edition, Tulsa, OK: Pennwell Press.

2. Other materials provided on Canvas. Google Drive, handouts

**Student learning outcomes: At the conclusion of the class, the successful students will be able to:**

1. identify and list major properties of key energy sources: coal, oil, natural gas, electricity, and renewable energy, write definitions of the key energy concepts provided with each chapter, and describe key energy policies
2. make conversions using metric/non-metric rates, price indices, and exchanges rates
3. use the international databases provided to the class to identify, graph, discuss and measure energy trends, growth rates, correlations between variables, large market players and complete assigned tasks to help maintain and enhance the collection of databases
4. review and apply the models and tools in the prerequisite courses microeconomics (market models), calculus (optimization, derivatives, integrals) and probability and statistics (means, variances, correlations, expected values) to specific energy examples.
5. apply qualitative models to show and explain the effects that causal variables have on energy markets
6. build and solve quantitative models with manual solutions for simple examples and computer applications (Excel and Gams) for more complicated models and to check manual solutions.
7. recognize how, what, when, and where models can be used for forecasting, policy analysis, project evaluation, economic decision making, and analyzing current events and controversies relating to energy markets.
8. identify an energy economic myth or misconception from the popular press or internet and use concepts from the course to explain why it is misleading or wrong.

**Course Requirements and Grading Procedures:**

You will be expected to have read the next assigned chapter as soon as we complete the previous chapter and by the time we start the new chapter in class.

Your grades will be determined by the following assigned activities, which sum to 800 points.

460 points – Exams: Midterm (200) Final (260)

90 points – 4 Quizzes, I will take the best 3 out of 4

100 points – 6 Assignments. I will take the best 5 out of 6.

50 points – Extra chapter. As we will not have time to cover all chapters, you will pick a later chapter to read and help improve existing learning materials or develop new materials. You will need to pick your chapter by September 15 and we should try to collaborate to set up the curriculum for each extra chapter **by October 30.**

80 points – Class activities 5 points per class. I will take the best 80%.

20 points – Find an economic myth or misconception relating to energy in the popular literature and write a short explanation or create a short presentation video that explains why this is a myth or misconception.

Grades are based on % of total points using the following scale

A > 92.5 %

A- 89.5-92.5%

B+ 87.5% – 89.5%

B 82.5% – 87.5%

B- 79.5% –82.5%

C+ 77.5% – 79.5%

C 72.5% – 77.5%

C- 69.5% – 72.5%

D+ 67.5% – 69.5%

D 62.5% – 67.5%

D - 59.5% –62.5%

**Late and absence policy:** There is flexibility built into the course, so absences are usually not an issue or make-up work offered for assignments, activities and quizzes. Assignments with soft copies are to be turned in during class or slid under my office door after hours on the due date unless otherwise announced. Assignments can always be turned in early if you know you will miss a class and will be accepted up until midnight of the day they are due without penalty. Homeworks turned in later than that will only be accepted under unusual circumstances.

Exams: If you will be absent during a scheduled exam, you should schedule a make-up time before the exam if at all possible.

**Canvas:** The course will use Canvas. To login, go to <http://canvas.mines.edu>. Click on login. I believe your mines username and password should get you in. You should have automatically been enrolled in the course when you are registered. I believe that if you click on the course called Advanced Energy Economics EBG430/530, you can access the material for the course.

**Tips, Tricks, and Queries:** If you have questions or can offer answers and advice about canvas or anything else in the course, you can post your material on this discussion board.

**Edit4Credit:** I will give one point of extra credit (up to 10 points per person) to the first person who finds substantive errors in the material for the course. (Formatting issues won't count.) Post the errors on Canvas on the discussion board called Edit4Credit. Click on the discussion and add a reply. In the title of your post, indicate where you found the error with the error indicated in the post. If you do not earn 10 points of Edits4Credits, see me near the end of the semester for other possibilities to earn up to 10 points of extra credit. If you subscribe you will be notified of new posts. Let me know if you can see others posts without subscribing.

**Video Learning Modules:** To make the class more interactive and class time more relaxed, some chapters will be supplemented with video learning modules. These modules contain review material, self tests, and new material to supplement and reinforce information from the book and lectures. You will be introduced to the format of these learning modules in assignment 1.

**Self Tests:** There are also self tests posted at (<http://dahl.mines.edu/530>) for each chapter to help you with homeworks and to study for quizzes and exams. Answers to the questions are online. Self tests are not to be handed in.

**Course schedule and topics covered:** Below is the table of contents from the book. We will cover chapters 1-7 and selected topics from other chapters given student preferences and time remaining. Assignments will be due one or two classes after we complete the topic with targeted due dates given below. As there is usually some slippage, assignment due dates may be moved further to the future. Dates for quizzes and exams will not change (unless by mutual agreement) but will be adjusted to the material that has been covered. Notice chapter 2 has been moved to be after chapter 4.

## Introduction to Markets, Modeling and Policy

### 1. Introduction

**A01 due August 28**

**Quiz 1 on Introduction and Matrix Review is on September 30**

### 3. Perfect Competition and the Coal Industry

### 4. Energy Taxes, Subsidies, and Social Welfare A03

**A02 due September 11**

**Extra chapter choice due September 14**

**Quiz 2 is September 20**

### 2. Energy Lessons from the Past and Modeling the Future

## **A03 due September 25**

### **Market Structure**

5. Natural Monopoly and Electricity Generation

**Midterm October 4**

6. Restructuring in the Electricity Sector

**Semester Break October 16**

**A04 due October 23**

**Extra chapter curricula established by October 30**

**Quiz 3 is November 1**

7. Monopoly, Dominant Firm and OPEC

**A05 due November 6**

**Quiz 4 is November 15**

**Remaining topics will be chosen by class from the chapters below.**

**A06 due November 20**

**Misconception due November 29**

**Extra chapter tasks due December 4**

8. Transaction Costs and U.S. Natural Gas Markets

9 Monopsony - Japan and the Asia Pacific LNG Market

10 Game Theory in W. European Natural Gas Market

### **Energy and the Environment**

11. Externalities and Energy Pollution

12 Public Goods and Global Climate Change

13. Energy Accidents

### **Dynamic Models and Model Inputs**

14. Allocating Fossil Fuel Production over Time and Oil Leasing

15. Supply and Costs

16. Modeling Energy Demand

17. Refining, Transportation, and Linear Programming

### **Managing Risk**

18. Energy Futures Markets for Managing Risk

19. Energy Options Markets for Managing Risk

### **Development and Sustainability**

20. Climbing the Energy/Development Ladder to a Sustainable Energy Future

21. Sustainable Wealth in Fossil Fuel Rich Developing Countries

### **The End of the Journey**

22. Managing in the Multicultural World of Energy

**Prerequisites for the Course** (See me if you do not have the prerequisites)

EBGN 509 Mathematical Economics or Calculus I, II, II, and simple Matric Algebra

To review math skills needed you can take self tests at

<http://dahl.mines.edu/courses/dahl/alg/>

<http://dahl.mines.edu/courses/dahl/MatA/690-MatA-st.htm>

<http://dahl.mines.edu/courses/dahl/calc/>

Introduction to Probability and Statistics

<http://dahl.mines.edu/courses/dahl/ps/>

Introduction to Microeconomics

<http://dahl.mines.edu/courses/dahl/micro/>

EBGN 511 Microeconomics



Cell phones are to be off during class.



If you have a notebook computer, I will sometimes post a request by noon of the class day to please bring notebook to class as we will do some in-class activities using Excel. We will work in groups so 1 notebook for 2-3 students usually works fine.

**Policy on academic integrity/misconduct:** The Colorado School of Mines affirms the principle that all individuals associated with the Mines academic community have a responsibility for establishing, maintaining an fostering an understanding and appreciation for academic integrity. In broad terms, this implies protecting the environment of mutual trust within which scholarly exchange occurs, supporting the ability of the faculty to fairly and effectively evaluate every student's academic achievements, and giving credence to the university's educational mission, its scholarly objectives and the substance of the degrees it awards. The protection of academic integrity requires there to be clear and consistent standards, as well as confrontation and sanctions when individuals violate those standards. The Colorado School of Mines desires an environment free of any and all forms of academic misconduct and expects students to act with integrity at all times.

Academic misconduct is the intentional act of fraud, in which an individual seeks to claim credit for the work and efforts of another without authorization, or uses unauthorized materials or fabricated information in any academic exercise. Student Academic Misconduct arises when a student violates the principle of academic integrity. Such behavior erodes mutual trust, distorts the fair evaluation of academic achievements, violates the ethical code of behavior upon which education and scholarship rest, and undermines the credibility of the university. Because of the serious institutional and individual ramifications, student misconduct arising from violations of academic integrity is not tolerated at Mines. If a student is found to have engaged in such misconduct sanctions such as change of a grade, loss of institutional privileges, or academic suspension or dismissal may be imposed.

The complete policy is [online](#).

**Grading Procedures** Homeworks with soft copies are to be turned in during class or placed in plastic holder by my door on the due date unless otherwise announced. They can be turned in early if you know you will miss a class and will be accepted up until midnight of the day they are due without penalty. Homework to be turned in electronically will also be accepted until midnight of the day they are due. Homeworks turned in later than that will only be accepted under unusual circumstances.

Exams: If you can not avoid being absent during a scheduled exam, you should schedule a make-up time before the exam if at all possible.

**Coursework Return Policy:** Graded material will be returned within two weeks of due date except under unusual circumstances.

**Students with Disabilities:** In guidance put forth by the Department of Justice and the Office for Civil Rights, it is incumbent upon us as an institution to ensure that students know where to seek assistance for disability-related accommodations or information. Inclusion of a disability support statement in syllabi is a national best practice and standard supported by ADA enforcement agencies and AHEAD (Association on Higher Education and Disability), as part of a multi-pronged approach to supporting an inclusive culture on campus.

As such, please include the following statement (*italicized*) in your course syllabi at Mines. Additionally, please make sure to underscore the statement pertinence and directive as part of your course welcome.

*Disability Support Services - The Colorado School of Mines is committed to ensuring the full participation of all students in its programs, including students with disabilities. If you are registered with Disability Support Services (DSS) and I have received your letter of accommodations, please contact me at your earliest convenience so we can discuss your needs in this course. For questions or other inquiries regarding disabilities or academic accommodations, I encourage you to visit [disabilities.mines.edu](https://disabilities.mines.edu) for more information.*

**Discrimination, Harassment and Title IX** - All learning opportunities at Mines, including this course, require a safe environment for everyone to be productive and able to share and learn without fear of discrimination or harassment. Mines' core values of respect, diversity, compassion, and collaboration will be honored in this course (More information can be [found here](#)) and the standards in this class are the same as those expected in any professional work environment. **Discrimination or harassment of any type will not be tolerated.** As a participant in this course, we expect you to respect your instructor and your classmates. As your instructor, it is my responsibility to foster a learning environment that supports diversity of thoughts, perspectives and experiences, and honors your identities. To help accomplish this:

- Course rosters are provided to the instructor with the student's legal name. I will honor your request to address you by an alternate name or gender pronoun. Please advise me of this preference early in the semester so that I may make appropriate changes to my records.
- If something is said or done in this course (by anyone, including myself) that made you or others feel uncomfortable, or if your performance in the course is being impacted by your experiences outside of the course, please report it to:
  - Me (if you are comfortable doing so)
  - Wellness Center- Counseling (<https://www.mines.edu/counseling-center/>)
  - Speak Up (<https://www.mines.edu/speak-up/>)- Anonymous Option

In this course, we will cultivate a community that supports survivors, prevents interpersonal violence, and promotes a harassment free environment. Title IX and Colorado State law protects individuals from discrimination based on sex and gender in educational programs or activities. Mines takes this obligation seriously and is committed to providing a campus community free from gender and sex-based discrimination. Discrimination, including sexual harassment, sexual violence, stalking, and domestic violence, is prohibited and will not be tolerated within the Mines campus community. If these issues have affected you or someone you know, you can access the appropriate resources here: <http://www.mines.edu/title-ix/>. You can also contact the Mines Title IX Coordinator, Karin Ranta-Curran, at 303-384-2558 or [krcurran@mines.edu](mailto:krcurran@mines.edu) for more information.

It's on us, all of the Mines community, to engineer a culture of respect