

AAE/ECON 371: ENERGY, RESOURCES AND ECONOMICS
DEPT. OF AGRICULTURAL AND APPLIED ECONOMICS
UNIVERSITY OF WISCONSIN - MADISON
FALL 2020

INSTRUCTOR: Sarah Johnston

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virtual office hours: Mondays 2-4 pm CT, and by appointment

COURSE DESCRIPTION: Use microeconomic theory to analyze energy markets. Discuss the economics of oil, gas, and electricity and learn about applications to contemporary issues and policy questions.

CREDITS: This is a 3 credit course.

PREREQUISITES: A A E 215, ECON 101, or ECON 111.

COURSE DESIGNATIONS: Intermediate Level; Counts as Liberal Arts and Science credit in L&S.

INSTRUCTIONAL MODE: Synchronous Online.

LECTURES: Tuesday and Thursday, 11:00 am - 12:15 pm CT on Zoom. This three credit course has two 75 min lectures per week. Students are expected to work approximately 7 hours outside class each week to complete assignments and learn course material.

Meeting ID - 953 7496 7859; Access Code - 37120

<https://uwmadison.zoom.us/j/95374967859?pwd=aU5VM0J4cFRhU1ZZSkFHRk1MY1M0QT09>

COURSE LEARNING OUTCOMES: By the end of this course, students should be able to do the following:

- use economic tools to describe energy demand
- apply economic models of competition to energy markets
- analyze how policies to mitigate climate change affect energy markets

COURSE WEBSITE: <https://canvas.wisc.edu/courses/220590>

OFFICE HOURS: Mondays from 2-4 pm CT on Zoom.

Meeting ID - 980 1802 1393; Access Code - 915837

<https://uwmadison.zoom.us/j/98018021393?pwd=NU9HcGRVcHlnTEptbzE3UnJQcEoyQT09>

EMAIL: Please include “371” in the subject.

READINGS: There is no textbook for this course. Readings for the course will be posted on Canvas. We will discuss the readings in class, so it is important that you do them beforehand.

PROBLEM SETS: There will be eight problem sets, with the due date given at the top of each assignment. **Problem sets must be submitted on Canvas by the time class starts (11 am CT).** Please do not wait until the last second in case of internet connectivity problems.

The purpose of the problem sets is to help you learn the material and allow you to monitor your progress in the course. The style of questions asked will be similar to the style of questions on exams. Therefore, completing the problem sets and carefully reviewing the answers is an important way you can prepare for the exams.

Problem sets will be graded on a 4 point scale that corresponds to $\checkmark+$, \checkmark , $\checkmark-$, $\checkmark--$. You will receive full credit if you make a serious effort to solve every problem. To demonstrate this, you will need to show your work on all problems. If you cannot figure out how to solve a problem, write down what you tried and why you tried it. Part of demonstrating effort is submitting assignments that are neat, organized, and legible. Incorrect answers will not necessarily be marked, so you will want to be sure to review your own work. Note, **you will not receive full credit if you skip any subpart of any problem.**

Problem sets submitted after 11:15 am will be considered late. Problem sets submitted up to 24 hours late will be accepted with a one point penalty. Problem sets more than 24 hours late receive no credit. Because last second emergencies sometimes occur, your lowest problem set score will be dropped when calculating your final grade. **While students are encouraged to collaborate on the problem sets, problem sets must be written up**

individually. No credit will be given for identical problem sets. We will use Piazza (access code EEF2020) for questions on the course material or problem sets. You are encouraged to help your classmates by responding to their questions.

EXAMS: There will be two exams during the semester, both administered virtually during class time. The dates are as follows:

- Midterm 1: 10/20/2020
- Midterm 2: 11/19/2020

Valid reasons for missing an exam are limited to serious illnesses and family emergencies, and you will be required to provide supporting documentation. If a student has a valid reason for missing either midterm exam, there will be no make-up offered at an alternative time; the weight for that midterm exam will be placed on the other midterm exam.

Midterm exam 1 will cover the introduction and the oil and gas markets sections of the course. Midterm exam 2 will cover the electricity markets section of the course. Questions about the OPEC strategy game may be asked on either exam. Exams will be open notes, but you cannot consult with your classmates. You will not have time to re-learn how to do a problem from your notes and should plan your studying accordingly.

OPEC STRATEGY GAME: In the middle part of the course, we will play a group-based strategy game. Your grade in this game will be primarily based on a memo describing why your team played the strategy it did. It will also include credit for active participation.

READING POSTS AND DISCUSSION: By the evening before each class (11:59 pm CT), you should post a short comment on the assigned reading for the next day's class to the Canvas discussion board. These comments do not need to be formal: a paragraph reflection or a couple of thoughtful questions is fine. There are 23 readings in addition to the first class Sharp reading. Your grade for these posts will be out of 20. Fifteen points will be based on whether or not you make a substantive post, with 0.75 points for each post. This means you can miss three posts and still get full credit. Five points will be based on your participation in discussions of the reading during lecture and the quality of your discussion posts. You can substitute active participation on the discussion board for participation during lecture, so students who are unable to attend synchronous lecture can still receive full credit.

PARTICIPATION: You are encouraged to ask questions in class. Almost always, another student will have the same question or find the same explanation unclear. You are encouraged (but not required) to have your camera on during class time. Your participation in class discussions enhances the learning of all students.

COURSE RHYTHM:

Monday	Tuesday	Wednesday	Thursday	Friday
	synchronous lecture		synchronous lecture	
discussion post		discussion post		
office hours				
	HW due most weeks		HW due occasionally	

GRADING: Your final grade will be computed using the following weighting scheme:

20%: Problem Sets

20%: OPEC Strategy Game

20%: Midterm Exam 1

20%: Midterm Exam 2

20%: Reading Posts and Discussion

Letter grades will be assigned based on total score at the end of the course. I plan to use the following cutoffs:

$\geq 92\%$	A
$\geq 88\% \ \& \ < 92\%$	AB
$\geq 82\% \ \& \ < 88\%$	B
$\geq 78\% \ \& \ < 82\%$	BC
$\geq 70\% \ \& \ < 78\%$	C
$\geq 60\% \ \& \ < 70\%$	D
$< 60\%$	F

I reserve the right to adjust these cutoffs downward; they will not be adjusted upward.

ACKNOWLEDGEMENTS: I am grateful to Shaun McRae, as much of the course material is adapted from his energy economics course. Jesse Burkhardt and Paul Brehm also helped with the design of this course, and Severin Borenstein generously shared the OPEC game.

ACADEMIC INTEGRITY: By virtue of enrollment, each student agrees to uphold the high academic standards of the University of Wisconsin-Madison; academic misconduct is behavior that negatively impacts the integrity of the institution. Cheating, fabrication, plagiarism, unauthorized collaboration, and helping others commit these previously listed acts are examples of misconduct which may result in disciplinary action. Examples of disciplinary action include, but is not limited to, failure on the assignment/course, written reprimand, disciplinary probation, suspension, or expulsion. Source: <https://conduct.students.wisc.edu/syllabus-statement/>

ACCOMMODATIONS FOR STUDENTS WITH DISABILITIES: The University of Wisconsin-Madison supports the right of all enrolled students to a full and equal educational opportunity. The Americans with Disabilities Act (ADA), Wisconsin State Statute (36.12), and UW-Madison policy (Faculty Document 1071) require that students with disabilities be reasonably accommodated in instruction and campus life. Reasonable accommodations for students with disabilities is a shared faculty and student responsibility. Students are expected to inform me of their need for instructional accommodations by the end of the third week of the semester, or as soon as possible after a disability has been incurred or recognized. I will work either directly with you or in coordination with the McBurney Center to identify and provide reasonable instructional accommodations. Disability information, including instructional accommodations as part of a student's educational record, is confidential and protected under FERPA. Source: <https://mcburney.wisc.edu/instructor/>

DIVERSITY & INCLUSION: Diversity is a source of strength, creativity, and innovation for UW-Madison. We value the contributions of each person and respect the profound ways their identity, culture, background, experience, status, abilities, and opinion enrich the university community. We commit ourselves to the pursuit of excellence in teaching, research, outreach, and diversity as inextricably linked goals. The University of Wisconsin-Madison fulfills its public mission by creating a welcoming and inclusive community for people from every background - people who as students, faculty, and staff serve Wisconsin and the world. Source: <https://diversity.wisc.edu/>.

COURSE SCHEDULE (SUBJECT TO CHANGE)

I. INTRODUCTION

September 3	Intro and energy basics
September 8 & 10	Short-run and long-run energy demand
September 15 & 17	When markets fail: monopolies and externalities

II. OIL AND GAS MARKETS

September 22 & 24	Optimal extraction of non-renewable resources
September 29 & October 1	Introduction to the oil and natural gas industries
	Introduction to the OPEC Game
October 6 & 8	Futures markets, speculation, and oil prices
October 13 & 15	Fracking, pipelines, and the North American energy market
October 20	MIDTERM EXAM 1
October 22	OPEC group meetings in class

III. ELECTRICITY MARKETS

October 27 & 29	Natural monopoly, regulation, and the electricity industry
November 3 & 5	Restructuring electricity markets and market power
November 10 & 12	Valuing renewable electricity generation
November 12	OPEC GAME MEMO DUE
November 17	Investment in the electricity transmission, market integration
November 19	MIDTERM EXAM 2

IV. SPECIAL TOPICS

November 24	NO CLASS
December 1	Retail electricity pricing
December 3	Distributed generation
December 8	Electric vehicles
December 10	Energy and economic development

TENTATIVE SCHEDULE OF PROBLEM SET DUE DATES

PROBLEM SET	DUE DATE
1	Tuesday, September 15, 2020
2	Tuesday, September 22, 2020
3	Tuesday, October 6, 2020
4	Thursday, October 15, 2020
5	Tuesday, November 3, 2020
6	Tuesday, November 10, 2020
7	Tuesday, December 1, 2020
8	Thursday, December 10, 2020