Syllabus EC438/538 Fall 2019

James Woods

Course Description

The official description of the course is:

> Economics and structure of energy markets, with a focus on electricity. Examines current policy issues arising from energy production and use.

This is a companion course to EC 437/537 which will address regulatory and competitive policies in electricity, public transportation, water, natural, and telecommunications. The order of the courses has changed to reflect the evolving nature of the field.

Prerequisites

The undergraduate section has microeconomic theory, EC 311, or the calculus based version, EC 415, listed as prerequisites. The graduate section requires only graduate standing.

As with most economics courses, the more background you bring to the class, the more get from the class. For this class, it means bringing a background in microeconomic theory and econometrics. Not all students will have a background in both and many of the graduate students from outside of economics will have neither. Any technical skills that students are missing will be supplemented with in-class tutorials. Sometimes this will mean learning about constrained optimization or breaking out laptops for a tutorial on running regressions in R.

Contact Information

Communication will be handled through slack https://psuenergyecon.slack.com. You should have received an invitation, if not, just go to that URL and use your @pdx.edu email to sign up. There are reasonable help documents to get you started. https://get.slack.help/hc/en-us/articles/218080037-Getting-started-for-new-users

Slack will be used for IM, email and forum style communication. It even handles phone calls. If you have a question about course material or the course itself, ask in one of the channels, e.g., #general. If you have a personal message that is not intended for others, send a direct message, i.e., @woodsj. The group has global do not disturb hours of 10pm - 8am. If you would like something different, alter your personal settings.

Please note that I am not online all the time, and when I am online I will prioritize well-phrased questions with sufficient detail. I tend to ignore general complaints, questions that can be answered by reading the syllabus or using the search bar.

Office Hours:

- My office is in CH 241-O.
- Drop in office hours are Monday 3:00-4:00 through the last week of class. There is no need to make an appointment for these hours – just come.
- If you can't attend regular office hours, please check my calendar http://https://woodsj.youcanbook.me/. I will make a limited number of 20 minute slots available each week.

Office hours for XXXX, the teaching assistant, will be posted on slack after the first week of class. We will also post some hours where we will available interactively on slack.

Textbook and Other Resources

The main text for the course is Dahl, Carol. *International Energy Markets: Understanding Pricing, Policies, & Profits.* PennWell Books, 2015. It was chosen undergraduates in mind and illustrates many of the concepts they learned in EC 311/415.

This text will be heavily supplemented with material from the Energy Information Administration (EIA), the textbook authors website, and journal articles and other resources available electronically through the library.

Assessments and Grade Policy

This class will be taught as a collaborative seminar with limited traditional lecture. There are no exams but there will be a considerable amount of writing and analysis, presentations by teams of student researchers. Nearly all work product will be made public to the class, though your grade will not.

- Discussion and Assignments (in total): 45%
- Final Draft of Term Paper: 20%
- Draft Term Paper: 15%
- Presentation of Paper Topic: 15%
- Annotated Bibliography: 3%
- Abstract: 2%

Term papers and bibliographies will be turned in a D2L assignment folder as a pdf or a link to a google doc with PSU log in and granted comment privileges. Malfunctioning links or corrupted files will be interpreted as a missed deadline and receive half the normal credit if corrected within 24 hrs. If a deadline is missed by more than 24 hrs, zero credit will be given.

Discussion and Assignments

Class sessions may begin with an introductory lecture followed by discussions of the assigned readings. Discussion will be facilitated by the instructor with the class being broken into semi-permanant teams who will be assigned specific questions about the readings. These questions will often, but not always, be distributed to the class ahead of time.

After discussion the teams will publish a summary of their conclusions to the rest of the class and answer questions from the class about the summary.

Teams will be assigned by the instructor during the first week of class. They will be composed of at least one graduate student and one undergraduate student. Assignments will be made based a survey of completed math, economics and statistics courses. The intent is to ensure that each team has the skills it needs to succeed.

The teams are intended to encourage cooperative learning where graduate students can assist undergraduate students with concepts they are unsure of and those with exceptional skills can share insight with others.

A team may remove a member by an anonymous 3/4th majority vote of current members. Removed members will act as a team of one until other teams remove members or students join the class. Removed members may join other teams by an anonymous 3/4th majority vote of the receiving team. All votes will be conducted by the instructor. The instructor reserves the right to reassign students to teams should there be large differences in team size.

Teams are expected to create intuitive explanations, make critical statements, and field reasonable questions. Performance will be evaluated by the instructor on a 0 to 5 scale.

Individual/Group Term Paper

The largest assignment will be a term paper. The term paper may be either a literature review, in which case it *must* be completed by an individual, or an empirical/theoretical paper which may have up to three co-authors. Graduate students must complete an empirical/theoretical paper. Term paper preparation and evaluation will be in stages.

1. Authors and co-authors must publish an abstract, including a few key references, in the "Draft Abstracts" assignment folder in D2L by *October 16th at 5pm*. Students will have a 20 minute review meeting with the instructor during that week. These meetings will be scheduled for the week of the 21st. Scope and depth changes will be agreed to in the meeting.
2. A revised abstract must be submitted by *October 28th at 5pm* in the "Final Abstracts" assignment folder in D2L. Abstracts will be discussed in class on October 30th.
3. Authors and co-authors will construct an annotated bibliography. A reasonably complete annotated bibliography will be submitted in D2L by *November 1st at 5pm* in the "Bibliography" assignment folder. Here are some links on how to create an annotated bibliography, http://guides.library.cornell.edu/annotatedbibliography and https://www.bethel.edu/library/research/apa-annobib-sixth.pdf
4. Authors must schedule a 20-minute presentation to the class on data collection, design and analysis approach prior to completion of the draft paper. Students conducting a literature review should schedule a similar session for a key papers in their literature review. These presentation will be scheduled to take place from *Nov 4th through the November 13th* unless the author team wants to schedule something earlier. Early drafts and annotated bibliographies should be distributed before the presentation.
5. A draft of the paper must be published in the "Draft Papers" assignment folder in D2L by *5 pm on November 18th*. If you are writing an empirical paper, the submission should include a link to your data and the code used to analyze the data. Comments to the students will be returned soon after. These comments will need to be addressed in the final paper.
6. The final paper must be published to the "Final Papers" assignment folder in D2L by *December 6th at 5pm*. Term papers must be less than 20 pages excluding bibliography. The submission must include a separate document addressing the issues with the draft paper stating how the point is either irrelevant or how it is addressed in the paper.

Topics and Readings

Do not let this section alarm you. We will only address part of this outline in the class. As with most of my upper-division courses, we will complete a small subset at the start of the class and then vote on each succeeding topic. Each topic will have an assignment, usually working with real data or using a model from the readings.

Each topic has some readings that both undergraduates and graduate students will read and some that are specific to each. Note that some of these modules will be shared with the Public Utility Economics course and I will be adding optional topics and supplementary readings throughout the term.

- Introduction of Core Topics
  - Starting on Topic
    - "Energy Primer: A Handbook of Energy Market Basics", FERC, 2015 (https://www.ferc.gov/market-assessments/guide/energy-primer.pdf), Chapter 1
    - Dahl, Ch 1-2.
  - Coal
    - Dahl, Ch 3.

    * Murray, Michael P.. 2006. "Avoiding Invalid Instruments and Coping with Weak Instruments." Journal of Economic Perspectives, 20(4): 111-132. http://stats.lib.pdx.edu/proxy.php?url=https://www.aeaweb.org/articles?id=10.1257/jep.20.4.111
  - NaturaS104061901630121Xl Gas
    * Dahl, Ch 8.
    * Energy Primer, Ch 2.
    * Joskow, Paul L.. 2013. "Natural Gas: From Shortages to Abundance in the United States." American Economic Review, 103(3): 338-43. http://stats.lib.pdx.edu/proxy.php?url=https://www.aeaweb.org/articles?id=10.1257/aer.103.3.338
    * Culver, Walter J., and Mingguo Hong. "Coal's decline: Driven by policy or technology?." The Electricity Journal 29.7 (2016): 50-61. https://stats.lib.pdx.edu/proxy.php?url=https://www.sciencedirect.com/science/article/pii/S104061901630121X
  - Electricity
    * Energy Primer, Ch 3.
    * Dahl, Ch 5-6.

    * Joskow, Paul L. "Markets for power in the United States: An interim assessment." The Energy Journal, Vol. 27, No. 1. http://economics.mit.edu/files/1184
    * Joskow, Paul L.. 2012. "Creating a Smarter U.S. Electricity Grid." Journal of Economic Perspectives, 26(1): 29-48. http://stats.lib.pdx.edu/proxy.php?url=https://www.aeaweb.org/articles?id=10.1257/jep.26.1.29
    * Covert, Thomas, Michael Greenstone and Christopher R. Knittel. 2016. "Will We Ever Stop Using Fossil Fuels?" Journal of Economic Perspectives, 30(1): 117-38. http://stats.lib.pdx.edu/proxy.php?url=https://www.aeaweb.org/articles?id=10.1257/jep.30.1.117
    * Borenstein, Severin. 2012. "The Private and Public Economics of Renewable Electricity Generation." Journal of Economic Perspectives, 26(1): 67-92. http://stats.lib.pdx.edu/proxy.php?url=https://www.aeaweb.org/articles?id=10.1257/jep.26.1.67
    * Puller, Steven L. and Jeremy West. 2013. "Efficient Retail Pricing in Electricity and Natural Gas Markets." American Economic Review, 103(3): 350-55. http://stats.lib.pdx.edu/proxy.php?url=https://www.aeaweb.org/articles?id=10.1257/aer.103.3.350
    * Transportation Electrification ***NEED PAPER***
    *
  - Oil
    * Dahl, Ch 7.
    * Energy Primer, Ch 4.
    * Smith, James L.. 2009. "World Oil: Market or Mayhem?" Journal of Economic Perspectives, 23(3): 145-64. http://stats.lib.pdx.edu/proxy.php?url=https://www.aeaweb.org/articles?id=10.1257/jep.23.3.145
    * Baumeister, Christiane and Lutz Kilian. 2016. "Forty Years of Oil Price Fluctuations: Why the Price of Oil May Still Surprise Us." Journal of Economic Perspectives, 30(1): 139-60. http://stats.lib.pdx.edu/proxy.php?url=https://www.aeaweb.org/articles?id=10.1257/jep.30.1.139
- Topic Options, Voted on in Class
  - Financial Markets
    * Energy Primer, Ch 5.
    * Dahl, Ch 18 - 19.
    * Knittel, Christopher R. and Robert S. Pindyck. 2016. "The Simple Economics of Commodity Price Speculation." American Economic Journal: Macroeconomics, 8(2): 85-110. http://stats.lib.pdx.edu/proxy.php?url=https://www.aeaweb.org/articles?id=10.1257/mac.20140033
    * Deng, Shi-Jie, and Shmuel S. Oren. "Electricity derivatives and risk management." Energy 31.6 (2006): 940-953. http://stats.lib.pdx.edu/proxy.php?url=http://www.sciencedirect.com/science/article/pii/S0360544205000496
  - Intro to Externalities and Public Goods
    * Dahl, Ch 11 - 12.
    * Viscusi, W. Kip, Joseph E. Harrington, and John M. Vernon. Economics of regulation and an-

titrust. MIT press, 2005., Ch 21 http://search.library.pdx.edu/PSU:all:CP71189149050001451
    * Metcalf, Gilbert E.. 2009. "Market-Based Policy Options to Control U.S. Greenhouse Gas Emissions." Journal of Economic Perspectives, 23(2): 5-27. http://stats.lib.pdx.edu/proxy.php?url=https://www.aeaweb.org/articles?id=10.1257/jep.23.2.5
- Natural Gas Outside the US
    * Dahl, Ch 9 - 10.

    * "International Energy Outlook", 2016, EIA, Ch 3. (https://www.eia.gov/forecasts/ieo/nat_gas.cfm)
- Price Controls and Subsidies (Not Carbon Taxes and Implicit Subsidies)
    * Dahl, Ch 4

    * Implementing Energy Subsidy Reforms Evidence from Developing Countries, Maria Vagliasindi, Washington : World Bank Publications 2012, Overview with countries devided between groups. http://search.library.pdx.edu/PSU:all:CP71205489150001451
- Market Monitoring
    * Energy Primer, Ch 6.
    * Helman, Udi. "Market power monitoring and mitigation in the US wholesale power markets." Energy 31.6 (2006): 877-904. http://stats.lib.pdx.edu/proxy.php?url=http://dx.doi.org/10.1016/j.energy.2005.05.011
- Hotelling's Rule and Dynamic Extraction
    * Dahl, Ch 14
    * Gaudet, Gérard. "Natural resource economics under the rule of Hotelling." Canadian Journal of Economics/Revue canadienne d'économique 40.4 (2007): 1033-1059. http://onlinelibrary.wiley.com/doi/10.1111/j.1365-2966.2007.00441.x/full
- Supply and Cost Curves
    * Dahl Ch 15
- Energy Demand
    * Dahl Ch 16
    * Allcott, Hunt and Michael Greenstone. 2012. "Is There an Energy Efficiency Gap?" Journal of Economic Perspectives, 26(1): 3-28. http://stats.lib.pdx.edu/proxy.php?url=https://www.aeaweb.org/articles?id=10.1257/jep.26.1.3
    * Dubin, Jeffrey A., and McFadden Daniel L. "An Econometric Analysis of Residential Electric Appliance Holdings and Consumption." Econometrica 52.2 (1984): 345-62. http://stats.lib.pdx.edu/proxy.php?url=http://www.jstor.org/stable/1911493
    * David R. Kamerschen, David V. Porter, The demand for residential, industrial and total electricity, 1973–1998, Energy Economics, Volume 26, Issue 1, January 2004, Pages 87-100, http://stats.lib.pdx.edu/proxy.php?url=http://dx.doi.org/10.1016/S0140-9883(03)00033-1
    * RESIDENTIAL ENERGY CONSUMPTION SURVEY (RECS), EIA. https://www.eia.gov/consumption/residential/index.cfm We will use this as an example of end use modeling as well as survey data collection and estimation.

Term Paper Resources

The course requires a term paper. It is a good idea to do some broad reading to see the breadth of topics in energy economics, which roughly means the economic effects of using and generating energy. Here are some sources for keeping up on current events and research topics.

- A list of energy related glossaries http://dahl.mines.edu/GlossaryLinks.pdf. Some of the links are 404 but the one at the California Energy Commission is pretty good.
- EIA Today in Energy (https://www.eia.gov/todayinenergy/) New topics every day.
- Journals that focus on energy economics issues
    - Energy Economics http://www.journals.elsevier.com/energy-economics/

  - The Energy Journal https://www.jstor.org/journal/energyj
  - Resource and Energy Economics http://www.journals.elsevier.com/resource-and-energy-economics/
  - Energy: The International Journal has economics and engineering http://www.journals.elsevier.com/energy/
  - Energy Policy http://www.journals.elsevier.com/energy-policy/
  - Utilities Policy for more electricity focused reading http://www.journals.elsevier.com/utilities-policy/
- Working Paper Sources
  - IDEAS has a curated weekly summary of energy working papers https://ideas.repec.org/n/nep-ene/
  - r/EconPapers has a weekly summary of working papers from National Bureau of Economic Research (NBER). They usually lead with energy and natural resource economics https://www.reddit.com/r/EconPapers.
- The Journal of Economic Perspectives (https://www.jstor.org/journal/jeconpers) has many easy to read symposia and review articles. Here are a few from the last decade or so. Some of these are already included in the readings.
  - SYMPOSIUM: OIL AND GAS MARKETS WINTER 2016 (https://www.jstor.org/stable/i40149800)
  - SYMPOSIUM: TRADING POLLUTION PERMITS WINTER 2013 (https://www.jstor.org/stable/i40086192)
  - SYMPOSIUM: ENERGY CHALLENGES WINTER 2012 (https://www.jstor.org/stable/i40064264)
  - SYMPOSIUM: CLIMATE CHANGE SPRING 2009 (https://www.jstor.org/stable/i27740519)
- Data
  - OpenEI http://en.openei.org/wiki/Main_Page
  - EIA https://www.eia.gov Just go to a topic and look for the data tab.
  - Quandl https://www.quandl.com/ Has data on many topics and is an easy way to bring in macroeconomic data.

Guidance on Writing and Referee Reports

Because term papers are rarer than they were in the past, I will be providing a lot of supports to make sure you can pull this off. The subject matter librarian for economics will give a seminar on how to conduct a literature review. I will also have handouts on how to write a literature review.

In addition there are two sources in the library reserve that are very helpful. First, McCloskey, D. (2000). Economical writing (Second ed.). Prospect Heights, Illinois: Waveland Press. is an excellent read on how to write. There are 31 short, snarky chapters in 91 pages. Read a chapter a day and try to apply what you read and you will be less embarrassed at work.

The second resource in the library reserve is a Chapter 19 in Wooldridge's, "Introductory Econometrics: A Modern Approach". It is a great outline of the process of empirical research. Graduate students and those attempting an empirical paper should read this before choosing a topic for their term paper.

Other Rules

- The use of laptops in class is encouraged nearly to the point of being demanded. The instructor will often assign scribes to publish notes of a discussion
- Begging for grades will result in an immediate lowering of your course grade by a full letter grade.
- When completing online quizzes or other assignments, you may use your book, wiki, calculator, spreadsheets, notes, or other resources as long as it is not another student or person. *The work must be authentically and genuinely your own. In other words, if you are copying answers you found online, it is not your work.*

- Go to office hours at the first sign of trouble – not as a last resort.
- In this classroom, we support and value diversity. To do so requires that we:
  - Respect the dignity and essential worth of all individuals
  - Promote a culture of respect toward all individuals
  - Respect the privacy, property, and freedom of others
  - Reject bigotry, discrimination, violence, or intimidation of any kind
  - Practice personal and academic integrity and expect it from others
  - Promote the diversity of opinions, ideas, and backgrounds, which is the lifeblood of a university

  For additional information, please see the Office of Affirmative Action & Equal Opportunity at http://www.pdx.edu/diversity/affirmative-action.
- Accommodations are collaborative efforts between students, faculty, and the Disability Resource Center. If you have a documented disability and require accommodation, you must arrange to meet with the course instructor prior to or within the first week of the term. The documentation of your disability must come in writing from the Disability Resource Center (Faculty letter). Students who believe they are eligible for accommodations but who have not yet obtained approval through the DRC should contact the DRC immediately. Reasonable and appropriate accommodations will be provided for students with documented disabilities. For more information on the Disability Resource Center, please see http://www.drc.pdx.edu/.
- Academic honesty is expected and required of students enrolled in this course. Suspected academic dishonesty in this course will be handled according to the procedures set out in the Student Code of Conduct.
- I am sympathetic to family emergencies but you must inform me as soon as possible. If the notice is verbal, please email me with your understanding of our agreement. All agreements have to be in writing.

Link to this syllabus https://github.com/woodsjam/Course-Energy-Economics. Check branch for this term.