# Syllabus EC438/538 Fall 2020

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

Office Hours:

- There are no in-person office hours this term. We will use Zoom to meet face-to-face.
- Drop in office hours are Monday 3-4pm and Tuesday 10am-11am through the last week of class. I will keep a Zoom meeting up during this time.
- You can schedule one-on-one meetings at https://woodsj.youcanbook.me/.

## 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 and presentations. 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 online 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

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. 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.

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. Feedback from students in the form of Best and Worst group member will be collected at the end of the class meeting.

### Assignments

In-class discussions are most effective when everyone has read the material before class. In order to make this more likely there may be a small writing or problem solving assignment associated with the readings.

These questions may be microeconomic theory questions, interpretations of graphs and regression output in papers, etc. They will not be duplicates of the questions we will discuss in class.

These will be due at the start of the class to avoid any confusion.

### 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.

Key deadlines for the term paper are:

1. Draft Abstract: *October 16th at 5pm.*
2. 20-minute Abstract Review: *October 26th at 5pm.*
3. Revised Abstract: *October 28th at 5pm.*
4. Annotated bibliography: *November 1st at 5pm.*
5. 20-Minute Presentation: *November 13th.*
6. Draft Paper: *November 18th at 5 pm.*
7. Final Paper: *December 6th at 5pm.*

Term papers must be **less than 20 pages** excluding bibliography, but should be about 15 pages. The final submission must include a separate document addressing 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
  - Natural 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
  - 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
  - Transportation Electrification
    - **NEED PAPERS**
- 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 antitrust. 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", 2019, EIA, Ch 3. (https://www.eia.gov/outlooks/ieo/pdf/ieo2019.pdf)
  - 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.

# Other Rules

- 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.*
- 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.