Energy Markets Syllabus

EMGT 5962/MBAD 6962 (also cross-listed as SEGR 4962, ECGR 4090, ECGR 5090, PPOL 8000, INES 8090)
Profs. Chowdhury & Schwarz  Spring 2015

Instructors: Prof. Badrul H Chowdhury  Prof. Peter M. Schwarz
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Hours: M & W: 3:30 – 4:30 pm  Hours: T Th 11-12 am, 1-1:30 pm
and by appointment

Course Description:
Energy and power systems in regulated and competitive environments and implications on business decisions for firms in these industries. Topics include: mechanism of energy markets; comparative market systems; determination of prices under different market structures; gas, oil, coal, and electricity market architecture; electricity market design; dispatch and new build decisions; smart grid and renewable energy in electricity markets; risk and risk management in energy including demand and price volatility and use of financial derivatives; and the impact of financial market trends and current and proposed policies on the energy industry.

Prerequisite: Basic math (including elementary Calculus, and economics (including Principles of Microeconomics) or consent of instructor(s)). SEGR 4961/EMGT 5961 Introduction to Energy Systems or ECON 5181 Energy and Environmental Economics.
Corequisite: If students have not completed SEGR 4961/EMGT 5961 Introduction to Energy Systems or ECON 5181 Energy and Environmental Economics, they should enroll in one of these courses concurrently with this one; or permission of instructor(s).


This text can be viewed online at no charge via a new limited free service offered by the UNC Charlotte library.

Students who follow the link from a non-UNCC IP address will be prompted to log in with their NinerNet username and password before they are connected to the publisher's site.
Reference Textbooks:

Supplementary Materials: Lecture notes and non-textbook readings (from among the listed readings below) will be provided through the course website on Moodle2. We anticipate using clickers, which can be purchased (new or used) or rented at the University Bookstore. You will need a clicker for class participation.

Learning Objectives:
After completing the course, the students will be able to
1. Have a working knowledge of the mechanisms of energy markets
2. Understand supply and demand dynamics
3. Understand marginal cost
4. Understand electricity market economics and the constitution of locational marginal price
5. Understand the impact of transmission congestion on pricing
6. Understand risk management policies.
Course Requirements:

(1) This class is offered as both an on-campus face-to-face delivery and an online version. Online students don’t have to be present in class to take this course if they sign up for the online section. Each lecture will be recorded using Panopto software. The software is maintained by Classroom Support. All students (both on-campus and on-line) will be able to watch the recording on Moodle shortly after the lecture ends.

(2) Regular, on-time attendance, including arriving on time, staying until the end of class, and not leaving class except during breaks, is a requirement for on-campus students. There will be a participation grade each week based on attendance, being on time and staying until the end of class, and answering questions during class on that day’s material.

A student whose religion requires that (s)he miss class for a religious observance must fill out a “Request for Religious Observances” form and submit it prior to the census date for that semester to receive an excused absence for that event. The University’s inclement weather number is 704-786-2877.

For online students, it is expected that they will watch the lecture on the day the lecture is recorded. However, if that’s not possible, they should finish watching the lecture by 4 pm on Sunday of the week of the lecture. There will not be a participation grade for online students. Instead, each of the three exams will count 25% for online students.

(3) There will be two in-course examinations and a final examination. Details will be distributed.

(4) During the semester undergraduate students will be required to present a ten-minute presentation (no more than 5 slides) on some aspect of energy markets at your employer. If you are not currently working you may choose to focus on any organization with operations in NC or SC. The goal of your presentation should be to educate us about a practice that needs improvement and possible solutions or about a model energy markets practice at your organization that you think others would benefit from learning about. Depending on class size, these may be team presentations.

On-campus graduate students will do one team project. Teams will be required to submit a written version of the project and present their project to class on the last day of class. Online graduate students will do a solo project (not team), and will not present it in class. Detailed instructions will be distributed separately.

(5) Special requirements for on-line students for exams, homework, and projects.
For on-line students, the exams and homework submission are handled via Moodle. The exams are emailed to all distance students at a pre-set time of the exam day. We anticipate all exams will be take-home exams, in which case online students will have the same amount of time as the on-campus students to take the exam. Moodle will not accept submissions past a specific time. Homework submissions work in a similar fashion - students have to upload their scanned homework to Moodle by the submission deadline. You must name your file as ‘HW#_Lastname_Firstname’ or ‘Exam#_Lastname_Firstname’ where # is replaced by the assignment number, Lastname and Firstname are your last and first names. You must also scan into a pdf document before uploading the assignment. Online students will turn in a solo term project, but will not present it in class.

(6) Graduate and undergraduate sections will be taught jointly, but obtaining graduate credit will require the inclusion of more advanced assignments on the homework, project, and exams.
Grading:

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<tr>
<th>Component</th>
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<tbody>
<tr>
<td>Exam I</td>
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<tr>
<td>Exam II</td>
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<tr>
<td>Final Exam</td>
<td>25%</td>
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<tr>
<td>Homework</td>
<td>15%</td>
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<tr>
<td>Presentation/Project</td>
<td>10%</td>
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<tr>
<td>Participation Grade</td>
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The grading scale is as follows:

- A = 90 - 100
- B = 80 - 89.99
- C = 70 - 79.99
- D = 60 - 69.99
- F = < 60
- Graduate students = U = < 70

Moodle Environment:

This course includes a significant and required use of the Moodle on-line environment. You must be able to access course materials and announcements on-line. You can login to Moodle here: [https://moodle2.uncc.edu/login/index.php](https://moodle2.uncc.edu/login/index.php)

Email:

You must be reachable via your UNC Charlotte email account. All course communication will be directed to you at your UNC Charlotte email address. If you primarily use a different email account, then you should forward your email to your primary account.

Diversity:

The Belk College of Business and the William Lee States College of Engineering strive to create an inclusive academic climate in which the dignity of all individuals is respected and maintained. Therefore, we celebrate diversity that includes, but is not limited to ability/disability, age, culture, ethnicity, gender, language, race, religion, sexual orientation, and socio-economic status.

Academic Honesty:

You are required to complete 100% of your own work in this class (including making a full contribution to the team project). Cheating violates the UNC Charlotte Code of Academic Integrity and may result in course failure, suspension, and/or expulsion. For more information see the following: [http://integrity.uncc.edu/](http://integrity.uncc.edu/)

Disability and Impairment Accommodation:

If you require course adaptations or accommodations because of a disability, or if you have emergency medical information about which we should be informed, please speak with us as soon as possible. Students who require such accommodations must work with the Office of Disability Services (704-687-4355).
Course Outline and Reading Schedule: (C = Prof. Chowdhury; S = Prof. Schwarz)

A. Overview of Energy markets

I. Week 1 Jan. 13 Course Overview: Syllabus and Energy and Electricity Markets (S)
   - Reading:

   Martin Luther King Holiday Monday Jan. 19

II. Week 2 Jan. 20 Review of Microeconomics (S)
    - Reading:
      1. Text Ch. 2

Weeks 3, 4 Jan. 27, Feb. 3 Energy Markets: Fuel Markets (S) and Value Chains (Guest Speaker Ronak Bhatt)
    - Readings:
      1. Schwarz provisional text: Ch’s on NG, Nu, Alt. Fuels (Moodle)
      2. Oil and Natural Gas: U of TX materials: Section 2, Ch’s 2-4
      3. Uranium: Uranium Development Partnership, Ch. 1
         a. chapters 3 and 4

Exam 1 handed out Feb. 3, due Feb. 10

B. Overview of Electricity Markets

III. Week 5, 6 Feb. 10, 17 Introduction to Electricity Markets (C/S)
     - Readings:
       1. Kirschen Ch. 1, Material on Regulation (to be posted on Moodle)
       2. PJM: Review of generation compensation and cost elements
          (available on Moodle).

     Spring Recess March 2-7

IV. Week 7, 8 Feb. 24, Mar. 10 Markets for Electrical Energy (C/S)
    - Readings:
      1. Kirschen Ch’s 3, 4
      2. MISO overview – level 100: day ahead (available on Moodle).
      3. J Griffin and S Fuller: A Primer on Electricity and the Economics
         of Deregulation
      4. Joskow: Intermittent vs. Dispatchable Technologies

Exam 2 handed out March 10, due March 17
   Tues. Mar. 17 11:59 pm Last day to withdraw from course with a ‘W’ grade
V. Week 9 Mar. 17 Ancillary Services (C)
   • Readings:
     1. Kirschen Ch. 5

   Spring Weekend: Apr. 3-4

VI. Week 10, 11 Mar. 24, 31 Transmission Networks (C)
   • Readings:
     1. Kirschen Ch. 6
     2. MISO overview – level 100: ISOs and RTOs (available on Moodle).

VII. Week 12, 13 Apr. 7, 14 Investing in Generation and Transmission (C)
   • Readings:
     1. Kirschen Ch. 7, 8

VIII. Week 14 Apr. 21 Summing Up (S) and Guest speaker Ronak Bhatt Investing in Energy

IX. Week 15 Apr. 28 Graduate student presentations (S)

Reading Day: Apr. 29 (Wednesday)

Final Exam handed out Apr. 28 and due May 5 (Tuesday), 5-7:30 PM. You may complete your final exam in class during this time, or earlier. But you must come to class and turn in a hard copy between 5-7:30 PM. If any undergraduate or graduate presentations are postponed, they will take place during the final exam period.

ALL PARTS OF THIS SYLLABUS ARE SUBJECT TO REVISION ANY REVISIONS WILL BE ANOUNCED IN CLASS OR VIA MOODLE
Citations


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5 [http://econweb.tamu.edu/puller/AcadDocs/primer.pdf](http://econweb.tamu.edu/puller/AcadDocs/primer.pdf)
6 [http://economics.mit.edu/files/6317 (See Moodle2 for AER 2011 version).](http://economics.mit.edu/files/6317 (See Moodle2 for AER 2011 version).)