

EOS/ENV/ENERGY 231 Syllabus

ENERGY AND THE ENVIRONMENT, Fall 2016

MW 1:25-2:40 PM – Rm. 107, Gross Hall

<u>Instructor</u>	<u>Teaching Assistant</u>
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<i>Office hours:</i> TBA	

COURSE DESCRIPTION

Modern society is based on the availability of low cost and reliable energy. Most of this energy currently comes from fossil fuels, and with recent technological breakthroughs making unconventional oil and gas resources economic to produce, it appears that we might be able to continue to rely on oil, natural gas and coal for another one or more centuries.

There are significant societal and environmental costs to our use of fossil fuels, however. These costs stem from problems associated with the extraction, refining and distribution of fossil fuels as well as with their use in transport, manufacturing, buildings and electricity generation. The biggest of these problems are local-to-regional scale water contamination, regional air pollution, and global climate change.

Alternatives to fossil fuels include nuclear and renewable energy, but these have environmental costs as well, and in general remain more expensive and complicated to deploy and operate on a large scale. And while increasing energy efficiency and conservation can help reduce environmental impacts of hydrocarbon use, growing population and rising living standards limit the extent to which these particular measures can be implemented.

This course will seek to provide students with a broad understanding of the current energy system, its challenges - particularly with respect to the environment - and possible paths to a sustainable energy future. The course is designed to give students a framework for thinking about why energy-related events are happening in the world, what they may mean for future energy use, and by extension, societal and environmental well-being, and how we might improve our current energy system moving forward.

COURSE OBJECTIVES

By the end of this course, you should:

- Know the major sources and uses for energy.
- Be able to explain the principal components to the primary energy industries, including how these components interact, and how the industries have been evolving over time.
- Know the nature, scope and impact of the most important environmental problems arising from our current energy system.
- Understand and be able to explain the first-order benefits and costs of emerging alternatives to current energy sources and uses.
- Know the principal ways these new alternatives are being promoted in an effort to make our energy system more sustainable.
- Be able to use back-of-the-envelope calculations to quantitatively answer many fundamental energy questions.

GRADING

Grades will be based on:

- Quizzes (18) 25% of final grade
- Tests (3) 75% of final grade

Quizzes will be given on the assigned pre-class readings at the start of each lecture class except when a test is scheduled that day. The format of the quizzes will be four multiple choice and/or short answer questions plus a word problem requiring a calculation. These quizzes are to help you keep up with the reading and ensure that you come prepared to better understand and apply the energy concepts from the reading that we will be discussing that day in class. The quizzes will be administered at the start of class and will last 5-10 min. Use a pencil in answering the questions. I will then review the answers to the quiz and you will grade yours in pen. Scoring will be discussed in class. You are not to change your answers during the grading session, nor are you to copy answers off your neighbors. The quizzes are to be done and graded independently and without aid of any reference materials. Any breach of these terms will not only lead to a failed grade on the quiz but also be treated as a violation of the Duke University Honor Code (stated below) and be reported. There will be a total of 18 quizzes this semester. The first graded quiz will be given Monday, September 12 (following the close of Add/Drop), and the last graded quiz will be given Wednesday, November 30. The lowest three quiz scores will be dropped from your overall quiz grade, so each of the 15 quizzes that will count will represent ~1.7% of your final grade. Please see the section "Policy on Class Absences" concerning missing a scheduled quiz.

Tests will be given at the end of each third of the course (after every 8-9 lectures). The second and third tests will be comprehensive but will emphasize material covered during the most recent third of the class. Each test will be worth 25% of your total grade. Please see the section "Policy on Class Absences" concerning missing a scheduled test.

Participation is an important part of the class. While there is no grade for participation, I expect that you will attend class regularly and on time, having completed beforehand all readings. I expect that you will be actively

involved in class discussions, including asking questions and sharing your knowledge and experiences with the class. And I reserve the right to cold call any student, at any time, in the class.

READINGS

The textbook for this class is an eBook by Prof. Michael Webber, entitled *Energy 101: Energy Technology and Policy*. The book is available for purchase from the following vendors:

- IOS tablet version available through Apple's App Store at <https://itunes.apple.com/us/app/energy-101/id911125935?mt=8>
- Android tablet version available through Google Play at <https://play.google.com/store/apps/details?id=com.webberenergygroup.energy101.android&hl=en>
- A desktop web-based version direct from UT Press and Webber Energy Group at <http://utpress.utexas.edu/index.php/webene>. This version will work on laptops or desktop computers, but not mobile reading devices. It is currently undergoing an upgrade and will be available for purchase after Sept. 1, 2016.

You are also to read [Duke University's Climate Action Plan](#), published in 2009, and its [2013 Progress Report](#). Both of these documents are posted on the class Sakai site.

I reserve the right to assign additional readings. If I do, I will notify you both in class and via the course Sakai site of where the readings will be posted and when you are to have read them by.

SAKAI

Readings, class announcements, schedule changes, grades, power point slides and working files (excel) will all be posted to the course Sakai site. Anyone having trouble working with the site should seek help from their fellow students, or contact Information Technology (<http://oit.duke.edu>).

TEACHING ASSISTANT

Candise, the teaching assistant, is responsible (1) for helping you understand the concepts in lectures, readings, and quizzes, (2) for checking and logging your quizzes, and (3) for helping administer the course and exams. Candise can answer questions by email. She will respond within 24 hours. If you need to see her in person, please attend Candise's office hours or arrange to see her by appointment.

CLASSROOM ETIQUETTE

- Computers allowed, but only for class activities, e.g., taking notes, researching questions that arise in class, and taking in-class quizzes. If, over the course of the semester, I find that people are not able to adhere to this practice, then computer use during class will be discontinued.
- Cell phones off.
- Food - Drinks are fine (e.g., coffee, water), but not food; please refrain from eating during class.
- Side conversations are discouraged during lectures and class discussions, and *forbidden* during quizzes and tests.

POLICY ON CLASS ABSENCES

This class adheres to Duke University's policy on class absences and missed work, which is explained in detail at <http://trinity.duke.edu/undergraduate/academic-policies/class-attendance-and-missed-work>. Please note that only the following qualify as an excused absence: (1) an illness that prevents you from coming to class, (2) a personal or family emergency, (3) observance of a religious holiday, and (4) a varsity athletic competition. If you are ill and unable to attend class and thus miss a quiz and/or a test, please submit the web-based short-term illness form (STINF) *prior* to class. The short-term illness form can be found at:

<http://tts-fm-admin01.trinity.duke.edu/stinf/>

If you are facing a long-term illness or a personal or family emergency, please notify your Academic Dean ASAP so that they can notify me and your other professors that you will be needing time to make up for work you will be missing.

If you are a varsity athlete with a competition schedule that will force you to miss a quiz or exam, or if you will be celebrating a religious holiday this semester and your observance will force you to miss a quiz or exam, notify Candise Henry ASAP. If any such notifications are made immediately prior to a quiz or exam later in the semester, I am likely to decline them unless there are extenuating circumstances as to why we weren't made aware sooner.

You are governed by the Duke University Honor Code in adhering to these policies (see below). Those with excused absences can take a makeup quiz/test for the missed class. Know though that the makeup may be notably more challenging than the original quiz/test.

Those without an excuse for missing a quiz/test will receive a grade of zero for the assignment. Unexcused absences include missing class to attend something else (e.g., job interview or wedding) and returning late from a trip, even if your delay is not your fault (e.g., airline problems). Remember, however, your three lowest quiz grades will be dropped in calculating your final grade, so in effect, you have three opportunities throughout the semester to miss a quiz.

THE DUKE COMMUNITY STANDARD

All activities of Duke students, including those in this course, are governed by the Duke Community Standard, which states:

“Duke University is a community dedicated to scholarship, leadership, and service and to the principles of honesty, fairness, respect, and accountability. Citizens of this community commit to reflect upon and uphold these principles in all academic and nonacademic endeavors, and to protect and promote a culture of integrity. To uphold the Duke Community Standard:

- *I will not lie, cheat, or steal in my academic endeavors;*
- *I will conduct myself honorably in all my endeavors; and*

- *I will act if the Standard is compromised.”*

The following affirmation will be included at the end of all assignments: *“I have adhered to the Duke Community Standard in completing this assignment.”* Please sign your name beside it.

SYLLABUS

Students are responsible for being aware of what is in this syllabus, so please read it thoroughly and if you have any questions, please contact me. Furthermore, this syllabus is subject to change based on the pace and/or needs of the class. Any revisions will be announced in class and, if necessary, an updated syllabus will be posted on Sakai. Students will be held responsible for adhering to all changes.

 [Env231ScheduleFall2016.pdf](#)