

EK-225 (Tues/Thurs 6-8:00 pm EPIC 204)
Introduction to Energy Conversion and Environmental Engineering

Instructor

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office hours:

After Class, and Arranged

Course Summary

This is a course about energy. How does society use energy, and how does energy use shape society? By building up our understanding of energy physics we then see how modern energy systems use energy to power our planet. The impacts and future energy uses will be explored. The science behind energy technologies from wind and hydro to conventional power plants, to solar and batteries will be covered. Grading is largely based on the three pillars of homework, participation, and projects. Some quizzes are thrown in the mix. Attendance is mandatory and will be taken at the start of class. After **4 absences** the participation grade will be 0%.

Texts

- **Required:**
 - *Energy Systems and Sustainability: Power for a Sustainable Future*, Everett and Boyle. (2012, 2nd ed.) ISBN: 0199593744
 - *Renewable Energy: Power for a Sustainable Future*, Boyle (2012, 3rd Ed.) ISBN: 0199545332
- **Strongly Recommended:** *Renewable Energy: A First Course*, Robert Ehrlich, 1st Ed. 2013
- Tester, Jefferson W., *Sustainable Energy: Choosing Among Options*. 2nd edition. MIT Press, 2012. ISBN: 9780262017473
- McKay, David J. C. *Sustainable Energy – Without the Hot Air*. UIT Cambridge, Ltd., 2009. ISBN: 9780954452933.

Evaluation

30% - Homework (10-12 Assignments)
15% - Class participation, involvement in discussions→Mandatory Attendance
10% - Quizzes (2), in class.
20% - Project, written group assignment on an energy technology/company
15% - Project: in class presentation and questions for other groups.
10% - Final Exam: Take home, due on exam day, cumulative.

Week	Topic	Reading
1	Intro to Energy	Chapter 1 – Boyle
2	Overview of Energy use	Chpt 1 –Permaculture
3	Wind Power	Chpt 7 –Boyle, pg 32. Without hot air
4	Hydro Power	Chpt 5 – Boyle
5	Fossil Fuel <i>Thursday 10/6: QUIZ I – In Class</i>	Chpt 5 – Everett
6	Nuclear Power <i>Friday 10/16 12:00 pm: MIT Tokamak Tour</i>	Chpt 10 – Everett
7	Internal Combustion and Transportation	Chpt 6 – Everett
8	Solar Thermal	Chpt 2 –Boyle
9	Solar Photovoltaics <i>Thursday 11/3: QUIZ II – In Class</i>	Chpt 3 – Boyle
10	Electrochemistry Overview	Battery Reading (handout)
11	Batteries and Fuel Cells	Fuel Cell Reading (handout)
12	Water-Energy-Nexus	W-E Nexus handout
13	Project Presentations	
14	<i>Quiz III - Take Home Final</i>	