

GE150

Sustainable Energy- Technology, Resources, Society and Environment

Fall 2015 v.1.0

T-R 09:30-11:00

CAS 316

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Required Texts :

Hinrichs and Kleinbach, Energy: Its Use and the Environment, 5th edition 2013

General Course Description

This course examines the social, environmental and technological aspects of renewable and nonrenewable energy systems. Human use of energy is considered in the context of contemporary social and environmental issues including globalization, climate change and sustainable development. The course is taught in three parts. In part 1 students are introduced to the basic physical and technical principles of conventional energy systems. In part 2 renewable technologies are covered. In Part 3 the social and environmental implications of energy are explored.

Grading

20% Exam 1, 20% Exam 2, 20% Exam 3, 10% homework, 10% sustainability plan, 10% discussion assignments, 10% discussion participation

Homework

Homework assignments are listed on the course outline, with occasional supplemental questions given in lecture. Assignments are due typed at the beginning of the discussion the following week. You must show all work and each step needed for quantitative answers to receive credit. Hand written responses turned in at the end of discussion will not receive credit.

Sustainability Plan

In groups of 2-4 students will propose a solution to an energy sustainability challenge that they find interesting . During the last discussion meeting students will make a 5 minute “elevator talk” presentation on the problem and propose a solution. Details will be given in class.

Discussion Sections

Attendance in discussion sections for which a student is registered is mandatory. An unexcused discussion absence will result in loss of homework and discussion credit for that week. Discussion sections will consist of HW review, in class discussion assignments, demonstrations of energy principles and provide an opportunity to address questions concerning lecture topics.

Field Trip

We will have an optional field trip to the museum of science during “college night”. Those who attend will be given the option of an extra credit assignment.

Participation

While not a formal grade component, students are expected to regularly attend lectures, come prepared to answer questions when called upon and contribute positively to the class environment. Irregular attendance, poor preparation and a lack of involvement will result in a grade penalty. Note that BU has a formal attendance policy which requires attendance to be taken and sets minimum attendance to get course credit, details can be found on the registrar's website.

Computer and Cell Phone Use Policy

Silence or turn off your cell phones during lectures and discussions. Students observed browsing the internet, sending email, playing video games, etc. in class will receive grade deductions with no additional notice and may be asked to leave the classroom. Computing devices are NOT permitted in discussions without an explicit invitation to do so by the TF for specific discussion meetings.

Academic Honesty

Any violations of the academic conduct code are taken very seriously by myself, your TF and the university. You should read the Academic Conduct Code for further information about specific definitions, procedures, sanctions, etc. Copies of the code are available in CAS 105 and online at <http://www.bu.edu/academics/>. I am required by university policy to refer all cases of suspected academic misconduct to the CAS Dean's Office and maintain a zero tolerance policy with regard to cheating of any kind.

Course Outline

Notes: Readings from sources other than the textbook are posted on blackboard unless otherwise noted

		Day	Topic	Reading/HW
Sep	3	r	Intro to Course: Energy Sustainability	Ch 1/ Baldwin Ch 1
		DIS	No Discussion This week	none
	8	t	Energy Basics 1	Ch 2
	10	r	Energy Basics 1	Ch 3
		DIS	Sustainability Challenges and Energy	Ch 2 Qs 2, 7 ; Ch 3 Qs 8, 12, 19
	15	t	Energy Basics 2: Heat Engines	Ch 4, Ch 11 A and B
	17	r	Conventional Energy: Fossil Fuels	Ch 7
		DIS		Ch 4 Qs 10, 14
	22	t	Conventional Energy: Fossil Fuels	Ch 7
	24	r	Economics of Fossil Fuels / Hubbert and trying to model depletion	Ch 7 Kaufmann 1991
		DIS		Ch 7 Qs 1, 4, 5, 9
	29	t	Conventional Energy- Nuclear Power	Ch 14
Oct	1	r	Conventional Energy- Nuclear Power	Ch 15 and 16
		DIS	Should the use of nuclear power be abandoned or increased?	Ch 14 Qs 2, 7, 10, 13
	6	t	Exam 1	All
	8	r	Solar- PV, Solar Thermal, Thermal Updraft	Ch 6, Ch 12 B, C, D, G
		DIS	No Discussion this week	
	13	t	Monday Schedule	
	15	r	Geothermal and Hydroelectric and Wind	Ch 18, Ch 12 F, Ch 12 E
		DIS	Wind power politics	Ch 6 Qs 13, 19, 22 Ch 12 Qs 9

				Ch 18 Qs 2, 5
	20	t	Biomass and Biofuels	Ch 17
	22	r	Hydrogen/Fuel Cells	Ch 10 J
		DIS		Ch 10 Qs 20,23,25
	27	t	Storage, Transportation and Distribution of Energy	Ch 10, Ch 11 C, Ch 6H
	29	r	Conservation Technologies “negawatts” Jevons Paradox	Jevons , Croucher2011 CH 5
		DIS	Home Energy Assessment	Ch 11 Qs 5, 9, 13
	3	t	Exam 2	All since exam 1
	5	r	Energy and Transportation	Ch 10 D, J
		DIS	Evaluation of Boston's Transportation sustainability	TBA
Nov	10	t	Impacts of Energy: Air Pollution	Ch 8
	12	r	Impacts of Energy: The Science of Climate Change http://www.ipcc.ch/publications_and_data/ar4/wg1/en/ch9s9-es.html http://www.ipcc.ch/publications_and_data/ar4/wg1/en/ch9s9-7.html	Ch 9 ← See links to the left
		DIS		TBA
	17	t	Impacts of Energy: The Science of Climate Change http://www.ipcc.ch/publications_and_data/ar4/wg1/en/ch9s9-es.html http://www.ipcc.ch/publications_and_data/ar4/wg1/en/ch9s9-7.html	Ch 9 ← See links to the left
	19	r	Policy Tools For Sustainability -Economic principles for decision making -Can we put a dollar value on nature -An “ecological” perspective on the economy	Baldwin Ch 20-21
		DIS		

	24	t	Energy Relevant Policy in the United States	Baldwin Ch 22/TBA
	26	r	Thanksgiving break	
		DIS	No Discussion This Week	
	1	t	Impacts of Energy: Water, Land and People http://www.ipcc.ch/publications_and_data/ar4/wg2/en/ch3s3-es.html	← See link to the left
	3	r	Social Implications of Energy: Conflict- WWI and the end of the Ottoman Empire to the Iraq War(s)	Baldwin Ch 23
		DIS	Find example of a contemporary energy conflict. What do you think is the most probable outcome? How might you resolve it?	Baldwin Ch 23 Qs 1-5
DEC	8	t	Social and Political Implications of Energy: Present Day watch “Meet the Stans: Kazakstan” prior to lecture: http://www.youtube.com./watch?v=EtxJN3o5kkY	Watch Video!
	10	r	A vision for a sustainable energy future Semester Wrap up and Final exam review	
		DIS		
DEC	TB D		Final Exam	All material from readings, discussion and lectures

Disclaimer:I reserve the right to make changes to this syllabus over the course of the semester.