Physics 105 Fall 2008

Physics for Decision Makers: The Global Energy Crisis

Professor Steve Rolston

Course Description: The aim of this course is for you to learn how physics attacks societal issues.

Specific objectives are:

- To understand the fundamental science of energy and energy usage in the world, including the fundamentals of the work energy relationship, the basic laws of thermodynamics, and energy conservation.
- To learn, through the process of discovery, how science formulates questions and addresses them with reasoning, evidence, and argumentation.
- To address specific questions which must be asked and answered in order to understand the important societal questions of energy usage and environmental impact.

Blackboard software: Our course will utilize Blackboard software for grades and assignments. The link to our class is found through https://elms.umd.edu We will also be developing a course Wiki.

Text: *Energy: Physical, Environmental and Social Impact* (3rd ed.) - G. Aubrecht

Clickers: We will be using personal response devices. Purchase at the book store - ask for a ResponseCard RF keypad. These will be an important part of your grade so get one and bring to class.

Classes: Lecture: Tuesday, Thursday 3:30 – 4:45 PM (PHYS 1412)

Discussion: Section 0101 – Monday - 12:00pm- 12:50pm (PHYS 1402)

Section 0102 – Monday - 1:00pm- 1:50pm (PHYS 1402)

Section 0103 – Monday - 3:00pm- 3:50pm (PHYS 1402)

Section 0104 – Friday - 12:00pm- 12:50pm (PHYS 1402)

Section 0102 – Friday - 2:00pm- 2:50pm (PHYS 1402)

Section 0103 – Friday - 3:00pm- 3:50pm (PHYS 1402)

Contact Information: Prof. Steve Rolston

Office: Computer and Space Sciences 2245

Phone: (301) 405-7189 Email: rolston@umd.edu

Office hours: Monday 4:00- 5:00 PM (drop in is OK)

Homework: Homework will be assigned regularly. The assignments will be posted on our Blackboard website as well as in lecture. Late homework will **not** be accepted except in the case of illness verified by a doctor's signature. One homework grade will be dropped.

Important Dates:

First class	Tuesday September 2, 2008	
Midterm exam	Tuesday October 21, 2008	
Thanksgiving break	Thursday November 27, 2008	Friday November 28, 2008
Last class	Friday December 12, 2008	
Final Exam	Saturday December 20, 2008	10:30 AM – 12:30 PM

If you have a reason why you cannot attend class (religious holiday, official University business), see the instructor before the exam! Only medical emergencies will be considered as excuses after the exams. If you miss an exam with a valid excuse, a makeup exam will be given.

Extra Help: I will be available at the end of each lecture to answer questions, or come to my office hours. Please seek help at the first sign of difficulties.

Lecture Notes: I will post .pdf versions of the lectures on the course web site after lectures.

Grading: Your grade will be based on the following:

Midterm Exam	15%
Energy Audit	20%
Wiki/Poster Projects	15%
Homework	15%
Class Participation*	15%
Final Exam	20%

*Clickers are required and will be used in part to assign Participation grades.

Academic Integrity: The University of Maryland, College Park has a nationally recognized Code of Academic Integrity, administered by the Student Honor Council. This Code sets standards for academic integrity at Maryland for all undergraduate and graduate students. As a student you are responsible for upholding these standards for this course. It is very important for you to be aware of the consequences of cheating, fabrication, facilitation, and plagiarism. For more information on the Code of Academic Integrity or the Student Honor Council, please visit http://www.studenthonorcouncil.umd.edu/whatis.html.

Disabilities: If you have a documented disability and wish to discuss accommodations, please contact me as soon as possible.

Helpful tips:

1) **Read the books** *before* the lecture and refresh yourself after.

2) **Do the homework**. There will be approximately 7 homework assignments, and your lowest homework grade will be dropped. You may collaborate on homework assignments, but you will be responsible for producing your own work.

3) **Attend the lectures**. The lectures, demonstrations, and discussions are how you will learn. Material covered in lecture but not in the book may appear on exams. Clickers will be used to count class participation.

4) **Attend Recitation** - much of your project work will be done in the recitation sections - you will be graded on your participation in recitation.

5) **Contribute to the projects.** There will be three major projects assigned during this course: a campus Energy Audit, the Maryland Energy Wiki, and Poster Project. Participation in these projects is essential and will hopefully be enjoyable. Students will work together in groups for each project.

6) **Talk to your classmates**. Trying to explain something to someone else is often the best way for you to fully understand the concept. Use the Blackboard discussion forum.

7) **Ask questions in lecture**. There are no stupid questions – only ones you don't ask.

Tentative Schedule:

Week	**Topic**
1	Physics and energy: Work, power and electricity
2	Demographics, free lunches, and the Tragedy of the Commons
3	The limits of efficiency: Laws of thermodynamics
4	Energy production, usage and loss
5	Conservation of energy *vs* energy conservation
6	Fossil fuel resources, Peak Oil
7	Waste, heat, pollution and transportation
8	Weather *vs* climate; anthropogenic change
9	Global warming: Treaties, regulations, responses
10	Solar energy: Wind and photovoltaics
11	Biomass: ethanol, sugar cane, *etc*; Energy costs of agriculture
12	Nuclear: Fission and fusion
13	Energy storage and load management
14	The view from Congress, the White House and the Courthouse