

## Physics 105 Fall 2011

### Physics for Decision Makers: The Global Energy Crisis

Professor Jordan A. Goodman

**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.

**This is a Marquee Science and Technology Course (and an i-Course):** At the completion of a Marquee Course you should be able to:

1. Look at complex questions and identify the science in the question and how it impacts and is impacted by political, social, economic, and ethical dimensions
2. Understand the limits of scientific knowledge
3. Critically evaluate science arguments
4. Ask good questions
5. Find information using various sources and evaluate the veracity of the information
6. Communicate scientific ideas effectively
7. Relate science to a personal situation

**Blackboard software:** Our course will utilize Blackboard software for grades and assignments. The link to our class is found through <https://elms.umd.edu>

**Text:** *Energy, Environment, and Climate* – R. Wolfson ISBN: 978-0393927634

**Clickers:** We will be using personal response devices. Purchase at the bookstore - ask for a ResponseCard RF keypad (used OK – but make sure they are RF). These will be an important part of your grade so get one and bring to class. See <http://clickers.umd.edu> for instructions.

**Classes:**       Lecture:       Tuesday, Thursday 12:30 – 1:45 PM (PHYS 1412)

Discussion Sections:

Section 0101 – Monday	12:00pm- 12:50pm	(PHYS 0405)
Section 0102 – Monday	1:00pm- 1:50pm	(PHYS 0405)
Section 0104 – Friday	12:00pm- 12:50pm	(PHYS 1219)
Section 0105 – Friday	1:00pm- 2:50pm	(PHYS 1219)

**Contact Information:**

Professor Jordan Goodman

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Email: [goodman@umd.edu](mailto:goodman@umd.edu)

Office hours: Tu 2:00 – 3:00 PM (drop-in anytime OK)

**Teaching Assistants**Sections 0101 and 0102 (Monday) Wrick (Rick) Sengupta - [wsengupta@gmail.com](mailto:wsengupta@gmail.com)Sections 0104 and 0105 (Friday) Michael Jarret [mjarret@umd.edu](mailto:mjarret@umd.edu)

**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 signed note. One homework grade will be dropped.

**Important Dates:**

First class	Thursday September 1, 2011	There <b>will be</b> discussion sections the first week
Midterm exam	<b>Tuesday, October 25, 2011</b>	
Thanksgiving break	Thursday November 24, 2011	Friday November 25, 2011
Last class	Tuesday December 13, 2011	
Final exam	Tuesday December 20, 2011	1:30-3:30 PM

If you have a reason why you cannot attend class (religious holiday, official University business), see the instructor beforehand! Only medical emergencies will be considered as excuses after 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 our 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:** The overall course grade may be “curved” (possibly up or down), but your score will be calculated based on the following percentages:

Midterm Exam	15%
Three Projects	45%
Homework	10%
Class Participation*	10%
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 the professor 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 6 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 will appear on exams.** Clickers will be used to count class participation. Clicking in for someone who is not in attendance will be treated as a violation of the Academic Integrity Code.
- 4) **Attend Discussion** - much of your project work will be done in the discussion sections - you will be graded on your participation in discussion.
- 5) **Contribute to the projects.** There will be major group projects assigned during this course. Participation in these projects is essential and will hopefully be enjoyable. Students will self-assess participation by group members.
- 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