


Physics 231

Physics for Future Presidents

Professor Gene Sprouse

Fall 2015



Course Description: The aim of this course is for you to learn how science attacks the *most* important societal issue facing our planet.

Specific objectives are:

- To understand the fundamental science of energy and energy usage in the world, and the human impact on the global climate.
- 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.
- To learn about other issues with a strong physics content such as satellites, space, quantum devices.

At the completion of the 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

Text: *Physics and Technology for Future Presidents: Richard Muller*

Clickers: We will be using clickers

Classes: Lecture: Tu-Th 1:00-2:20pm in Grad Physics P-129

Attendance: This is not going to be your standard lecture course where you sit passively watching Power Point slides drift by in front of your eyes. The class will be highly interactive, with in-class group activities and responses. Your attendance is critical to your success. Participation in class and discussion sections will be part of your grade.

Reading: There will be reading assignments to be completed *before* each class, and a short assignment (typically a short answer to a single question) related to the reading. There will be discussion related to the reading in class, so be sure to do your reading – you may be asked about it!

Homework: There will be two components to the homework. Each week you will find and submit a link to a relevant article in the media. Be prepared to summarize and discuss in class. Here is a link to a large number of interesting sources compiled by a Carnegie Mellon Professor: <https://www.andrew.cmu.edu/course/33-115/resources.html> Some of these items require a subscription, but you can get them through the Stony Brook Library site.

Other homework will be assigned approximately every other week. All assignments will be posted on our course website as well as in lecture. Late homework will **not** be accepted except in the case of illness verified by a doctor's signature.

Project: There will be one term project for the semester. This will be an opportunity for you to go into a subject that interests you that is related to the course, and do some research and analysis. More details will be announced later.

Important Dates:

First class	August 25	
Midterm exam 1	September 29	<i>Subject to change</i>
Midterm exam 2	October 29	<i>Subject to change</i>
Thanksgiving break	November 26	
Last class	December 3	
Final Exam	December 14	5:30-8:00pm

If you have a reason why you cannot attend class (religious holiday, official University business), see me 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 or confusion.

Grading: Your grade will be based on the following:

Midterms	25%
Project	15%
Reading Assignments	10%
Homework	15%
Class Participation*	10%
Final Exam	25%

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

Academic Integrity

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

Helpful tips:

- 1) **Read the assignments** *before* class and refresh yourself after.
- 2) **Do the homework.** There will be approximately 7 homework assignments. You may collaborate on homework assignments, but you will be responsible for producing your own work.
- 3) **Attend class.** Classes will be highly interactive with a mix of lecture, group activities, demonstrations, and discussion. Clickers will be used in part to measure class participation.
- 4) **Talk to your classmates.** Trying to explain something to someone else is often the best way for you to fully understand the concept.
- 5) **Ask questions in class.** There are no stupid questions – only ones you don't ask.

Tentative Course Plan

Schedule of Classes			
<u>Class</u>	<u>Date</u>	<u>Subject</u>	<u>Reading in PTFP</u>
1	25-Aug	Introduction: Is there a looming crisis?	1
2	27-Aug	The role of energy in the 21st century	1
3	1-Sep	Energy and Power	1
4	3-Sep	Atoms and Heat	2
5	8-Sep	Atoms and Heat	2
6	10-Sep	Atoms and Heat	2
7	15-Sep	Nuclei and Radioactivity	4
8	22-Sep	Nuclei and Radioactivity	4
9	24-Sep	Nuclear Reactors and Atomic Bombs	5
	29-Sep	First Exam (Chaps. 1, 2, 4)	1,2,4
10	1-Oct	Nuclear Reactors and Atomic Bombs	5
11	6-Oct	Nuclear Reactors and Atomic Bombs	5
12	8-Oct	Electricity and Magnetism	6
13	13-Oct	Electricity and Magnetism	6
14	15-Oct	Electricity and Magnetism	6
15	20-Oct	Light	8
16	22-Oct	Invisible Light	9
17	27-Oct	Climate Change	10
	29-Oct	Second Exam (Chaps. 4,5,6)	4,5,6
18	3-Nov	Climate Change	10
19	5-Nov	Climate Change	10
20	10-Nov	Climate Change	10
21	12-Nov	Climate Change	10
22	17-Nov	Gravity, Force and Space	3
23	19-Nov	Gravity, Force and Space	3
24	24-Nov	Quantum Physics	11
	26-Nov	No class – Thanksgiving holiday	
25	1-Dec	Quantum Physics	11
26	3-Dec	Relativity and the Universe	12
FINAL EXAM	14-Dec	5:30-8:00 pm Final Exam	All

