


Physics 23 I

Physics for Future Presidents

Professor Gene Sprouse

Spring 2016



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-125

Attendance: This class will be interactive, with in-class group activities and responses. Your attendance is critical to your success. Participation in class discussions will be part of your grade.

Reading: There will be reading assignments to be completed *before* each class, and sometimes 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 every week. 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	January 26	
Midterm exam 1	March 1	<i>Subject to change</i>
Spring break	March 14-18	
Midterm exam 2	April 14	<i>Subject to change</i>
Last class	May 5	
Final Exam	May 16	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	20%
Reading Assignments	10%
Homework	10%
Class Participation*	10%

Final Exam	25%
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*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 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.



Course Plan

Schedule of Classes				
<u>Class</u>	<u>Date</u>	<u>Lecture Subject</u>	<u>Reading in PTfFP</u>	<u>Homework Due</u>
1	26-Jan	Introduction: Is there a looming crisis?	1	
2	28-Jan	The role of energy in the 21st century	1	
3	2-Feb	Energy and Power	1	Submit link
4	4-Feb	Solar, Wind, Friction	2	HW #1
5	9-Feb	Atoms and Heat	2	Submit link
6	11-Feb	Heat Engines, Heat Pumps	2/4	HW#2
7	16-Feb	Nuclei and Radioactivity	4	Submit link
8	18-Feb	Nuclei and Radioactivity	5	Group projects
9	23-Feb	Nuclear Reactors and Atomic Bombs	5	Submit link
10	25-Feb	Group Project Talks		Group projects
	1-Mar	First Exam (Chaps. 1, 2, 4)	1,2,4,5	
11	3-Mar	Fusion Reactors	6	
12	8-Mar	Electricity and Magnetism	6	Submit link
13	10-Mar	Electricity and Magnetism	8	HW#3
	14-18 Mar	No class – Spring Break		
14	22-Mar	Light	8	Submit link
15	23-Mar	Light	9	
16	29-Mar	Invisible Light/Climate Change	10	Submit link
17	31-Mar	Climate Change	10	HW#4
18	5-Apr	Climate Change	3	Submit link
19	7-Apr	Gravity, Force and Space	3	Submit outline
20	12-Apr	Gravity, Force and Space	3	Submit link
	14-Apr	Second Exam (Chaps. 6,8,9,10)	6,8,9,10	
21	19-Apr	Quantum Physics	11	Submit link
22	21-Apr	Quantum Physics	11	
23	26-Apr	Quantum Physics	11	Submit link
24	28-Apr	Relativity	12	Term paper due
25	3-May	The Universe	13	Submit link
26	5-May	Course Review		
FINAL EXAM	16-May	5:30-8:00 pm Final Exam		