

## Physics 250, 2018 Spring

Palash Banerjee, Dept. of Physics, UW-Stevens Point

### 1 Basic information

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Course title	University Physics II, PHYS 250
Instructor	Palash Banerjee, B125 Science
Contact	715-346-4187, palash.banerjee@uwsp.edu
Office hours	MTWF, 12 — 1 p.m.
Pre-requisite	Math 121 is required
Textbook	"Principles of Physics" by Serway and Jewett
Required	Scientific calculator, a straightedge, and a protractor.

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### 2 Course description

PHYSICS 250 IS A CONTINUATION of the introductory calculus based sequence in physics for scientists and engineers which introduces you to important fundamental phenomena in electricity, magnetism, waves, and optics. In this course, we will discover the fundamental laws of electricity and magnetism and apply these laws to the study of electric circuits and other practical instruments and devices. You will also see how these laws predict the phenomena of electromagnetic waves which will lead us into the study of optics, optical instruments and imaging systems and several properties exhibited by waves such as polarization, interference and diffraction. Although my approach will be mathematically formal most of the time, I will make connections with applied physics, chemistry and engineering so you can see how abstract mathematical theories can have extremely rich practical applications.

### 3 Course objectives

By the end of the course, you should be able to:

1. describe the fundamental principles of physics and apply them to explain various physical phenomena.
2. apply the methods of differential and integral calculus to solve physics problems.
3. build experiments and analyze their results by constructing theoretical models.

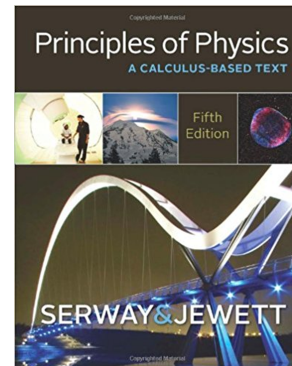


Figure 1: Your textbook is "Principles of Physics" by Serway and Jewett, 5th ed., Cengage, ISBN 978-1133104261.

#### 4 *Course assignments*

1. **Homeworks:** To do well in this class, you must practice. I will hand out one homework at the end of each discussion. You may discuss the concepts and ideas with each other as you solve your homeworks but you *may not* copy each others' work. Your homework assignments count for 20% of your grade.
2. **Discussion:** To help you keep up with the class materials I will give you a group quiz in each discussion. This will count for 8% of your grade.
3. **Laboratory:** Physics is an experimental science and the laboratory is a good place for you to develop your intuition, learn some common experimental techniques and have first hand experience with some of the concepts that we will cover in the lectures. Plus, the ability to make careful and reliable measurements is an incredibly useful skill to have. You will work in groups of four and perform experiments once a week. A brief technical report will be due the end of the laboratory session. Your laboratory performance will count for 12% of your course grade.
4. **Exams:** There will be *two* midterm exams during the semester not counting your final exam. These exams will be held in the evening. Each exam counts for 20% of your grade. Overall, your exams determine 60% of your grade.

#### 5 *General course policies*

1. Food and drinks are absolutely **not** permitted in the laboratory.
2. No make-up labs will be offered; no make-up exams will be offered. I will accept **only one** late assignment per student during the course, provided you have made arrangements with me *before*. No excuses are needed. A second late homework will receive no more than 80% credit. Subsequent late submissions will not be accepted.
3. Make-up work will only be accepted in the case of excused absences. Excused absences include death in the immediate family, illness with a note from the appropriate health care professional, religious observance, an event in which you officially represent the University of Wisconsin-Stevens Point and the event directly conflicts with an exam or lab. Excused absences must be approved with documenting materials prior to the date of absence.

4. I will drop the lowest homework score, the lowest discussion score and the lowest laboratory score. *All* the exams count. If you miss any exam, you will receive a zero for that exam.
5. The schedule for the finals is set by the University. I will not schedule an early final exam for whatever reason. Please don't ask.
6. I *do not* assign work for extra credit. There are *no* bonus points that you can earn. **Once you hand in your final exam, there is nothing more you can do to change your grade.**

## 6 Grading and evaluation

I will calculate your grade based on a weighted percentage of your scores as follows:

Assignment	Value
Homeworks	20%
Laboratory work	12%
Discussion quiz	8%
Exams (2 midterms, 20% each)	40%
Final examination	20%

Your final grades will be determined as follows:

Total score	Grade
93% and above	A
90–92%	A-
87–89%	B+
83–86%	B
80–82%	B-
77–79%	C+
73–76%	C
70–72%	C-
67–69%	D+
60–66%	D
below 60%	F

I do *not* grade on a curve. Scores will be rounded up according to the following example: 86.6 – 86.9% will be rounded up to 87% and become a B+, but 86.0 – 86.5% will remain at 86% and will earn a B.

## 7 Course schedule

This is a tentative course schedule. I will try my best to follow this schedule, but I reserve the right to change things if needed. I will mostly follow the ideas as discussed in your textbook but my class notes may be different from how your textbook presents the information. In some cases, I might deviate entirely from your textbook for good reasons.

Week	Topic (Chapter from your textbook)	Laboratory
(1) Jan 21	Electric forces and fields (19)	(0) Review — vectors, forces, and work.
(2) Jan 28	continued	(1) Intro to electrostatics
(3) Feb 4	Electric potential; capacitors (20)	(2) Mapping electric field lines
(4) Feb 11	continued	(3) dc circuits, resistors and diodes
(5) Feb 18	Current and dc circuits (21)	(4) Electrical energy and power
Feb 21	Mid term exam 1, 5:30 - 8:30 p.m., SCI A121	
(6) Feb 25	continued (21)	(5) Capacitors and RC circuits
(7) Mar 4	Magnetic forces and fields (22)	(6) Solar cell circuits
(8) Mar 11	Faraday's Law and inductance(23)	(7) Electromagnetic induction
(9) Mar 18	Theory of oscillations (12)	(8) Resonance and molecular vibrations
() Mar 25	Spring break	
(10) Apr 1	Mechanical waves and their properties (13, 14)	ac circuits
Apr 4	Mid term exam 2, 5:30 - 8:30 p.m., SCI A121	
(11) Apr 8	Electromagnetic waves (24)	Reflection and virtual images
(12) Apr 15	Reflection and refraction (25)	Refraction
(13) Apr 22	Imaging systems (26)	A compound 2 lens imaging system
(14) Apr 29	Wave optics (27)	Gratings
(15) May 6	continued	Spectral analysis of atomic hydrogen
(16) May 13	Comprehensive final exam, Mon May 14, 8:00 — 10:00 a.m., SCI A107	

## 8 Academic misconduct

Please *do not* copy each others homeworks, class assignments, laboratory reports, and examinations and pass them off as your own. Any confirmed incidence of academic misconduct, including plagiarism and other forms of cheating will be treated seriously and in accordance with University policy.