Physics 240, 2017 Fall
Palash Banerjee, Dept. of Physics, UW-Stevens Point

1 Basic information

Course title	University Physics I, PHYS 240
Instructor	Palash Banerjee, B125 Science
Contact	715–346–4187, palash.banerjee@uwsp.edu
Office hours	MWF, 1 — 2 p.m.
Pre-requisite	Math 120 *is* required
Textbook	*"Principles of Physics"* by Serway and Jewett
Required	Scientific calculator and a one-inch three-ring binder

2 Course description

Physics 240 is the first semester of a one year calculus based introductory sequence in physics for scientists and engineers. This class will cover foundational topics in mechanics and introduce you to thinking about the natural world in mathematical terms. We will study the following in some depth — (a) frames of reference, vectors and the theoretical description of motion, (b) forces, their applications and introduction to conservation laws, and (c) the theory of rotational motion, rigid body equilibrium and angular momentum. My goal is to discuss fewer topics but in greater conceptual and mathematical depth. I hope that by studying these fundamental physics principles you will develop a deeper and keener understanding of *why* the world around you works the way it does.
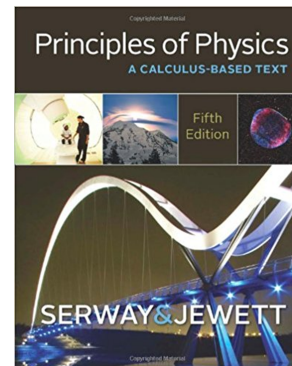

Figure 1: Your textbook is "Principles of Physics" by Serway and Jewett, 5th ed., Cengage, ISBN 978-1133104261.

Reminder—Math 120 is a pre-requisite for this class. You *cannot* take Math 120 at the same time as Physics 240.

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.

4. write brief technical reports to communicate your analytical and experimental findings.

4   Course assignments

1. **Homeworks:** To do well in this class, you must practice early and often. To help you do well, I will hand out short homeworks after each class. In addition, I will also hand out one extended 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 assignments count for 15% of your grade.

   Homeworks count for 15% of your grade.

2. **Discussion:** To ensure you are working on your assignments and are keeping up with the class materials, I will give you a short fifteen minute quiz at the beginning of each discussion. I will then hand out your extended assignment so you can start working on your weekly homework right away *in my presence*. Your performance in discussion will count for 8% of your grade.

   Discussions 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.

   Laboratory work counts for 12% of your grade.

4. **Exams:** There will be *two* midterm exams during the semester not counting your final exam. These exams will be held in place of the regular laboratory session. Each midterm counts for 20% of your grade. The final exam is comprehensive and counts for 25% of your grade. Overall, your exams determine 65% of your grade.

   Each mid term exam counts for 20% and the final exam counts for 25% 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. 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	15%
Laboratory work	12%
Discussion	8%
Exams (2 midterms, 20% each)	40%
Final examination, comprehensive	25%

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. I will provide my own notes and exercises for each class which will supplement the textbook.

Week	Topic (Chapter from your textbook)	Laboratory
(1) Sept 3	Motion in one dimension (2)	Uncertainties in experimental measurements
(2) Sept 10	continued	Motion with constant acceleration
(3) Sept 17	Motion in two dimensions (3)	Vectors
(4) Sept 24	continued	Newton's 2nd Law
(5) Oct 1	Newton's Laws (4)	Mid term exam 1
(6) Oct 8	Applications (5)	Biomechanics I — forces involved in jumping
(7) Oct 15	Work and energy (6 & 7)	Circular motion
(8) Oct 22	continued	Work done by machines
(9) Oct 29	Linear momentum and collisions (8)	Friction on an inclined plane
(10) Nov 5	continued	Mid term exam 2
(11) Nov 12	Rotational motion I – kinematics (10)	Biomechanics II — equilibrium of rigid bodies
(12) Nov 19	Rotational motion II – dynamics (10)	Moment of inertia
(13) Nov 26	Rotational motion III – angular momentum (10)	Oscillations and resonance
(14) Dec 3	Theory of gravitation and applications (11)	Fluid mechanics — buoyant forces
(15) Dec 10	continued	Review and problem solving
(16) Dec 17	Comprehensive final exam, Thu Dec 21, 2:45 — 4:45 p.m., SCI-A109	

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.