University of Wisconsin-Stevens Point
Physics and Astronomy
University Physics I — PHYS 240
2016 Fall

Course Information

- **Course title:** University Physics I, PHYS 240

- **Instructor:** Palash Banerjee

- **Contact:** B125 Science, x–4187, palash.banerjee@uwsp.edu.

- **Office hours:** I will be in my office MTW from 2 – 3 p.m. and on Thursday from 1 – 2 p.m. guaranteed. I am also available at other times, either right after class or otherwise by appointment. I am interested in your success so please come and see me as many times you wish.

- **Pre-requisites:** MATH 120 *is* required.

- **Required:**

  1. Textbook: *"Principles of Physics"*, Serway and Jewett, fifth edition, Brooks-Cole.
  2. Calculator: You must have a scientific calculator. A cell phone or smart phone is not a scientific calculator and I will *not* allow you to use such devices in the exam.

- **Laboratory:** Handouts for the laboratory will be provided.

- **Course description:** This is an introductory calculus based course in physics for scientists and engineers and deals with the study of classical mechanics. We will spend the first half of the semester discussing fundamental foundational topics which are relevant to scientists and engineers such as motion, forces and torques, work and energy, and the concept of conserved quantities such as energy, linear momentum and angular momentum. In the second half of the semester, we will explore three advanced topics — (a) the theory of vibrations, (b) the physics of sound waves and (c) fluid mechanics. I hope that by studying and applying fundamental physics principles to relevant problems in physics, chemistry and engineering, you will develop a deeper and keener understanding of *why* the world around you works the way it does.

- **Course objectives:** By the end of the course, you should be able to:

  1. Describe the fundamental concepts of mechanics, sound waves and fluids.
  2. Become proficient in the methods of differential and integral calculus by applying them solve problems.
  3. Recognize the meaning of important physics concepts by applying them to explain various physical phenomena.
  4. Apply these concepts in a laboratory setting to verify theories, make predictions and test them through careful experiments.

- **Classroom times:** All classes are held in the Science building.

- **Lectures:** Mon, Wed & Fri 11 am – 12 noon in A109.
- **Discussion:** Once a week in A-106.
- **Laboratory:** Once a week in B-104.

- **Homeworks:** I will assign homework at the end of each discussion. Your written solutions will be due one week later in class. You may discuss the concepts and ideas with each other as you solve the homework problems but you *may not* copy each others' work. Homeworks count for 19% of your grade.

- **Discussion:** You will spend every discussion session on a class exercise. I will allow you to work in small groups, working out the solutions to a few problems. Many of the problems will re-emphasize the content of the lectures and give you a chance to practice basic physics techniques. Your performance in discussion will count for 6% of your grade.

- **Laboratory:** Physics is an experimental science and the lab 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 report will be due the end of the laboratory session. Your laboratory performance will count for 13% of your course grade.

- **Exams:** There will be *three* midterm exams during the semester not counting your final exam. These exams will be held in the evening from 7 – 9 pm in CCC-101. Each midterm counts for 14% of your grade. The final exam is comprehensive and counts for 20% of your grade. Overall, your exams determine 62% of your grade.

- **Academic misconduct:** As a student at UWSP, I expect you to be familiar with the following document: `http://www3.uwsp.edu/stuaffairs/Documents/RightsRespons/SRR-2010/rightsChap14.pdf`, especially Section 14.03. Simply put, *do not* copy each others homework, lab reports and exams 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.

General Course Policies

- Food and drinks are absolutely **not** permitted in the laboratory. No exceptions.

- 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.

- 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.

- I will drop the lowest homework score, the lowest discussion score and the lowest lab score. *All* the exams count. If you miss any exam, you will receive a zero for that exam.

- 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.

- 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**.

Grading and Evaluation

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

Assignment	Value
Homeworks	19%
Laboratory work	13%
Discussion	6%
Exams (3 midterms, 14% each)	42%
Final examination, comprehensive	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.

Tentative Course Schedule

The tentative course schedule is as follows. This might change and I will try my best to announce changes beforehand.

Week of	Topic (lecture + discussion)	Laboratory
(1): Sept 4	Ch 2: Motion in one dimension; average and instantaneous velocity and the concept of a limit.	(1): Uncertainties in experimental measurements
(2): Sept 11	Ch 2: (continued) Ch 3: Motion in two dimensions	(2): motion with constant acceleration
(3): Sept 18	Ch 4: The Laws of motion	(3): How to handle vectors
(4): Sept 25	Ch 4: (continued) Ch 5: Applications Midterm 1, Thu Sept 29, 7 - 9 pm, A109	(4): Verifying Newton's 2nd Law.
(5): Oct 2	Ch 5: (continued)	(5): Forces involved in jumping: the force plate
(6): Oct 9	Ch 6: Work done by a force and the concept of kinetic energy; concept of potential energy Ch 7: Conservation of energy	(6): The inclined plane
(7): Oct 16	Ch 8: Theory of collisions	(7): Concepts in static and kinetic friction
(8): Oct 23	Ch 8: (continued) Midterm 2, Thu Oct 27, 7 - 9 pm, A109	(8): Circular motion
(9): Oct 30	Ch 10: Rotational motion; torque and equilibrium; concept of angular momentum	(9): Work done using machines
(10): Nov 6	Ch 12: The theory of oscillations;	(10): Torque and equilibrium
(11): Nov 13	Ch 13 & 14: Mechanical waves; Interaction between waves -- superposition	(11): Moment of inertia
(12): Nov 20	Ch 14: (continued) Thanksgiving break	(12): Oscillations and resonance
(13): Nov 27	Midterm 3, Mon Nov 28, 7 - 9 pm, A109 Ch 15: Fluid statics and dynamics	(13): Wave interference
(14): Dec 4	Ch 15: (continued) extra topics in fluid mechanics: viscosity & non-ideal fluids;	(14): Standing waves in strings and pipes
(15): Dec 11	(continued)	(15): Buoyancy and Archimedes' principle
(16): Dec 18 Finals week	Comprehensive final exam Monday Dec 19 10:15 a.m. – 12:15 p.m., A109	