Syllabus and course policies, Physics 250

1 *Basic information*

Course title	Physics 250 (University Physics II)
Instructor	Palash Banerjee
Contact	SCI B-201, palash.banerjee@uwsp.edu
Student hours	T 11 am — 12 noon, WF 12 noon — 1 pm, in SCI B-212.
Pre-requisite	Physics 240 (Physics I) as well as Mathematics 256 (Calculus II)
Textbook	*"Physics for Scientists & Engineers 10th ed"* by Serway and Jewett.
Required	Laboratory notebook, a scientific calculator, a straightedge and a protractor.

2 *Course description*

Physics 250 covers foundational topics in electricity, magnetism, waves, and optics and continues to introduce you to the mathematical representation of the physics world. Class time will be used to discuss a limited number of fundamental topics but in greater conceptual and mathematical depth. This theoretical work will be supplemented by extensive experiments that introduce you to contemporary laboratory instruments and measurement techniques, as well as the mathematical methods of data analysis.

Figure 1: Required — a lab notebook, a three ring binder for the handouts, a straightedge and a protractor, as well as a scientific calculator.

3 *Learning outcomes*

The assignments in this course support the following learning outcomes:

1. You should be able to explain the major conceptual ideas in physics and apply them to the solution of scientific problems.
2. You should be able to apply advanced mathematical methods to the solution of physics problems.
3. You should be able to design and perform an experiment, and be able to construct a mathematical model to explain the results you obtain from that experiment.
4. You should be able to improve your writing skills and learn to write clearly. If you write clearly, you will think clearly and this will sharpen your analytical skills.

4 *Course assignments*

1. **Homeworks:** Homeworks will be due the beginning of class Friday at 11 am. You may expect approximately 13 ± 1 homeworks during the course. All the homeworks count and I will not drop your lowest score. It is a good learning experience to work together in a group as you do your homework, but you *may not* copy each others' work.
2. **Discussion:** Discussion time will be spent reviewing important concepts and mathematical methods. I will provide a few carefully chosen problems for you to work on. Group work will be encouraged so you can learn from each other. There will also be a short quiz at the end so you can check your own learning. I will drop your lowest discussion score.

3. **Laboratory:** The physics laboratory is a place for you to learn contemporary measurement techniques and the methods of data analysis. The laboratory is not complete unless you submit a clearly written scientific report, due the beginning of Discussion every Tuesday. I will drop your lowest score.

4. **Exams:** There will be *two* midterm exams during the semester during lab time. There will also be a final exam at the end of the semester. *All* the exams count and no score will be dropped. If you miss any exam, you will receive a zero for that exam.

5 *Grading and evaluation*

I will calculate your grade based on a weighted percentage of your scores as shown in the table to the left below. Your final letter grades will be determined as shown in the table to the right below.

Assignment	Value
Homeworks	20%
Laboratory work	15%
Discussion	5%
1st exam	20%
2nd exam	20%
Final examination	20%

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.

6 *Other course policies*

1. If you are going to be late on an assignment, please let me know. I will accept only one late assignment and no excuses are needed. Subsequent late assignments will not be accepted.
2. No make-up labs will be offered and no make-up exams will be offered.
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, or an event in which you officially represent UWSP 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. Please *do not* copy each others homeworks, class assignments, laboratory reports, and examinations and pass them off as your own. Any such incidents will be treated seriously and in accordance with University policy.
5. Food and drinks are not permitted in the laboratory.
6. 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.
7. I *do not* assign work for extra credit and 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.

7 Course schedule

Week	Chapter: Topic	Laboratory
(1) Sep 3	Ch 22: We meet electric charges and electrostatic forces.	The electroscope.
(2) Sep 10	Ch 22: We discover electric fields and learn some mathematical methods.	The measurement problem and uncertainty analysis.
(3) Sep 17	Ch 23: We meet Gauss' law and learn about surface integrals and symmetry.	Mapping electric field lines.
(4) Sep 24	Ch 24: We find a connection between work done, line integrals and electric potential.	Electric circuits I - the differential conductance of a wire.
(5) Oct 1	Ch 25: We apply the theory of fields and potentials to electrodes and discover capacitors.	Electric circuits II - Energy and power.
(6) Oct 8	Ch 26: We study electron collisions in a wire and connect electric fields to current density.	Mid term exam 1
(7) Oct 15	Ch 27: We encounter an emf device and construct the theory of electric circuits.	Electric circuits III - the four probe technique and the conductivity of steel.
(8) Oct 22	Ch 28 & 29: We discover magnetic fields and forces and learn about cyclotron orbits.	Electric circuits IV - a resistance bridge and the null method.
(9) Oct 29	Ch 30: We discover induced electric fields with strange mathematical properties.	Electric circuits V - Capacitor circuits and the solution to a first order differential equation.
(10) Nov 5	Ch 33: We study waves and learn about the phase of a wave function.	Electric circuits VI - Magnetic field of a coil.
(11) Nov 12	Ch 33: We study polarized electromagnetic waves and learn about transmitters and antennas.	Mid term exam 2
(12) Nov 19	Ch 34: We study Fermat's principle of Least Action and discover refraction.	Thanksgiving break
(13) Nov 26	Ch 35: We study imaging systems and learn appearances can be deceptive.	Final project: To design, build and operate a scientific instrument. I - Build and calibrate a photodetector circuit.
(14) Dec 3	Ch 36: We learn to draw phasor diagrams when we study two source interference.	II - Interaction of polarized light with a solution of chiral molecules.
(15) Dec 10	Ch 37: We learn how apertures modify the wavefront and learn about diffraction.	III - Presentation, reflection and report.
(16) Dec 17	Final exam , Thu Dec 21 2:45 — 4:45 p.m.	