Physics 213: General Physics I

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1 Contact Information

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Office Hours: Tuesdays 3:00–4:30. "Office Hours" means that I promise I will be there and will give you priority over students from my other courses. You are welcome to make an appointment or to drop by my office anytime, with the understanding that I may be busy.

2 Course Goals

Welcome to General Physics I! This course explores basic principles of physics with a view towards applications to the life sciences and related fields. We will explore kinematics (motion), forces, energy, momentum, fluids, waves, and thermodynamics. Specific course goals include the following:

1. improving deductive reasoning skills;
2. developing an appreciation for physics and its applications to many sciences, especially life sciences, as well as everyday life;
3. understanding the relationship between the fundamental physical quantities of force, momentum, energy, and heat; and
4. learning basic concepts covered on the MCAT examination. ☺

This is a course which many students find very challenging. Please don't lose heart! I am confident that if you put in the effort you will be able to excel. I have some suggestions for maximizing your learning listed throughout this syllabus.

3 Course Format

The course meets MWF 9:00 AM – 9:50 AM (for Section 1) or 12:00pm – 12:50pm (for Section 3) in Lewis 101. Homework assignments will be made available on Fridays and be due the following Friday. Optional "Problem Sessions" will be held Thursday evenings from 7:00 PM – 8:30 PM in Lewis 109 (note the different room).

This course will make extensive use of the Blackboard system. I will post all homework assignments, administer reading quizzes, and occasionally make announcements there. It is your responsibility to log in *regularly* and keep up with what is posted. If you have any problems with the site you should let me know **immediately**.

3.1 Grade Breakdown

The course grade will be based on the following formula:

- Class Participation (5%)
- Reading Quizzes (10 %)
- Homework Assignments (35%)
- Midterms (12.5 each%)
- Final Exam (25 %)

3.2 Class Participation and Clickers

Coming to lecture and participation in it are a vital part of this class. Everyone learns best when they are actively engaged in the lesson. This is especially true in physics class, which deals with concepts which can seem a little foreign at first. You should come prepared with a calculator as well as anything else you may need to participate. Ask questions if you get lost. My goal is to teach you, not spend fifty minutes confusing you. Demonstrating your involvement by asking questions or volunteering answers can only help your grade. Finally, please be prompt—you are responsible for all material whether or not you were in class.

It is difficult to have an interactive lesson in such a large class, but one tool to facilitate this is a "clicker" that allows the class to vote electronically (much like on TV ☺). The bookstore has interwrite^{TM} PRS clickers available which should be purchased sometime this week (although it is possible that the bookstore will run out, in which case I will extend this deadline). Once you have purchased your clicker you will need to email me its ID—I will keep track of who votes in classroom polls and this will figure into your class participation grade.

3.3 Reading Quizzes

The material in a physics class needs to be covered multiple times in order to be understood. In addition to the general outline (below), I will provide detailed reading assignments for each class. These assignments should be read before coming to class (and probably again after class or completion of the assingment). In order to encourage you to read the book, there will be reading quizzes two or three times a week. These quizzes will be administered through the Blackboard test mechanism. The quizzes will be due at 12:01am on the day of lecture (i.e., the night before class). You should do the reading quizzes on your own. Half credit for the quiz will be given for simply doing it; the other half will be based on how you perform on the quiz.

3.4 Homework

Homework assignments are your best opportunity for working out confusions and mastering the material. While you are encouraged to discuss problems with your classmates, **your write up must be your own!** Finding a joint solution and then each person copying that common solution is strictly prohibited. On the other hand, going home and each person writing up a solution on his or her own after working together to solve a problem is perfectly acceptable. While this difference might be something of a fine line, it will also help you gain a better grasp of the material. It is much easier to understand a solution than to come up with one—as will become evident when you take the first test.

For more on my expectations on homework solutions, please see the document "The Care and Feeding of a Physics Problem Set."

3.5 Exams

The two midterms will be on September 23 and October 28. The final exam will be on Monday, December 5, at 8am for Section 1 and 12pm for Section 3. All tests will be in-class, closed-note, and closed-book. However, you will be permitted to bring in an $8.5'' \times 11''$ sheet of paper with any formulae or notes you want on it. The only rules are (1) it must be readable by the unaided eye, and (2) you must write everything yourself (i.e., photocopying the book or somebody else's notes is not permitted).

3.6 Textbook

The textbook for this course is *Physics: Principles with Applications, 6th ed.* by Giancoli. We will cover most of the material in chapters 1-15, omitting the majority of the optional (starred) sections. This textbook is a good reference, and offers many fine resources for students. These include a companion website, a students solution manual, and more. In particular, I have explored the practice questions and problems on the website and found them to be quite good. I strongly encourage you to check out the website and try the practice problems *on your own*, especially if you are having difficulty with the material. Practice makes perfect, and this is especially true in physics.

3.7 Academic Dishonesty

I will generally trust that you will observe the guidelines above regarding collaboration and that you will be academically honest. However, you should be aware that the University has just streamlined the process for recording academic dishonesty, and any case of academic dishonesty will be dealt with harshly. In particular, any instance of cheating on an exam or copying homework solutions out of a solutions manual (whether online or in print) will result in an automatic failing grade for the course.

3.8 Course Outline

Week	Topics	Reading Assignment
08/22 – 08/26	introduction; kinematics in one dimension	chapters 1 & 2 (all)
08/29 – 09/02	kinematics in two dimensions and vectors	chapter 3 (all)
09/05 – 09/09	forces and Newton's laws	sections 4-1 — 4-6
09/12 – 09/16	free-body diagrams and problem solving with Newton's laws	sections 4-7 — 4-9
09/19 – 09/23	circular motion; gravitation; **first midterm**	5-1—5-3, 5-6—5-8, 5-10
09/26 – 09/30	work and energy	sections 6-1—6-6
10/03 – 10/07	problems using conservation of energy; linear momentum	sections 6-7—6-10, 7-1, 7-2
10/10 – 10/14	collisions; introduction to rotation	7-3—7-6, 7-9—7-10, 8-1, 8-2
10/17 – 10/21	rolling and torque; statics	sections 8-3—8-8, 9-1—9-4
10/24 – 10/28	fluids; **second midterm**	sections 10-1—10-10
10/31 – 11/04	vibrations and waves	sections 11-1 — 11-13
11/07 – 11/11	sound	chapter 12 (all)
11/14 – 11/18	temperature, kinetic theory, and heat	13-1—13-4, 13-6—13-10, ch. 14
11/21 – 11/25	**Thanksgiving break—happy holidays!**	
11/28 – 12/02	the laws of thermodynamics	sections 15-1—15-9, 15-11

4 Additional Tips

- Always try a problem on your own before getting help.
- Make sure you understand what the problem is asking before you attempt to solve it.
- Draw a picture whenever possible.
- Pay attention to units.
- Try doing worked examples in the book without peeking.
- Remeber that solving a problem is not necessarily a linear process; wrong turns and dead ends are often instructive.

Finally:

Doing physics involves both learning concepts and mastering problem solving. These are distinct skills, but they interact and support each other. You will often find that you read the book and somewhat understand a concept. If you then do a problem, that concept may become clearer, and reading the book a second time will then result in a deeper understanding. Do not be afraid to do practice problems and reread the book as many times as necessary—it will eventually all come together.