

Physics 214: General Physics II

Instructor: Dr. Itai Seggev (dök' • tər ē • tī' sě' • gěv)

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1 Contact Information

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Office Hours: Mondays 2:00–3:30. “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.

Grader: Baishali Ray **Email:** bray@olemiss.edu **Office Hours:** see Tutoring Room.

2 Course Goals

Welcome to General Physics II! This course continues the exploration of basic principles of physics—started in General Physics I—with a view towards applications to the life sciences and related fields. In this semester, we will focus on thermodynamics and electromagnetic phenomena (including optics). 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 unity of electromagnetic phenomena, despite apparent disparity;
4. acquiring a basic understanding of nuclear physics; and
5. 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.

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 Wednesdays and be due the following Wednesday. Optional “Problem Sessions” will be held Tuesday evenings from 7:30 PM – 9:00 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 (10%)
- Reading Quizzes (15 %)
- Homework Assignments (25%)
- 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 clicker (see below), calculator, and 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 interwriteTM PRS clickers available which should be purchased sometime this week. Once you have purchased your clicker you will need to log on to Blackboard and register its ID. The ID is the six-digit number on the back of the actual clicker device. (Registration only needs to be done once per semester; you do not need to do this again if you’ve already done it for another class).

The class participation grade will be based largely on attendance, as recorded by the PRS system. However, I reserve the right to raise or lower the class participation grade based on my observations in class. After your first 3 absences, each additional absence will deduct 3% from your class participation grade. If you forget your clicker, you should record your answers and your clicker ID on a piece of paper and hand it in at the end of class. These instances will count towards your 3 absences, but will incur only a 1.5% penalty. Athletes and others who must attend university functions should provide me with documentation, preferably in advance, in order to avoid this penalty.

Note: You must register your clicker on Blackboard no later than 11pm on Sunday, January 22, or you will lose 20% of 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 assignment). In order to encourage you to read the book, there will be reading quizzes that must be completed prior to class. These quizzes will be administered through the Blackboard test mechanism. The quizzes disappear (i.e., are no longer available for you to take) at 11:30pm on the night before class. The reading quizzes consists of four multiple choice questions. One of these will always be the question “Are you alive?” which will be worth 3 points on the quiz. Make sure you answer this question correctly. The other 3 points will come from the remaining three questions. Your two lowest reading quiz scores will be dropped. Reading quizzes are open-book, but they are not open-friend or open-Internet.

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 writeup must be your own!** Moreover, you are strongly encouraged to spend some time (at least 15 to 20 minutes) on each problem by yourself before seeking help. It is much easier to understand a solution than to come up with one—as will become evident when you take the first test.

Homework assignments will have the five parts enumerated below. All solutions you turn in should follow the guidelines in the companion document *The Care and Feeding of a Physics Problem Set*. Please understand that these are *homework* guidelines—I realize that you do not have the time for all these niceties on examinations. The five parts of a problem set are:

1. *Basic stretch*: The problems in this section **should not** be turned in but are for your benefit. These will consist of easy (mostly Level I) problems. They may serve to prepare you for the actual assignment or just as a quick check that you understand the basics.
2. *Warmup Problems*: The problems in this part **should** be turned in, but will be graded on a completion basis. There will be five such problems (occasionally combinations of book problems), harder than the basic stretch problems (mostly Level II) and worth 6 points a piece. You will receive either 6 points (a serious attempt was made and the rules of the *Care and Feeding* were generally followed); 3 points (a solution was attempted, but it is obviously incomplete or the rules of the *Care and Feeding* were ignored); or 0 points (no serious attempt or problem missing). The grader’s determination will be given deference and, much like instant replay in the NFL, there must be incontrovertible visual evidence of a mistake in order for me to overrule her.
3. *The Question*: These problems **should** be turned in. I will assign one Question from the end of the chapter (as opposed to a Problem) on each assignment. These will be

graded equally on content and style, so be sure to write well. I will be involved in the grading of these questions.

4. *In the Zone*: These problems **should** definitely be turned in. The final 15 points of the 50-point problem set will come from a harder problem which will force you to integrate several concepts. These problems will often be written by me. They should be similar in style, although probably a little higher in difficulty, than problems on the exams. I will be closely involved in the grading of these problems, and they will be graded *strictly*. Make sure you follow the rules in the *Care and Feeding*.
5. *Extra Reps*: These problems **should not** be turned in. These are additional problems at the level of warmup problems or higher. These make emphasize slightly different topics or simply provide extra practice. I will often list “Highly Recommended” problems in **boldface**, which are problems which were “runner’s up” to the problems in the warmup section.

Homework must be turned in class on the date it is due to receive full credit. Under no circumstances can homework be accepted for credit once solutions have been posted, which will usually be the evening on the day they are due. Athletes and other individuals who may be absent should turn in their homework early or contact me ahead of time to make alternate arrangements. One homework grade will be dropped.

3.5 Exams

The two midterms will be held at night, from 7:00 to 8:30 pm on Thursday, February 23, and Thursday, March 30. The final exam will be at 8:00am on Wednesday, May 10, for Section 1 and at noon on Thursday, May 11, for Section 3. Barring a documentable emergency (e.g., being hospitalized), **you must contact me well in advance of the exam in order for me to consider providing any sort of makeup**. For the final, you may request to take the exam with the other section, which will generally be permitted on a space-available basis. However, no other accommodation is possible unless *required* by University regulation. In particular, **purchasing an airline ticket that forces you to leave before the end of finals week is not grounds for taking the exam at another time**.

Exam grades will be curved: the maximum score will be determined by the average of the first, third, and fifth highest grades on the exam. The final exam will be split into three parts: new material (worth 50%), first midterm material (worth 25%), and second midterm material (also worth 25%). If your percentage grade on the second or third part is higher than your grade on the corresponding midterm, the grade from that part of the final will replace your midterm grade.

All tests will be in-class, closed-note, and closed-book. However, you will be permitted to bring in an 8.5" × 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 Final Overall Grades

I go through the following process in determining final grades:

1. I compute everyone's overall average according to the formula given in section 3.1. I *may* also do an overall curve.
2. Starting with the standard 90/80/70/60 ABCD scale, I adjust this scale (usually downward) so that it coincides with gaps in the grade distribution. This a way, a few points do not make a difference in the overall grade.
3. Finally, I examine each student's grade individually. If I see a noticeable improvement or I am aware of extraordinary circumstances (extended illness, getting a concussion the night before the midterm, etc.), I *may* adjust the grade. Students who have excellent attendance and who I see making the maximum effort will get the greatest benefit during this step.

4 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. Please keep the following in mind:

1. 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.
2. Since class attendance as recorded by the PRS system feeds directly into your grade, giving your clicker to another student is a form of cheating. If I notice more clickers going off than there are students in the room, I will stop class and take attendance. Those involved will receive an automatic failing grade in the course.
3. As indicated above, your homework must reflect your own work. Finding a joint solution with a collaborator 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.

5 Course Outline

5.1 Textbook

The textbook for this course is *Physics: Principles with Applications, 6th ed.* by Giancoli. We will cover most of the material in chapters 13-25, omitting the majority of

the optional (starred) sections. We will cover additional material as time permits. At the present time, I plan to cover special relativity (chapter 26) and nuclear physics (chapters 30 & 31), but this is subject to change. The textbook is a good reference, and offers many fine resources for students. These include a companion website, a student's 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.

5.2 Tentative Schedule

Week	Topics	Reading Assignment
01/18 – 01/20	temperature and heat	13-3, 13-6—13-10, 14-1—14-4
01/23 – 01/27	thermodynamics	14-5—14-8, 15-1—15-6
01/30 – 02/03	entropy; electric fields	15-7—15-12, 16-1—16-7
02/06 – 02/10	field lines; conductors; electric potential	16-8—16-10, 17-1—17-5
02/13 – 02/17	capacitance; dielectrics; currents	17-7—17-10; chapter 18
02/20 – 02/24	DC Circuits; First Midterm: chs. 13-17	chapter 19
02/27 – 03/03	magnetism	20-1—20-8
03/06 – 03/10	electromagnetic induction	21-1—21-5, 21-6—21-10
03/13 – 03/17	Spring Break—Enjoy!	
03/20 – 03/24	electromagnetic waves; ray model of light	chapter 22, 23-1, 23-2
03/27 – 03/31	geometrical optics; 2nd Midterm: chs. 18-22	23-3—23-8, 23-10
04/03 – 04/07	wave nature of light	24-1—24-10
04/10 – 04/14	optical instruments; Good Friday	25-1—25-4, 25-7—25-9
04/17 – 04/21	the special theory of relativity	chapter 26
04/24 – 04/28	nuclear physics and radioactivity	chapter 30
05/01 – 05/05	nuclear energy and radiation	chapter 31

6 Finally

Doing physics involves both learning concepts and mastering problem solving. These are distinct skills, but they interact and support each other. Remember that solving a problem is not necessarily a linear process; wrong turns and dead ends are often instructive. 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.