

Principles of Physics II Syllabus

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2 Course Description

Welcome to Principles of Physics II! This course is the second semester of a two-semester sequence that presents an intermediate, calculus-based introduction to physics. The first semester will cover ideas like kinematics, Newton's laws, conservation of energy, rotational motion, and thermodynamics. The second semester will cover electricity and magnetism, oscillations, waves, optics, and radioactivity. We will develop a conceptual understanding of the laws of physics, and use these laws to describe a wide range of physical phenomena.

In addition to these physics-specific goals, this course will develop skills that will serve you well in your career. A particularly vital one is the ability to reason through complex problems using basic principles or physical models. Solving problems and mastering concepts are closely linked; only after you have mastered the underlying physical concepts and principles will you be able to apply them effectively to solve problems.

3 Course Prerequisites

Students should have taken Calculus 1 or should be taking it concurrently. Other prerequisites for PHYS/PBPM 102 are high school algebra, geometry, and trigonometry.

4 Text and Course Supplies

The standard set of materials for the two-semester sequence (PHYS/PBPM 101/102) is as follows

- Physics for Scientists and Engineers: A Strategic Approach with Modern Physics (3rd Edition) by Randall D. Knight
- A subscription to MasteringPhysics the online homework service associated with Knight's book.
- A clicker in order to participate in class questions. Most days, questions will be asked of you which involve your input. The clicker is an easy way to collect anonymous answers from a large class such as this.

5 Course Web Page

Blackboard will host the course web pages for this course. Almost all the information that you will need for this course (i.e., syllabus, homework schedule, web links to homework solutions and computer programs for certain homework assignments, how to find/contact your professor, announcements, etc.) will be placed on this website. Familiarize yourself with the course website; it will come in handy

6 Course Philosophy

This course may be different than other physics courses you have taken in the past. In the same way that you cannot learn basketball by watching a video on basketball, you cannot learn physics by simply listening to someone lecture on physics. This is a well-documented fact based upon years of research by the physics education community. You must play an active role in your learning. The various components of the course will be discussed in section 7. Here we want to give you an overview and a successful strategy for doing well in the course.

- **Well before each class, actively read the chapter assigned for that class period**
 - **What does “active” reading entail?**

A good analogy would be an apprentice learning a trade from a master. As you read a chapter, if you don't understand something, ask! The answer should be there in the text and there are exercises (with solutions) and worked examples to help you find it. The more you can figure out what the author is saying, the more the knowledge becomes your own. Anyone can passively read a physics textbook, but to really understand what you have read, you have to own the knowledge. This type of reading is called “active reading.” Developing this skill will help you in whatever career you choose—active reading is the sight equivalent of active listening, which was listed as an essential skill for getting a good job. You may not believe this right now, but this is the most important thing you can do to earn a good grade in the course.
- **Go to all of your lectures and recitation sessions and ask questions!**
 - You will get much more out of lecture and recitation if you ask questions rather than just sitting there passively. This is the time to get questions answered that you were unable to answer yourself.
- **Make a serious attempt at all of the homework problems assigned.**
 - You will be given 3 attempts at each on-line homework problem (see section 7.3). Make a serious attempt to answer the question on the first try. Avoid the temptation to see the solution first (which is shown after the second attempt). Why? Because you will be given only one attempt at each exam problem.

7 Course Components (with percentage of course grade in italics)

7.1 Clicker Questions

We will cover close to one chapter a day. You are responsible for reading the chapter before coming to class. In addition to reading the text, you should work the exercises that are embedded in the reading to help reinforce the concepts and check your understanding.

Clicker questions will be asked most every day. They will mostly cover concepts related to the material although sometimes they will require simple math. It is absolutely essential to your success in the course and to the success of the course itself that you keep up with the reading assignments. Class sessions will make little sense if you fail to do so. The results of these questions will indicate possible areas of confusion for the class, and they will help guide classroom discussion. Remember, unlike perhaps other large lecture courses, class time in PHYS/PBPM 101 is a key time for you to ask questions!

7.2 Attendance/Participation (*10%*)

Attending all lectures and recitations is integral for a summer course. Because the pace is fast, and there is no slowing down, attending all lectures and recitations is required. There will be no make-up recitations except in extenuating circumstances. Excused absences will be considered only under exceptional circumstances such as serious illnesses, off-campus, university-sanctioned activities, or certain legal obligations, such as jury duty

7.3 Homework Assignments (*15%*)

The Enhanced WebAssign system will be used for the majority of homework problems this semester. You need a registration access number to use the system (see section 4). All homework must be submitted according to the WebAssign schedule. You will be given three attempts to answer each HW problem. If you answer correctly on the first attempt, you will receive 100% for that problem. If you answer correctly on the second attempt, you will receive 80%. After the second attempt, the solution to the problem is made available to you. If you answer correctly on the third attempt, you will receive 60%. If you do not answer correctly on the third attempt, you will receive 0% for that problem. Your lowest three homework assignment grades will be dropped.

7.4 Recitation sessions (*15%*)

Attendance at recitation twice each week is required. During this time, students will complete a few problems covering relevant material from the past week. These problems in recitation will not be collected for a grade. Working in small groups is encouraged for the recitation section. You will then have a couple problems to work at home to be submitted the following time your recitation meets for a grade. No recitation grades will be dropped. Absences from recitation will result in a 0 for that grade

7.5 Exams (60%)

There will be 5 exams (one on each Friday class). The final exam will be cumulative in that physics builds upon itself, but not cumulative in that questions from the first test would be explicitly on the test. Some sections may be explicitly excluded as indicated by your professor closer to the final exam.

7.5.1 Materials to Bring to the Exams

You will need writing implements (pens or pencils), an eraser, and a calculator for each exam. Check your calculator batteries before you come to exams. You may be asked to bring a straight edge to an exam.

8 Attendance and Other Course Policies

8.1 Attendance

Attendance to lecture and recitation sessions is mandatory. Attendance will be taken in all of these components. Because of the fast pace of summer courses, even missing a single lecture can set you back significantly.

8.2 Homework

Homework must be submitted on time. Your 3 lowest scores on individual HW assignments will be dropped.

8.3 Recitation Sessions

Attendance at the weekly recitation sessions is mandatory. Problems will be assigned, completed, and submitted as part of your course grade. Absences from recitation will result in a 0 for that grade.

8.4 Makeup Exams

Makeup exams are a great inconvenience for everyone, and they will be considered only under exceptional circumstances such as serious illnesses, off-campus, university-sanctioned activities, or certain legal obligations, such as jury duty. Except in emergency situations, arrangements for makeup exams need to be made prior to the regularly scheduled exam. If an unexpected emergency prevents you from taking the exam, notify your instructor as soon as possible.

9 Course Grades

Your final grade in PHYS/PBPM 101 is determined from a weighted average of your recitation session attendance and problems (R, 15%), homework (H, 15%), attendance (A, 10%),

and five exams (E, 60% total, with each exam weighted equally). You can calculate your course percentage from the following equation, where each letter corresponds to your percentage in that component of the course:

$$\text{Course Percentage} = 10*A + 15*H + 15*R + 12*E1 + 12*E2 + 12*E3 + 12*E4 + 12*E5$$

Grading Scale:

A Range	90 and above
B Range	80-89.9
C Range	70-79.9
D Range	60-69.9
F	below 59.9

The instructor reserves the right to lower the borderline percentages, but will never raise them.

10 Academic Integrity

Physics as practiced in real life is often a collaborative exercise. Students are therefore permitted and encouraged to work with classmates on homework to stimulate their own thought processes and to receive feedback from their peers on possible misconceptions. However, the written work that you submit should be yours alone – actual or effective Xerox copies of written work are not permitted.

Cheating on exams and copying homework are serious offenses. Any suspected cases of cheating/plagiarism will be reported and dealt with according to the rules specified by the Honor System.

Most academic integrity violations are simply incorrect choices made when students are stressed out, sleep deprived, and facing numerous deadlines. Keep this mind: it takes only a brief moment to make a bad decision, but it takes far longer to earn back the trust of instructors, advisors, and friends. Further, an academic integrity violation will follow you for years, even after you leave the university to seek your first job or professional degree. Rather than making a poor choice, take control of the situation by talking to your instructor or a counselor beforehand, especially if external pressures (roommate troubles, relationship issues, depression, etc.) are involved. Remember, Georgetown faculty take very seriously the Jesuit educational principle of *Cura Personalis* (care for the whole person).

11 Cell phones and laptops

We don't want to hear cell phones or other electronic devices. Turn them off before class or at least set them on silent mode. It is very unfair to other students to have your personal affairs interfering with their education.

Laptops are distracting to you and to students around you. You are best served by leaving them at home or in your backpack, but we understand some of you may occasionally

need to use your laptop during lecture. Out of consideration for your fellow students, please only use laptops in the back third of the classroom, preferably only in the last few rows.

12 Where to go for help

Regular office hours for faculty members and TAs will be posted on Blackboard by the end of the first week of class. TA office hours will be held in Reiss 501B, and will cover most afternoons and evenings.

Professor Johnson will be leading the lecture portion of the course, the homework assignments, and the recitation instructors. Issues with the recitation should be addressed with the instructor first, but if they persist, please contact Prof. Johnson.

13 Topics to be covered in PHYS 102:

Waves

Optics

Diffraction/Interference

Coulomb's Law/Gauss' Law

Biot-Savart/Ampere

Circuits

Maxwell's Equations

Photoelectric Effect

Radioactivity