Physics 112 is the second semester of a two semester introduction to Physics. The goal of the course is to develop your analytical and problem-solving skills while learning the physical laws that govern electricity and magnetism, waves, and optics. Physics 112 differs from Physics 111 in two important ways: the subject matter is more abstract and the use of more calculus will be required.

This course is designed for those planning to major in science or math.

Instructor: Thomas Carroll
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Class Hours and Location
Lecture: 11:00 - 11:50 a.m., Monday, Wednesday, and Friday, Pfahler 001

Office Hours
My official office hours will be:
   Tuesday     2:30-5:00 pm
   Wednesday   1:00-5:00 pm
   Thursday    10:00-11:45 am

If you would like to meet with me at another time, feel free to knock on my door to see if I’m available or make an appointment with me. I’m happy to meet with you individually, but you can also come with other students (especially if you’re working on the problem sets together). It can also be helpful to hear your colleagues’ insights and questions. Finally, feel free to email me with questions as well.

You should also take advantage of the Physics problem sessions run by the majors. It’s a great place to work on the problem set in a group with expert help available. I will announce the times and locations of the sessions when they are scheduled.

Text
The textbook for the course is *Understanding Physics* by Cummings, Laws, Redish, and Cooney. (ISBN: 0-471-37099-1)
Exams

There will be three in-class exams. Don’t spend your time memorizing equations. You may bring an 8.5” x 11” sheet with notes and equations on one side to the exams. You may find that in the course of doing the problems and making the sheet that you end up memorizing the equations anyway. I will also provide you with a model equation sheet before the midterms, however I still recommend that you make your own.

Grading

Homework will count for 30% of your grade. It is important that you turn in the problem sets on time; late homework will not be accepted. However, your lowest 2 homework grades will be dropped.

The lab will count for 20% of your grade.

The four exams will count for 30% of your grade (10% each).

The final exam will count for the remaining 20% of your grade.

Letter grades will be assigned on a 10 point scale:

- A  90-100
- B  80-90
- C  70-80
- D  60-70

Plus/Minus grades will be assigned within 3 points of the boundary (e.g., a 92 average is an A-, while a 78 average is a C+).

Attendance

Attendance is expected. Conceptual tests are interspersed throughout the lecture and are an important component of the learning in this course. You can expect that test questions will be a combination of the types of problems that you see in the problem sets and the more conceptual problems we tackle in the in-class tests. The conceptual tests require you to interact with your classmates to learn physics from them and teach physics to them; this does not work if you are not present!

If you need to miss class, please let me know in advance. This is particularly true if you have an athletic match/game/tournament. If you do miss class, please come chat with me and make sure that you get the notes!

Web Sites

Primary access to the online course content will be through my web site:

webpages.ursinus.edu/tcarroll.

From there, you can link to

webpages.ursinus.edu/tcarroll/phys112/phys112.html,

where you can access the necessary web sites.

The main course site is: polaris.deas.harvard.edu/galileo/students/?courseID=1774. Here you will find the reading assignments, lectures with concept tests, and handouts (including exam solutions and any class notes I make available). On your first visit to the site, you’ll need
to enroll in the course. In the upper right hand corner there is a *sign in* link. This will bring up a page asking for your email address and password. Underneath is a *Not registered? Enroll* link. Following this link will take you to the registration page where you can set up your account. By the end of Wednesday you need to register.

The online homework site is [https://hw.utexas.edu](https://hw.utexas.edu). Follow the student instructions at [https://hw.utexas.edu/bur/studentInstructions.html](https://hw.utexas.edu/bur/studentInstructions.html).

**Course Components**

**Reading**

There will be reading assignments for every class that are intended to be read before class. We will not cover every bit of the reading in class. However, we will go into more depth on the critical topics so it will be helpful for you to have completed the reading.

The reading assignments are generally not very lengthy. When reading for science, though, you may find that it takes multiple readings and lots of thinking to understand. Take your time reading and make sure that you understand the physical arguments and equations before you move on. Pausing to draw a diagram, derive an equation on your own, or reformulate an argument in your own words can be helpful. This type of reading skill is important for science, particularly for journal reading. Journal articles are often written more to pack in as much information as possible and less to help the reader understand.

**Problem Sets**

Most of the homework for this class will be handled online. This does not mean that you will be *doing* your homework online; you will only be submitting your answers online. The suggested strategy is to print out the problem set and work on it (see below) and then, when you are ready, to submit the answers.

Every other week, there will also be a more difficult problem for you to write out and hand in to me. These will typically be problems from the textbook. I will grade these and post the solutions. The goal of these problems is to give you practice at solving the more challenging problems that might appear on the exams and to get more feedback from me.

New problem sets will be issued each week at the web site, with the problem set usually due the following Sunday. Once the due date is passed, solutions will also be available online.

Follow the instructions at this website:

[https://hw.utexas.edu/bur/studentInstructions.html](https://hw.utexas.edu/bur/studentInstructions.html)

The unique number for this course is **08112**.

I strongly encourage you to work in groups on the problem sets. A few other pointers:

1. You should start on the problem sets as early as possible. By the Monday evening a week before the set is due, it’s a good idea to have at least read and understood what each question is asking. The earlier you start thinking about a problem, the better you will be at coming up with ideas for solving it.

2. Even though working in groups is recommended and I’m available to help you, you should try working on the problems independently first.

3. You should be able to write the solution independently without consulting someone else’s solution or notes from a group discussion. If you cannot do that, then you are not prepared to solve the problem on an exam.
Lecture

The lectures will focus on the key concepts from the reading. Some derivations and discussions may not be repeated from the text, so that we can develop the most difficult ideas.

There will be questions interspersed throughout class to aid you in thinking about the concepts in the lecture. You’ll have some time to think about the answer and possibly to discuss it in small groups. I will then poll the class to find out your answers. Your answers will not be recorded or graded, but the questions and answers will be posted on the web site. Your answers will also help to guide the next part of the lecture. Additional similar questions will also be posted to aid in your studying.

Laboratory

You will have lab once each week. The lab is an important component of the course, in which you will have the chance to focus on skills that we will not develop in the lecture. These include experimental methods, data analysis, error analysis, and working with experimental equipment.

You are responsible for printing the instructions for each lab and bringing them to lab with you. Labs are linked to from the course web site.

Schedule

The schedule can be viewed at the main web site

polaris.deas.harvard.edu/galileo/students/?courseID=1774

by clicking on the Lectures link.