Physics 180 Syllabus

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1 Contact Information

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- Office hours : To be posted on Classes*v2, or by appointment.

2 Class Goals

1. To give you a broad introduction to physics, aimed to be useful across multiple disciplines.
2. To develop analytic and numerical problem-solving skills, including the ability to make useful approximations

3 Class Overview

Physics 180 is designed to be part of an introductory sequence of physics classes and covers topics in introductory mechanics, waves and thermodynamics. Electromagnetism, special relativity and other "modern" topics will be covered in Physics 181. If you are thinking of taking an introductory physics sequence here at Yale, your options are Physics 170, 180, 200, and 260. Please refer to the Dept. of Physics website, or talk to the DUS or the appropriate professors.

You will also notice that Physics 180 has two sections. The section by Prof. Krusberg will more oriented more towards working in small groups, whereas this section will be a more traditional lecture class. Both these sections will be synchronous in terms of topics covered and will run at the same level, there will be minor differences in the assigned work.

3.1 Overview of Expected Workload

1. Physics 180 meets twice a week in two 75 minute sessions. You are expected to attend, and participate in discussions.
2. There will be reading assignments, and short homework problems due the day before every class. These are online, and are immediately graded.
3. There will be a written HW assignment due every Friday.
4. There will be two in-class midterms, and a final exam.

3.2 Note on shopping period

The reading assignments for Physics 180 will start from the second class, and the first homework assignment will be due at the end of the second week. Note that you are responsible for completing this work and keeping up with the material, even if you are undecided about this class.

Note that the HW and participation grades have some "padding" - you do not need to complete everything to get full credit. You may choose to use this freedom during shopping period, if you miss some work.

4 Required Text and Resources

- *Halliday, Resnick and Walker, 10th Edition* : We will focus on Vol. 1 of the book. While we will use the book for some HW problems, the posted HW will always have the full problem, so you may use a different edition instead. I may sometimes refer to certain problems/sections in the book, so if you are using a different edition, you probably want to make sure you have a way of accessing this edition.
- You should also make sure you are subscribed to the Classes*v2 site; all class announcements will be made there.
- We do not have formal discussion sections for this class. Instead, we will hold Study Halls three times a week (times to be posted on Classes*v2). The first two of these will be an opportunity to work through more problems in depth (we will assign some examples, but you are not limited to them). The third will be aimed towards answering HW problems.
- A forum for class discussions and questions will be set up on Classes*v2; this is an excellent place to post questions (and answer them!). The class TAs and I will regularly monitor and respond to any posts here.

5 Classwork and Grading Policies

A summary of the grading policies and grade distributions are in Tables 1 and 2.

Classwork	Fraction of Grade	Completion Fraction
Initial & Final Assessment test	1%	100%
Clicker participation	4%	75%
Pre-lecture reading and assignments	15%	80%
Homework	25%	90%
Midterm 1	15%	100%
Midterm 2	15%	100%
Final Exam	25%	100%

Table 1: Summary of grading. The completion fraction is the percentage of the work you must complete to get full credit. For example, there will be 10 HW assignments, each worth 50 points. You will get the entire 25% of the grade if your combined HW score is 450 or greater.

Score	Grade
90-100	A
85-90	A-
80-85	B+
75-80	B
70-75	B-
65-70	C+
60-65	C
55-60	C-
40-55	D
0-50	F

Table 2: In the event of e.g. a very hard exam, I will appropriately scale scores. Note that your grade only depends on your performance in the class; the class will not be curved.

5.1 Assessments

The Physics department has been giving a pre- and post-class assessment test to allow us to track what aspects of the class work (and which do not).

5.2 In-class participation

Given the size of this class, we will use clickers at varying points during lecture. You will need to check out a clicker for the term from Bass library, and register it on the Classes*v2 site. The goal with the clicker questions is to highlight tricky concepts, and make you think conceptually about the material. You must "click" on at least 75% of the in-class questions to get credit for that lecture, and in 75% of all lectures (that had clicker questions) to get full credit. However, do not worry if you do not have your clicker for the first or second lecture; those will not count towards your grade.

Clicking for someone else will be treated as a violation of Yale's academic policies.

5.3 Pre-class reading

This is a relatively fast-paced class. To get the most out of lectures, you will need read through the material for the lecture before class (a regularly updated schedule is on Classes*v2, and readings will be announced before class). To encourage this, there will be a short set of problems due before every class. These will be numerical problems or multiple choice, and will require direct application of concepts and formulae you encountered in the reading.

These will be online (exact details to be announced), and you will receive an immediate grade. You may re-attempt these problems as many times as you choose; we will keep only your highest grade.

You are encouraged to work in groups to read and discuss the material, and the problems. You may not complete/submit the solutions in a group, and you must submit your own work.

5.4 Homework

Interesting problems in physics are rarely solved by the simple application of a formula. They usually require distilling down to essential aspects with appropriate approximations (think spherical cows) and weaving together different concepts. The weekly HW assignment is designed to give you practice with these problems. You should make sure you understand how to solve the problem (and think about variants); it is likely some of the homework problems will resurface on exams (sometimes in disguise).

There will be approximately 10 problem sets (see the Class Schedule for the exact dates), posted every Friday and due the following Friday by 5:00pm. You can turn in a problem set up to 2 days late (latest by Sunday, 5:00pm without a Dean's excuse) with a 25% penalty each day. Homework later than two days

will not be accepted. **You require a Dean's excuse (no exceptions) to turn in a late homework without penalties.**

You are allowed to collaborate on your homework assignments; however, any work you turn in **must** be your own. In particular, you may not refer to anyone else's work while writing up solutions.

All homework should be turned into Classes*v2, under the assignment tab as a single PDF file. You may turn in scanned versions of your HW (there are scanners in all the libraries, and most phones and tablets now have scanning apps), or if you like, you can type up your HW. If you foresee this being an issue, please get in touch with me ASAP.

5.5 Midterms

There will be two in-class midterms; these will be closed-book, closed notes exams with a provided formula sheet. These exams will be comprehensive (they will cover all the material covered), although **significant** emphasis will be on the new material covered.

One of the goals of the midterm is to also help you learn the material. To aid with that (and recognizing that in-class exams are challenging), you will have an opportunity to turn in a revised version of your exam for up to 50% of the points you lost. For example, if you got 60% on the in-class exam, you can get up to 80% after turning in the revised exam.

The exact details for turning this in will be announced on class; you will nominally have one week after the exams are returned. You will not be allowed to turn it in late. The collaboration policy is the same as the HW; you may discuss with your classmates, but the work must be your own. In particular, while writing up solutions, you may not refer to work that is not your own.

You will need a Dean's Excuse (without exception) if you need to reschedule an exam.

5.6 Final Exam

There will be a comprehensive three-hour final exam at the end of the term. As with the other exams in this class, this will be a closed book, closed notes examination, with a provided formula sheet.

Since this class has two sections, you may choose to take the final exam at either offered time. **You may however only do one exam.**