PHYS 2170
General Physics 3 for Majors
Fall 2021

OVERVIEW

This is the third semester of the introductory physics sequence designed for prospective physics majors. We will discuss special relativity, waves, and quantum mechanics. We welcome non-physics majors who are interested in these topics as well.

PHYS 2130 covers similar topics at a more laid back pace; however, note that most future physics majors will be expected to have taken PHYS 2170.

Lectures: MWF 12:40-1:30 PM, Duane G1B30.

Instructor: Andrew Lucas (`andrew.j.lucas@colorado.edu`); Duane F629.
Office hours: W 1:30-3:00 PM and Th 11:00 AM - 12:00 PM, in G2B90 (Physics Help Room).

Canvas: https://canvas.colorado.edu/courses/72640

Books and References: Not required, but recommended for background reading.

- ▶ J. R. Taylor, C. D. Zafiratos, and M. A. Dubson. *Modern Physics for Scientists and Engineers* (2nd ed., University Science Books, 2015)
- ▶ D. Morin. "Waves" (online lecture notes).

Recommended prerequisites: PHYS 1115, PHYS 1125, MATH 2300; or similar.

Recommended corequisites: MATH 2400; or similar.

COURSE OUTLINE

Here I provide a list of course topics, along with the recommended reading. Weekly suggested readings will be posted on Canvas.

1. relativity (TZD 1.1-1.4, 1.6-1.13, 2.1-2.10)

2. classical waves (TZD 1.14, Morin 1.1, 4.1, 4.2, 4.5, 5.2.1, 5.2.2, 6.3, 7.2, 8.2, 8.3, 9.1-9.4)

3. quantum physics (TZD 4.1-4.3, 5.1-5.7, 6.1-6.9, 7.3-7.8, 7.10, 8.1-8.8)

COURSE POLICIES

- ▶ All documents are found by clicking appropriate links on the homepage of Canvas.
- ▶ You are free to choose whether to attend class in person or remotely via Zoom. Zoom links will appear via the Canvas Zoom plug-in. Zoom will be used to record lectures.
- ▶ I will often pause lecture for a short period of time and ask you to do a short calculation or think about the answer to a conceptual question. Since there are many students and the classroom is huge, you are encouraged to respond with the iClicker app. Participation is encouraged, but optional.
- ▶ Standard university policies regarding appropriate conduct on campus also apply to this class, and can be found in writing on the course website.

GRADES

▶ **40% homework:** Homework can be found on the course website, and on Canvas. Homework is **due at or before 11:59 PM on the due date**. Solutions will be posted on Canvas on the third day after the due date. You must upload every homework assignment electronically into Canvas. I anticipate approximately 11 homework assignments in this class.

Homework late and drop policies: Every student has 3 extensions, which can be tracked in the ungraded "Extensions Left" assignment in Canvas. Extensions can be used as follows:

▶ To receive a no penalty 48 hour extension on the due date for a homework assignment.
▶ To drop a homework which was not turned in, *or* a homework which was turned in late but is (at the end of the class) below your average homework score.
▶ To drop a low homework score. (Any remaining extensions will be used this way at the end of the class.)

I will not grant further extensions or push back deadlines any further. I apply these rules automatically, in the order listed above, so you do not need to ask for permission to use these extensions.

You can work together on homework, but you must write up your own solutions to receive credit.

▶ **60% exams:** We will have 3 **timed, 2 hour in-person exams** during this class:

▶ **Exam 1:** 7:00 PM - 9:00 PM, Thursday, September 30.
▶ **Exam 2:** 7:00 PM - 9:00 PM, Thursday, November 4.
▶ **Exam 3:** 4:30 PM - 6:30 PM, Saturday, December 11.

Your total exam score T is calculated, given your scores on exams 1, 2 and 3 ($E_{1,2,3}$), as:

$$T = \frac{2E_1 + 2E_2 + 2E_3 - \min(E_1, E_2, E_3)}{5}.$$

In the Canvas gradebook, this is implemented by the "repeat scores" for exams.

Let me know in the first few weeks of class if you are not able to take these exams at these times, or in person; I should be able to arrange an alternative.

The curve in this class is expected to be as follows (and will not be made harsher):

grade:	A	A–	B+	B	B–	C+	C	C–	D+	D	D–
% required:	95%	90%	85%	80%	75%	70%	65%	60%	55%	50%	45%

The holistic grading method for this class can be found on the course website. Partial credit is assigned on the basis of the entire (sub)problem taken together, and is primarily given based on demonstrated conceptual understanding. Note that you can get full credit even with minor mistakes.

Each homework/exam will be graded out of 100 points. The numbers besides each (sub)problem denote the number of points that problem is worth. If a (sub)problem is worth $5k$ points, you'll receive 0, k, $2k$, $3k$, $4k$ or $5k$ points according to the holistic grading scheme. **There will always be more than 100 points that can be earned. Extra credit (scores over 100) are possible.** You should expect that some of the problems (especially on homework) could be very hard, which is why you do not need to solve them to get "full credit" of 100 points. With that said, you should also at least try each problem – partial extra credit is assigned.

Consequences for any kind of cheating or academic dishonesty will, at minimum, include receiving a 0 on the assignment(s) in question and a mandatory referral to the Honor Code board. Further consequences may occur, at the discretion of the course instructor and graders.