

# Basic Physics for Science and Engineering I

## PHYS 0174, Fall 2023

<b>Instructor:</b>	Dr. David Nero
<b>Office:</b>	221B Allen Hall
<b>Office Hours:</b>	Wednesday 1–3pm, Friday 5:30–6:30pm Other times by appointment.
<b>Office Phone:</b>	(412) 624-7394
<b>Email:</b>	<a href="mailto:djn23@pitt.edu">djn23@pitt.edu</a>
<b>Class Website:</b>	Canvas ( <a href="https://canvas.pitt.edu">canvas.pitt.edu</a> )
<b>Textbook:</b>	<i>Fundamentals of Physics, 12th edition</i> by Halliday, Resnick, and Walker (other recent editions are fine)
<b>Homework:</b>	Achieve (linked to from Canvas)

---

## Course Description

Physics 0174 is the first term of a two-term calculus-based introductory lecture-demonstration sequence in physics primarily for students intending to major in a field of science or engineering. Calculus is used as needed, and should be taken at least concurrently. This course fulfills one Dietrich School of Arts and Sciences Natural Science General Education Requirement.

Topics covered in Physics 0174 include: kinematics, Newton's laws of motion, work, kinetic and potential energy, conservation of energy, linear momentum, conservation of angular momentum, rotational kinematics and dynamics, rigid body motion, conservation of angular momentum, gravitation, simple harmonic motion, and waves.

Credit will not be given for both the Physics 0174/0175 sequence and the Physics 0110/0111 sequence. Students intending to major in physics are encouraged to instead take Physics 0475/0476, the honors introductory sequence. Students who need the associated laboratory course, Physics 0219, should take it *after* Physics 0174.

## Course Learning Objectives

- Demonstrate conceptual understanding of the concepts, principles and laws of physics covered in this course, as listed in the course description.
- Describe a physical situation, as necessary, using multiple representations such as written conceptual statements, mathematical equations, diagrams, and graphs, and be able to translate from one representation to another.
- Perform a conceptual analysis of a problem and identify physical principles required for its solution.
- Translate physical principles to formulate the mathematical statements required to solve a problem.
- Apply mathematical concepts and methods such as algebra, differentiation, integration, trigonometry, and vector analysis as necessary to analyze and solve problems.

## Requirements

1. **Phones and all other electronic devices must be silenced.** Laptops, tablets, phones, etc. are welcome to be used for note taking or other academic purposes. Watching videos, playing games, and/or browsing the Internet is not appropriate during lecture.
2. **Be courteous to your neighbors.** Carrying on a conversation, habitually coming in late or leaving early, or misusing technology (as detailed above), are all disruptive to the class. Students who fail to show common courtesy will be asked to leave the classroom.

## Policies

**Attendance:** You will get the most out of this class if you actively participate. To that end, there will be graded assignments that require you to be present in class. I realize that some absences are unavoidable, so I will drop your four lowest days of regular in-class work, no questions asked. You will need to provide documentation of excusable absences for more than four days to be dropped. There is no penalty for missing class beyond a zero grade on the assignments missed.

**Missed Assignments/Exams:** The only assignment that I will accept late is homework, at a 20% penalty per day. If you are aware of an impending conflict with the scheduled time of an exam or other assignment, you should let me know as early in the semester as possible. In these cases, accommodations will be provided as long as the circumstances are reasonable and you can provide appropriate documentation. In cases where prior arrangements have not been made, missed exams can only be made up after the fact in cases of documented emergency, and **only if you contact me within 48 hours of the missed exam.** Otherwise, missed assignments and exams earn a zero grade.

**Electronic Communication:** Students are expected to regularly check their pitt.edu email and to regularly sign on to Canvas. Failure to read and react to University communications in a timely manner does not absolve the student from knowing and complying with the content of communications.

**Statement on Classroom Recording:** Lectures will be recorded for students to view later. Students may not distribute these recordings to anyone outside of the class, nor may they create their own recordings of the lectures, discussion, and/or activities without the advance written permission of the instructor, and any such recording properly approved in advance can be used solely for the student's own private use.

**Academic Integrity:** Students in this course will be expected to comply with the [University of Pittsburgh's Policy on Academic Integrity](#). Any student suspected of violating this obligation for any reason during the semester will be required to participate in the procedural process, initiated at the instructor level, as outlined in the University Guidelines on Academic Integrity. This may include, but is not limited to, the confiscation of the examination of any individual suspected of violating University Policy. Furthermore, no student may bring any unauthorized materials to an exam, including dictionaries and programmable calculators.

To learn more about Academic Integrity, visit the [Academic Integrity Guide](#) for an overview of the topic. For hands-on practice, complete the [Academic Integrity Modules](#).

**Disability Services:** If you have a disability for which you are or may be requesting an accommodation, you are encouraged to contact both your instructor and [Disability Resources and Services \(DRS\)](#), 140 William Pitt Union, (412) 648-7890, [drsrecep@pitt.edu](mailto:drsrecep@pitt.edu), (412) 228-5347 for P3 ASL users, as early as possible in the term. DRS will verify your disability and determine reasonable accommodations for this course.

**Title IX:** As your professor, I am required to report any incidents of sexual misconduct that are directly reported to me. You can also report directly to Office of Civil Rights and Title IX: 412-648-7860 (8:30am–5pm M–F) or via the Pitt Concern Connection at: [Make A Report](#)

If you wish to make a confidential report, Pitt encourages you to reach out to these resources:

- The University Counseling Center: 412-648-7930 (8:30am to 5pm M–F) and 412-648-7856 (after business hours)
- Pittsburgh Action Against Rape: 1-866-363-7273 (24/7)

If you have an immediate safety concern, please contact the University of Pittsburgh Police: 412-624-2121

## Grade Scale

Grades may be curved up a percentage point or two, depending on average exam scores. Grades will never be curved down. It is possible for everyone to earn an A, although grades of A+ are limited to the top few students. If you achieve the following final grade percentages in the course, you will receive at least:

Percentage	Minimum Grade
90%	A-
80%	B-
70%	C
65%	C-
55%	D-

## Grading

Assignment	%	Notes
In-Class Questions	10%	lowest 4 dropped
Homework	10%	
Concept Quizzes	10%	lowest 2 dropped
Recitation Quizzes	10%	lowest 1 dropped
Midterm Exams	40%	
Final Exam	20%	

### In-Class Questions

During most classes, there will be several questions posed for you to answer using Top Hat. You can access Top Hat through Canvas or using their mobile app. In my opinion, the app is nicer. The University is already paying for Top Hat, so you don't need to pay anything extra. Grading will be 80% credit for participation, and 20% credit for correctness. As detailed under "Attendance" above, your lowest four scores are dropped.

### Homework

Homework will be posted on the online homework system, Achieve. You will be prompted to create an account when you first access the homework. Unfortunately, Achieve is not free. In my judgment, the benefits of the feedback it offers justifies the price. Homework may be completed late for reduced credit (20% penalty per day).

### Concept Quizzes

In addition to homework problems, Achieve will be used to administer short concept quizzes. The purpose of these quizzes is twofold: 1) They will verify that you are keeping up with the lecture videos. 2) They will provide immediate feedback that I will use to adjust the content of the class. You may treat these quizzes

as open book/notes. That said, they are not meant to be difficult—in my opinion, the questions are easier than what I will put on the exams (homework and textbook questions are a much better gauge of exam difficulty). Be mindful of the posted deadlines. Late concept quizzes are not accepted, but your two lowest scores are dropped.

## Recitation Quizzes

At the end of most recitations, a short multiple-choice quiz will be administered, with the purpose of providing frequent feedback of your understanding. These quizzes will be open book/notes, and may be completed in groups. If you find that you are frequently relying on group members during these quizzes, you will likely have significant trouble with the exams. Make sure to correct that situation before exam time! If you miss recitation, you should contact your TA to ask about attending a different section that week. Since that may not always be possible, your lowest recitation quiz is dropped.

## Midterm Exams

There will be three midterm exams and a cumulative final exam. Each of the midterm exams will be all short-calculation questions. The final exam will be all multiple choice. All exams are closed book/notes, but students may prepare a double-sided page of notes for reference. Stand-alone calculators are permitted (no apps), but only for calculations—not as a place to store information. Students may not share any materials during exams, including calculators and note sheets.

## Extra Credit Opportunities

### Cubits Question and Answer (+2%)

We will be using [cubits.ai](#) for pre-class lecture videos along with question-and-answer. I will use these comments to adjust the content of the class. You will be able to see the comments that your classmates have made, and you are encouraged to reply to those comments. As an incentive, I will award extra credit to any student who posts a question or answer 20 times over the course of the semester (a little less than one per lecture). Those who spam low-content posts to inflate their total diminish the utility of online discussion, and so will be disqualified from earning this extra credit.

### Surveys (+0.5%)

At the beginning and end of the semester, short surveys will be administered on behalf of the Physics department. The results of these surveys are used to help us improve Physics education.

### UTA Visit (+0.5%)

Undergraduate Teaching Assistants (UTAs) are fellow undergraduates who recently completed this course and earned a top grade. (They are different than the TAs who lead recitation.) They are an excellent resource for homework assistance. As an added incentive, any student who visits a UTAs for this class **twice** will receive 0.5% extra credit. Make sure you tell the UTA your name, since they will be keeping track of attendance for this purpose.