University of Pittsburgh

Fall Term 2025-2026

Course title: ***Introduction to Physics 2***
Meetings: *Mon/Wed/Fri* 1:00–1:50 pm in *343 Alumni Hall*
Contact information: Matteo Broccio `[mbroccio]`, 3941 O'Hara St, Allen Hall 100F.
Office hours: to be announced on our Canvas site.

Course description

This is the second half of our algebra-based sequence that presents all the fundamentals of classical physics and a few elements of modern physics. The distinctive character of physics is that a small set of principles allows us to make predictions on a wide range of natural phenomena that happen around us. Even processes inside the human body must obey physical principles, and most medical technology completely relies on physics-based techniques. The topics that we will discuss in depth in this course include: laws of thermodynamics, electrostatics, currents and circuits; magnetism; electromagnetic induction; electromagnetic waves; basic optics including medical applications.

A primary learning goal is to identify and apply physics principles in various real-life situations and on occasion, in the context of other disciplines. A secondary goal is the development or refinement of competencies useful for problem solving. Initially, you are expected to be equipped with basic algebra and geometry, basic trigonometry and vector algebra, to be reviewed at the beginning of the term. Beware that this is a relatively fast paced course.

The course is managed on Canvas, which you can access using your Pitt credentials (help desk for tech issues: 412-624-4357). You are expected to check our Canvas site daily. You will find assigned and recommended videos, study tips, practice material, and feedback.

Minilectures

Before class meetings, you are **required** to watch a couple of brief *video minilectures* (linked from Canvas) and answer the embedded conceptual questions (*checkpoints*). You will be able to pause, rewind, scan, and replay the videos as many times as you want –with no consequence on your minilecture grade. You are recommended to *take brief notes* and *reflect* on what you just watched before attempting checkpoints. Some tips on how to make the best out of the viewership are found at the Modules page on Canvas. You will have a single attempt, but receive a generous 90% of the credit for viewership (viewership is accurately tracked and logged by Panopto) and the remaining 10% for a correct answer to the embedded question. The main purpose of pre-class assignments is to prime you for various in-class activities, in which you will be tasked to compare, contrast, apply,

and combine concepts introduced in my videos. These checkpoints will represent only a first instrument for you to verify your basic understanding of the material – they are *not representative* of exam questions. Other learning resources will be used for that purpose, such as sample problems collaboratively solved in class and at recitations.

Complementary textbook

A complementary resource to my video mini-lectures is the OpenStax *College Physics* electronic book, downloadable for free from OpenStax. Extra examples and practice problems can be found there. We will cover mainly Chapters 14, 15, and 18–29, although the material will not be necessarily presented in the same style as this book. You do not need to purchase the print book.

Class meetings

The face time we have together will be mostly devoted to your *active learning*, after I give a *brief* review of the ideas – assuming you all watched the assigned mini-lectures well before we meet. I will demonstrate or simulate physical processes and elicit discussions about them. Also, I will extensively model how to combine different concepts and train you to effectively check your own work. The goal is to gradually turn you into *independent* problem solvers by means of coaching and timely feedback. I will put emphasis on conceptual relationships and sense making of the equations, which goes well beyond the execution of "cookbook recipes". This sense-making is paramount to your learning and will be reflect in your exam performance, by design. Any questions I will ask in class will be for the purpose of elicit active participation and questions, and will not be graded. To ensure the free and open discussion of ideas, students may *not* independently record classroom lectures without the advance written permission of the instructor. I will make notes with my hand annotations available to you, typically within ∼12 hours after each class meeting.

Recitations

Your recitations contain the collaborative solution of a problem in which you will combine concepts from the previous week's instruction and a synchronous assessment (or 'quiz'), which contains an open-end problem-solving part and a multiple-choice concept-focussed part. Your teaching assistant will ensure to give you enough feedback on what you have learned up to that point that you should be conceptually equipped for the assessment. For clarity, recitation is a safe place for questions about physics content: questions about class policies, logistics, or schedule issues should be asked directly to the course instructor and not to your TA. We understand that unexpected events may happen. We are *materially unable* to either process medical excuses or give makeup assessments outside of a scheduled recitation. Instead, at the end of the term, I will drop your *three* lowest recitation scores (which include a zero for every absence you had to make). Your recitation instructor's office hours should be communicated to you within the first few days of class and echoed on Canvas.

Online homework

You will be assigned homework via the online platform Achieve by Macmillan Learning, which is fully integrated with our Canvas (on Canvas, look for the 'Macmillan Learning' link in the left-side menu). To sign up, simply follow screen prompts. You must register using your full name as it appears in the class roster (no nicknames!). Any duplicate accounts or unauthorized accounts will be automatically removed, and I decline any responsibility for resulting losses of work or credit.

Homework allows to independently verify your conceptual understanding and practice problem solving. Collaboration with other classmates is *not* discouraged, but eventually you will need to genuinely know (not *think* you know) how to set up and solve a problem of that same kind completely on your own. Just copying other students' homework answers typically results in abysmally low performance on exams, which overall weigh more than the homework itself. Every homework assignment will be *stay open for 6 additional days past the regular due date, with a 10% deduction for late submission*: no need to email me for extension requests within that time frame. Extension requests made *after* the 'late due date' will be altogether ignored. There will be *no makeup* homework, under any circumstances. Your *single* lowest assignment score will be dropped.

Exams

There will be *three assessments (midterm exams) during the term*, each covering approximately three modules of material, plus a cumulative final exam to be announced as soon as it is scheduled. Assessments will contain both conceptual questions and quantitative problems, whose average difficulty will be comparable to the more difficult problems from your homework sets, the recitation problems, and the in-class examples. The exact format will be explained in detail via Canvas. The focus of these exams is to assess your *conceptual and procedural understanding* of the Physics principles and not to test your mathematical prowess. The lowest exam score will be dropped, so your midterm exam grade will be determined by your two better exam scores.
We are **unable to offer any makeup exams after a scheduled assessment was missed for any reason, without exception**. An unsubmitted assessment will by default earn a zero score. If a *medical or personal emergency* occurs, the student should *communicate it via email to the instructor as soon as humanly possible*. Being 'excused' means that the automatic zero score on the missed assessment will be dropped. If you have any questions about this exam policy, please do not hesitate to contact me.

Self-assessment

In Physics, each new concept builds on earlier ones, so it is crucial to keep current with the taught material. Frequently checking one's reasoning helps your conceptual understanding and creates a good environment for developing problem solving skills, which should be rooted in conceptual and contextual understanding. Effective *study tips* are posted on Canvas, and other instruments for self-assessment will be made available during the semester. Exiting one's current comfort zone is a normal part of learning, so it should never be viewed as an intellectual threat. Your comfort zone can also be *gradually expanded*, because through regular exercise brain can grow, much like a muscle

does through physical workout. After an honest self-assessment, you can: a) *realistically* monitor your progress; b) be in a better position to discuss ideas with peer tutors or teaching assistants, and get the most out of their feedback when you seek their help; c) distinguish conceptual issues from procedural difficulties or lacking math instruments, which is also very helpful. Please reach out for help in a timely manner, when in doubt –help resources are spelled out in the next section.

Help resources

You surely are not alone in your learning process, but you will need to be proactive in seeking help. The following help resources are available to you:

- Instructor's weekly *office hours*, to help you check your conceptual understanding, provide unconditional support, and help you determine where you are positioned along an ideal 'learning progress bar' for the course. Times and locations on Canvas.
- Teaching assistants's weekly *office hours* to help you check your conceptual understanding, provide constant coaching and support, along with additional practice opportunities, and help you catch up with the material. Times and locations on Canvas.
- *Physics Resource Room*. Grad students are able to help you Mon–Fri with concept checking, problem solving, and mathematical procedures. Just walk in at 508 Allen Hall and a grad student will be there to help you.
- *Peer tutoring*. Undergrad students who very successfully took this course before you (and are also in attendance of class meetings this term) will help you at the times to communicated through Canvas. No need to schedule an appointment, just walk in at 519 Allen Hall.

Accommodations

If you have a disability requiring special testing accommodations or other classroom modifications, you need to notify both the instructor and Disability Resources and Services as early as possible. You will be asked to provide documentation of your disability to determine the appropriateness of accommodations, which will not be shared with your instructor – your instructor will be notified of the assessment outcomes in terms of practical recommendations. If you are unsure and wish to talk to me, I will also be happy to advise to the best of my knowledge. To notify Disability Resources and Services, call (412) 648-7890 or send an email to `drsrecep@pitt.edu` to schedule an appointment. The Disability Resources and Services office is located in 140 William Pitt Union on the Oakland campus. Feel free to reach out to me with an email if you have doubts or concerns in this area: I will be happy to help.

Grade calculation

Your numerical grade will be calculated using the weights shown in the following table. In summary, 56% of your grade comes from your individual performance on timed in-class assessments.

Component of coursework	**Weight, %**
Pre-class Minilectures (*lowest score to be dropped*)	12%
Recitation Assessments (*three lowest scores to be dropped*)	14%
Online Homework (*lowest scores to be dropped*)	18%
Midterm Exams (*lowest exam scores to be dropped*)	36%
Cumulative Final Exam	20%

To give you an *approximate idea*, a numerical score of $\sim 93\%$ will be converted to an A; a score of $\sim 82\%$ to a B; a score of $\sim 72\%$ to a C. These main cutoffs may undergo small adjustments, typically not to exceed 1% in either direction, and the cutoffs for "+" and "-" grades will be determined accordingly. The official letter grade cutoffs will be posted on Canvas before the letter grade is published on Peoplesoft. Unless a manual entry error in the gradebook or a miscalculation was made by either me or my teaching assistants, your final letter grade is *not* subject to appeal.

Academic integrity policy

All the students 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 term will be required to participate in the procedural process, initiated at the instructor level, as outlined in the University Guidelines on Academic Integrity, publicly available at:
`http://www.provost.pitt.edu/info/acguidelinespdf.pdf`.
Violations of integrity guidelines *will* result in the opening of an independent verification process, and once confirmed, serious consequences ranging from a zero score on that entire assessment to a failing grade for the course, depending on the type of the offense.

Updates to policies

Updates to any of the information contained in this document will have to be announced *by me* both in the classroom and through Canvas to be in effect. Questions about policies or policy updates shuold be always directed to the course instructor, not to your recitation instructor, to avoid miscommunication or confusion. Thanks for reading.