University of Pittsburgh

Summer Term I 2021-2022

Course title: ***Introduction to Physics 1***
Meeting: *Mon/Thu* at 9:00 am in *102 Thaw Hall*
Instructor: Dr. Matteo Broccio `[mbroccio]`, 217 Allen Hall.
TAs: Victoria Bonidie, Brenda Gomez, Zhikang Zhou.
Office hours: to be announced via Canvas.

Course description

This is the first 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: dimensional analysis, object translations, rotations, and vibrations; simple collisions; fluid statics and flow; heat and temperature concepts; waves and Doppler effect.

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 will be introduced during the term, focusing on their application. 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: 412-624-4357). You are expected to check Canvas daily. You will find videos, study tips, feedback, and grade entries (except for individual homework grades, which show on the homework platform).

Video minilectures and checkpoints

Before class meetings, you are required to watch a few *video minilectures* (linked from Canvas) and try your best to answer the embedded conceptual questions (*checkpoints*). You will be able to pause, rewind, scan, and replay the videos as many times as you want. You are recommended to *take brief notes* and *reflect* on what you just watched before attempting these checkpoints. You will have a single attempt on the question, but will receive credit for the complete viewership of the corresponding video (viewership is accurately tracked and logged by Panopto for each user).

The purpose of pre-class questions is to prime you for various in-class (and recitation) activities, in which you will be asked 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 meant to be representative* of exam questions. Other learning resources will be used for that purpose, such as problems solved in class and collaborative worksheets in recitations.

Is there a textbook?

A complementary resource to my video mini-lectures is the OpenStax *College Physics* electronic book, downloadable (at no cost) from OpenStax. Extra examples and practice problems can be found there. We will cover mainly Chapters 1-17, although the material will not be necessarily presented in the same style as this book. You will not need to purchase the print book.

Our class meetings

The time we spend 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, but will not count toward your grade. 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 $\sim$ 4–5 hours after the end of each meeting.

Recitations

Our recitations comprise a collaborative worksheet in which you will combine concepts from the previous week and a synchronous quiz, which is *not* a test but rather a formative assessment. 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 synchronous quiz. For clarity, recitation is a safe place for questions about physics content: questions about class logistics or schedule should be asked through our Canvas Discussion tool – and there is a strong chance that another student will be able to answer your question even before a TA does! We *are unable to either process medical excuses or give makeup quizzes*. At the end of the term, I will drop your *two* lowest recitation scores (which include a zero for every absence).

Homework

You will be assigned homework via a commercial online platform *every week*, unless announced otherwise directly by the instructor (himself). To sign up for it, use the directions given the first day of class, and follow the screen prompts. You are required to register using your full name as it appears in the class roster (no nicknames, in the interest of clarity!). Any duplicate accounts or unauthorized accounts will be automatically removed, and I decline any responsibility for resulting losses of work or credit after a removal. Homework will count for a significant fraction of your grade.

Homework allows to independently verify your conceptual understanding and practice problem solving. Your 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. Multiple tutoring resources are available, and will be posted under the Modules page on Canvas. For extensions, *every assignment will be automatically left open for 3 additional days past the regular due date, with a 10% deduction for late submission* – so you will not need to send an email to requests an extension within that time frame. Any extension requests made *after* the 'late due date' will be altogether ignored. Finally, there will be *no makeup* homework sets, but at the end of the semester, your *two* lowest scores will be dropped.

Examinations

There will be *four 1-hour assessments (midterm exams) during the term*, each covering about three modules of material, respectively on May 25, June 1, June 8, June 15 , and a cumulative 2-hour final exam on June 25. the final exam will cover material from the last three modules, as well as conceptual milestones from select modules 1-9. The assessments will contain both conceptual questions and quantitative problems, whose average difficulty will be comparable to the more difficult problems from your homework sets, recitation problems, and in-class examples. The exam format will be explained in further detail via Canvas. The focus will be to assess your conceptual and procedural understanding of the Physics and not to test your mathematical prowess. All students are expected to take all three assessment. I will be **unable to offer any makeup exams, after a scheduled assessment was missed for any reason**.
The following policy applies in the case of missed exams.
An unsubmitted assessment will by default earn a zero score. If a *medical emergency* occurs, the student has the obligation to *communicate it via email to the instructor as soon as humanly possible*. In all qualifying cases, being excused means that the automatic zero score on that assessment will be dropped, so the midterm exam grade will be determined by the other three midterm exam scores. Under no circumstances a student can miss two midterm exams. If you have questions about this policy, please do not hesitate to contact me via email sooner rather than later.

Your self-assessment

In Physics, each new concept builds on earlier ones and this is a relatively fast-paced corse, so it is crucial to keep current with the material. Frequently checking one's reasoning is crucial to the development of conceptual understanding and problem solving skills, and in class you will receive many stimuli in those directions. Effective *study tips* are posted on Canvas; other instruments for self-assessment will be made available by the instructor during the semester. Exploring areas out of one's current comfort zone is a normal part of learning, so it should never be viewed as threatening. Also, your comfort zone can be gradually expanded, because through regular exercise brain can grow, much like a muscle does through physical workout.

An honest self-assessment has many advantages. You can: a) *realistically* monitor your progress; b) be in a better position to discuss with peer tutors or teaching assistants, and get the most out of their feedback when you seek their help; c) mentally separate genuinely conceptual issues from procedural difficulties or lacking math prequisites, which is very helpful. Please read the study tips on Canvas and reach out if you have serious doubts on how to apply them to your situation.

Our help resources

You surely are not alone in your learning process, but you will need to be proactive in seeking help. Consider all the following help resources available (at no additional cost):

- Instructor's weekly *office hours*, to help you check your conceptual understanding, provide unconditional support, and help you determine where you are currently positioned along an ideal 'learning progress bar' for the course. Details 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. Details on Canvas.
- *Study Lab.* At Pitt's Study Lab, undergraduate tutors are able Mon–Fri to virtually help you with concept checking, problem solving, and mathematical prerequisite review. You will need to schedule an appointment directly with the Study Lab staff. Details on Canvas.

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 no later than one week into the semester. 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 accommodations. 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, 60% of your grade comes from your individual performance on timed in-class assessments.

Item in master course gradebook	**Weight, %**
Pre-class video minilectures (*single lowest module score will be dropped*)	12%
Mandatory recitations (*two lowest scores will be dropped*)	18%
Post-class homework (*two lowest scores will be dropped*)	20%
Midterm exams (*lowest of four scores will be dropped*)	36%
Cumulative Final Exam, last day of class	14%

To give you an approximate idea, a total score of $\sim 93\%$ should be converted to an A; a total score of $\sim 83\%$ to a B; a total score of $\sim 71\%$ to a C. This 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 a couple of days after the final exam. Unless a manual entry error in the gradebook or a miscalculation was made by me or my teaching assistants, your final letter grade is *not* subject to appeal.

Academic integrity policy

All 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`.
For online assessments, every student will be required to sign a honor code before starting the assessment, and to strictly follow all the instructor's directions. 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 and policy changes

Updates to any of the information contained in this document will have to be announced *directly by me* both in the classroom and through Canvas to be in effect. In the first few weeks of class, I will also keep a discussion board reserved for logistical questions and/or questions about policies or policy updates. Thanks for reading.