University of Pittsburgh

Fall Term 2021-2022

Course title: ***Introduction to Physics 1***
Meeting time: *Mon/Wed/Fri* 12:00–12:50 pm
Meeting place: *343 Alumni Hall*
Contact information: Dr. Matteo Broccio [`mbroccio`], 217 Allen Hall.
Office hours: *Zoom* (meeting ID on Canvas), Tue 5:15–6:45 pm; Wed 5:15–6:45 pm.
TAs: Emily Biermann [`emily.biermann`]; Lorena Mezini [`lom31`] (meeting IDs on 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 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. 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 80% partial credit for viewership of the corresponding video (viewership is tracked and logged by Panopto, though solely for our internal records).

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 and your participation

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 count toward your participation grade, as measured by effort and not correctness. 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 $\sim$ 12–18 hours after the end of each meeting.

Recitations and feedback

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 place for questions about content and problem solving: questions about 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). If you anticipate an *exceptional* schedule conflict, please write to your teaching assistant, copying me, and we may be able to offer you to attend another recitation taught by the same instructor, although we cannot guarantee we will always find a solution in every situation, given the many constraints.

Homework

You will be assigned homework via an online platform *every week*, unless announced otherwise directly by the instructor (not a TA). 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 6 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 the lowest score will be dropped at the end of the semester.

Examinations

There will be *three assessments (exams) during the term*, each covering about three modules of material, respectively on Sept 15, Oct 13, Nov 17 – dates to be confirmed. The final exam (yet to be announced) will cover for about 2/3 the last three modules, and about 1/3 conceptual milestones from select past modules. 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 during the first week of class, but 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 health-related situations, the student *may* be excused from a single exam by sending a signed physician note certifying his/her inability to perform schoolwork, and other kinds of emergencies will be evaluated on a case-by-case basis. If a chronic medical condition applies, the students is expected to have already contacted Disability Services about it, as outlined in the next section. In all the above cases, being excused means that the automatic zero score on the assessment will be dropped, so the midterm exam grade will be determined by the other two 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 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 are surely not alone in your learning process. Consider all the following help resources available (at no additional cost!):

- Instructor's and teaching assistants's weekly *office hours*, to help you check your conceptual understanding, provide unconditional support, and help determine where you are currently positioned in your ideal 'progress bar'. Details on Canvas.

- *Pitt Physics Server* of the Department of Physics and Astronomy. There, graduate teaching assistants will be able to virtually help you Mon–Fri with harder problems or math issues, no appointment needed. Details and links are 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 and links are on Canvas.

Regarding disabilities

If you have a disability that requires special testing accommodations or other classroom modifications, you need to notify both the instructor and Disability Resources and Services no later than two weeks into the semester. You may be asked to provide documentation of your disability to determine the appropriateness of 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 general area.

Grade calculation

Your numerical grade will be calculated using the weights shown in the following table. In summary, 64% of your grade comes from individual performance on in-class assessments.

Item in master course gradebook	Weight, %
Pre-class mini-lecture questions (*lowest two scores dropped*)	12%
Participation (explained on Canvas)	4%
Recitations (*lowest two scores dropped*)	12%
After-class homework (*lowest score dropped*)	19%
Midterm exams (*lowest score on **taken** exam will be dropped*)	36%
Final exam (cumulative)	18%
(Earned *extra credit* to be added in % points, at end of term)	(tba)

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 changes in scenario

Updates to any of the information in this document will have to be announced directly by me *both* in the virtual classroom and via Canvas to be actually in effect. In the first few weeks of class, I will also have a discussion board reserved for logistical questions and/or questions about policies or policy updates. Given the dynamic public health situation around us, I cannot rule out any future changes, but I can strongly reassure you they will *not* affect either the number of assessments or the grade breakdown. Under any future scenario, I will work in a way that ensures a general fairness of evaluation based on the learning objectives for this course. Thanks for reading.