

This syllabus is subject to change (because of the developing COVID-19 circumstances).

Modern Physics 1 (PHYS 0477)

Term 2221 (Fall 2021)

- Instructor: dr.s. (Prof. Vladimir Savinov).
- Office: only virtual (on ZOOM).
- Office hours: all office hours will be conducted via ZOOM. Time for office hours and ZOOM info will be announced in class, on CANVAS and via e-mail. Office hours are conducted in group environment. Please show up at the time when office hours start. Note that my office hours are more like recitations than office hours. Office hours will NOT be recorded. Just in case, so you know, I do not do tutoring.
- e-mail (the best way to contact me): vps3@pitt.edu
I will communicate with class using CANVAS and e-mail. All e-mails sent to class will also be posted/archived on CANVAS. Please make sure to set your CANVAS account to alert you when new announcements are posted.
- Lectures: MW 11:00am-12:15pm, F: 11:00am-11:50am.
- Main textbook: *Modern Physics for Scientists and Engineers*, Second Edition, by John R. Taylor, Chris D. Zafiratos and Michael A. Dubson, University Science Books, 2015.
- NOT a textbook but a very useful read, available online via Pitt for free: *Revolutions in Twentieth-Century Physics*, by David J. Griffiths, Cambridge University Press, 2012. ISBN-10: 1107602173
- A potentially useful additional source (on reserve in Engineering Library (Benedum Hall)): *Modern Physics for Scientists and Engineers*, Fourth Edition, by Stephen T. Thornton and Andrew Rex, Cengage Learning, 2013. ISBN-10: 1133103723.
- An awesome source but not a regular textbook / advanced / fun read: *Foundations of Modern Physics*, by Steven Weinberg, Cambridge University Press, 2021. ISBN-10: 1108841767

Course Description

There is not much “Modern” about this Modern Physics class, as we will cover four subareas of physics all of which were developed a long time ago. We will cover, in this particular order, Thermodynamics, Special Relativity with elements of General Relativity, developments leading toward Quantum Physics, and introduction to Quantum Mechanics. One of my most important objectives is to prepare you for more advanced classes.

The Thermodynamics lectures will closely follow Halliday, Resnick and Krane’s first volume of “Physics” (5th ed.), chapters 21 through 24. These four chapters (and the answers to odd-numbered problems) are posted for you on CANVAS. Additional material will be introduced in class as needed.

The rest of the material will follow Taylor's textbook and other sources. We will cover only some of the Taylor's textbook. Most, but not necessarily all of the homework problems will be from these textbooks or based on them. In addition, there may also be assignments from outside the book on relevant material. Modern Physics textbook's ISBN could be found on its website (see above). Knowledge of introductory physics (at Phys174/175 level), calculus, vector algebra and basics of differential equations is assumed and expected. You will have to read the textbook before class and after class, and do a sizeable body of independent work outside of class. You will normally be responsible for all material from chapters (partially or fully) discussed in class.

Attendance

Attendance is not mandatory though I expect every student to attend every single class. Students are most strongly advised to take lecture notes during class and to study their notes later in the week. If you can't reproduce the calculations presented in class or/and in the book, this would be a clear sign of having trouble with class material. Lectures will NOT be recorded. Lecture notes will NOT be available.

CANVAS

Up to date information about class, including assignments and complementary material, will be regularly posted on CANVAS. You can access CANVAS at <http://canvas.pitt.edu> (use your Pitt network computer account and password to log in). CANVAS information will be updated regularly (almost daily). Make sure you check CANVAS for this class often.

Homework Assignments

Homework will be assigned (announced on CANVAS) regularly. You will be turning in your work as snapshots via GradeScope. Make sure to show all your work. Do not skip intermediate steps. Do not try to save paper. Please try to be neat. Do not e-mail your work to me or the grader (unless I request this) – use GradeScope. Make it easy for the grader to figure out what you have done. Show ALL steps, do NOT assume that some of the steps are “obvious” or “trivial”. Points will be taken off for incomplete explanations and/or difficult-to-follow work. Note that the “official” solutions should not be used as a reference of how much of your work you have to show: these solutions often just provide guidance, important calculations and elaborations are not shown. Your own solutions should show all calculations and elaborations. This applies even more so to the exams. One more time: your work must be exceptionally well-documented, with the explanations of what you do and why you do that. **This requirement is of particular importance especially at midterms and final exam.** Attend office hours. Take notes in class. Homework problem solutions will be posted on CANVAS. When you have questions for the grader, contact them via email with a CC: to me.

Grading Scheme and Other Details

There will be two term exams (midterms) and one comprehensive (*i.e.*, cumulative) final exam (though it will emphasize later material). Midterm dates will be announced at a later time, but no later than two weeks before the actual exam time. Final exam is currently scheduled to take place on Friday, Dec. 17, between 10am and 11:50am. Your work will be score-graded. Each homework will be 10 pts max. Similar scoring will be used for midterms and final exam. Your letter grade will be determined using your total score with contributions from your homework (~10%), mid-term exams (~25% each), and final exam (~40%). Correspondence of scores to letter grades will be announced in December after the grades

are posted. There will be no for-credit quizzes. There will normally be no extra-credit opportunities, unless I decide to make these available to the entire class. Unless the university transitions to a remote learning mode, there will be NO remote exams. Exams will be closed-book but you will be allowed to prepare your own formula pages. If you have any questions / need anything clarified, please contact me at vps3@pitt.edu.

COVID-19 Pandemic-Related Matters: Because of the developing COVID-19 situation, until Sept. 13 the class will be taught remotely at the scheduled time. You will be connecting to ZOOM from a location convenient for you, including, if you like, the assigned classroom (Thaw 11). If you choose to attend the remote lectures from the classroom, please make sure to bring your laptop/phone/tablet and headphones (FLEX@PITT equipment will not be available). In-person instruction is supposed to start on Monday, September 13. Regardless of the mode of instruction, the class will follow the university's COVID-19 policies. **In particular, everyone in class, regardless of their vaccination status, must be wearing a face mask covering their mouth and nose. If you experience any symptoms that could be associated with COVID-19, please stay home and get tested. If you have to quarantine or isolate, please let me know ASAP, so I know what's going on.**

Special and/or Unexpected Circumstances and Emergencies: Should such arise, please follow the following protocol: first take care of your emergency and/or unexpected circumstances and then, when you have time, send me an e-mail outlining your circumstances and the nature of your emergency. All such events will be handled on case-by-case basis. Generally, please do not rely on oral communications with me – any request / explanation of some situation / any commitment must be communicated electronically. Generally, no “I” or “G” grades will be assigned in this class. All work for this course should be completed before the end of this term.

Religious Observances and Class Activities: In case your religious observances conflict with class activities / tests / homework assignments due dates and such, please alert me to such possible conflicts as soon as possible and in advance.

Special Accommodations for Disability: If you have a disability that requires special testing or other accommodations, you should notify both the instructor and the Office of Disability Resources and Services (DRS) as early as possible in the term. You may be asked to provide documentation of your disability to determine the appropriateness of accommodations. The Office of Disability Resources and Services is located in the William Pitt Union, Room 140. If needed, please call (412) 648-7890 (voice) to schedule an appointment with them. A comprehensive description of the services provided by DRS office can be obtained on [their web site](#).

Academic Integrity: All students in this course are expected to follow the University of Pittsburgh academic integrity guidelines. If you are not aware of the specifics, you should obtain a copy of these guidelines from the Dietrich School of Arts and Sciences Dean's Office, 140 Thackeray Hall, or look them up online at [their web site](#). Violations of these guidelines by a student may result in a zero score for an examination/homework/other or/and a failing grade for the entire course.

Other University Policies: Over the past many years Pitt developed a large number of important policies. This syllabus is assumed to be in implicit 100% compliance with all these policies and regulations.