

PHYSICS 1331

Term 2204 (Spring 2020), class# 22240

- Instructor: Dr.S. (Prof. Vladimir Savinov).
- Office: Allen Hall, 402 (office hours are conducted elsewhere).
- Office hours: time and location will be announced in class, on CourseWeb and via e-mail. Also, I am usually available right after class in Thaw 104 or in the hallway outside. I am practically never available right before class, not even for quick questions. Office hours are conducted in group environment (unless you are the only student who showed up). Show up at the time when office hours start. If you show up late, most likely you will miss some important discussion. Just in case, so you know, I do not do tutoring.
- Phone#: (412) 624-9042 (NOT a good way to get in touch with me).
- e-mail (THE best way to contact me): vps3@pitt.edu
In order for your e-mail to be delivered to me you are **strongly advised** to use Pitt's e-mail system. Note that I will be communicating with class using students' e-mail addresses in **pitt.edu** domain. It is your responsibility to make sure you read e-mails sent to you at **pitt.edu** regularly and do not miss any of the information. All e-mails sent to class will also be posted/archived on CourseWeb.
- Lectures: MWF 1:00pm-1:50pm, Thaw 104.
- Textbook: *Classical Mechanics* by John R. Taylor, University Science Books, 2005.

Course Description

Classical (non-relativistic) Mechanics is one of the earliest and well-established disciplines in Physics. Various aspects of Mechanics, such as, *e.g.* chaos, non-linear phenomena, numerous applications to Engineering and such remain to be active areas of research. In this class we will study deterministic behavior of single particles and rigid bodies. We will start with Newtonian formulation of Mechanics and advance to Lagrangian and Hamiltonian dynamics later in the term. Most generally, the objectives include 1) to provide the students with a strong background in the techniques and methods of Classical Mechanics at intermediate level, 2) to introduce the mathematical methods for solving differential equations and, most importantly, 3) to prepare you better for more advanced classes, more specifically, Electricity and Magnetism, Introduction to Electromagnetic Theory, Thermodynamics and Statistical Physics, and Quantum Mechanics.

The lectures will closely follow the textbook (with additional material introduced in class, as needed), and most, but not necessarily all, of the homework problems will be from the text or based on it. In

addition, there may also be assignments from outside the book on relevant material. I requested a copy of the textbook to be placed on reserve at [Bevier Engineering Library](#) in [Benedum Hall](#). You can buy a copy of the textbook from Pitt's bookstore. Textbook information can be found at [publisher's web site](#) or/and at [amazon.com](#) and many other sources. Textbook's ISBN-13: 978-1-891389-22-1, ISBN-10: 1-891389-22-X. I plan to cover most of material from chapters 1 through 11 and 13. Knowledge of introductory physics (at Phys174 level), calculus, vector algebra and differential equations is assumed and expected. Please keep in mind that these are prerequisites for this class. 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 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. If you miss a class, it would be your responsibility to catch up by studying the textbook, by asking other students to share their notes with you and by attending office hours to ask questions about assigned problems and to clarify material in the textbook and/or presented in class. I will not be holding individual sessions with students who missed a class – if you couldn't make it, read the book. I do not provide lecture notes.

Courseweb

Up to date information about class, including assignments and complementary material, will be regularly posted on Courseweb (a.k.a. Blackboard). You can access Courseweb at <http://courseweb.pitt.edu> (use your Pitt network computer account and password to log in). CourseWeb information will be updated regularly (almost daily).

Homework Assignments

Homework will be assigned (announced electronically on Courseweb) regularly. When you turn in your assignment, show all your work. Do not skip intermediate steps. Do not try to save paper. Your pictures/plots/sketches must be large size. Do not turn in your scratch paper. Be neat. Do not e-mail your work to me (unless I request this). Make it easy for whoever grades your work 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 insufficient explanations and/or difficult-to-read work. This applies even more so to the exams. Attend office hours. Take notes in class. The solutions to the homework problems will be posted on Courseweb. Before you ask questions of the type “what's wrong with (every single step) of my solution?”, study posted solutions, understand how to do the problem, do it from scratch and, if you are unable to solve the problem after that, come to office hours / ask me to help, so I can explain the solution to you. I do not normally explain what's wrong with individual wrong solutions, rather, I explain how the problem should (or could) be solved.

Grading Scheme and Other Details

There will be two midterm exams and one comprehensive (*i.e.*, cumulative) final exam. Midterms dates will be announced at a later time, but no later than two weeks before the actual exam. The final

exam date is set by the university (see <https://www.registrar.pitt.edu/sites/default/files/pdf/2204%20Final%20Exams.pdf>), and it is currently scheduled on Tuesday, Apr. 21, between 10:00am and 11:50am. The location of final exam will be announced at a later time. You should be aware of the [University Final Exam Conflict Accommodation Procedure](https://www.registrar.pitt.edu/assets/pdf/final_procedure.pdf) outlined at https://www.registrar.pitt.edu/assets/pdf/final_procedure.pdf. The final grade will be determined by your homework (~10%), mid-term exams (~25% each), and final exam (~40%). If you have any questions / need anything clarified, please contact me at vps3@pitt.edu.

Supplementary References

I requested to place several additional textbooks for you on reserve at [Bevier Engineering Library](#) in [Benedum Hall](#). These books are not required for this class, but may come in handy. These books include

- *Vector and tensor analysis with applications* by A. I. Borisenko and I. E. Tarapov. Translated and edited by Richard A. Silverman, Pitt library call number **QA261.B5513, 1968a**, [an excellent text on the subject of vectors and tensor analysis](#).
- *Analytical Mechanics* by G.R. Fowles and G.L. Cassiday, Pitt library call number **QA807.F65, 1993**, [this is another excellent undergraduate-level textbook](#).
- *Introduction to Classical Mechanics* by D. Morin, Pitt library call number **QA805.M822 2008**, [yet another excellent undergraduate-level textbook](#).
- *Classical Dynamics of Particles and Systems* (any edition) by J.B. Marion and S.T. Thornton, Pitt library call number **QA845.M38, 1995**, [an advanced undergraduate book used by many Pitt professors in the past, a classic undergraduate text](#).
- *Classical Mechanics: Point Particles and Relativity* by W. Greiner, Pitt library call number **QC125.2.G7413, 2004**, [the first part of a two-volume introduction to undergraduate-level Mechanics used in some parts of Europe](#).
- *Classical Mechanics: Systems of Particles and Hamiltonian Dynamics* by W. Greiner, Pitt library call number **QA805.G675, 2003**, [the second part of a two-volume introduction to undergraduate-level Mechanics used in some parts of Europe](#).
- *Classical Mechanics* (any edition) by H. Goldstein, Pitt library call number **QA805.G624, 1980**, [one of the standard graduate-level books](#).
- *Mechanics* by L.D. Landau and E.M. Lifshitz, Pitt library call number **QA805.L283, 1989**, [an advanced hard-core undergraduate-level book](#).
- *Mathematical Methods of Classical Mechanics* by V.I. Arnold, Pitt library call number **QA805.A6813, 1989b**, [a very advanced graduate-level book that will blow your mind](#).

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 an e-mail to your teacher outlining your circumstances and the nature of your emergency. All such events will be handled on case by case basis. Generally, do not rely on an oral communication with your teacher, 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 your teacher 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.