

Physics 410: Classical Mechanics

Spring 2011 — Professor Shawhan

Course topics:

Intermediate applications of Newton's laws; momentum and energy; damped and driven oscillations; mechanics in noninertial frames; Lagrangian mechanics; central forces; collision theory; Hamiltonian mechanics; rotational motion of rigid bodies; coupled oscillators and normal modes; chaos; relativity.

Prerequisites:

PHYS 374 (Intermediate Theoretical Methods)

MATH 241, 246, and 240 (Calculus III, Differential Equations, and Linear Algebra)

or, alternatively, MATH 340 and 341

Lectures:

Mondays and Wednesdays from 11:00–11:50, and Fridays from 10:00–11:50 (including a break!). All lectures will be in room 0405 of the Physics Building. Class attendance is strongly encouraged, of course, but is not strictly required. I do not attempt to keep records of class attendance.

Required textbook:

“Classical Mechanics” by John R. Taylor. The ISBN number is 978-1-891389-22-1. We will cover most of the book, but not all sections of every chapter. I will try to remember to be clear about what sections you should be reading and what will be covered on the exams. I have made a complete schedule for the course, but it is subject to change depending on how the course goes.

Homework:

There will normally be one homework assignment per week to be turned in and graded. Feel free to work on the homework with one or more classmates; however, to ensure that you really do learn the material (and will therefore do well on the exams), please follow this simple rule: **do not ever look at another student's written solution before writing yours**. Verbal discussion of how to solve a problem, and sketching together on scratch paper or a blackboard, are fine since they can help you learn while still ensuring that you need to know what you're doing to write out **your own** actual solution.

Don't wait until the last minute to start a homework assignment! In fact, try to start it early so that you can ask for help if you need it. Please do all of the homework and turn it in on time, unless you have a valid excuse (i.e. illness, a religious observance, or some other compelling reason). If you do not have a valid excuse, you can still turn in the homework up to 24 hours late for half credit; after 24 hours, no credit will be given.

Exams:

There will be two midterm exams and a final exam. The two midterms will be in-class exams; they will be on Fridays so you will have 110 minutes to work. You will not be able to use books or notes, but I will provide copies of the formulae and constants printed on the front and back endpapers of the textbook. The exams must be taken on the scheduled days unless you have a valid excuse. If you know in advance that you will have to miss an exam, please inform me as soon as possible so that we can arrange a make-up. Note that the make-up exam will be identical to the regular exam; I will trust you and your classmates to not allow the contents of the exam to leak out to someone who still has to take it. The final exam will be a take-home exam which you will have 24 hours to work on; you'll have some flexibility to choose your 24-hour window. I will be happy to distribute the exam by email and will

accept good-quality scanned images in place of paper if you don't want to come to campus just to pick up and/or turn in the exam. You may use the textbook, your notes, your past exams and the posted solutions while working on the final exam. However, **do not consult with any other person while working on the final exam**. I am counting on you to preserve the integrity of the exam to represent the purely *individual* work of you and your classmates.

Course grade:

30%	Homework
20%	First midterm
20%	Second midterm
30%	Final exam

Contact Information:

Prof. Peter S. Shawhan, room 4205B in the Physics Building, 301-405-1580, pshawhan@umd.edu

Office hours: Mondays/Tuesdays/Wednesdays/Fridays 1:30–3:00, Thursdays 1:00–2:30

TA/Grader: Changhun Lee, changhun@umd.edu, office TBD

Office hours: TBD

*** NOTE: Office hours are subject to change – watch for announcements

If you are unable to come during regular office hours, please contact me by email or phone to ask a question and/or arrange a time to meet.

Course Evaluations:

As you probably know, the University of Maryland has a system called CourseEvalUM which collects information from students about the quality of courses and the effectiveness of instructors, and provides online summaries at Testudo for students to view when they are preparing to register for future semesters. This can be a valuable resource for you and for other students, and helps me to improve the class from one year to the next, but it depends on your participation! Your feedback is confidential and important to the improvement of teaching and learning at the University as well as to the faculty tenure and promotion process.

Honor Code:

The University of Maryland has a nationally recognized Code of Academic Integrity, administered by the Student Honor Council. This Code sets standards for academic integrity at Maryland for all undergraduate and graduate students. As a student you are responsible for upholding these standards, and as your instructor I am responsible for reporting any violations. It is very important for you to be aware of the consequences of cheating, fabrication, facilitation, and plagiarism. For more information on the Code of Academic Integrity or the Student Honor Council, please visit <http://www.studenthonorcouncil.umd.edu/whatis.html> .

Religious observances:

If you need to miss class, a homework deadline, or an exam due to a religious observance, please notify me in advance—preferably at the beginning of the semester.

Students with disabilities:

Accommodations will be provided to enable students with disabilities to participate fully in the course. Please discuss any needs with me at the beginning of the semester so that appropriate arrangements can be made.

Weather and emergency closures:

If the University is closed due to weather or some emergency situation on a day when homework is due, then that homework must be turned in at the beginning of the next class when the University is open. If the University is closed on the scheduled date of an exam, then the exam will be given during the next class period when the University is open. If the University is closed on any non-exam day, including a review session (the class immediately before an exam), then the exam will still be given according to the original schedule. In these or other exceptional circumstances, I will attempt to send out information by email.