

Physics 171 / 171H
Introductory Physics: Mechanics and Relativity
Fall 2007 — Professor Shawhan
** Updated November 5 **

Course topics: Kinematics, Newton's laws, energy and work, special relativity, rotational kinematics, angular momentum, gravity, fluids, and gases. This course is designed for physics majors and those desiring a rigorous preparation in the physical sciences. Knowledge of basic calculus will be assumed.

Prerequisites: Math 140 (Calculus I) and a high school physics class, or permission of the department.

Lectures: Mondays, Tuesdays, Thursdays, and Fridays from 9:00–9:50 in room 1201 of the Physics Building. See the Course Schedule for the planned topic(s) for each lecture. The schedule may shift around by a day or so if some topics take more or less time than expected. Note that Physics 171 and Physics 171H (the honors section) share the lectures. Students in 171H will also have a weekly discussion session at a different time.

Required textbook: “Physics for Scientists and Engineers” by Tipler and Mosca, sixth edition, volume 1, published by W. H. Freeman and Company. The ISBN number is 1-4292-0132-0. You do not need to bring the book to class. Most lectures are associated with 1–3 sections from the book as indicated on the Course Schedule, and you should read those. You can either read those sections before the lecture or after the lecture, but try not to fall behind by more than a day or two.

Optional web application: You may also wish to get the “PhysicsPortal” web product, which includes an electronic version of the book plus interactive exercises and other extra content. The cost of the textbook bundled with one semester (actually six months) of access to the PhysicsPortal, if you are able to get it, is only about \$5 more than the cost of the book alone. The ISBN number for this bundle is 1-4292-0605-5. If purchased separately, the one-semester PhysicsPortal access costs about \$35–40. If you would like to learn more about the portal, visit <http://portals.bfwpub.com/pse6e.php>.

Homework will be assigned about once per week and must be turned in at the beginning of class on the specified date (or earlier). Don't wait until the last day to get started! 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 that, no credit will be given. As an exception to the 24-hour cutoff, if the homework was due on a Friday, then it will be accepted in class on the following Monday for half credit. (Homework due on Tuesday will be accepted late only up to Wednesday morning, not Thursday.)

If you are unable to finish the complete homework assignment on time, then you may turn in a partial set of answers on time for full credit, and then turn in the remaining answers late for half credit. However, this practice is discouraged since it complicates the grading and bookkeeping.

If people take advantage of this *too* often, I may change the policy to disallow it. If you must turn in additional answers late, please write “Additional answers – turned in late” at the top of your page to help us keep things straight.

There will be three **exams** during the semester plus a final exam. The exams will be given in class, on paper, and will be closed-book. Any needed physical constants or data will be provided. You will need a calculator with standard trigonometry functions, etc. 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.

Up-to-date course information and your scores on assignments will be available on the ELMS (Blackboard) system. If you go to <http://elms.umd.edu> and log in with your username (which is your campus “Directory ID”) and password, you should see the course listed in the “My Courses” panel.

Course grade:

40%	Homework
12%	Each exam during the semester
24%	Final exam

How to do well in this course:

Come to the lectures. Keep up with the reading. Do all the homework. Ask for help (your teacher, TA, or a classmate) whenever there is something you don’t understand. Also ask about anything you are curious about. Review your notes and past homework assignments before each exam.

Contact Information:

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

Usual office hours: Tuesdays 1:00–2:00 and Wednesdays 3:00–4:00 in room 4205B

TA: Rashmish Mishra, 4223 Physics Building, 301-405-6192, rashmish.kumar@gmail.com

Office hours: Wednesdays 1:00–3:00 in room 4223

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

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

Honor Code:

The University of Maryland, College Park 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 for this course. 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> .

Students with disabilities:

Accommodations will be provided to enable students with disabilities to participate fully in the course. Please discuss any needs with your instructor 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, we will attempt to communicate with students by email.

Physics 171 / 171H Course Schedule Fall 2007 — Professor Shawhan

Date	HW due	Lecture topic(s)	Reading assignment
Thu Aug 30		Course intro; Measurement and units	1-1 to 1-5
Fri Aug 31		Motion in one dimension	2-1, 2-2
Mon Sep 3		<i>Labor Day — No class</i>	
Tue Sep 4		Solving problems with acceleration	2-3, 2-4
Thu Sep 6		Vectors and coordinate systems	1-6, 1-7
Fri Sep 7	HW 1	Motion in two and three dimensions	3-1, 3-2
Mon Sep 10		Circular motion	3-3
Tue Sep 11		Newton's first and second laws	4-1, 4-2, 4-3
Thu Sep 13	HW 2	Various forces	4-4, 4-5
Fri Sep 14		Solving problems with forces	4-6
Mon Sep 17		Newton's third law	4-7, 4-8
Tue Sep 18		Center of mass	5-5
Thu Sep 20	HW 3	Review	
Fri Sep 21		Exam 1	
Mon Sep 24		Friction and drag	5-1, 5-2
Tue Sep 25		Solving problems with curved paths	5-3
Thu Sep 27		Solving problems with time-varying forces	5-4
Fri Sep 28		Energy and work	6-1, 6-2
Mon Oct 1	HW 4	Dot products, work, and power	6-3, 6-4
Tue Oct 2		Potential energy	7-1
Thu Oct 4		Conservation of energy	7-2, 7-3
Fri Oct 5		Quantization of energy	7-5
Mon Oct 8		Systems; Solving problems with collisions	8-1, 8-2, 8-3
Tue Oct 9	HW 5	Reference frames	8-4
Thu Oct 11		Relativity	R-1
Fri Oct 12		Implications of relativity	R-2, R-3, R-4
Mon Oct 15		Relativity of Simultaneity tutorial	R-5
Tue Oct 16		Spacetime diagrams and Lorentz transformation	
Thu Oct 18		Relativistic momentum, energy, and particles	R-6
Fri Oct 19	HW 6	Review	
Mon Oct 22		Exam 2	

Tue Oct 23		Rotational kinematics	9-1, 9-2
Thu Oct 25		Moment of inertia	9-3, 9-4
Fri Oct 26		Solving problems with torque and rotation	9-5
Mon Oct 29		Torque and rolling objects	9-6
Tue Oct 30	HW 7	The vector nature of rotation	10-1
Thu Nov 1		Angular momentum and torque	10-2
Fri Nov 2		Gyroscopes	10-2
Mon Nov 5		Conservation of angular momentum	10-3
Tue Nov 6	HW 8	Quantization of ang. mom.; Static equilibrium	10-4, 12-1, 12-2
Thu Nov 8		Solving problems with static equilibrium	12-3, 12-4
Fri Nov 9		Elasticity	12-7
Mon Nov 12		Problem-solving workshop	
Tue Nov 13	HW 9	Review	
Thu Nov 15		Exam 3	
Fri Nov 16		Gravitational force and potential	11-2 (part), 11-3
Mon Nov 19		Gravitational fields and tides	11-4
Tue Nov 20		Kepler's laws	11-1, 11-2 (rest)
Thu Nov 22		<i>Thanksgiving — No class</i>	
Fri Nov 23		<i>Thanksgiving — No class</i>	
Mon Nov 26		Orbital dynamics	
Tue Nov 27	HW 10	Density and pressure in fluids	13-1, 13-2
Thu Nov 29		Buoyancy	13-3
Fri Nov 30		Fluids in motion	13-4
Mon Dec 3		Temperature and thermal equilibrium	17-1
Tue Dec 4	HW 11	The absolute temperature scale	17-2
Thu Dec 6		The ideal gas law	17-3
Fri Dec 7		The kinetic theory of gases	17-4
Mon Dec 10		Heat transfer	
Tue Dec 11	HW 12	Review	
Mon Dec 17		Final exam, 8:00-10:00 am in our regular room	