Physics 171
Introductory Physics: Mechanics and Relativity
Spring 2009 — Professor Abazajian

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 10:00–10:50 in room 0405 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.

Required textbook: "Physics for Scientists and Engineers" by Tipler and Mosca, sixth edition, volume 1, published by W. H. Freeman and Company with the online Physics Portal Bundle. The ISBN number for this bundle is 978-1-4-2921201-4. If you would like to learn more about the portal, visit http://portals.bfwpub.com/pse6e.php. You do not need to bring the book to class. Most lectures are associated with 1–4 sections from the book as indicated on the Course Schedule, and *you should read those prior to the lecture.*

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 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.

Exams: 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:
Do your readings *before* the lecture on the material. Come to the lectures. Do all the homework. Ask for help (your professor, TA, or a classmate) whenever there is something you don't understand. *Utilize office hours!* The professor and TA are here to help with the material, not make it harder. Review your notes and past homework assignments before each exam.

Contact Information:
Prof. Kevork Abazajian, 4101 Physics Building, 301-405-6009, kev@umd.edu
Usual office hours: Tuesdays 2:00–3:00pm and Thursdays 4:00-5:00pm in room 4101
TA: TBA

*** 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 Course Schedule
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	Date	HW due	Lecture topic(s)	Reading assignment
Mon	26-Jan		Course intro; Measurement and units	1-1 to 1-5
Tue	27-Jan		Mechanics Survey	
Thu	29-Jan		Vectors and coordinate systems	1-6, 1-7
Fri	30-Jan		Motion in one dimension, acceleration	2-1, 2-2, 2-3, 2-4
Mon	2-Feb	HW 1	Motion in two and three dimensions	3-1, 3-2
Tue	3-Feb		Circular motion	3-3
Thu	5-Feb		Peer Instruction; Newton's 1st & 2nd laws	4-1, 4-2, 4-3
Fri	6-Feb	HW 2	Forces	4-4, 4-5
Mon	9-Feb		Force Problems	4-6
Tue	10-Feb		Newton's 3rd law	4-7, 4-8
Thu	12-Feb		Force Problems; Peer Instruction	
Fri	13-Feb	HW 3	Review	
Mon	16-Feb		**Exam 1**	
Tue	17-Feb		Friction and drag	5-1, 5-2
Thu	19-Feb		Solving problems with curved paths	5-3
Fri	20-Feb		Time-varying forces, Center of Mass	5-4, 5-5
Mon	23-Feb		Peer Instruction; Energy and work	6-1, 6-2
Tue	24-Feb	HW 4	Dot products, work, and power	6-3, 6-4
Thu	26-Feb		Potential energy; Conservation of energy	7-1
Fri	27-Feb		Peer Instruction; Conservation of energy	7-2, 7-3
Mon	2-Mar		Quantization of energyl; Many Bodies	7-1, 8-1, 8-2
Tue	3-Mar		Solving problems with collisions	8-3
Thu	5-Mar	HW 5	Reference frames	8-4
Fri	6-Mar		Peer Instruction; Relativity	R-1 to R-4
Mon	9-Mar		Relativity of Simultaneity tutorial	R-5
Tue	10-Mar		Relativistic momentum, energy, and particles	R-6
Thu	12-Mar	HW 6	Peer Instruction; Review	
Fri	13-Mar		**Exam 2**	
	Spring Break: March 16-20			
Mon	23-Mar		Rotational kinematics	9-1, 9-2
Tue	24-Mar		Moment of inertia	9-3, 9-4
Thu	26-Mar		Solving problems with torque and rotation	9-5
Fri	27-Mar		Peer Instruction; Torque	9-6
Mon	30-Mar	HW 7	The vector nature of rotation	10-1
Tue	31-Mar		Angular momentum and torque	10-2

Thu	2-Apr		Gyroscopes & Angular Momentum	10-2
Fri	3-Apr		Gyroscopes & Angular Momentum	10-3
Mon	6-Apr	HW 8	Peer Instruction; Conservation of **L**	10-4
Tue	7-Apr		Static equilibrium	12-1 to 12-4
Thu	9-Apr		Elasticity	12-7
Fri	10-Apr		Peer Instruction; Problem-solving workshop	
Mon	13-Apr	HW 9	Review	
Tue	14-Apr		**Exam 3**	
Thu	16-Apr		Kepler's Laws and Orbital Mechanics	11-1, 11-2
Fri	17-Apr		Gravitational force and potential energy	11-2, 11-3
Mon	20-Apr		Exam 3 solutions	
Tue	21-Apr		Peer Instruction; Gravitational fields & tides	11-4
Thu	23-Apr	HW 10	Density and pressure in fluids	13-1, 13-2
Fri	24-Apr		Buoyancy	13-3
Mon	27-Apr		Fluids in motion	13-4
Tue	28-Apr		Peer Instruction; Simple Harmonic Motion	14-1, 14-2
Thu	30-Apr		Pendulums	14-3
Fri	1-May	HW 11	Damped, driven oscillations	14-4
Mon	4-May		Peer Instruction; Temperature	17-1
Tue	5-May		Thermometers and refrigerators	17-2
Thu	7-May		The ideal gas law	17-3
Fri	8-May	HW 12	The kinetic theory of gases	17-4
Mon	11-May		Review – first half of the course	
Tue	12-May		Review – rest of the course	

Final Exam: Time/DATE TBA