

# Physics 161: General Physics I Spring 2012 Syllabus

## Sections 0201, 0202, 0203, 0204, 0205, 0206

**COURSE DESCRIPTION** General Physics: First semester of a three-semester calculus-based general physics course. Laws of motion, force, and energy; principles of mechanics, collisions, linear momentum, rotation, gravitation, oscillations and fluids.

MATH140 is a prerequisite and MATH141 is a co-requisite.

### STAFF

#### INSTRUCTOR

NAME	EMAIL	OFFICE HOURS	LOCATION
Dr Daniel Hertz	<a href="mailto:dbhertz@umd.edu">dbhertz@umd.edu</a>	Tu 12:00–1:30 pm Th 12:00–1:30 pm (and by appointment)	PHY 3102

#### DISCUSSION TAs

NAME	EMAIL	OFFICE HOURS	LOCATION
Andrew Allocca	<a href="mailto:aallocca@umd.edu">aallocca@umd.edu</a>	TBD	TBD
Jeffrey Demers	<a href="mailto:jdemeripi@gmail.com">jdemeripi@gmail.com</a>	TBD	PHY 3101

**COURSE WEBSITE AND COMMUNICATION** Course documents, lecture slides, homework assignments and course communication will all be handled using ELMS Blackboard. Make sure you have access to the course site. Changes of schedule and other important course information will be posted on the course website and in the event of urgent information will be emailed to students.

### TIMES AND LOCATIONS

SECTION	TYPE	TIME	LOCATION	INSTRUCTOR
All	Lecture	MWF 12:00–11:50 am	PHY 1412	Dr Hertz
0201	Discussion	Tu 2:00pm–2:50pm	MTH 0307	Andrew Allocca
0202	Discussion	Tu 2:00pm–2:50pm	MTH 0305	Jeffrey Demers
0203	Discussion	Th 2:00pm–2:50pm	MTH 0305	Andrew Allocca
0204	Discussion	Th 3:00pm–3:50pm	MTH B0427	Jeffrey Demers
0205	Discussion	F 8:00–8:50 am	PHY 1219	Jeffrey Demers
0206	Discussion	M 4:00–4:50 pm	MTH B0425	Andrew Allocca

### REQUIRED MATERIALS

- *Physics for Scientists and Engineers: A Strategic Approach with Modern Physics 2<sup>nd</sup> Ed*, Volume 1, by R. Knight
- MasteringPhysics subscription.  
This is needed in order to have access to the web-based homework assignment and collection system. You can obtain an access code by purchasing a new copy of the textbook with which a code is bundled. Alternately, if you buy a used copy of the textbook, you can purchase an access code for MasteringPhysics separately, either online at [www.masteringphysics.com](http://www.masteringphysics.com) for or at the campus bookstore (for approximately ~ \$45.00)
- ResponseCard RF-LCD Clicker.  
If you already own a clicker, you do not need to buy a new one You must make sure your clicker is registered. You will not be able to use use an iPhone/iPad/other mobile device.

### LECTURES

Students are *required* to attend lectures, where homework assignments will be collected, exams will be announced and administered, and the course material will be presented. During lectures, cell phones and other mobile devices may not be used. Lectures are not intended as a replacement for the textbook. It is very important that you keep on top of the reading and do not let your self fall behind. Almost all of the material in this course builds on previously covered topics, and if you fall behind, it will be very difficult to catch up. Lectures will be a mixture of traditional lecturing (for which slides will be posted the previous night), along with problem-solving (both in groups and individually)

**CLICKERS/  
PARTICIPATION**

Lectures will include a number of questions which you will be asked to answer using your ResponseCard clicker. Credit is assigned on whether or not you answer the question, *not* on what answer you choose. In other words, you still get credit if you guessed wrong. But if you don't answer at all, you get no credit.

Participation will account for 5% of your final grade. For purposes of your participation grade, each of the 38 lectures (discounting the first two lectures and all-class exams) will be worth an equal amount, regardless of the number of questions asked. You will receive full participation credit for a lecture provided you answer at least half of the questions (regardless of whether they are answered correctly or not). If you do not answer at least half the questions, you will not receive credit.

You may miss five lectures without any penalty; beyond that every lecture missed will correspond to a loss of 1/33<sup>th</sup> of the 5% possible for participation.

**HOMEWORK**

Homework will be assigned weekly and consists of two parts:

*The first homework assignment will be due on 2/1.*

The first is assigned through the MasteringPhysics website. The code for the course is DBHERTZ161SPRING2012. Each assignment will be posted on Wednesdays at 5:00 pm and is due the following Wednesday at 11:59 pm.

The policies for MasteringPhysics questions will be as follows:

- Number of attempts per question: 5
- Deduction of credit for incorrectly answering a multiple-choice or true/false question.
  - Deduction per incorrect answer: 100% / (# of answer options - 1)
- Deduct credit for opening a Hint.
  - Deduction per Hint opened: 5%

In addition to the MasteringPhysics homework, there will be a written portion which will be posted on the course blackboard site. This must be written up and handed in on paper before the beginning of class on Wednesday. Make sure that your homework is stapled together (do not use a paper clip) and that your name and section number are on every page in the top right corner. Discussion and collaboration between students regarding homework assignments is strongly encouraged. However, all work you hand in *must* be your own. Copying another student's homework is a violation of the University's code of academic integrity and will be dealt with accordingly (see below).

*Late homework will not be graded. Homework which is illegible will not be graded.*

There will be 11 homework assignments (of each type) during the course. Of these, only the 9 best will be used for purposes of calculating your final grades (so you drop your two worst homework grades for each of the written and MasteringPhysics assignments if you complete in all assignments).

**QUIZZES**

Quizzes will be conducted weekly in lecture, using clickers. These will take place on Mondays (following homework being due on Wednesday). The material in each quiz will be based on the homework due the previous Wednesday.

*The first quiz will be on 2/6.*

For the quizzes, you will be assigned partial credit (1 point) for answering a question incorrectly, and full credit (5 points) for answering it correctly. If you do not attend the lecture, or do not answer, you will receive 0 points. All quizzes will be weighed equally for purposes of determining your final grade, regardless of the number of questions on the quiz.

Quizzes are there to test your conceptual understanding of the subject and ensure that you have understood the homework.

There will be 10 quizzes during the course. Of these, only the 8 best will be used for purposes of calculating your final grades (meaning that you can drop your two worst quiz grades if you complete all quizzes).

**DISCUSSION  
SECTIONS**

Discussion sections will be conducted by Teaching Assistants. They will involve interactive tutorials, problem solving help, addressing students' individual concerns and questions, and are an important part of the course. Graded homework and midterm exams will be returned during discussion section.

**EXAMS**

There will be three 50-minute in-class exams (prelims) on 3/2, 3/30 and 4/27 during the normally scheduled lecture and a one 2 Hr. Final exam (5/14, 6:30–8:30 pm).

*All exams are closed book and closed note exams.*

Students will have access to a sheet containing important formulae and physical constants. The use of graphing calculators is not permitted for exams.

Of the three in-class exams, only your best two grades will be counted for the final grade.

**FINAL GRADE**

The overall course average will be a B–, with roughly 20% of students receiving an A+, A or A–, roughly 45% receiving a B+, B or B–, roughly 25% receiving a C+, C or C– and the remainder of students receiving a D or F.

The final grade will be based on the components with the following weights:

<b>Portion</b>	<b>Contribution</b>
Best two of three prelims	$2 \times 22.5\% = 45\%$
Final Exam	30%
Participation	5%
Quizzes (best 8)	10%
Homework (best 11)	10%

The grades for each portion of the course will be curved to a common mean and standard deviation (assuming a roughly Gaussian distribution) in order to obtain a reasonable overall distribution.

**STUDENTS WITH DISABILITIES**

Students with disabilities should meet with the instructor at the beginning of the semester so that appropriate arrangements can be made to accommodate the student's needs. I am more than happy to accommodate students with special needs but you need to inform me ahead of time so that I can arrange for the appropriate measures to be taken.

**TUTORING**

The Physics Department has a free tutoring service, the Slawsky Clinic. It is located in Room 1214 in the Physics building. See <http://www.physics.umd.edu/academics/ugrad/slawsky.html>

**UNIVERSITY CLOSURE**

In the event of a University Closure the department will do its best to accommodate students by scheduling make-up sessions or revision of the lab schedule.

**ACADEMIC INTEGRITY**

I expect all students to comply with the University of Maryland's academic integrity policies, including the [code of academic integrity](#) and the [honor pledge](#). Any and all failures to comply will result in a failing grade and will be reported to the Honor Council.

Violations of the code include but are not limited to copying homework, using unauthorized materials during exams, copying another student's exam, and using another student's clicker in lecture, either for a quiz or participation credit.

**ABSENCES AND MAKEUPS**

As a general policy, there will be no make-ups for missed lectures, quizzes, homework assignments and exams because students are already permitted to drop their lowest two quiz and homework grades, their lowest five participation grades for lectures, as well as their lowest midterm. Make-ups beyond this built-in leeway will only be possible under extreme extenuating circumstances, generally limited to medical emergencies for which documentation must be provided, signed by a health care professional.

## Tentative Schedule of Lectures

Week	Class	Date	Day	Topic	Subtopics	Ch. in Knight	HW	Quiz
1	1	1/25	W	Introduction	Introduction to Physics, Terms and Units			
	2	1/27	F	& Vectors	Vectors & Math	3		
2	3	1/30	M	Motion	Concepts of Motion, $x$ , $v$ and $a$	1		
	4	2/1	W	in 1-D	Graphing Motion in 1-D	2.1–2.3	1	
	5	2/3	F		Constant Acceleration Motion in 1-D	2		
3	6	2/6	M	Motion	Motion in 2-D: Projectiles	4.1–4.3		1
	7	2/8	W	in 2-D	Circular Motion and relative motion	4.4–4.7	2	
	8	2/10	F		Non-uniform circular motion, reference frames	4		
4	9	2/13	M	Forces	Interactions and Forces, Laws of Motion	5.1–5.6		2
	10	2/15	W	&	Newton's Laws of Motion	5.4–5.7, 7.1–7.3	3	
	11	2/17	F	Dynamics	Free-body Diagrams	5.7		
5	12	2/20	M		Dynamics in 1-D	6.1–6.3		3
	13	2/22	W		Friction and Drag	6.4–6.5	4	
	14	2/24	F		Statics and Pulleys	7.4–7.5		
6		2/27	M		Uniform Circular Motion	8.1–8.3		4
	15	2/29	W		Dynamics in 2-D	8.4–8.7	5	
	16	3/2	F		<b>PRELIM 1: Motion and Forces</b>	<b>1–7</b>		
7	17	3/5	M	Energy	Kinetic Energy, Gravitational Potential Energy	10.1–10.3		
	18	3/7	W		Conservation of Energy, Elastic PE	10.4–10.5	6	
	19	3/9	F		Work and Energy	11.1–11.5		
8	20	3/12	M		Potential Energy Graphs, Power	11.6–11.8		6
	21	3/14	W	Momentum	Momentum and Impulse	9.1–9.3	7	
	22	3/16	F		Inelastic Collisions and Explosions	9.4–9.5		
<b>Spring Break</b>								
9	23	3/26	M		2-D Collisions, Elastic collisions	9.6, 10.6		7
	24	3/28	W		Problem-solving with collisions	9.2, 9.4–9.6, 10.6	8	
		3/30	F		<b>PRELIM 2: Dynamics, Energy, and Momentum</b>	<b>8–11</b>		
10	25	4/2	M	Rotation	Rotational Kinematics	12.1–12.2		
	26	4/4	W		Rotational Energy, Moments of Inertia	12.3–12.4	9	
	27	4/6	F		Torque	12.5		
11	28	4/9	M		Rotational Dynamics	12.6–12.7		9
	29	4/11	W		Static Equilibrium	12.8	10	
	30	4/13	F		Angular Momentum, Rotation as Vectors	12.9–12.11		
12	31	4/16	M	Gravitation	Newtonian Gravity, Gravitational Field	13.1–13.4		10
	32	4/18	W		Kepler's Laws, Gravitational Energy	13.5–13.6	11	
	33	4/20	F		Problem-solving in Gravitation	13		
13	34	4/23	M	Oscillations	Simple Harmonic Motion, Potential Energy	14.1–14.3		11
	35	4/25	W		SHM Dynamics, Vertical Oscillations	14.4–14.5	12	
		4/27	F		<b>PRELIM 3: Rotation and Gravitation</b>	<b>12–13</b>		
14	36	4/30	M		The Pendulum, Damping and Forcing	14.6–14.6		
	37	5/2	W	Fluids	Pressure & Density in fluids	15.1–15.2	13	
	38	5/4	F		Pascal's Principle, Hydraulic Lift	15.3		
15	39	5/7	M		Archimedes' Law and Buoyancy	15.4		13
	40	5/9	W		Course Review			
		5/14	M		<b>Final Exam 6:30–8:30 pm</b>	<b>1–15</b>		