PHYS161 - General Physics: Mechanics and Particle Dynamics

Spring Semester, 2015

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, simple harmonic motion, and fluids.

Pre-requisite MATH 140

Co-requisite: MATH 141

Instructor David C Buehrle
1330 Physics Building

x5-6045

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Office hours: TBA.

Lecture **SECTIONS 0101-0110: TuTh 2:00 – 3:15PM, Toll Physics Building Room 1412 (Large Lecture Hall)**

SECTIONS 0301-0309: MWF 2:00 – 2:50PM, Toll Physics Building Room 1412 (Large Lecture Hall)

Discussion Sections Discussion sections will be conducted by the Teaching Assistant, and are a forum where students can ask questions about the course material, where you will take your quizzes, and where problems will be worked out with student participation.

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Section	TA	Office	Day	Time	Room
0101	**Megan Marshall**, meganmarshall20@gmail.com	PSC 3260 x5 6016	M	9:00AM-9:50AM	PHY 0405
0102	**Megan Marshall**, meganmarshall20@gmail.com	PSC 3260 x5 6016	W	4:00PM-4:50PM	MTH 0105
0103	**Jaideep Pathak**, jpathak@umd.edu	PHY 0220 x5 5969	F	9:00AM-9:50AM	PHY 0405
0104	**Hwan Mun Kim**, kim.hwanmun@gmail.com	PHY 0104 x5 8577	F	10:00AM-11:50AM	PHY 1204
0105	**Jaideep Pathak**, jpathak@umd.edu	PHY 0220 x5 5969	M	9:00AM-9:50AM	PHY 1204
0106	**Lance Boyer**, lboyer@umd.edu	PHY 3101 x5 6191	M	3:00PM-3:50PM	MTH 0304
	Lance Boyer,	PHY 3101		4:00PM-	MTH 0101

0107	lboyer@umd.edu	x5 6191	M	4:50PM	
0108	**Hwan Mun Kim**, kim.hwanmun@gmail.com	PHY 0104 x5 8577	W	4:00PM-4:50PM	PHY 1219
0109	**Jaideep Pathak**, jpathak@umd.edu	PHY 0220 x5 5969	M	4:00PM-4:50PM	PHY 1219
0110	**Jaideep Pathak**, jpathak@umd.edu	PHY 0220 x5 5969	M	3:00PM-3:50PM	PHY 1204

Section	TA	Office	Day	Time	Room
0301	**Daniel Campbell**, djcampbe@umd.edu	PHY 0104 x5 8577	Tu	3:00PM-3:50PM	PHY 0405
0302	**Daniel Campbell**, djcampbe@umd.edu	PHY 0104 x5 8577	Tu	4:00PM-4:50PM	PHY 1204
0303	**Jaideep Pathak**, jpathak@umd.edu	PHY 0220 x5 5969	Th	4:00PM-4:50PM	PHY 1219
0304	**Megan Marshall**, meganmarshall20@gmail.com	PSC 3260 x5 6016	F	10:00AM-10:50AM	MTH 0101
0305	**Lance Boyer**, lboyer@umd.edu	PHY 3101 x5 6191	F	11:00AM-11:50AM	MTH 0304
0306	**Megan Marshall**, meganmarshall20@gmail.com	PSC 3260 x5 6016	F	11:00AM-11:50AM	PHY 1204
0307	**Daniel Campbell**, djcampbe@umd.edu	PHY 0104 x5 8577	Th	3:00PM-3:50PM	PHY 1204
0308	**Megan Marshall**, meganmarshall20@gmail.com	PSC 3260 x5 6016	Tu	4:00PM-4:50PM	MTH 0103
0309	**Lance Boyer**, lboyer@umd.edu	PHY 3101 x5 6191	Th	4:00PM-4:50PM	PHY 1204

Textbook

Required: **Physics for Scientists and Engineers** Volume 1, **Third edition**,

by Randall D. Knight (Addison Wesley). Although your homework will be assigned on line through Mastering Physics from the third edition of Randall Knight, please note that insofar as the course material is concerned there is very little of any difference between the 2nd edition and the 3rd edition in regard to Vol. 1. There are significant differences in other volumes but not that of Vol. 1. Therefore, if you were to purchase a used 2nd edition of volume 1 you would not be missing out on anything important – the only difference would be that the assigned HW numbers from the 3rd edition on the Mastering Physics probably would not coincide with the HW problems

from the second edition.

Lectures Students are required to attend lectures, where announcements will be given, exams will be announced and administered, and the course material will be presented.

We will be using the Learning Catalytics classroom participation tool in our course. Sign in to Mastering and click the "Learning Catalytics" link in the "In-Class Learning" area (top right) to verify your access. If you don't have access yet, you are required to purchase access.

Learning Catalytics access is included when you buy Mastering with an eText subscription or a new book package. If you bought a Mastering subscription without an eText, you will need to purchase Learning Catalytics access.

Preparation **Not all material will be directly covered in lectures**. Students are responsible for reading and understanding all material in assigned chapters, whether or not this material is explicitly treated in the lectures.

Lab No lab component in PHYS161

Homework Homework will be done through Mastering Physics. ***You must submit your answers for the homework problems over the internet using the Mastering Physics web site (see below)***.

There are several advantages to electronic homework submission:

(1) You will know right away if your answer is right or wrong

(2) If you give a wrong answer, you can go back and try again to see if you can get the correct solution. You will be allowed 6 attempts for each question, so don't waste them.

(3) You are graded only on your final answers and get your score when you are done.

(4) The site also has a tutorial capability that you may find helpful.

Note that the software may randomize the numbers each time you make a new attempt on a problem, so be careful and remember that other students working on exactly the same problems are likely to have different numbers. The best way to do physics problems is first to work out carefully a general analytical solution to the problem and then plug in the numbers at the end. This is especially true if the numbers are being randomized each time so everyone has different numbers.

Why You Need to do the Homework: One of the main ways you can understand Physics is by doing the homework. Do not wait until the night before it's due to start working on your homework. The homework can be expected to be difficult and it counts a lot towards your final grade in enabling you to succeed on your exams. A sure way to get an F in this course is to not do the homework or not give yourself enough time to work on it.

Getting started in electronic homework submission: To turn in your homework, you need to go to:

http://www.masteringphysics.com/

The site is best accessed with a current version of Windows Explorer or Firefox. If you run into problems, check the system requirements. In the past, there have been major trouble issues working Mastering in Physics through Google Chrome so don't try using Google Chrome.

Registering and Gaining Access to Mastering Physics: In order to turn in your homework, you will need to register at the Mastering Physics website http://www.masteringphysics.com/. To register, you need two things - an access number and the class ID. **When you buy (new or used copy of) your textbook you will need to purchase a Mastering Physics access key number. The easy way to do this is to simply buy it on line from the above MP website.**

Your class ID is: PHYS161BUEHRLES2015

Exams There will be two mid-term exams and a one 2 Hr. Final exam. You must take the Final exam in order to pass PHYS161.

All exams are closed book and closed note exams. For each exam, you may have one "cheat sheet" that contains physical constants and formulas. You may also have a calculator

Excuses Missing an exam is not allowed without a valid documented excuse as defined by the University (medical problem, religious holiday, or serious family crisis). In all cases, a makeup exam must be completed in a reasonable amount of time or you will receive a score of zero for the exam. The makeup test or assignment, and the due date, must be arranged by consulting with Professor Buehrle as soon as possible after it becomes apparent that an exam date will be missed. Turning in late homework is not encouraged as it will result in a reduction of 10% of the points for every day late. If you are going to miss an assignment because of a religious holiday, it is your responsibility to inform the instructor in advance so that suitable arrangements can be made.

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

Two mid-term exams: 2 x 20%	= 40 %
Comprehensive Final Exam	= 40 %
Homework, Participation, and Quizzes	= 20 %

The final grade will be set at the end of the semester after all work is completed. In assigning the final grade, I will be guided by the University of Maryland grading policy, quoted below:

- A+, A, A- denotes excellent mastery of the subject and outstanding scholarship. (90-100)
- B+, B, B- denotes good mastery of the subject and good scholarship. (80-90)
- C+, C, C- denotes acceptable mastery of the subject and the usual achievement expected. (70-79)
- D+, D, D- denotes borderline understanding of the subject. It denotes marginal performance, and it does not represent satisfactory progress toward a degree. (60-70)
- F denotes failure to understand the subject and unsatisfactory performance. (< 60)

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.
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	All students will be expected to comply with the University of Maryland's academic integrity policies, including the code of academic integrity and the honor pledge. Failure to comply will result in a failing grade and will be reported to the Honor Council.

Week	Date			01xx	030x	Ch Sections	HW	Quiz
	M	Jan	26		Introduction & Terms			
	Tu		27	Introduction & Terms				
1	W		28		Vectors & Math	3	0	
	Th		29	Vectors & Math		3		
	F		30					
	M	Feb	2		Motion (p-v-a)	1		
	Tu		3	Motion (p-v-a); Graphing 1-D Motion		1,2.1-2.3		
2	W		4		Graphing 1-D Motion	2.1-2.3	1	1
	Th		5	Constant Acceleration in 1-D		2		
	F		6		Constant Acceleration in 1-D	2		
	M	Feb	9		2-D Motion; Projectiles	4.1-4.3		
	Tu		10	2-D Motion; Projectiles		4.1-4.3		
3	W		11		Circular Motion & Relative Motion	4.4-4.7	2	2
	Th		12	Circular & Relative Motion; Non-Uniform CM		4		
	F		13		Non-Uniform Circular Motion	4		
	M	Feb	16		Forces ; Laws of Motion	5.1-5.6		
	Tu		17	Forces ; Laws of Motion; Free-Body		5.1-5.7		
4	W		18		Free-Body Diagrams	5.4-5.7,7.1-7.3	3	3
	Th		19	1-D Dynamics		6.1-6.3, 7.1-7.3		
	F		20		1-D Dynamics	6.1-6.3		
	M	Feb	23		Friction & Drag	6.4-6.5		
	Tu		24	Friction & Drag;Statics & Pulleys		6.4-6.5, 7.4-7.5		
5	W		25		Statics & Pulleys	7.4-7.5	4	4
	Th		26	Centripetal Force		8.1-8.3		
	F		27		Centripetal Force	8.1-8.3		
	M	Mar	2		2-D Dynamics	8.4-8.7		
	Tu		3	2-D Dynamics;Kinetic Energy; Gravitational PE		8.4-8.7,10.1-10.3		
6	W		4		Kinetic Energy; Gravitational PE	10.1-10.3	5	5
	Th		5	Energy Conservation; Elastic PE		10.4-10.5		
	F		6		Review			

Week	Date			01xx	030x	Ch Sections	HW	Quiz
	M	Mar	9		**EXAM I**	CH 1-8		
	Tu		10	**EXAM I**		CH 1-8		
7	W		11		Energy Conservation; Elastic PE	10.4-10.5	6	
	Th		12	Work & Energy		11.1-11.5		
	F		13		Work & Energy	11.1-11.5		
	M	Mar	16					
	Tu		17					
	W		18					
	Th		19					
	F		20					
	M	Mar	23		Power & Energy Diagrams	11.6-11.8		
	Tu		24	Power & Energy Diagrams		11.6-11.8		
8	W		25		Impulse & Momentum	9.1-9.3	7	6
	Th		26	Impulse-Momentum; Inelastic Collisions		9.1-9.5		
	F		27		Inelastic Collisions & Explosions	9.4-9.5		
	M	Mar	30		2-D Collisions; Elastic Collisions	9.6, 10.6		
	Tu		31	2-D Collisions; Elastic Collisions		9.2,9.4-9.6,10.6		
9	W	Apr	1		Collision Problem-Solving	9.2,9.4-9.6,10.6	8	7
	Th		2	Rotational Kinematics		12.1-12.2		
	F		3		Rotational Kinematics	12.1-12.2		
	M	Apr	6		Torque & Moment of Inertia	12.3-12.5		
	Tu		7	Torque & Moment of Inertia		12.3-12.5		
10	W		8		Rotational Dynamics	12.5-12.7	9	8
	Th		9	Rotational Dynamics; Static Equilibrium		12.6-12.8		
	F		10		Equilibrium & Angular Momentum	12.8-12.11		
	M	Apr	13		Newtonian Gravity; Gravitational Field	13.1-13.4		
	Tu		14	Angular Momentum; Angular vectors		12.9-12.11		
11	W		15		Kepler's Laws; Gravitational PE	13.5-13.6	10	9
	Th		16	Newtonian Gravity; Gravitational Field		13.1-13.4		
	F		17		Gravitation Problem-Solving	13		

Week	Date			01xx	030x	Ch Sections	HW	Quiz
	M	Apr	20		Implications of Newtonian Mechanics			
	Tu		21	Kepler's Laws; Gravitational PE		13.5-13.6		
12	W		22		Review		11	10
	Th		23	**EXAM II**		CH 9-13		
	F		24		**EXAM II**	CH 9-13		
	M	Apr	27		Simple Harmonic Motion	14.1-14.3		
	Tu		28	Simple Harmonic Motion; SHM Dynamics		14.1-14.5		
13	W		29		SHM Dynamics; Vertical Oscillators	14.4-14.5	12	
	Th		30	Simple Pendulum; Damping		14.6,		
	F	May	1		Simple Pendulum; Damping	14.6		
	M	May	4		Fluid Density & Pressure	15.1-15.2		
	Tu		5	Fluid Density & Pressure		15.1-15.4		
14	W		6		Pascal's Principle; Hydraulic Lift	15.3	13	11
	Th		7	Fluid Flow & Elasticity		15.5-15.6		
	F		8		Fluid Flow & Elasticity	15.5-15.6		
	M	May	11		Course Review			
	Tu		12	Course Review				
15	W		13					
	Th		14					
	F		15					