# Physics 130 (General Physics I) Spring 2013 Dr. Pfeil

## **Course Meeting Time and Place**

- □ PHY130-01: MWF: 9:00 am 9:50 am, Merion 112
- □ PHY130-02: MWF: 8:00 am 8:50 am, Merion 112

Due to the course enrollment you must attend the section for which you are registered.

## **Course Description:**

Physics 130 is the first semester of an algebra based survey of Physics. Topics covered include kinematics, dynamics, thermodynamics, and kinetic theory. In a nutshell, this semester we will learn how forces give rise to motion, and the consequences of that motion both at a macroscopic and microscopic scale. These topics, in addition to being fundamental underpinnings of modern technology, are required to understand biomechanics and cellular biology. PHY140 is primarily a service course for biology and pre-health professionals, so I will be emphasizing biological applications wherever possible.

A laboratory portion of this course will provide hands-on experience with these phenomena, and give a glimpse into how scientists discovered the physical laws covered in the lecture.

A good grasp on high-school algebra and trigonometry is a pre-requisite for this class. Mathematical language provides the precision required to state physical laws and the tools to manipulate them. We will be using algebra and trigonometry on a daily basis.

## **Specific Learning Outcomes:**

Our goals are:

- An ability to think critically and analytically.
- An ability to use words, equations, and graphs to communicate effectively in a technical setting.
- An ability to apply reductionist problem solving techniques.
- An ability to employ quantitative concepts and mathematical models.
- Mastery of course material.

## **Required Course Materials:**

- *Physics* by Cutnell and Johnson, 9<sup>th</sup> ed. Wiley.
- WileyPlus access code for *Physics* 9<sup>th</sup> ed.
- Physics 130 lab manual handouts (provided on D2L).
- Laboratory Notebook (BookFactory, as sold by University Bookstore)

#### **Contact Information:**

- <u>email: spfeil@wcupa.edu</u> (please include lecture section e.g. PHY130-01 in the subject line.)
- <u>office:</u> Schmucker Science South 229 (please note this is not in Merion)
- <u>phone:</u> (610) 430-4084

# **Office Hours:**

My scheduled office hours as of the first day of class are listed below, this may be adjusted if enough students have a scheduling conflict. I am also available by appointment.

Monday	Thursday	Friday
2 pm-3 pm 🛛	8 am – 11 am 🛛	1 pm – 2 pm 🛛
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Please check-off which office hours you can attend.

# **Course Schedule:**

**NOTE:** Because of contract negotiations between state administrators and APSCUF (the faculty union), the class schedule for this course is tentative, and is subject to revision in the case of a strike. Your professor will not be teaching the course during a strike, including lectures, meetings with students, assigning or grading work, or submitting mid-term or final grades. During a strike, faculty will not be able to receive email through the university server.

Date	Lecture	Reading	Lab	Demo
01/28/13	Introduction, Units, Vectors and	1.1-1.5		
	Scalars, Problem Solving			
01/30/13	1D Kinematics Part 1	2.1-2.4, 2.7	No Lab	
02/01/13	1D Kinematics Part 2, Free Fall	2.5-2.6, 2.8		Foil Ball
02/03/13	Homework #1 (Reminder)			
02/04/13	Vectors	1.5-1.9	Free-Fall	
02/06/13	2D Kinematics Part 1	3.1-3.5		
02/08/13	2D Kinematics Part 2	Handout		Projectile Motion Demo
02/10/13	Homework #1 and #2 Due			
02/11/13	Newton's Laws	4.1-4.5	Projectile	
			Motion	
02/13/13	Forces	4.6-4.10		
02/15/13	Equilibrium and Non-equilibrium	4.11-4.12		Inclined Plane
	Applications			
02/17/13	Homework #3 Due			
02/18/13	More Applications of Newton's Laws		Using Data	
			Studio	
02/20/13	Uniform Circular Motion 1	5.1-5.4		Twirling Mass
02/22/13	Exam #1	CH 1-3		
02/24/13	Homework #4 (Reminder)			
02/25/13	Uniform Circular Motion 2	5.5-5.6	Inclined Plane	
02/27/13	Work and Kinetic Energy	6.1-6.4		

03/01/13	GPE & Energy Conservation	6.5-6.10		
03/03/13	Homework #4 and #5 Due			
03/04/13	Power, Hooke's Law and Elastic PE.	10.1-10.3	Spring Mass System	
03/06/13	Impulse and Momentum	7.1-7.3		
03/08/13	Collisions	7.4-7.6		Cart Collision
03/10/13	Homework #6 Due			
03/11/13	More Collisions		Conservation of Momentum	
03/13/13	Rotational Kinematics	8.1-8.3		
03/15/13	Exam #2	CH4-6		
03/17/13	Homework #7 (Reminder)			
	Spring Break			
3/25/13	Centripetal Acceleration and Rolling Motion	8.5-8.6	Biomechanics	Rolling Race
03/27/13	Rotational Dynamics	9.1-9.4		Angular Momentum Chair
03/29/13	Rotational Dynamics II	9.5-9.7		
03/31/13	Homework #7 and #8 Due			
04/1/13	Simple Harmonic Motion	10.1-10.3	Spring Mass Oscillator	
04/3/13	The Pendulum and Damping	10.4-10.6		The Period of a Pendulum.
04/5/13	Elasticity	10.7-10.9		Crystal Model
04/07/13	Homework #9 Due			
04/8/13	Hydrostatics 1	11.1-11.4	Pendulum 1	
04/10/13	Hydrostatics 2	11.5-11.6		
04/12/13	Hydrodynamics 1	11.7-11.10		Bernoulli Demo
04/14/13	Homework #10 Due			
04/15/13	Hydrodynamics 2 (viscosity)	11.11-11.12	Pendulum 2	
04/17/13	Waves and Waves on a String	16.1-16.7		
04/19/13	Exam #3	CH7-10		
04/21/13	Homework #11 (Reminder)			
04/22/13	Sound Waves	16.8-16.11		Beats Demo
04/24/13	Superposition and Interference	17.1-17.4	Archimede's Principle	
04/26/13	Standing Waves	17.5-17.8		Standing Waves
04/28/13	Homework #11 and 12 Due			
04/29/13	Temperature and Thermal Expansion	12.1-12.6		Thermal Expansion Demo
05/01/13	The Ideal Gas Law, Kinetic Theory	14.1-14.3	Standing Waves	
05/03/13	Exam #4	CH11-12 & 16-17		

05/06/13	Thermodynamics 1	15.1-15.4	
05/08/13	Thermodynamics 2	15.5-15.7	
05/10/13	catch up or review, Homework #13		
	Due		
05/13/13	FINAL EXAM @ 8 am for		
	PHY130-01 MWF 9-10 am		
05/15/13	FINAL EXAM @8 am for		
	PHY130-02 MWF 8-9 am		

#### Homework Assignments (On WileyPlus)

HW	Problems
1	CH1: 4, 6
	CH2: FC3,FC6, 4, 9, 18, 29, 44, 46, 65, 67
2	CH1: 23, 29, 31, 40, 41, 46, 48
	CH3: 2, 9, 15, 18, 43
3	CH4: FC1, FC5, FC7, 5, 7, 11, 16, 17, 22, 38
4	CH4: 43, 54, 56, 72, 74, 110
5	CH5: FC1, FC7, 1, 8, 11, 14, 27 CH6: FC1, FC11, 3, 13
6	CH6: 30, 37, 64 CH7: FC7, FC15, 2, 8, 16, 21, 29, 31
7	CH7: 33, 34 CH8: 9, 22, 40, 48, 54
8	CH9: FC3, Fc10, FC18, 1, 3,15, 34, 57, 59
9	CH10: FC3, FC11 2, 6, 15, 17, 30, 43, 47, 51
10	CH11: FC9, 2, 11, 23, 34, 40, 43, 56
11	CH11: 61, 67, CH16, 2,4, 13, 34, 39, 52, 56, 76, 81
12	CH17: FC2, 2, 14, 20, 28, CH12 5, 11, 33, 44
13	CH14: 13,15, 35, 37, 41 CH15: 1, 6, 13, 45

## Assessment:

I will be using the D2L grade-book feature to post course grades. Please check it periodically. The course has the following assessed components:

- Laboratory (15%): Please see supplementary lab syllabus.
- <u>Homework</u> (10%): All homework assignments for the semester are posted on WileyPlus. No late homework will be accepted. The assigned homework is the <u>minimum</u> amount of practice a highly gifted student would need. I highly suggest doing more, as many as possible, practice problems. Please note the textbook has answers for all of the odd problems.
- <u>Regular Exams</u> (50%, 4 @ 12.5% ea.): Regular exams are cumulative, since Physics as a subject is inherently cumulative, but only in an incidental fashion. For example, one may be required to use concepts from kinematics (the first exam) on a problem involving forces (the second exam). I will try to minimize this on regular exams, but it is impossible to eliminate.

**If you miss a regular exam:** If you miss an exam for a **University Sanctioned Event** you must notify me in advance so that we can arrange for you to take the exam in a manner consistent with its integrity. You

must also provide some form of documentation (performing arts program, competition schedule etc.). If you miss for any other reason the same rules apply, and it must be a very good reason (Sickness, death, and dismemberment all qualify. If in doubt, ask.)

• **Final Exam** (25%): A cumulative final focusing on synthesis. In addition to problems similar to the midterm you will be asked to combine concepts from different parts of the course.

I will be using the official WCU scale for grades, see p.48 in the undergraduate catalog. However, I reserve the right to adjust the weights of individual components, or the scale to account for unforeseen circumstances.

## **Electronic Device Policy:**

The pace of the course is such that your undivided attention will be required for the entire lecture and lab period. Please set all electronics to silent or "vibrate mode" and put them away. Both you and your neighbors will be able to concentrate on the material at hand.

## **D2L/WileyPlus:**

We will be using two online platforms for this course WileyPlus, the publishers homework system, and D2L. Homework assignments are to be performed on WileyPlus. I will post lecture slides, without solutions to example problems and etc. to D2L. Because I am continually refining my lecture presentations final versions will be posted *after* lecture. I will post *draft* versions prior to the lecture. All lab manuals will be posted on D2L.

As the author of these materials I give you *the student* permission to store and print a copy of all materials authored by me for your personal use during this semester. However, you may not repost them or make them available in any form to students not currently enrolled in this course. **Please see intellectual property statement.** 

## Attendance:

Lecture attendance while not formally required is strongly suggested. I will be supplementing the textbook and going over as many examples as we can fit into the time. You are responsible for all material covered during any absence.

## **Disability Statement:**

If you have a disability which will require special accommodation, please meet with me as soon as possible to discuss your needs. Also, contact the Office of Students with Disabilities (OSD) at (610) 436-2564. Both WCU and I desire to comply with the ADA of 1990.

# **University Sanctioned Events:**

If you will be participating in a University sanctioned event during class or an exam **you must notify me in advance.** Please see the discussion of University Sanctioned Events in the general catalog.

# **Physics Tutoring:**

Physics tutoring is available through LARC (610) 436-2535. In the past peer tutoring has also been available from SPS (the Society of Physics Students). If SPS tutoring becomes available this semester I will make an announcement. These should be considered in <u>addition</u> to my office hours, which are the first place you should stop for additional help.

# **Intellectual Property Statement:**

I, the instructor, utilize copyrighted materials under the "Freedom and Innovation Revitalizing the United States Entrepreneurship Act of 2007" (Fair Use Act). Apart from such copyrighted materials, all other intellectual property associated with this course is owned and copyrighted by the instructor, including, but not limited to, lectures, course discussions, course notes, slides, assessment instruments such as exams, and supplementary materials posted or provided to students authored by the instructor. No recording, copying, storage in a retrieval system, or dissemination in any form by any means of the intellectual property of the instructor, in whole or in part, is permitted without prior written permission of the instructor. When such permission is granted, it must specify the utilization of the intellectual property and all such permissions and waivers shall terminate on the last day of finals of the semester in which this course is held.

# **ACADEMIC INTEGRITY & CONDUCT**

I have a zero tolerance policy for breaches of academic integrity. Breaches of academic integrity will be investigated and sanctions imposed to the full extent available under University policy. For questions regarding the university Academic Dishonesty, the No-Grade Policy, Sexual Harassment, or the Student Code of Conduct, students are encouraged to refer to their major department's handbook, the Undergraduate Course Catalogue, the Rams Eye View, or the University Web Site. Please understand that improper conduct in any of these areas will not be tolerated and may result in immediate ejection from the class.

## **PUBLIC SAFETY**

The Emergency Communications Committee recommends that the number of WCU's Department of public safety be available on every course syllabi. WCU Department of Public Safety: (610) 436-3311.