Physics 140-02 (7672)
Fall 2013
Dr. Pfeil

Course Meeting Time and Place

Meeting Time: MoWeFri 8:00-8:50 am

Meeting Place: Merion 112

Contact Information:

- email: spfeil@wcupa.edu (please include lecture section e.g. PHY140-02 in the subject line.)
- office: Schmucker Science South 229 (please note this is not in Merion)
- phone: (610) 430-4084

Course Description:

Physics 140 is a continuation of Physics 130, which covers electricity, magnetism, electrical circuits, optics and quantum physics. This material underpins such diverse applications as the iridescent display feathers of the ostrich, gel-electrophoresis, neuron function, the generation of rainbows, and how electrical power is generated.

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, 9th ed. Wiley.
- WileyPlus access code for *Physics* 9th ed.
- Physics 140 lab manual handouts (provided on D2L).
- Laboratory Notebook (BookFactory, as sold by University Bookstore

Office Hours:

My scheduled office hours as of the first day of class are listed below. I reserve the right to adjust this schedule to reflect unforeseen circumstances.

Monday	Wednesday	Thursday	Friday
9-10 am	9-10 am	8-9 am	9-10 am 2-3 pm

Time Commitment and Work Flow

The life of a college student is not easy. A full time student can expect to spend about 50 hrs per week on coursework, or about 12.5 hrs per week per course. Here is how I recommend you spend your 12.5 hours for Physics 130.

Activity	Time Commitment
Reading Prior to Class	1.5 hrs/week
Class	2.5 hrs/week
Post Lecture Study	1.5 hrs/week
Homework After Lecture	3.75 hrs/week
Reading Prior to Lab	0.25 hrs/ week
In Lab Time	2 hrs/week
Post Lab Write-Up	1 hrs/week
Total Time Spent	12.5 hrs/week

Course Schedule:

Below is a tentative schedule for the course. Although I will endeavor to stick closely to the schedule as posted below, I reserve the right to modify it as needed over the course of the semester.

Date	day	Meeting	Topic	Reading	HW Problems	Lab
08/26/13	M	1	Introduction, what to expect, the charge model part one.	18.1-18.3	CH18: 1,3,6	No LAB
08/28/13	W	2	Charging and electric Forces.	18.4-18.5	CH18: 8, 10, 19, 21	
08/30/13	F	3	The E-Field Model One	18.6-18.7	CH18: 30, 31, 33	
09/02/13	M		**Labor Day**			
09/04/13	W	4	The E-field Model Part Two	18.7-18.11	CH18: 54, 57	NO LAB
09/06/13	F	5	EPE and Electric Potential	19.1-19.3	CH19: FC2, 2, 3, 17	
09/09/13	M	6	Equipotential Dielectrics	19.4-19.5	CH19: FC12, 33, 42	Electric Charge
09/11/13	W	7	Energy in an E-field Applications	19.5-19.6	CH19: 43, 49, 57	
09/13/13	F	8	Electric Potential Problem Solving			

09/16/13	M		**Exam 1**			Electric Field
09/18/13	W	9	EMF and Current	20.1-20.3	CH20: FC1,FC2, 5	
09/20/13	F	10	Power and AC Current	20.4-20.5	CH20: 22, 25, 26	

09/23/13	M	11	Series and Parallel Wiring, and Kirchoff's Rules	20.6-20.10	CH: 20 41, 50, 52	Ohm's Law
09/25/13	W	12	Capacitors and RC Circuits	20.12-20.14	CH20: 93, 95, 97, 103	
09/27/13	F	13	Magnetic Field, Magnetic Force and the Right Hand Rule	21.1-20.2	CH21: FC3, 4, 6, 7	

09/30/13	M	14	Applications of Magnetic Force	21.3-21.4	CH21: 13, 19, 21	Resistors in Series
10/02/13	W	15	Magnetic Force and Currents	21.5-21.6	CH21: 32, 33, 43, 44	
10/04/13	F	16	Production of Magnetic Fields	21.7-21.9	CH21: 55, 56, 57	

10/07/13			Fall Break			NO LAB
10/09/13		17	Catch-Up and Motional EMF	22.1-22.2	None Assigned	
10/11/13		18	Catch-Up and Flux	22.1-22.3	CH22: 11, 14, 15	

10/14/13	M		**EXAM 2**			Resistors in Parallel
10/16/13	W	19	Faraday and Lenz Laws	22.3-22.5	CH22: 18, 19, 20, 34	
10/18/13	F	20	Inductance and the Energy in B-Fields	22.8	CH22: 49, 50, 54	

10/21/13	M	21	Applications of Induction	22.7,22.9	CH20: 42, 45	RC Circuits
10/23/13	W	22	Electromagnetic Waves I	24.1-24.3	CH24: 1, 3, 8, 15	
10/25/13	F	23	Energy in EM Waves and the Doppler Effect	24.4-24.5	CH24: 24, 26, 35	

10/28/13	M	24	Polarization and Applications	24.6	CH24: 36, 39, 42	Induction
10/30/13	W	25	Ray Optics and Reflection Spherical Mirrors	25.1-25.4	CH25: 5, 6, 39,	
11/01/13	F	26	Image Formation Concave and Convex Mirrors	25.5-25.6	CH25: 14, 15, 22, 27	

11/04/13	M		**EXAM 3**			Snell's Law
11/06/13	W	27	The Index of refraction and Snell's Law	26.1-26.2	CH26: 1, 6, 10, 15	
11/08/13	F	28	Total internal reflection and dispersion	26.3-26.5	CH26: 27, 28, 45, 46	

11/11/13	M	29	Lenses	26.6-26.8	CH26: 49, 51, 54	Thin Lenses

11/13/13	W	30	Optics of the Eye	26.9-26.10	CH26: 74, 76, 77, 79	
11/15/13	F	31	Optical Interference and Superposition	27.1-27.2	CH27: FC1, 1, 4	

11/18/13	M	32	Diffraction and Resolving Power	27.5-27.6	CH27: 25, 28, 35	Interference
11/20/13	W	33	Diffraction Gratings and Applications	27.7-27.9	CH27: 43, 44, 48	
11/22/13	F	34	Photon Momentum and Energy	29.1, 29.3-29.4	CH29: 1, 4, 5, 8	

11/25/13	M		**EXAM 4**			NO Laboratory
			Thanksgiving Break			

12/02/13	M	35	DeBroglie Wavelength, and Uncertainty	29.5-29.6	CH29: 15, 25, 29	Diffraction
12/04/13	W	36	The Bohr Model and Modern Quantum	30.3-30.6	CH30: 7, 8, 12, 13	
12/06/13	F	37	Practice With Energy Levels (Problems)			

12/09/13	M	38	Nuclear Physics	31.1-31.4	None Assigned	No LAB
			Final			
			Final			

Assessment:

I will be using the D2L grade-book feature to post course grades. Please check it periodically.

- **Laboratory** (15%): Laboratory notebooks will be checked for completeness. A brief lab write-up associated with each lab will be graded in depth.
- **Homework** (15%):
  - Homework assignments are due once a week on WileyPlus at 11 pm Sunday night.
  - For administrative reasons each weekly homework assignment of 9-15 problems has been broken up into three mini-assignments, one for each lecture.
  - I strongly suggest attempting each mini assignment as the material is covered, rather than waiting until the weekend.
  - Solutions to all homework are available online after the due date.
  - Because solutions will be available no late homework will be accepted.
  - **In addition to graded assignments, additional practice problems will be made available on WileyPlus**

- **Regular Exams** (45%, best 3 of 4 @ 15% per exam.): Four regular exams will be given during the semester. I will keep your highest three scores.
  - **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.) In all other cases a missed exam will be treated as your dropped exam.

- **If you have an OSD letter pertaining to exams:** You are responsible for making the appropriate arrangements **prior** to the exam date and time.

- **Final Exam** (25%): The final is cumulative and will require synthesis of 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.

In terms of the WCU standard and the courses point system grades are as follows.

Letter	Grade Points	Percentage	Points	
A	4.000	93 - 100	930-1000	Excellent
A-	3.670	90 - 92	900-920	
B+	3.330	87 - 89	870-890	Superior
B	3.000	83 - 86	830-860	
B-	2.670	80 - 82	800-820	
C+	2.330	77 - 79	770-790	Average
C	2.000	73 - 76	730-760	
C-	1.670	70 - 72	700-720	
D+	1.330	67 - 69	670-690	Below Average
D	1.000	63 - 66	630-660	
D-	0.670	60 - 62	600-620	
F	0.000	59 or lower	590 or below	Failure

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 publisher's 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 make a good faith effort to post draft versions prior to the lecture, *but these may have substantial revisions.* 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 Policy:

It is a bad idea to miss lecture. Lecture attendance for PHY130 is strongly correlated with performance on homework assignments and exams. We will do a number of examples in lecture.

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 addition 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.