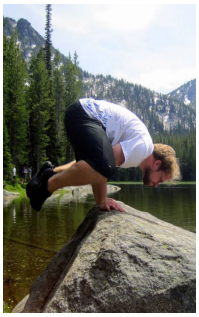
Phys 222

Introductory Physics II

MWF, 9:10am, Collins 318



Jed Rembold, Ph.D

jjrembold@willamette.edu
willamette.edu/~jjrembold
wise.willamette.edu – Phys 222 tab
Collins 311
Office Hours: MW 3–5pm or whenever my door is open (basically always)
(503) 370-6860

This syllabus is subject to change or adaptation as the semester progresses.

Course Description: The intent of this course is to introduce the concepts of basic electromagnetics, including concepts of electric and magnetic forces, circuits, potentials and fields to undergraduate students. The concepts of optics and diffraction will also be explored near the end of the semester. Particular emphasis will be placed on learning strong problem solving skills applicable both outside and inside the physics classroom.

Prerequisite(s): Phys 221 and either Math 140 or Math 152
Note: A minimum grade of C- is required for this course to count toward university credit.
Credits: 1.0

Text: *Matter & Interactions*, 4th Edition
Author: Chabay and Sherwood
ISBN-13: Hardcover: 978-1-118-87586-5
Loose-Leaf: 978-1-118-91451-9
E-Text: 978-1-119-02908-3
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Course Objectives:
Over the semester, students will gain a working knowledge in:

1. Electric and magnetic fields
2. Potentials
3. Circuits and circuit components
4. Wave theory
5. Optics

Moreover, physics is a field that requires intense problem solving. By the end of the semester students will have honed and practiced various methods of problem solving that can be applicable to their own fields of interest and study.

Grade Distribution:

Attendance	4%
Labs	10%
Online Homework	15%
Video Homework	10%
Test 1	12%
Test 2	12%
Test 3	12%
Final Exam	25%

Letter Grade Distribution:

>= 92.00	A	72.00 - 77.99	C
90.00 - 91.99	A-	70.00 - 71.99	C-
88.00 - 89.99	B+	68.00 - 69.99	D+
82.00 - 87.99	B	62.00 - 67.99	D
80.00 - 81.99	B-	60.00 - 61.99	D-
78.00 - 79.99	C+	<= 59.99	F

Student Learning Objectives (SLO):

- To have a broad theoretical and experimental understanding of electromagnetics and optics. Demonstrated through correct written homework, completion of labs, and passing the midterms and final exam.
- To be able to setup problems symbolically, correctly using an appropriate problem solving strategy with necessary mathematical methods to solve physical problems, and to communicate and interpret those solutions visually, numerically, and verbally. Demonstrated though lecture participation, homework, and lab participation.
- To understand and be able to model a situation computationally using basic principles and fundamental interactions. Demonstrated through computational homework and lab participation.
- To understand how to utilize and operate basic laboratory equipment and software to collect, analyze, interpret and present experimental data. Demonstrated though participation and completion of labs.

Course Assessment:

- **Homework**
  - Online: Online homework will be assigned on Monday and Wednesday after class and will be due Wednesday or Friday night at midnight (respectively). Each assignment will be approximately 1 problem broken up into sub-parts exploring a key concept discussed in class that day. Online homework will operate through WebWorK, and you will not be penalized for incorrect answers. The goal is for you to work your way through to the end and come and request help if you need it!
  - Video: Each Friday you will be assigned a problem objective, similar to the problem objectives that will accompany each online homework problem. In this case, however,

you are responsible for creating and solving a problem that conveys your understanding and mastery of the objective. You will present your problem and solution in a short (<4 min) video which will be due Monday at midnight. Nothing fancy is needed; your video might just be an image of the worked problem with you talking about it. The underlying idea is that nothing showcases a mastery (or lack) of understanding (both to me and yourself) than when you have to physically explain something. This is also your chance to show some creativity or explore types of problems that you may find more interesting or engaging. Anything is valid, so long as you can convey a mastery of the objective.

- **Labs**
  - Labs will take place weekly during your assigned time. If circumstances arise and you have to miss a lab session, please contact both your lab instructor *and* myself so that we can attempt to work you into a different section for that day or find a time when you can potentially make it up with a TA. If you miss a day, there *is* a week at after Spring Break when a missed lab can probably be made up, but that is it. Attendance in labs is **mandatory** for you to receive points for that lab. *Missing more than 4 labs will result in immediately failing the course.*
- **Tests**
  - There will be three tests spaced throughout the semester in addition to the final. Tests will take place during lecture hours, and will thus be limited to 1 hour. Calculators are encouraged, however cell phones or any other Internet capable devices are prohibited. Basic trig calculators will do everything you need for this course and are only a few dollars should you need one for test days (I also have a small supply you could borrow from). All tests will be closed book, however you will be allowed a single sided, hand-written 3×5 inch index card upon which you can write whatever you might find helpful. The preparation of this note card can serve as an excellent review and study-aid for the test. Physics is not generally a memory demanding discipline, but having the basics in your head will greatly help you approach problems with speed and precision. The note card should provide you with enough of a fall back to not memorize everything while still encouraging you to memorize the vitals. All needed constants will be provided for you on tests. *While I'll ask you to turn note cards in with your tests, I will return them. Keep your old note cards, as you will be able to use them on the final!*
- **Attendance**
  - Attendance to lectures will be graded. Questions will be asked in class and students will respond via polling technology. Simply responding to each question will earn your attendance points for the day, but answering correctly will earn you some extra credit. Over the course of the semester, that extra credit can really add up, so show up!

Course Policies:

Late Work Policy

I understand that sometimes things come up and you are unable to get an assignment in on time, and I strive to be incredibly flexible and accepting of late work. However, there also comes a point when you get too far behind to realistically keep up with the class. In an effort to compromise between the two, my late policy is as follows. For the online homework, after

the due date you will still have a week to complete the assignment for 80% credit, after which you receive a zero. For the video homework, you are alloted 7 cumulative days of late work throughout the entire semester. So you can turn 7 assignments in one day late, 1 assignment in a week late, etc. without penalty. Once you have used up your 7 days, any further late video assignments will immediately be worth only 50% of their total possible points.

Incomplete Policy

An incomplete grade will only be granted in the case of prolonged illness or family emergencies that remove the student from the campus for an extended time period during the semester. Under no situations will an incomplete be granted due to a student falling behind through lack of motivation, understanding, or time management skills. If you are concerned about your progress and how you are doing in the class, please come visit me! We can sort out where you are struggling and work out a plan to get you back on track.

Tutoring Hours

The physics department employs several exceptional upper-class physics majors to serve as group tutors. Tutoring is available in the physics hearth from 7–9pm from Sunday through Thursday. If you are getting stuck and need a push in the right direction, or if you just need to hear something explained in a different manner, stop by and talk to them!

Willamette Policies:

Academic Honesty

Cheating is defined as any form of intellectual dishonesty or misrepresentation of one's knowledge. Plagiarism, a form of cheating, consists of intentionally or unintentionally representing someone else's work as one's own. Integrity is of prime importance in a college setting, and thus cheating, plagiarism, theft, or assisting another to perform any of the previously listed acts is strictly prohibited. An instructor may imposed penalties for plagiarism or cheating ranging from a grade reduction on an assignment or exam to failing the course. An instructor can also involve the Office of the Dean of the College of Liberal Arts for further action. For further information, visit: https://willamette.edu/cla/catalog/resources/policies/plagiarism_cheating.php.

Time Commitments

Willamette's Credit Hour Policy holds that for every hour of class time there is an expectation of 2-3 hours work outside of class. Thus, for a class meeting three days a week you should anticipate spending 6-9 hours outside of class engaged in course-related activities. Examples include study time, reading and homework, assignments, research projects, and group work.

Special Accommodations Diversity and Disability Willamette University values diversity and inclusion; we are committed to a climate of mutual respect and full participation. My goal is to create a learning environment that is usable, equitable, inclusive and welcoming. If there are aspects of the instruction or design of this course that result in barriers to your inclusion or accurate assessment or achievement, please notify me as soon as possible. Students with disabilities are also encouraged to contact the Accessible Education Services office in Matthews 103 at 503-370-6737 or Accessible-info@willamette.edu to discuss a range of options toemoving barriers in the course including accommodation.

Tentative Course Outline:

The weekly coverage might change as it depends on the progress of the class. However, I highly recommend you follow along with the reading, as it makes a large difference! While this course outline will remain static, I'll keep an updated copy on my website in case of changes.

Week	Date	Chapter	Description	Lab
	Jan 22		Intro and Review	
	Jan 24	Ch 13	The Electric Field	
	Jan 27	Ch 13	The Electric Field	
2	Jan 29	Ch 13	The Electric Field	Glowscript Review
	Jan 31	Ch 14	Electric Fields and Matter	
	Feb 03	Ch 14	Electric Fields and Matter	
3	Feb 05	Ch 14	Electric Fields and Matter	Electric Field and Forces
	Feb 07	Ch 15	Electric Field and Distributed Charges	
	Feb 10	Ch 15	Electric Field and Distributed Charges	
4	Feb 12	Ch 15	Electric Field and Distributed Charges	Electric Dipole Field
	Feb 14	Ch 15	Electric Field and Distributed Charges	
	Feb 17	Ch 16	Electric Potential	
5	Feb 19	Ch 16	Electric Potential	Distributed Charges
	Feb 21		**Test 1 (Ch 13–15)**	
	Feb 24	Ch 16	Electric Potential	
6	Feb 26	Ch 16	Electric Potential	Potential Difference
	Feb 28	Ch 17	Magnetic Field	
	Mar 02	Ch 17	Magnetic Field	
7	Mar 04	Ch 17	Magnetic Field	Magnetic Field
	Mar 06	Ch 18	Electric Field and Circuits	
	Mar 09	Ch 18	Electric Field and Circuits	
8	Mar 11	Ch 18	Electric Field and Circuits	Magnetic Dipoles and Energy in Circuits
	Mar 13	Ch 19	Circuit Elements	
	Mar 16	Ch 19	Circuit Elements	
9	Mar 18	Ch 19	Circuit Elements	DC Circuits
	Mar 20		**Test 2 (Ch 16–19)**	
	Mar 23		*Spring Break*	
10	Mar 25		*Spring Break*	
	Mar 27		*Spring Break*	
	Mar 30	Ch 20	Magnetic Force	
11	Apr 01	Ch 20	Magnetic Force	Gap Week
	Apr 03	Ch 20	Magnetic Force	
	Apr 06	Ch 21	Patterns in Fields in Space	
12	Apr 08	Ch 21	Patterns in Fields in Space	Magnetic Force
	Apr 10	Ch 21	Patterns in Fields in Space	
	Apr 13	Ch 22	Faraday's Law	
13	Apr 15	Ch 23	Electromagnetic Radiation	Faraday's Law
	Apr 17	Ch 23	Electromagnetic Radiation	
	Apr 20	Ch 23	Electromagnetic Radiation	
14	Apr 22		*SSRD*	Lenses
	Apr 24		**Test 3 (Ch 20–23)**	
	Apr 27	Ch S3	Waves	
15	Apr 29	Ch S3	Waves	Interference
	May 01	Ch S3	Waves	
	May 04		Review Day	
16	May 09		**Final**	