PHYS 2220 (Spring 2019)

Instructor: Dr. Eugene Mishchenko, JFB 216, E-mail: mishch@physics.utah.edu
Office hours: Monday, Wednesday, 3:00-4:30 pm
Course Marshal: Alex Lovlein, alovlein@gmail.com
Course Assistant: Mary Ann Woolf, 205 JFB, 801-581-4246 woolf@physics.utah.edu

WebAssign Link: https://www.webassign.net/utah/login.html

Textbook: Serway & Jewett, *Physics for Scientists and Engineers*, 9th Edition.

Lecture Sections

2220-001	MW	11:50 am - 1:10 pm	JFB 103
2220-011	MW	1:25 pm - 2:45 pm	JFB 103

Discussion Sections

2220-002/012	T H 7:30-8:20 am	JFB 325	Ash Ashhok
2220-003/013	T H 8:35-9:25 am	JFB 325	Heshan Hewa
2220-004/014	T H 9:40-10:30 am	JFB 325	Heshan Hewa
2220-005/015	T H 9:40-10:30 am	ST 205	Philip Beltracchi
2220-006/016	T H 10:45-11:35 am	CSC 10-12	David Ohlson
2220-007/017	T H 10:45-11:35 am	ST 208	Philip Beltracchi
2220-008/018	T H 12:55-1:45 pm	JFB 325	Ren-Bo Wang
2220-009/019	T H 12:55-1:45 pm	ARCH 228	Alec Lovlein
2220-010/020	T H 2:L00-2:50 pm	JFB 325	Ren-Bo Wang

WebAssign and Textbook

The homework assignments will be from the textbook "*Physics for Scientists and Engineers*" by Serway and Jewett, 9th edition, and will be handled online through WebAssign. Although it is not required, it is ***strongly recommended*** that students purchase the ebook on WebAssign, rent or purchase either an electronic version of Serway and Jewett's "*Physics for Scientists and Engineers*" or a hard copy. Inexpensive used copies of the 6th, 7th, or even 8th edition can be bought from Amazon.com or eBay. The assignments are accessed by each student when they enter the WebAssign website (https://www.webassign.net/utah/login.html) at a cost of $100 for both the homework and ebook. The homework is **required** for the semester. Students are responsible for their own WebAssign access on-line.

Homework

Homework is due on Mondays at 11:45 am (Tuesday if Monday falls on a holiday); there will be no homework due the week immediately after a midterm.

Homework assignments and grading are provided by WebAssign. You will complete all homework assignments over the web and receive immediate feedback (grade). For most problems, you will be given up to five opportunities to enter the correct answer. During exams, however, you will be required to present full solutions (see the Exams section below) on your first and only attempt. For this reason, it is

strongly recommended that you work out all homework problems as if it were exam problems. You should then compare your solutions with the solutions provided by the Teaching Assistants, which will be available after the due date through the WebAssign.

Discussions Sessions:

Tuesday and Thursday classes are an important part of the learning process. Discussions are facilitated by graduate Teaching Assistants and undergraduate Learning Assistants. Problems are assigned for each class for group discussions during the class. These problems complement and further the concepts that you learn during lectures and work out in your homework assignments. It will not be uncommon for the discussion problems to be more challenging than your homework problems. You should aim to master both, as both pools of problems will be used to illustrate ideas that will be tested during exams. A significant number of points (14% of the total) will be given for discussion assignment.

Grading

100 homework points: 10 high-score homework (out of 11), 10 points each
100 midterm exam points: 2 high-score midterm exams (out of 3), 50 points each
50 points for discussion assignments
100 final exam points
Total: 350 points

Make-up exams/assignments only for legitimate reasons: emergency (documented), university-approved travel, etc.; tests can be taken ahead of time in case of significant personal reasons (travel, conflict with work schedule, etc.).

Exams

To get full credit for a problem you must

1) demonstrate understanding of the subject matter by identifying the relevant physical laws;
2) present a correct mathematical formulation of these laws;
3) describe all steps in the solution with clear and correct explanations;
4) find a solution in an algebraic form;
5) obtain a numerical answer;
6) assess the reasonableness of the obtained solution.

Remember that you are scoring points as long as you are progressing along a logical and correct path to the solution; a mistake in the algebra only reduces the score. Most importantly, show your **reasoning**.

All midterm exams (see the dates on schedule below) will be held during the regular class times in FMAB Auditorium.

Final Exam: **The final exam is Monday, April 29, 3:30 – 5:30 p.m--Ledture 001 in 2008 HEB; Lecture 011 in 2004 HEB.** This is a University scheduled exam time. **THERE WILL BE NO EARLY FINAL EXAMS!**

Learning Objectives:

The main objective is to acquire a basic understanding of the physics of electromagnetic fields and knowledge of its common applications. Further objectives include developing problem-solving skills (ability to analyze a problem, identify principles necessary for its solution, and devise and implement a solution), precision in thinking and communicating ideas.

Principles of Learning:

The modern pedagogical science acknowledges that different people learn best using different techniques; some are visual learners, some are auditory learners, and so on. But one principle remains unquestioned: the more time you spend thinking about physics and actually **doing it**, the better you will learn it. Keep in mind that mastering physics is not about learning information but about synthesizing knowledge, placing everything in a proper context, **understanding** it and learning how to apply it; for this reason, physics does not well to memorization. In fact, there is little memorization that is required to learn physics.

The understanding of physics that you are developing requires sufficient time in order to work out the right associations in your mind. Therefore, cramming for exams is a bad way to learn physics. Regular and persistent studying is the key to success. The textbook is a great resource—use it. Try to read it before a lecture, even if only to get the main idea of the new material. Then read it very carefully again after the lecture. Finally, remember to refer back to those parts that you find to be challenging as you are working through your homework assignments. Homework assignments typically have 7-8 problems. This is more than is reasonable to complete in a single setting! You should plan accordingly and give yourself plenty of time to work on the assignments. If you leave it until the last moment, you will most likely find yourself overwhelmed. No extensions will be granted because of a poor time management! Think ahead.

WebAssign/Homework Issues

For any questions regarding homework assignments, including time extensions for legitimate reasons, and questions about WebAssign, contact Alec Lovlein (alovlein@gmail.com). Please note the vast majority of suspected WebAssign problems can be resolved by 1) checking your solutions carefully, or 2) checking how your solution is entered into WebAssign (especially if it is a formulaic rather than numerical answer). Actual WebAssign bugs are very rare.

Exam Re-grading Requests

To have your exam re-graded, you have to fill out the re-grade form and attach to it **the original** of your exam worksheet (only the problem being regraded needs to be submitted) and give it to Mary Ann Woolf at JFB 205. Note that upon a re-grade request your solution will be reviewed *de novo* and may lead to in an increased grade but may also result in a decreased grade if it is determined that the grader overlooked some flaws in the solution.

Schedule

Class	Subject	Reading	Homework Problems (due at 11:45 am on Mondays)	Discussion Problems
Mon Jan 7	**Electricity, charges, Coulomb's law**	23.1-23.4		
Tue Jan 8				**Ch. 23**: 12,25,28
Wed Jan 9	**Electric field**	23.6-23.7		
Thu Jan 10				**Ch. 23**: 16,43,86
Mon Jan 14	**Flux of electric field, Gauss's law**	24.1-24.4	#1 **Ch. 23**: 17,19,**31,63,71,79**	
Tue Jan 15				**Ch. 24**: 7,32,61
Wed Jan 16	**Gauss's law applications, Electric potential**	25.1-25.3		
Thu Jan 17				**Ch. 25**: 7,16,73
Tue Jan 22			#2 **Ch. 24**: 5,13,34,**63** **Ch. 25**: 1,12,23,**67**	**Ch. 25**: 31,32,74
Wed Jan 23	**Electric potential**	25.4-25.8		
Thu Jan 24				**Ch. 25**: 36,45,57
Mon Jan 28	*Review*		#3 **Ch. 23**: 72,**89** **Ch. 24**: 53,**59** **Ch. 25**: 44,47,**59**	
Tue Jan 29				**Ch. 23**: 87 **Ch. 24**: 67 **Ch. 25**: 68
Wed Jan 30	*Midterm test 1*			

Thu Jan 31				**Ch. 24**: 65 **Ch. 25**: 72
Mon Feb 4	**Capacitors, energy of capacitors**	26.1-26.4		
Tue Feb 5				**Ch. 26**: 26,54,72
Wed Feb 6	**Dielectrics, dielectric constant**	26.5-26.7		
Thu Feb 7				**Ch. 26**: 48,61,73
Mon Feb 11	**Ohm's law, resistance, power**	27.1-27.6	#4 **Ch. 26**: 2,19,25,31, 34, 47,**63,75**	
Tue Feb 12				**Ch. 27**: 43,59,78
Wed Feb 13	**EMF, internal resistance, resistors in series and parallel**	28.1-28.2		
Thu Feb 14				**Ch. 27**: 71 **Ch. 28**: 13,17
Tue Feb 19			#5 **Ch. 27**: 10,17,**38** **Ch. 28**: 3,4,7,11,**19**	**Ch. 28**: 66,70
Wed Feb 20	**Kirchhoff's laws, RC circuits**	28.3-4		
Thu Feb 21				**Ch. 28**: 73,76
Mon Feb 25	*Review*		#6 **Ch. 26**:69,75 **Ch. 27**: 68 **Ch. 28**: 23,24,29,30,41	
Tue Feb 26				**Ch. 28**: 31,32
Wed Feb 27	*Midterm test 2*			
Thu Feb 28				**Ch. 28**: 80,81

Mon Mar 4	**Magnetic field, forces on moving charge and currents**	29.1-29.6		
Tue Mar 5				**Ch. 29**: 3,17,39,77
Wed Mar 6	**The Biot-Savart law, Ampere's law, magnetic materials**	30.1-30.6		
Thu Mar 7				**Ch. 30**: 4,25,73
SPING BREAK				
Mon Mar 18	**Motional EMF, Faraday's law, Lenz's law**	31.1-31.4	#7 **Ch. 29**:10,25,**40**,46 **Ch. 30**: 7,48,64,**71**	
Tue Mar 19				**Ch. 31**: 11,31,35
Wed Mar 20	**Eddy currents, generators and motors**	31.5-31.6		
Thu Mar 21				**Ch. 31**: 42,71,79
Mon Mar 25	**Inductance, RL, LC, and LRC circuits**	32.1-32.6	#8 **Ch. 31**: 3,12,25,34,37,43,**66**,**79**	
Tue Mar 26				**Ch. 32**: 33,49,80
Wed Mar 27	**Reactance, phasors, resonances, power**	33.1-33.8		
Thu Mar 28				**Ch. 33**: 28,41,78
Mon Apr 1	*Review*		#9 **Ch. 32**: 5,17,25,**39** **Ch. 33**: 12,23,44,**71**	

Tue Apr 2				**Ch. 30**: 13 **Ch. 31**: 62 **Ch. 33**: 59
Wed Apr 3	*Midterm test 3*			**Ch. 29**: 3,10,17,25,39,40,46
Thu Apr 4				**Ch. 32**: 60 **Ch. 33**: 80
Mon Apr 8	**Displacement current and Maxwell's equations, Electromagnetic waves**	34.1-34.5		
Tue Apr 9				**Ch. 34**: 11,23,43
Wed Apr 10	**Ray optics, Huygens principle, reflection and refraction, total internal reflection, dispersion**	35.1-35.8		
Thu Apr 11				**Ch. 35**: 19,27,63
Mon Apr 15	**Imaging by mirrors and lenses**	36.1-36.4	#10 **Ch. 34**: 8,21,22,28 **Ch. 35**: 5,15,**74**,**83**	
Tue Apr 16				**Ch. 36**: 12,22,25
Wed Apr 17	**Combinations of lenses, magnification, Optical devices**	36.5-36.10		
Thu Apr 18				**Ch. 36**: 35,53,78
Mon Apr 22	**Interference, Diffraction**	37.1-37.5 38.1-38.5	#11 **Ch. 36**: 4,5,20,24,31,42,**77**,**94**	
Tue Apr 16				**Ch. 37**: 4,17,57

Drop/Add/Withdrawal

Last day to add without permission code is Friday, January 11
Last day to drop (delete) classes with no tuition penalty is Friday, January 18.
Last day to add classes is Friday, January 18.
Last day to elect CR/NC options is Friday, January 18.
Last day to withdraw from term length classes is Friday, March 8.

Holidays

Monday, January 21	Martin Luther King Jr. Day
Monday, February 18	Presidents' Day
Sunday-Sunday, March 10-17	Spring Break