

**Physics 212, Spring 2010** Textbook: Fundamentals of Physics/8<sup>th</sup> edition, Halladay/Resnick/Walker

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Spring 2010 Semester Schedule

Per.	Times	Monday	Tuesday	Wednesday	Thursday	Friday
1	8:00-8:50		Phys 211R.1 14 MBB			
2	9:00-9:50		Phys 211R.1 14 MBB			
3	10:00-10:50	Phys 211L 13 MBB	Phys 211R.2 14 MBB	Phys 211L 13 MBB	<b>Office Hours by Appointment or Happenstance; drop in if you find me on campus</b>	Phys 211L 13 MBB
4	11:00-11:50		Phys 211R.2 14 MBB			
5	12:00-12:50		Phys 211R.3 14 MBB			
6	1:00-1:50		Phys 211R.3 14 MBB			
7	2:00-2:50	Office Hour		Office Hour		Office Hour
8	3:00-3:50	Phys 212 13 MBB	Phys 212 14 MBB	Phys 212 13 MBB		Phys 212 13 MBB
9	4:00-4:50		Phys 212 14 MBB			

**Physics 212** is an introduction to the physics of electricity and magnetism. We will work at manipulating the mathematical descriptions of electric and magnetic fields and describing the effects of these fields on the observable world. Problem-solving will be a large component of our work.

**Grading Policy:** Grades will be based on the percentage of the total possible number of points available to be accumulated.

- Points can be accumulated by performance on quizzes (some announced, some not announced), Lab, four major tests, a comprehensive final examination, and class participation.
- The minimum percentages for letter grades are: 90% A, 87% A-, 80% B+, 75% B, 70% B-, 65% C+, 60% C, 50% D.
- **Except for cases of horrible class participation** (e.g. Negative scores will be awarded for detracting from the physics under discussion and may account for 0% to 100% of your course grade; see "classroom culture" below; cell phone ringing, text messaging or other cell phone use, calculator or computer game-playing, non-relevant conversations, using tobacco products, and rude behavior are some of the actions that can bring about negative scores), **the lab will account for 20% of your course grade; the final exam will account for 15% of your course grade; the tests and quizzes will combine to account for 65% of your course grade.**

**Equipment Policy:** YOU ARE TO BRING THESE WITH YOU TO EACH CLASS/Lab period: The textbook, a scientific electronic calculator (One of the programmable, graphing calculators, such as the TI-85, 86, or 89, is strongly recommended so that the drudgery of solving quadratic equations or systems of linear equations by hand can be eliminated), a straight edge calibrated in centimeters, pencils.

**Attendance policy:** If you have to miss a test, a quiz, a laboratory exercise, or an examination for any reason, you must see me and request a chance to make up for the miss. There is no guarantee that your request will be granted. In the case where you have to miss a class activity because you are involved in some official Penn State activity, you (not your advisor or coach) must notify me in writing at least a week in advance so that we can work out a way for you to do the work. For some quizzes you will not have advance notice and I will evaluate after-the-fact excuses if you miss one of these.

**Disability Policy:** Consistent with University policy, any student requesting an accommodation must provide documentation from the Office for Disability Services. If you have a documented disability and wish to receive academic accommodations, please contact the Campus Nurse, Barbara McDanel (room 133 Admin. Bldg., 724-773-3955, [BQM5@psu.edu](mailto:BQM5@psu.edu) ). For additional information, check the university web site: <http://www.lions.psu.edu/ods>

**Academic Integrity Policy:** Academic dishonesty is not limited to simply cheating on an exam or assignment. The following is quoted directly from the "PSU Faculty Senate Policies for Students" regarding academic integrity and academic dishonesty: "Academic integrity is the pursuit of scholarly activity free from fraud and deception and is an educational objective of this institution. Academic dishonesty includes, but is not limited to, cheating, plagiarizing, fabricating of information or citations, facilitating acts of academic dishonesty by others, having unauthorized possession of examinations, submitting work of another person or work previously used without informing the instructor, or tampering with the academic work of other students." All University and Eberly College of Science policies regarding academic integrity/academic dishonesty apply to this course and the students enrolled in this course. Refer to the following URL for further details on the academic integrity policies of the Eberly College of Science:

<http://www.science.psu.edu/academic/Integrity/index.html>

Each student in this course is expected to work entirely on her/his own while taking an exam, to complete assignments on her/his own effort without the assistance of others unless directed otherwise by the instructor. **(Unless you receive written instructions from the instructor telling you that you may work with someone else, all written work (both in-class and out-of-class) is to be individual work. "Written work" includes lab reports, derivations, problem solutions, solutions to take-home quizzes and tests, essays, explanations, and anything else turned in on paper or electronically for which you will receive a grade.)**, and to abide by University and Eberly College of Science policies about academic integrity and academic dishonesty. Academic dishonesty can result in assignment of "F" by the course instructors or "XF" by Judicial Affairs as the final grade for the student.

**Classroom Culture:** In order to maintain an environment that encourages focused discussion of physics, you must take off all headphones, turn off all cell phones, pagers, radios, and any other electronic devices other than the calculators/computers you use while doing computations for the class (electronic game-playing, net surfing, and email activities are prohibited.) You must also refrain from using any tobacco products while in the classroom. **You must show respect for the other people in the room at all times.** Considerations of classroom culture are quantified under "class participation" in the grading policy.

**Homework:** Homework will not be collected; a list of practice questions and problems is provided, and a quiz over these will be given each Friday (except February 5, April 02 and April 23). You should keep a record of your solutions to review before quizzes and tests. You should expect the problems to take a lot of time. It is not unusual for one solution to require an hour of concentrated effort.

Physics 212 Spring 2010 Practice Problems by Chapter. **These questions are to be answered and these problems are to be solved in step with the topics covered in class; the Friday quizzes will be based on the questions and problems you should have answered and solved up the day of the quiz.**

Chapter	Questions and Problems
21	<b>Q:</b> 1, 3, 7, 9 <b>P:</b> 7, 11, 21, 23, 25, 31, 33, 35, 39, 55, 59, 65
22	<b>Q:</b> 1, 3, 5, 7, 9, 11 <b>P:</b> 9, 13, 17, 19, 25, 33, 37, 43, 47, 51, 53, 59, 65, 83
23	<b>Q:</b> 1, 3, 5, 9 <b>P:</b> 1, 3, 7, 9, 11, 17, 21, 31, 39, 41, 51, 53, 57, 67, 73
24	<b>Q:</b> 1, 5, 7, 9 <b>P:</b> 3, 9, 15, 19, 23, 29, 33, 35, 45, 47, 55, 67, 69, 85, 101
25	<b>Q:</b> 1, 3, 5, 7, 9, 11 <b>P:</b> 7, 11, 17, 23, 27, 31, 35, 41, 45, 53, 57, 69
26	<b>Q:</b> 3, 9 <b>P:</b> 3, 5, 11, 13, 15, 23, 25, 31, 35, 39, 43, 53, 57, 71, 75
27	<b>Q:</b> 3, 5, 7, 9, 11 <b>P:</b> 1, 5, 7, 13, 15, 17, 21, 31, 37, 39, 41, 47, 51, 55, 61, 73, 81, 89, 95
28	<b>Q:</b> 1, 3, 7, 9 <b>P:</b> 9, 15, 19, 23, 27, 29, 31, 33, 39, 45, 47, 53, 63, 79
29	<b>Q:</b> 1, 7, 9, 11 <b>P:</b> 3, 5, 9, 13, 15, 17, 23, 31, 33, 35, 39, 45, 47, 51, 53, 55, 59, 75, 77, 85, 89
30	<b>Q:</b> None <b>P:</b> 1, 3, 7, 9, 11, 13, 15, 19, 25, 27, 31, 35, 37, 39, 41, 45, 53, 57, 61, 65, 67, 69, 73, 77, 101
31	<b>Q:</b> 1, 3, 5, 7, 9, 11 <b>P:</b> 3, 9, 11, 15, 17, 21, 25, 29, 33, 41, 43, 45, 49, 59, 63, 65, 77
32	<b>Q:</b> 1, 3, 5, 9 <b>P:</b> 1, 3, 5, 9, 23, 27, 31, 49

## Physics Lab Rules and Procedures, spring 2010

1. Each student must maintain a lab notebook (bound composition notebooks are available in the bookstore for this purpose).
  - The notebook is to contain a complete record of the lab work for each experiment.
  - Each page of the notebook must be signed and dated by the author.
  - Every experimental record must contain
    - a) The names of the lab group members
    - b) Any derivations of equations
    - c) A description of the experimental set-up (including a list of identifiable equipment).
    - d) A record of the procedures followed.
    - e) All data tables
    - f) All calculations
    - g) The final result
    - h) A discussion of the experiment
  - The record must be written in the order of occurrence; blank spaces must be neatly crossed out.
  - No erasures are to be made; mistakes are to be neatly crossed out and initialed by the author.
  - Graphs and/or other print-outs must be permanently glued into the notebook in the appropriate places in the record. You should print extra copies of any of these that you will need for your formal partial lab report (see 2 below).
  - All experimental numbers must be presented in the as good experimental values, in the form  $N \pm \Delta N$ , where  $\Delta N$  is the uncertainty in the value of  $N$ , or in the form  $N_{\text{Min}} \leq N \leq N_{\text{Max}}$ , where  $N_{\text{Min}} = N - \Delta N$  and  $N_{\text{Max}} = N + \Delta N$ .
  - Occasionally the lab notebooks will be collected and evaluated.
2. Once the final results have been obtained and the equipment put away the student will usually be required to write a formal partial lab report containing the objective, the results, and a discussion of the experiment. **This is to be printed out and turned in to the instructor at the beginning of the lecture period on the Friday of the week the experiment was done. (Occasionally this partial report will not be required and, instead, the lab notebooks will be collected at the end of the lab period; these will then be graded.)**
  - Proper English is required; you must use complete sentences, proper grammar, and correct spelling.
  - Past tense and passive voice are required (**incorrect**: "We calculated the acceleration to be...." or "The acceleration is...." **Correct**: "**The acceleration was calculated to be....**")
  - **Objective**: States the question or questions that were to be answered by the experiment:
    - a) Start with a phrase such as, "In this experiment" or "In this study" and then explain from there. If the experiment was to test the prediction made by an equation that you derived as part of the lab work, you should put the equation here, with all symbols defined, and you should attach the fully-explained derivation as an appendix.
    - b) These statements should be as specific as possible to demonstrate a clear understanding of the experiment.
    - c) The purpose of these statements is to explain what the experiment was supposed to do and how the results were to be obtained.
  - **Results**: Written text and properly labeled figures and tables; the wordings in the labels must match the wording in your text. The written text of the results section may be as short as one sentence summarizing the highlights and directing the reader to specific Tables and Figures.
  - **Discussion**: Explain what you think your data mean. Describe patterns and relationships that emerged. Compare these results to trends described in the literature and to theoretical behavior. Explain how any changes to or problems with the experimental procedure may have affected the results, or offer other suggestions as to why your results may have been different from or similar to related experiments described in the literature. Interpretations should be supported whenever possible by references to the lab manual, the text, and/or other studies from the literature, properly documented.
3. Unless you are sick (Don't come if you are contagious.) you must attend the lab sessions.
4. The lab will account for 20% of your course grade:
  - Completeness is the key for receiving a high score on the lab notebook. Following the rules (see 1, above) is also of great importance.
  - Neatness is a necessary but not sufficient condition for achieving a high score on the objective/results/discussion paper. The quality of the results of your experimental work will also be evaluated. This paper must also make sense and be in the correct form.

**Class Schedule:** Unless something unforeseen occurs we will follow this schedule below. ***In the schedule table the class topic for that day is given. After the first day, please read the relevant sections in your textbook before coming to class that day (There is always the possibility of a short "reading quiz" quiz over the relevant textbook material).*** In addition to the tests and quizzes shown, there may be some unannounced quizzes.

Physics 212 Schedule Table for Fall Semester 2009

Monday	Tues	Wednesday	Friday
01/11 Introduction	01/12 Static Electricity	01/13 The Concept of Electric Charge and Coulomb's Law	01/15 <b>Quiz</b> Coulombs Law Exercises and Problems
01/18 <b>MLK Jr. Day</b> <b>Classes do not meet</b>	01/19 Exploring the Electric Field	01/20 <small>End of Drop/Add period</small> Coulomb's Law and the Electric Field	01/22 <b>Quiz</b> The Electric Field
01/25 The Electric Field	01/26 Electric Force and Field Exercises and problems	01/27 The Electric Flux	01/29 <b>Quiz</b> Gauss' Law
02/01 Electric Flux and Gauss' Law	02/02 Gauss' Law exercises and problem session	02/03 <b>Test # 1</b>	02/05 Electric Potential
02/08 Electric potential	02/09 Equipotential lines and the electric field	02/10 Electric Potential	02/12 <b>Quiz</b> Capacitance
02/15 Capacitance	02/16 The cathode ray tube experiment	02/17 Capacitors, dielectrics, and energy	02/19 <b>Quiz</b> Resistivity, Resistance, Resistors, Electric Current
02/22 Resistance, Resistors, Current, and Power	02/23 Capacitance Measurement	02/24 Simple Circuits	02/26 <b>Quiz</b> Simple Circuits
03/01 Simple Circuit Problems	03/02 The Light Bulb circuit experiment	03/03 Kirchhoff's Rules	03/05 <b>Quiz</b> Non-Simple Circuits
<b>03/08 Spring Break</b>	<b>03/09 Spring Break</b>	<b>03/10 Spring Break</b>	<b>03/12 Spring Break</b>
03/15 Non-Simple Circuits	03/16 <b>Test # 2</b>	03/17 Magnetic Field	03/18 <b>Quiz</b> Magnetic Field
03/22 Magnetic torque on current loops	03/23 RC Circuit Experiment	03/24 Ampere's Law	03/26 <b>Quiz</b> The Biot-Savart Law
03/29 Magnetic Field problems and exercises	03/30 Magnetic Field Measurements	03/31 <b>Test # 3</b>	04/02 Magnetic Flux and Faraday's Law
04/05 Faraday's Law	04/06 The Current Balance	04/07 Faraday's Law	04/09 <b>Quiz</b> <small>Last Day to Late Drop</small> Faraday's Law and the Electric Field
04/12 Inductance and Inductors	04/13 Magnetic Field of the Earth Measurement	04/14 Inductance circuits	04/16 <b>Quiz</b> Alternating current
04/19 a,c, circuits	04/20 Inductance and ac series circuit resonance	04/21 Transformers and ac circuits	04/23 <b>Test #4</b>
04/26 Magnetism in Matter	04/27 a.c. phasors	04/28 Maxwell's Equations	04/30 <b>Quiz</b>
05/03 Final Exams	05/04 Final Exams	05/05 Final Exams	05/07 Final Exams