

Physics 222, Physics with Calculus II

Section 4, Spring 2010

Dr. Yost

Office:	216 Grimsley Hall	Textbook:	Serway & Jewitt, Physics for Scientists and Engineers, 7 th ed. ISBN: 0-495-11245-3
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Classes:	112 Grimsley, MWF 11:00	Web Page:	www.vic.com/syost/phys222
Office Hours:	MWF 9-10 AM, 4-5 PM, or by appointment	Homework:	www.webassign.net

Welcome to Dr. Yost's section of **Physics 222, Physics with Calculus II!** This course is a second step in the study of the classical foundation of physics, covering thermodynamics and electricity and magnetism. More generally, the course is designed to give practice in elementary mathematical modeling of natural phenomena and problem solving in the physical sciences. Developing these skills is an essential prerequisite for further study in engineering and science. Topics covered include the laws of thermodynamics, ideal gases, electric and magnetic fields, electric currents, resistance, capacitance, inductance, and electromagnetic waves.

This course assumes more experience with calculus than 221. Integration will be used more frequently this semester. We will also be solving some simple ordinary differential equations, and introducing partial differential equations as needed. If you have not seen these yet in a calculus course, it should not be a problem, since our discussion of them will be self-contained.

Grades

The final course grade will be determined by a combination of factors:

Hour Exams (three)	50%
Final Exam	25%
Homework	25%

Grades are on a scale based on my expectations and the performance of past classes – not a curve, but with some flexibility in the grade boundaries. Homework is graded more rigorously than exams, since there is more time to complete it.

Exams

Three “Hour Exams” will be given throughout the semester. The dates of these are scheduled in advance, and will not be subject to change without a very good reason. If you have a known conflict with an exam, you must notify me before the exam to request an excused absence. One exam grade may be dropped with a valid excuse. Excuses will be granted after a missed exam only in the event of a documented unforeseen emergency. If you are too sick to take an exam, you may contact me the day of the exam, if possible.

The exams are designed to test your acquisition of problem solving skills and your conceptual understanding of the material, and do not reward memorization. Basic equations will be provided for each exam, but you will need to know how to use them. The situations explored in the exam may not be identical to the homework, but should be similar enough to be recognized if you worked all the problems. The best preparation for an exam is practice. If necessary, do more than the assigned problems. Every odd-numbered problem has an answer in the back of the textbook, and can be used for additional practice.

You must bring a scientific calculator to the exams, and may not share them. The calculator should have trigonometric functions, logarithms, and powers, but need not have advanced features for solving equations or calculus. Advanced calculators may be used on exams, but the advanced functions, beyond trigonometry, logarithms, and powers, may not be used. Cell phones must be off and not visible during exams.

Homework

Most homework is turned in using WebAssign. You will need an access code purchased through the Cadet Store to use the system. If you had one last semester for Physics 221, it should still work, as should your user-id and password. If you do not have it at the beginning of class, the system gives you a two-week grace period to acquire it. To log in, go to www.webassign.net, and fill in the log-in form on the right side of the page. Your user-id is the first part of your Citadel e-mail address, your institution is Citadel, and your password is the last four digits of your Citadel ID number, unless you already had one for this user-id. If so, it has not changed, but can be reset if you forgot it. For example, if your e-mail address is smithj1@citadel.edu and your ID number is CIT-07-1234, then your user-id is smithj1 and your password is 1234. If you use WebAssign in more than one course, you may have other user-ids. Be sure to use the correct one for this course.

Instructions for answering WebAssign questions are provided by the system. Please take the time to read them, because you normally only have five attempts to answer a questions, and errors in entering the answer count toward the total. WebAssign will understand answers only in a very specific format. Do not guess what this format is. Some of the homework must be turned in on paper. These problems are due in class on the due date, which is normally earlier than the computer problems would be due.

Answers to symbolic questions are usually entered through the new MathPalette interface, but occasionally through an older text-based system, which is very fussy about formatting. If you find the interface hard to use or buggy, you are welcome to turn in symbolic answers on paper the morning they would be due on the computer, provided you have not exhausted all allowed tries for the question. Hand-graded answers must always show your work for credit, and are graded using the same standards as WebAssign, apart from formatting issues, and the fact that multiple attempts are not possible.

No submissions are accepted after the due date, by WebAssign's clock unless you request an automatic extension. You may do this within three days of the due date, provided you have not seen the answers, and get a three-day extension, during which time you receive partial credit for any correct submissions. Solutions for generic values of the numbers in the problems are available after the due date, and you may use these for help, with the goal of being sure you understand the solutions, not just getting credit for the homework, since this is essential for success on the exams.

Do not wait until the last minute to start a problem set. Normally, you should try to have the problems completed *before class*, to leave time to ask questions in the next class if you have any serious problems. If you are routinely waiting until the last day to do the problems, you have a serious scheduling problem. Successful students often begin work on the problems as soon as they are posted. WebAssign will not give credit for incorrect answers, so you must allow time for multiple attempts, in case your first attempts are wrong. Your goal should not be just to get points on the homework, since you must be able to replicate similar reasoning in an exam situation. This means that understanding the entire solution path is essential.

In the event of a wrong answer, don't be overconfident: programming errors are possible, but rare, and the problem is almost always with the answer entered. A common error is to enter too few digits, or to keep too few in intermediate calculations. WebAssign normally expects an answer to be correct within 1%, which requires at least three digits to be used throughout calculations. If you have trouble getting the right answer or suspect a programming error, you can send me an e-mail, but only if you started early enough to leave time for an answer.

Do not expect to solve all of the problems while seated at the computer. Most are too difficult for this. A successful strategy is to do all your work symbolically on paper first, and put in numbers only in the later stages. This makes it easier to check and understand your work, and makes it easier to review for an exam. Keep a record of all of your problem-solving steps, and draw a lot of pictures: much of physics problem solving is geometrical. A neat notebook recording your problem-solving techniques can be valuable when preparing for exams.

Physics is a Hands-On Subject

You would not expect to learn to play a violin by watching an expert, or to excel at football by watching football games. Similarly, you cannot effectively learn physics merely by watching lectures or reading the book. To learn physics, you have to do physics. It is only through struggling with the problems that you will acquire the problem-solving skills needed to reach the next level and successfully complete the course. The first steps are always the most difficult, but the more effort you put into them, the stronger you will become. If you find the material difficult, you must confront it head-on, since every step you take to bypass the difficulty will only make you weaker, and create more difficulties as the course progresses. There is simply no easy, passive, route to success. You have to work for it.

When beginning a new chapter, your first step should be to read the material. You should begin this reading before the first class on a topic. The classes will ordinarily assume some prior exposure to the material being discussed. The amount of time we have in class is not sufficient to “cover” the material: you must do this through the reading. The classes should reinforce the reading, guide you through difficult concepts, and give practice in problem-solving. Remember that the goal is conceptual understanding, not memorization.

Getting Help

If you find yourself in trouble, get help without delay. This is a fast-paced, cumulative course. Any difficulties encountered early will compound as the course progresses. If you have any doubt about who to see, talk to me. Come to office hours, send an e-mail, or make an appointment. My goal is for every one of you to succeed in this course. The Citadel Writing and Learning Center provides tutoring in Mathematics and Physics. The Physics Department can also recommend tutors. You can, and should, help each other. I do not consider it to be cheating to receive help from other cadets on the homework, provided that they are not doing the work for you. Keep in mind that seeking too much help may give you a good grade on the homework, while preventing you from doing well on the exams, even if you think you have understood the material. There is no substitute for the hard work of puzzling through the concepts on your own until a coherent understanding starts to emerge.

Topics

The following topics in Serway and Jewitt will be covered this semester.

Ch. 19	Temperature	Ch. 26	Capacitance
Ch. 20	First Law of Thermodynamics	Ch. 27	Current and Resistance
Ch. 21	Kinetic Theory of Gasses	Ch. 28	DC Circuits
Ch. 22	Second Law of Thermodynamics	Ch. 29	Magnetic Fields
Ch. 13	Universal Gravitation	Ch. 30	Sources of the Magnetic Field
Ch. 23	Electric Fields	Ch. 31	Faraday's Law
Ch. 24	Gauss's Law	Ch. 32	Inductance
Ch. 25	Electric Potential	Ch. 34	Electromagnetic Waves

Gravitation will be covered in parallel with electrostatics, as an example of another inverse-square law.

Calendar

The following calendar is subject to change, except for exam dates, which may be considered to be final. Homework due dates are indicated by a "HW" number.

Dates	Monday	Wednesday	Friday
Jan. 13 - 15		Ch. 19	Ch. 20 sec. 1-3
Jan. 18 - 22	MLK Day	HW 1	Ch. 20 sec. 3-7
Jan. 25 - 29	Ch. 20 (3-7), Ch. 21 (1-4)	HW 2	Ch. 21 sec. 1-4
Feb. 1 - 5	Ch. 22	Ch. 22	HW 3
Feb. 8 - 12	Exam 1: Ch. 19 - 22	Ch. 32 sec. 1 – 3	Ch. 13 sec. 1 – 3
Feb. 15 - 19	Ch. 23, sec. 4-7 / Ch. 13.4	HW 4	Ch. 24
Feb. 22 - 26	Ch. 25 sec. 1-3 / Ch. 13.5-6	HW 5	Ch. 25 sec. 4-7, Ch. 26.6
Mar. 1 - 5	Ch. 26 sec. 1-4	HW 6	Exam 2: Ch. 23 – 26, 13
Mar. 8 - 12	Ch. 27	Ch. 28 sec. 1 – 3	HW 7
Mar. 15 - 19	Ch. 29	Ch. 29	HW 8
Mar. 22 - 26	Ch. 30	Ch. 30	HW 9
Mar. 29 - Apr. 2	Exam 3: Ch. 27 - 30	Ch. 31	Ch. 31
Apr. 5 - 11	Spring Break		
Apr. 12 - 16	HW 10	Ch. 32	Ch. 32
Apr. 19 - 23	HW 11	Ch. 34	Ch. 34
Apr. 26 - 30	HW 12	Final Exam: Sat. May 1, 8:00	