

Revised Mar. 5, 2009

# Physics 222, Physics with Calculus II

## Section 1, Spring 2009

**Dr. Yost**

<b>Office:</b>	216 Grimsley Hall	<b>Textbook:</b>	Serway & Jewitt, Physics for Scientists and Engineers, 7 <sup>th</sup> ed. ISBN: 0-495-11245-3
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<b>Classes:</b>	117 Grimsley Hall, MWF 8:00	<b>Web Page:</b>	<a href="http://www.vic.com/syost/phys222">www.vic.com/syost/phys222</a>
<b>Office Hours:</b>	M, Tu, F 14:00 – 15:00 or by appointment	<b>Homework:</b>	<a href="http://www.webassign.net">www.webassign.net</a>

Welcome to Dr. Yost's section of **Physics 221, 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, temperature and entropy, ideal gases, electric and magnetic fields, electric currents, resistance, capacitance, inductance, DC and AC circuits, 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 (four)	60%
Final Exam	20%
Homework	20%

Individual course work will be graded numerically in each category. The interpretation of these grades in arriving at a midterm or final letter grade will be based on a comparative study of the performance of the cadets in each category. As a rough guide, you may expect the average final grade in the course to be a low B, and approximately 20% of the grades to be A's.

## Exams

Four "Hour Exams" will be given throughout the semester, covering about four chapters each. 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](http://www.webassign.net), and click the red **Log In** button toward the middle of the left 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 changed it last semester. 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.

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.

Entering symbolic answers on the computer can be difficult. If this is a problem, you are welcome to turn in symbolic answers on paper the morning **before** they would be due on the computer. 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 23:59:00 on the due date, by WebAssign's clock. After that, the answers are available on-line. Extensions for known conflicts require previous approval, and are given only in rare cases. Emergency extensions are possible only if you have not viewed the set after it was due, when the answers are available.

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, or worse, until the last night, 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.

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. 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.

## Blackboard

This course will use the Blackboard system [blackboard.citadel.edu](http://blackboard.citadel.edu) for announcements, a communication portal, and to provide access to notes and problem solutions. You should be sure you can access the system. All students received an e-mail before the start of classes on how to do this.

## 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 attending classes 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.

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. 27	Current and Resistance
Ch. 20	First Law of Thermodynamics	Ch. 28	DC Circuits
Ch. 21	Kinetic Theory of Gasses	Ch. 29	Magnetic Fields
Ch. 22	Second Law of Thermodynamics	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. 33	AC Circuits
Ch. 26	Capacitance and Dielectrics	Ch. 34	Electromagnetic Waves

## 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.

Revised Mar. 5

Dates	Monday	Wednesday	Friday
Jan. 12 - 16		Syllabus, Ch. 19.1-3	Ch. 19.4-5, 20.1-2
Jan. 19 - 23	MLK Day	Ch. 20.3-4	Ch. 20.5-6, HW 1
Jan. 26 - 30	Ch. 20.7, 21.1-2	Ch. 21.2,4, HW 2	Ch. 21.3, 22.1-2,4
Feb. 2 - 6	Ch. 22.3-5, HW3	Exam 1: Ch. 19 – 22.5	Ch. 22.6 - 8
Feb. 9 - 13	Ch. 23	Ch. 23	Ch. 23
Feb. 16 - 20	Ch. 24, HW 4	Ch. 24	Ch. 25
Feb. 23 - 27	Ch. 25, HW 5	Ch. 26, sec. 1-4	Ch. 26, sec. 5-6, HW 6
Mar. 2 - 6	Exam 2: Ch. 23 – 26.4	Ch. 27	Ch. 27
Mar. 9 - 13	Ch. 28,	Ch. 28, HW 7	Ch. 29
Mar. 16 - 20	Ch. 29	Ch. 30, HW 8	Ch. 30
Mar. 23 - 27	Spring Break		
Mar. 30 - Apr. 3	Ch. 31, HW 9	Exam 3: Ch. 27 - 30	Ch. 31
Apr. 6 - 10	Ch. 32, HW 10	Ch. 32	Ch. 32
Apr. 13 - 17	Ch. 33, HW 11	Ch. 33	Ch. 33
Apr. 20 - 24	Ch. 34, HW 12	Ch. 34	Ch. 31 - 34, HW 13
Apr. 27 - May 1	Exam 4: Ch. 31-34	Final Exam: Sat. May 2, 13:00	