

PHYS 1112 Syllabus

University of Georgia, Fall 2006

<http://www.physast.uga.edu/classes/phys1112/wiegert/>

Introduction

Welcome to Physics 1112. This course is the second half of a two-semester introductory sequence. This semester we will focus on electromagnetism, one of the four fundamental forces of nature. The understanding of electric, magnetic, and optical phenomena as different aspects of the same underlying force was a crowning achievement of 19th century physics. Without this understanding, our modern electronic world would not be possible.

The ordering of topics this semester will be different from the traditional sequence. We will start with optics, the study of light and how it interacts with matter. You will then learn about electric fields and electric potential. You will see how to apply those concepts to study electric circuits and currents (moving charges). Next we will discuss the magnetic field, and how electric and magnetic fields interact with each other. With any time remaining, we may touch on topics in modern physics, which includes relativity and quantum physics.

As you no doubt know from your first semester of physics, this is a quantitative science. We will not neglect the qualitative and conceptual aspects of electromagnetism, but much of the work in this course will involve setting up and solving math problems. You will need to be able to communicate your results in a variety of ways—mathematical and numerical expressions, diagrams and graphs, and even “plain English.” By now you should be comfortable with using algebra, geometry, and trigonometry in the context of physics, and well-acquainted with basic concepts such as units and dimensions, scientific notation, and significant figures.

Keep in mind that physics subjects are grounded in basic and widely-applicable principles. Mechanics concepts like force, energy, and torque *will* reappear in this course, and you will continue to make use of Newton’s Laws, the conservation laws, and their applications (e.g., wave motion). *If you do not feel comfortable with your background in mathematics or mechanics, please come see me.*

If you are a physics or astronomy major, or are considering those possibilities, then this course is probably not for you. Please talk to Prof. Geller (physics) or Prof. Shaw (astronomy) for help in exploring your options.

Basic Information

Instructor:	Dr. Craig Wiegert	Email: wiegert@physast.uga.edu
Office:	240 Physics Building	Phone: 542-4023
Class:	MWF Period 4 (11:15–12:05), 221 Physics Building MWF Period 7 (2:30–3:20), 202 Physics Building	
Lab:	Various times, 321 Physics Building	
Final Exam:	Friday 8 Dec, 7:00–10:00 pm, location TBA (mass final)	
Clinic:	(optional) TBA	
Office hours:	TBA	

Course Materials

The following materials are all *required* for this course:

- *Physics, Volume 2*, 2nd ed., by J. S. Walker (Pearson Prentice Hall). This is the “red cover” edition. It is acceptable to use the first edition (white cover) or third edition (blue cover), but you are responsible for knowing about any changes in content.
- *Experiments for an Introductory Physics Course*, 4th/5th ed., by R. M. Wood and S. P. Lewis. This is the same lab manual from the first semester of physics, and will be used in your lab section.
- A CPSrf response pad from eInstruction (the “clickers”). Bring this to every class; we will be using them throughout the semester for participatory learning activities.
- A simple scientific calculator with trigonometric functions, *to be used for arithmetic only*. The use of calculator graphing, algebraic, or programming functions will *not* be permitted for any exam, nor will PDAs, cellphones, pagers, etc.

Student Resources

- The course Web site at <http://www.physast.uga.edu/classes/phys1112/wiegert/> will have course information and announcements, homework and exam solutions, etc. Many of these will be Adobe PDF files. There will also be an email announcement list. It is imperative that you have access to the Web and an email account that you check daily.
- Optional weekly homework clinics will give you and your classmates an opportunity to work on problems in small groups. I will be on hand to answer questions and give guidance, but this is really designed for you to work together, not to watch someone else work problems.
- If you cannot come to my regular office hours, or need additional help, please set up an appointment (by email, by phone, or in person) to see me outside of class.
- The textbook publisher has a companion Web site for the first edition, at the URL <http://www.prenhall.com/Walkerphysics/>. This site contains summaries and practice problems for each chapter, and is a good way to increase your confidence and familiarity with the material.
- There is a Student Study Guide with Selected Solutions for this textbook that may be useful, although students have given this guide mixed reviews. Information on this and other resources is provided in your textbook.
- Tutors are available either through the UGA Tutorial Program at Milledge Hall, or directly through the Department of Physics and Astronomy. (This should not be inferred as an endorsement, recommendation, or requirement of this course.)

Grading Policy

At the end of the semester, your overall grade will be determined from your performance on exams, homework, and labs, weighted as follows:

- 25% Cumulative final exam grade
- 45% Three in-class exams (20%/15%/10% for highest/middle/lowest grades)
- 15% Overall homework grade
- 15% Overall laboratory grade

Letter grades will be assigned from your overall numerical grade percentage according to the following scale:

A 90.0 **A-** 87.5 **B+** 85.0 **B** 80.0 **B-** 78.5 **C+** 75.0 **C** 70.0 **C-** 67.5 **D** 60.0 **F**

Overall numerical grades will *not* be rounded (i.e., 89.9 is still an A-).

Despite the firm cutoffs mentioned above, a “curve” of sorts will apply to numerical grades. Because exam scores in particular rarely correspond to the standard letter grade cutoffs, each raw exam score will be converted into a rescaled numerical grade, guided by the mean and standard deviation of the raw score distribution. It is these rescaled grades that are combined into an overall grade. Lab scores and homework scores will not be rescaled. A rescaled numerical grade will *never* be lower than your raw score.

Any requests for a regrade of an assignment or an exam must be made no later than one week after the item is returned. Keep in mind that for a regrade I will look at the entire assignment/exam, not just one problem, and may raise *or* lower your score. Regrade requests (including those for online homework) should be accompanied by all your work.

Exams

There will be three in-class midterm exams, as well as a cumulative final exam. They will all be closed-book and closed-notes. However, I will provide you with a formula sheet for each exam, so that you can focus your studying on understanding rather than rote memorization. You may use a scientific calculator *for arithmetic only*; all memory registers and programs must be cleared.

Exams will consist of both conceptual and problem-solving questions, similar to homework and in-class examples. Unless told otherwise, you must show your work on each exam problem in order to receive full credit. Detailed exam solutions will be posted to the course Web site after each in-class exam has been graded.

The purpose of exams is to test your understanding thoroughly and to distinguish among levels of performance. In order for exams to be effective assessments, raw scores will usually be lower than the expectations created by the “standard” grade cutoffs. The numerical grade rescaling is designed to map your performance onto the standard grade cutoffs.

In general, *there will be no make-up midterm exams*. If you need to miss a midterm exam for a *serious, documentable* reason, your final exam grade will be substituted for your “lowest” midterm exam, making your final exam worth 35% of your overall grade. This policy is designed in part to handle unavoidable situations like medical or family emergencies, or previously scheduled academic or athletic events. You *must* contact me as soon as you

know of the conflict (before the exam if at all possible), and you must provide sufficient documentation in a timely fashion. (An example of *unacceptable* documentation is a slip of paper stating only that you visited the health center, with no indication of the severity of your illness.) Do not make the mistake of simply presuming that your situation or documentation merits an excused absence; that determination is not your prerogative. *If your absence is unexcused, you will receive a grade of zero for the exam.*

A make-up final exam will be given only for students with legitimate, documentable reasons as explained above.

Homework

In general, weekly homework assignments will be due every Thursday. The pace of the class and changes to the schedule may necessitate different due dates, which will be announced in class. Homework assignments will be posted online, and most problems will require you to submit your answers on the Web. However, some assignments may ask you to turn in handwritten responses; in this case, hand in your assignments to me directly or place them in my mailbox in the main office (Room 201). *Do not* slide anything under my office door. Detailed homework solutions will be posted to the Web site after the homework is due.

Each assignment will be weighted equally. Responses will be graded for correctness, although for some problems incorrect responses may earn partial credit for the effort. Problems that are to be handed in on paper must show all work legibly in order to receive credit.

Your lowest two assignment percentages will be dropped in calculating your composite score. Again, this policy compensates for the unavoidable circumstances that may prevent you from submitting homework on time (e.g., illness, scheduled event, Internet failure, etc.). *Late homework will not be accepted or excused.*

Teamwork can be a very effective way of learning, so I strongly encourage you to interact with your classmates on homework problems. That is in fact one of the goals of the optional weekly clinics. However, do not mistake teamwork for plagiarism; the work you hand in *must be your own*, not copied, reworded, or paraphrased from someone else's work.

Final Grade Adjustment

Throughout the semester, you will be asked in class to answer conceptual and quantitative questions on the material, both individually and in small groups. Your responses will be graded primarily on participation, although correct responses will receive a small bonus. These activities allow you to demonstrate your sincere effort and active engagement.

At the end of the semester, the results of these exercises will be used to adjust your overall grade. Students who have participated significantly more than the class average will earn an adjustment of up to two percentage points. Students who participate at an average level will earn up to one percentage point. Students who participate significantly below the class average will not earn a grade adjustment. This adjustment cannot lower your grade, but may help if you are at a borderline. Because this is an adjustment rather than a formal component of your overall grade, *absences will not be excused.*

Aside from this adjustment, *there is no extra credit* in this course.

Student Responsibilities

- Above all, you have the right to expect courtesy from your fellow students, and the same will be asked of you. Courtesy includes the expectation that everyone will come to class ready to learn, willing to interact, and able to ask or answer questions freely. Courtesy also implies that you arrive on time and stay until the end of class. Disruptions or distracting behavior will not be tolerated.
- You are responsible for all topics discussed in class, as well as class announcements. Although attendance is not mandatory, you will be at a serious disadvantage if you do not attend class. Class absence does not excuse you from your responsibility.
- You are responsible for the material covered by the reading assignments. The content and pace of the class will assume that you have read the textbook *before* the class in which those topics will be discussed.
- You are responsible for the material covered in the homework. I cannot emphasize enough the importance of doing the homework assignments! Just as with other areas of learning, your physics problem-solving skills will improve only by practicing conscientiously and consistently. You will diminish the learning value of homework if you leave it for the last minute, or cope by relying on others' efforts.
- Attend your assigned lab section and follow the TAs' instructions. Refer to the lab schedule online for more information on lab policies, including attendance and make-up policies. If you have lab-related questions, please see Mr. Tom Barnello in Room 319.
- Ask for clarification on anything you find unclear, ambiguous, or unspecified. This includes both course policies and physics topics. Ignorance is never a valid excuse.
- Know the rules concerning withdrawals and incompletes, published in the UGA *Undergraduate Bulletin*. Of particular importance is the following passage:

Students who fail to drop a course or wish to withdraw from a course after the designated drop/add period for a term must withdraw through OASIS (Online Access to the Student Information System). An instructor also may withdraw a student from a course due to excessive absences as defined in the course syllabus. Withdrawals after the drop/add period will result in course entries on the academic record with grades of W or WF as assigned by the instructor(s). A student who withdraws or is withdrawn for excessive absences after the midpoint withdrawal deadline of the semester (date to be specified in the Schedule of Classes) is assigned a grade of WF, except in those cases in which the student is doing satisfactory work and the withdrawal is recommended by the Office of Student Affairs because of emergency or health reasons.

For withdrawals before the midpoint, I will generally enter a grade of W even for technically failing grades, *if* I judge that you have made a sincere effort in the class. *It is possible to earn a grade of WF before the midpoint*; don't assume otherwise! You are expected to officially withdraw in a timely fashion once you have made that decision.

If you do not complete the initial required administrative tasks of the course (questionnaire, "clicker" registration, etc.), you may be withdrawn from the class.

Academic Honesty

The University of Georgia has a comprehensive policy on academic honesty, described in a document entitled *A Culture of Honesty*. This document is available through the Office of the Vice President for Instruction or online at <http://www.uga.edu/ovpi/>. As a UGA student, you are responsible for knowing and understanding this policy. If you have any question about the appropriateness of your academic work in this course, you are obligated to ask me for clarification.

I take issues of academic honesty very seriously, and it is my responsibility to uphold the University's policy. This means, among other things, that I will not hesitate to report my suspicions of dishonesty to the Office of the Vice President for Instruction.

PHYS 1112 Class Schedule Fall 2006

Keeping in mind the reorganization of the course material, the schedule below is approximate and subject to modification, *possibly including exam dates*. Significant schedule changes will be announced in class. You are expected to read the relevant textbook sections *before* the material is discussed in class. Note that the midpoint withdrawal deadline is 9 October.

Class	Date	Reading	Topic
1	W 16 Aug		Course Intro
2	F 18 Aug	25.2, 25.3	Nature of Light
3	M 21 Aug	26.1, 26.2	Nature of Light, Geometrical Optics
4	W 23 Aug	26.3, 26.4	Geometrical Optics
5	F 25 Aug	26.5	Geometrical Optics
6	M 28 Aug	26.6	Geometrical Optics
7	W 30 Aug	26.7	Geometrical Optics
8	F 1 Sep	26.8	Geometrical Optics
	M 4 Sep		LABOR DAY HOLIDAY
9	W 6 Sep	27.1–27.3	Optical Instruments
10	F 8 Sep	27.4–27.5	Optical Instruments
11	M 11 Sep	28.1–28.2	Wave Optics: Interference
12	W 13 Sep	28.3	Wave Optics: Interference
13	F 15 Sep	28.4, 28.5	Wave Optics: Diffraction
14	M 18 Sep	28.6	Wave Optics: Diffraction
15	W 20 Sep		EXAM #1 , Chapters 25–27
16	F 22 Sep	19.1, 19.2	Electric Charge
17	M 25 Sep	19.3	Electric Force
18	W 27 Sep	19.4, 19.5	Electric Fields
19	F 29 Sep	19.6, 19.7	Gauss's Law
20	M 2 Oct	20.1, 20.2	Electric Potential
21	W 4 Oct	20.3, 20.4	Electric Potential
22	F 6 Oct	20.5	Capacitors
23	M 9 Oct	20.6	Capacitors, Energy
24	W 11 Oct	21.1, 21.2	Current and Resistance
25	F 13 Oct	21.3, 21.4	DC Circuits
26	M 16 Oct	21.5	DC Circuits
27	W 18 Oct	21.6	DC Circuits
28	F 20 Oct		EXAM #2 , Chapters 28, 19, 20
29	M 23 Oct	22.1, 22.2	Magnetic Fields
30	W 25 Oct	22.3	Magnetic Fields
	F 27 Oct		FALL BREAK

Class	Date	Reading	Topic
31	M 30 Oct	22.4	Magnetic Fields
32	W 1 Nov	22.5, 22.6	Currents and Magnetic Fields
33	F 3 Nov	22.7, 22.8	Currents and Magnetic Fields
34	M 6 Nov	23.1, 23.2	Magnetic Flux
35	W 8 Nov	23.3	Faraday's Law of Induction
36	F 10 Nov	23.4	Lenz's Law
37	M 13 Nov	23.5, 23.6	Induction and Work
38	W 15 Nov	23.7	Inductance
39	F 17 Nov	23.9, 23.10	Inductance and Energy
40	M 20 Nov W 22 Nov F 24 Nov		EXAM # 3 , Chapters 21–23 THANKSGIVING BREAK THANKSGIVING BREAK
41	M 27 Nov	25.1, 25.4	Electromagnetic Waves
42	W 29 Nov	25.5	Electromagnetic Waves, Polarization
43	F 1 Dec	29.1–29.3	Relativity
44	M 4 Dec	29.4–29.6	Relativity
45	W 6 Dec		Course Review
	F 8 Dec		FINAL EXAM , 7–10 pm