PHYS 1112 Syllabus

University of Georgia, Fall 2009

Introduction

Welcome to Physics 1112. This course is the second half of a two-semester introductory sequence. This semester we'll 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 wouldn't be possible.

The ordering of topics this semester will be different from the traditional sequence. We'll 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'll 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.

As you know from your first semester of physics, this is a quantitative science. We won't 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'll 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 don't feel comfortable with your background in mathematics or mechanics, please come see me.*

If you are a physics or astronomy major, or if you're considering those possibilities, then this course is probably not for you. Please talk to me (physics) or Prof. Shaw (astronomy) about other options.

Basic Information

Instructor:	Dr. Craig Wiegert	Email:	`wiegert@physast.uga.edu`
Office:	215 Physics Building	Phone:	542-4023

Class:	MWF Period 4 (11:15–12:05), 202 Physics Building
Lab:	Various times, 319 Physics Building
Final Exam:	Thursday 10 December, 12:00–3:00 pm, 202 Physics Building
Clinic:	TBA
Office hours:	TBA

Required Course Materials

- *Physics, Volume 2*, 3rd ed., by J. S. Walker (Pearson Prentice Hall). This is the "blue cover" edition. You may use older editions (white or red covers) or the 4th edition (black cover) if you wish, but you are responsible for knowing about any changes in content.
- *Experiments for an Introductory Physics Course*, 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. You may use the newer 6th edition if you wish.
- An Interwrite PRS RF response pad (the "clickers"). Bring this to every class; we will be using them throughout the semester for participatory activities.
- A simple scientific calculator for exams, which must be *non-programmable, non-graphing, and non-symbolic.* Examples of acceptable calculators include the TI-30X series or the Sharp EL-531. The use of calculator graphing, algebra-solving, or programming functions will *not* be permitted for any exam, nor will PDAs, cellphones, etc.

Online Course Resources

- Online assignments are an essential part of the course. You will access them with an account on the LON-CAPA system at `http://spock.physast.uga.edu/`.
- You will be subscribed to a low-volume email announcement list. It is important that you check your email daily.
- The eLearning Commons (the replacement for WebCT) will serve as another repository of course information: homework and exam solutions, practice problems, grades, links to outside resources, etc.

Other Student Resources

- 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 Website for an earlier 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 Tutoring Program at Milledge Hall (for free), or directly through the Department of Physics and Astronomy (for hire).

Grading Policy and Assignments

Your overall grade will be determined from your course performance, weighted as follows:

20% Cumulative final exam grade
45% Three in-class exams (20%/15%/10% for highest/middle/lowest grades)
15% Laboratory grade
15% Homework grade
5% Reading quizzes and in-class activities

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

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–).

Any requests for a regrade of an assignment or an exam must be made no later than one week after the item is returned. For a regrade I will look at the entire assignment/exam, not just one problem, and this 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 and a cumulative final exam. All exams will be closed-book and closed-notes. You may use a simple scientific calculator that is *non-programmable, non-graphing, and non-symbolic.* (Calculators such as the TI-83 or TI-84 are *not allowed.*) I'll provide you with a formula sheet for each exam, and will also post it to the Web before the exam. The purpose of the formula sheet is to focus your studying on understanding rather than memorization. If you feel you need an equation that's not on the sheet, don't memorize it; learn how to derive it from the equations that *are* given.

Exams will comprise both conceptual and problem-solving questions, very similar to homework, practice problems, and in-class examples. Unless told otherwise, you must show your work on each problem in order to receive full credit. Partial credit is awarded (based on your work) for incomplete or incorrect answers, so it is usually in your best interest to attempt every problem. Detailed solutions will be posted to the Web after each in-class exam.

Exams are designed to test your understanding thoroughly and to distinguish among levels of performance. In order for exams to be effective assessments, raw scores will often be lower than the expectations created by the "standard" letter grade cutoffs. These raw exam scores will be converted into "rescaled" numerical grades. This conversion is based partly on the distribution of raw scores, but also on the difficulty level of the exam. A rescaled numerical grade will *never* be lower than your raw score. Also, unlike a typical curve, you are *not competing* against your peers; it is possible for everyone to get an A or B, for example.

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 one of your midterms, making your final exam worth 30-40% of your overall grade (depending on how this grade compares to your other midterm exam grades). This policy is designed 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 note stating only that you visited the health center, with no indication of the severity of your illness.) Do not simply presume that your situation or documentation merits an excused absence; that determination is not your prerogative. *Unexcused exam absences will result in an exam grade of zero.*

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

Homework

Regular, personal practice with physics problems is essential to understanding physics, so you will have weekly homework assignments. The assignments will generally be due every Thursday, although class pacing and scheduling may necessitate different due dates, which will be announced in class. Assignments will be posted online, and most problems will require you to submit your answers on the Web. However, some assignments may also have a handwritten component, which you should hand in to me directly or put into my mailbox in the main office, Room 201. (*Do not* slide anything under my office door.) Detailed solutions will be posted to the Web after the homework is due.

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.

Each assignment will be weighted equally unless otherwise specified. I will drop your lowest two assignment percentages in calculating your overall score. Again, this policy compensates for the unavoidable circumstances that may occasionally 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 to learn, so I encourage you to collaborate with your classmates on homework problems. That is in fact a goal of the optional weekly clinics. However, don't mistake teamwork for plagiarism; *your solutions must be your own.* Copying or paraphrasing from someone else's work, or from any source of homework solutions, is a violation of academic honesty policies.

Since you can't collaborate on exams, homework is your best opportunity to develop your own problem-solving skills.

Reading Quizzes

You are required to read the assigned textbook sections *before* the class in which those topics are discussed. I will regularly assign short quizzes based on the reading, either on the Web and due before class, or using "clickers" at the start of class.

Regular reading is an *essential* part of your preparation for class. Don't expect to understand everything in the textbook at first sight. However, your ability to learn *during* class will strongly depend on having already encountered the material *prior* to class. You should jot down notes and questions as you read; this will help organize your class notes and will remind you to ask for clarification.

Class Activities

You will often be asked in class to answer conceptual and quantitative questions, both individually and in small groups, and often using the "clickers". 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 class engagement.

At the end of the semester, the results of these exercises will be combined with your reading quiz scores as a component of your overall grade. As with homework scores, a comparable fraction of the activities and quizzes will be "dropped" to compensate for the occasional absence or problem with your "clicker". I will *not* accept a written record of your responses as a clicker substitute, or otherwise excuse any absence from class.

Extra Credit

There is no extra credit in this course.

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/honesty/`. This policy covers all academic work.

As a UGA student, you are responsible for knowing and understanding this policy. If you have *any* question about the appropriateness of your actions or your work, you are obligated to ask me for clarification.

I take the issue of academic honesty very seriously, and it is my responsibility to uphold the University's policy. This means, among other things, that I won't hesitate to report my suspicions of dishonesty to the Office of the Vice President for Instruction. Typical consequences of cheating on homework or an exam range from receiving a zero for that grade, to failing the 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 and willing to learn and 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're responsible for everything discussed in class and all assigned reading (even for textbook topics not explicitly covered in class). Absence doesn't excuse you from this responsibility. Your understanding of physics (and your grade) *will* suffer if you skip class or neglect the preparatory reading. If your schedule makes it difficult to attend class regularly and on-time, you shouldn't take this course.
- You're responsible for the material covered in the assignments. I can't emphasize enough the importance of homework! Just as with other areas of learning, your physics problem-solving skills will improve only by practicing regularly and conscientiously. You won't get much learning value from homework if you procrastinate, or if you depend on the efforts of others.
- Attend your assigned lab section and follow the TAs' instructions. Refer to the lab syllabus for more information. If you have lab-related questions, please see Mr. Tom Barnello in Room 310.
- 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 policies in the *Undergraduate Bulletin* concerning withdrawals and incompletes. The following passage is particularly important:

  > Students are limited to four withdrawals during their undergraduate careers.... 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 WP or WF as assigned by the instructor(s). A student who withdraws or is withdrawn for excessive absences after the withdrawal deadline of the semester is assigned a grade of WF except when the student is doing satisfactory work and Student Support Services is able to approve the withdrawal because of a hardship situation.

  For withdrawals before the midpoint, I will enter a grade of WP even for technically failing grades, *if* I judge that you have made a sincere, significant 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 don't complete the initial required administrative tasks of the course (e.g., the questionnaire), or are demonstrably not attending class and completing work, you may be withdrawn from the class for "excessive absence"—probably with a WF.

PHYS 1112 Class Schedule
Fall 2009

The schedule below is approximate and subject to modification, *possibly including exam dates*. Significant schedule changes will be announced in class. Note that the midpoint withdrawal deadline is Thursday, 22 October.

Class	Date	Reading	Topic
1	M 17 Aug	25.2	Course Intro, Nature of Light
2	W 19 Aug	25.3, 26.1	Nature of Light, Geometrical Optics
3	F 21 Aug	26.2, 26.5	Geometrical Optics
4	M 24 Aug	26.3, 26.4	Geometrical Optics
5	W 26 Aug	26.6	Geometrical Optics
6	F 28 Aug	26.7	Geometrical Optics
7	M 31 Aug	26.8	Geometrical Optics
8	W 2 Sep	27.1–27.3	Optical Instruments
9	F 4 Sep	27.4, 27.5	Optical Instruments
	M 7 Sep		LABOR DAY HOLIDAY
10	W 9 Sep	28.1	Wave Optics: Interference
11	F 11 Sep	28.2	Wave Optics: Interference
12	M 14 Sep	28.3	Wave Optics: Interference
13	W 16 Sep		**EXAM #1**, Chapters 25–27
14	F 18 Sep	28.4, 28.5	Wave Optics: Diffraction
15	M 21 Sep	28.6	Wave Optics: Diffraction
16	W 23 Sep	19.1, 19.2	Electric Charge
17	F 25 Sep	19.6, 19.3	Electric Force
18	M 28 Sep	19.4, 19.5	Electric Fields
19	W 30 Sep	19.7	Gauss's Law
20	F 2 Oct	20.1, 20.2	Electric Potential
21	M 5 Oct	20.3	Electric Potential
22	W 7 Oct	20.4	Electric Potential
23	F 9 Oct	20.5	Capacitors
24	M 12 Oct	20.6	Capacitors, Energy
25	W 14 Oct	21.1, 21.2	Current and Resistance
26	F 16 Oct	21.4	DC Circuits
27	M 19 Oct	21.5	DC Circuits
28	W 21 Oct		**EXAM #2**, Chapters 28, 19, 20
29	F 23 Oct	21.3	DC Circuits

Class	Date	Reading	Topic
30	M 26 Oct	21.6	DC Circuits
31	W 28 Oct	22.1, 22.2	Magnetic Fields
	F 30 Oct		FALL BREAK
32	M 2 Nov	22.3	Magnetic Fields
33	W 4 Nov	22.4	Magnetic Fields
34	F 6 Nov	22.5, 22.6	Currents and Magnetic Fields
35	M 9 Nov	22.7, 22.8	Currents and Magnetic Fields
36	W 11 Nov	23.1, 23.2	Magnetic Flux
37	F 13 Nov	23.3	Faraday's Law of Induction
38	M 16 Nov	23.4	Lenz's Law
39	W 18 Nov	23.5, 23.6	Induction and Work
40	F 20 Nov		**EXAM # 3**, Chapters 21, 22
	M 23 Nov		THANKSGIVING BREAK
	W 25 Nov		THANKSGIVING BREAK
	F 27 Nov		THANKSGIVING BREAK
41	M 30 Nov	23.7	Inductance
42	W 2 Dec	23.9, 23.10	Inductance and Energy
43	F 4 Dec	25.1, 25.4	Electromagnetic Waves
44	M 7 Dec	25.5	Electromagnetic Waves, Polarization
45	Tu 8 Dec		Course Review
	Th 10 Dec		**FINAL EXAM**, 12–3 pm