PHYS 1112 Syllabus

Summer 2009

Prof. Uwe Happek

http://www.physast.uga.edu/classes/phys1112/Happek/

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, starting 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.

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 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 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 Prof. Wiegert (Physics) or Prof. Shaw (Astronomy) for help in exploring your options.

Basic Information

Instructor:	Uwe Happek	Email:	`uhappek@physast.uga.edu`
Office:	236 Physics Building	Phone:	542-2859

Class:	MTWRF 10:30 - 11:30AM, 202 Physics Building
Lab:	Various times, 321 Physics Building
Final Exam:	TBA (July 30 -31)
Help Session:	MTWR 6:30 - 8:00 PM, 221 Physics Building
Office hours:	MTWRF 11:45 - 12:30, 236 Physics Building

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 (or newer) editions (white or red covers) 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.
- 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

- The course Website at http://www.physast.uga.edu/classes/phys1112/Happek will be used to disseminate course information: homework assignments and solutions, exam solutions, practice problems, etc.
- 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/.
- Announcements and grade information will be made available through WebCT.

Other Student Resources

- Optional help sessions will give you and your classmates an opportunity to work on problems in small groups. A Teaching Assistant will 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. In addition, I have an open door policy: if my office door is open, you are welcome to see me, for whatever reason.
- 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, or directly through the Department of Physics and Astronomy.

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

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 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. 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 exams. If you need to miss an 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.

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.

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, multiple-choice online quizzes based on the reading material. Each quiz will be posted to the Web on the day before the class it pertains to, if not earlier. You must complete the quiz by 10 am on the morning of the corresponding class.

Regular reading is an important part of your preparation for class. Don't expect to understand everything in the textbook at first sight! However, your learning effectiveness *in* class will depend on having encountered the material *prior* to class. You should jot down notes and questions as you read; this will aid in organizing your class notes and will remind you to ask for clarification.

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/ovpi/. 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 all topics discussed in class, all class announcements, and all assigned textbook reading (even if some sections aren't explicitly covered in class). Absence does not excuse you from this responsibility. While attendance is not strictly mandatory, your understanding of physics (and your grade) will suffer if you skip class. If your schedule makes it difficult to attend class regularly and on-time, you shouldn't take this course.
- You are 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 leave it for the last minute, or 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 327.
- 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 concerning withdrawals and incompletes, published in the UGA Student Affairs website

  http://uga.edu/studentaffairs/students/withdrawals.htm.

  Of particular importance is the following passage:

  > Undergraduate students are allowed four (4) career withdrawals graded WP (Withdraw Passing) at UGA before all subsequent withdrawals receive an automatic grade of WF (Withdraw Failing). The count began fall semester 2008, regardless of when a student matriculated and regardless of any withdrawals in previous terms. Students may view their withdrawal count in the Registration Main Menu and in the Withdrawal Processing menu on OASIS.
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  > Students withdrawing from classes should be aware of the following:
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  > Every non-hardship withdrawal graded WP counts towards the four (4) UGA withdrawals that each student is allowed during their college career at UGA. Students may withdraw from more than four (4) classes, but after the fourth non-hardship WP, the grade will be an automatic WF. Students wishing to withdraw from some or all of their classes before the withdrawal deadline of the semester may do so on OASIS. Faculty may assign a WP (Withdraw Passing) or a WF (Withdraw Failing) depending on the student's class performance and attendance up to that point. A withdrawal prior to the deadline does not guarantee a WP but does give the faculty the option of a WP.

> Students withdrawing from their classes after the withdrawal deadline of a semester may only receive a grade of WF unless they have an approved *Hardship Withdrawal*.

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.

PHYS 1112 Class Schedule
Summer 2009

The schedule below is approximate and subject to modification, *possibly including exam dates*. Significant schedule changes will be announced in class and/or on WebCT. Note that the midpoint withdrawal deadline is July 09, 2009.

Class	Date	Reading	Topic
1	F 05 Jun	25.2, 25.3	Course Intro, Nature of Light
2	M 08 Jun	26.1, 26.2	Geometrical Optics
3	T 09 Jun	26.3	Geometrical Optics
4	W 10 Jun	26.4	Geometrical Optics
5	R 11 Jun	26.5, 26.8	Geometrical Optics
6	F 12 Jun	26.6, 26.7	Geometrical Optics
7	M 15 Jun	27.1 - 27.3	Optical Instruments
8	T 16 Jun	27.4 - 27.6	Optical Instruments
9	W 17 Jun	28.1	Wave Optics: Interference
10	R 18 Jun	28.2	Wave Optics: Interference
11	F 19 Jun	28.4	Wave Optics: Diffraction
12	M 22 Jun		**EXAM #1**, Chapters 25–27
13	T 23 Jun	28.5, 28.6	Wave Optics: Diffraction
14	W 24 Jun	19.1, 19.2	Electric Charge
15	R 25 Jun	19.3	Electric Force
16	F 26 Jun	19.4, 19.5	Electric Fields
17	M 29 Jun	19.6, 19.7	Gauss's Law
18	T 30 Jun	20.1, 20.2	Electric Potential
19	W 01 Jul	20.3, 20.4	Electric Potential
20	R 02 Jul	20.5, 20.6	Capacitors
	F 03 Jul	No Class	
21	M 06 Jul	21.1, 21.2	Current and Resistance
22	T 07 Jul	21.3, 21.4	DC Circuits
23	F 08 Jul		**EXAM #2**, Chapters 28, 19, 20
24	W 09 Jul	21.5	DC Circuits
25	R 10 Jul	21.6	DC Circuits

Class	Date	Reading	Topic
26	M 13 Jul	22.1, 22.2	Magnetic Fields
27	T 14 Jul	22.3, 22.4	Magnetic Fields
28	W 15 Jul	22.5, 22.6	Currents and Magnetic Fields
29	R 16 Jul	22.7, 22.8	Currents and Magnetic Fields
30	F 17 Jul	23.1, 23.2	Magnetic Flux
31	M 20 Jul	23.3	Faraday's Law of Induction
32	T 21 Jul	23.4	Lenz's Law
33	W 22 Jul		**EXAM # 3**, Chapters 21, 22
34	R 23 Jul	23.5, 23.6	Induction and Work
35	F 24 Jul	23.7, 23.9, 23.10	Inductance
36	M 27 Jul	25.1, 25.4	Electromagnetic Waves
37	W 28 Jul	25.5	Electromagnetic Waves, Polarization
38	F 29 Jul		Course Review