PHYS 1112 Syllabus

Fall 2017

Prof. Uwe 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. Caillault (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:	MWF Period 2 (9:05 - 9:55), 202 Physics Building
Lab:	Various times, Physics Building
Help Session:	(optional) to be announced
Office hours:	M W 11:15 - 12:05

Required Course Materials

- *Physics, Volume II*, 4th ed., by J. S. Walker (Pearson Prentice Hall). You may use older editions if you wish, but you are responsible for knowing about any changes in content. Actually, you may use any non-calculus based physics textbook.
- 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 eLC 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/.

Other Student Resources

- Optional weekly homework sessions 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 or in person) to see me outside of class.
- Tutors are available either through the Physics Department or the UGA Tutoring Program

  (This should not be inferred as an endorsement, recommendation, or requirement of this course.)

Grading Policy and Assignments

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

60% Best four out of five in-class exams
20% Laboratory grade
20% Homework grade

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

A [90, 100] **A–** [85, 90)

B+ [82 - 85) **B** [78, 82) **B–** [75, 78)

C+ [72, 75) **C** [68, 72) **C–** [65, 68)

D [55, 65)

F [0, 55)

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 five in-class exams. The worst exam will be dropped, e.g. each of your best four exams counts 15% towards your overall grade.

All exams will be closed-book, but you are allowed to bring one standard sheet of paper containing anything you want, handwritten, both sides. 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.*)

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.

No make-ups or re-scheduling

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.

I will drop your lowest two assignmentgrades in calculating your overall score. 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.

In-Class Rules

No laptops, pagers, cellphones, iPads, iPods, or any other electronic/communication devices are permitted in the classroom.

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.
- The University policies regarding withdrawals and incompletes can be found in the Undergraduate Bulletin and on the Registrar's Office website

PHYS 1112 Class Schedule
Fall 2017

The schedule below is approximate and subject to modification, *possibly including exam dates*. Significant schedule changes will be announced in class and/or on eLC.

Class	Date	Reading	Topics
1	M 14 Aug		Course Intro
2	W 16 Aug	26.1-2	Nature of Light, GO
3	F 18 Aug	26.3-4	Geometrical Optics
4	M 21 Aug	26.5-7	Geometrical Optics
	W 23 Aug	27.1-2	Optical Instruments
5	F 25 Aug	27.3-4	Optical Instruments
6	M 28 Aug	27.5	Optical Instruments
7	W 30 Aug	28.1-2	Wave Optics
8	F Sep 1	25-27	Geometrical Optics Review
9	M 04 Sep		Labor Day
10	W 06 Sep		Exam 1
11	F 08 Sep	28.4,6	Wave Optics
12	M 11 Sep	19.1-2	Electric Charge
13	W 13 Sep	19.3-4	Coulomb's Law, E-Field
14	F 15 Sep	19.5-6	Electric Flux
15	M 18 Sep	19.7	Gauss
16	W 20 Sep	28, 19	Exam 2 review
17	F 22 Sep		Exam 2
18	M 25 Sep	20.1-2	Energy, Potential
19	W 27 Sep	20.3	Potential
20	F 29 Sep	20.4	Potential
21	M 02 Oct	20.5	Capacitors
22	W 04 Oct	20.6	Energy Storage
23	F 06 Oct	21.1-3	Electric Current
24	M 09 Oct	21.4	Electric Current
25	W 11 Oct	21.5	Current and Resistance
26	F 13 Oct		Review Exam 3
27	M 16 Oct		Exam 3
28	W18 Oct	22.1-2	Magnetism
29	F Oct 20	22.3	Magnetic Forces
30	M 23 Oct	22.4-5	Magnetic Forces
31	W 25 Oct	22.6-7	Ampere's Law
32	F 27 Oct		Fall Break

Class	Date	Reading	Topic
33	M 30 Oct	22.8	Magnetism in Matter
34	W 01 Nov	23.1-2	Induced EMF, Flux
35	F 03 Nov		Review, Exam 4
36	M 06 Nov		Exam 4
37	W 08 Novr	23.3	Faraday's Law of Induction
38	F 10 Nov	23.4	Lenz's Law
39	M 13 Nov	23.5, 23.6	Induction and Work
40	W 15 Nov	23.7	Inductance
41	F 17 Nov	23.9-10	Inductance and Energy
	Thanksgiving		
42	M 27 Nov	24	AC currents
43	W 29 Nov	25.1-3	Electromagnetic Waves
44	F 01 Dec	25.4-5	Electromagnetic Waves, Polarization
45	M 04 Dec		Review Exam 5
46	T 05 Dec		Exam 5