PHYS 1112 Syllabus

University of Georgia, Fall 2009

http://www.physast.uga.edu/phys1112/nakayama/

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 rigonometry 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. Caillaut (astronomy) for help in exploring your options.

Basic Information

Instructor:	Kanzo Nakayama	Email: `nakayama@physast.uga.edu`
Office:	219 Physics Building	

Class:	MWF Period 3 (10:10–11:00), 221 Physics Building
Lab:	Various times, 321 Physics Building
Final Exam:	Wednesday 16 May, 8:00–11:00 am, 221 Physics Building
Office hours:	MWF 11:00–12:00

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) 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/phys1112/nakayama/ 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/.
- You will be subscribed to a low-volume email announcement list. It is important that you check your email daily.

Other Student Resources

- 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.
- 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
50% Three in-class exams
15% Laboratory grade
15% Homework grade

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.*)

Exams will comprise both conceptual and problem-solving questions, 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.

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. 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 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.*

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. Each student is responsible for keeping track of such changes by attending 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. (*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 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. 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

You are required to read the assigned textbook sections *before* the class in which those topics are discussed. 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. 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.

Student Responsibilities

- 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 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 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 *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 is assigned a grade of WF except when the student is doing satisfactory work and the Office of Student Affairs is able to approve the withdrawal because of a hardship situation.

  For withdrawals before the midpoint, I will enter a grade of W 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), you may be withdrawn from the class.

Topics & Schedule:

PHYS 1112 Class Schedule
Fall 2009

The schedule below is tentative and subject to changes *possibly including exam dates* which will be announced in class. Each student is *fully responsible* for keeping track of such changes by attending class.

Class	Date	Reading Assignments	Topic
1	M 17 Aug		Course Intro
2	W 19 Aug	25.2, 25.3	Nature of Light
3	F 21 Aug	26.1	Geometrical Optics
4	M 24 Aug	26.2	Geometrical Optics
5	W 26 Aug	26.5	Geometrical Optics
6	F 28 Aug	26.3, 26.4	Geometrical Optics
7	M 30 Aug	26.6, 26.7	Geometrical Optics
8	W 2 Sep	26.8	Geometrical Optics
9	F 4 Sep	27.1–27.3	Optical Instruments
	M 7 Sep		Labor Day
10	W 9 Sep	27.4, 27.5	Optical Instruments
11	F 11 Sep	28.1	Wave Optics: Interference
12	M 14 Sep	28.2	Wave Optics: Interference
13	W 16 Sep	28.4	Wave Optics: Diffraction
14	F 18 Sep		**EXAM #1**, Chapters 25–27
15	M 21 Sep	28.5	Wave Optics: Diffraction
16	W 23 Sep	28.6	Wave Optics: Gratings
17	F 25 Sep	19.1, 19.2	Electric Charge
18	M 28 Sep	19.6, 19.3	Electric Force
19	W 30 Sep	19.4, 19.5	Electric Fields
20	F 2 Oct	19.6, 19.7	Gauss's Law
21	M 5 Oct	20.1, 20.2	Electric Potential
22	W 7 Oct	20.3, 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 Assignments	Topic
30	M 26 Oct	21.6	DC Circuits
31	M 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	23.7	Inductance
	M 23 Nov		Thanksgiving
	W 25 Nov		Thanksgiving
	F 27 Nov		Thanksgiving
41	M 30 Nov		**EXAM # 3**, Chapters 21, 22
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	T 8 Dec		Course Review
	W 16 Dec		**FINAL EXAM**, 8–12 am

4