PHYS 1112 Syllabus

University of Georgia, Fall 2022

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

We'll start with geometrical 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.

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 Prof. Geller (physics) or Prof. Magnani (astronomy) for help in exploring your options.

Basic Information

Instructor:	Kanzo Nakayama	Email: `nakayama@uga.edu`
Office:	219 Physics Building	
Class:	TR Period 2 (9:35–10:50 am), room 202 Physics Building	
Lab:	Begins on Monday, Aug. 22. All inquiries related to Labs should be directed to either your respective lab TAs, or our Lab Coordinator, Mr. Daniel Boyd at: Daniel.Boyd@uga.edu, 706-542-2903, Rm. 310.	
Final Exam:	Dec. 13, 7:00–10:00 pm, Location: TBA	
Office hours:	TR 1:00 pm–2:00 pm	

Disclaimer

This course syllabus is a general plan for the course; deviations announced to the class by the instructor may be necessary. Therefore, each student is *fully responsible* for keeping track of such deviations by attending class.

Required Course Materials

- *Physics*, Chapters 19-28, 5th ed., by J. S. Walker (Pearson Addison-Wesley), with **Mastering Physics**. You may use older editions (especially, the 4th edition).
- *Lab Manuals* can be found at http://www.physast.uga.edu/courses.
- A simple scientific calculator for exams, which must be *non-programmable, non-graphing, and non-symbolic.* The use of calculator graphing, algebra-solving, or programming functions will *not* be permitted for any exam, nor will laptops, cellphones, iPads, iPods, or any other electronic/communication devices (with the exception of the tools needed for the DRC accommodation).

Online Course Resources

- **Mastering Physics**: *Student Registration Instructions for eLearning Commons/D2L*:
  1. Log in to eLearning Commons/D2L and open your course.
  2. Select the MyLab and Mastering link in Course Navigation or a module.
  3. Select Open MyLab & Mastering to go to the course home page.
  4. Sign in to link your Pearson and eLearning Commons/D2L accounts. If you're new to MyLab and Mastering, create an account.
  5. Select one of the available access options when asked:

  · Enter a prepaid access code that came with your textbook or from the bookstore.
  · Buy instant access using a credit card or PayPal account.
  · Select Get temporary access without payment for 14 days.

  6. Select Go to my course.

  We recommend you always enter your Mastering Physics course through eLearning Commons/D2L.

  Make sure your browser is ready. Check the system requirements at https://mlm.pearson.com/global/system-requirements/

  Student Mastering Resources:
  · Get Started with MyLab and Mastering video (this video shows students how to register for their Mastering course that is integrated with D2L)
  · Get Started with Mastering (in-product help for students on the features of Mastering)

- 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.
- 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 or Fall 2022 Tutors. The latter is offered directly by some of the graduate students at the Department of Physics and Astronomy for a fee (This should not be inferred as an endorsement, recommendation, or requirement of this course.).
- All inquiries related to Labs should be directed to either your respective lab TAs, or our Lab Coordinator, Mr. Daniel Boyd, at: Daniel.Boyd@uga.edu, 706-542-2903, Rm. 310.

Grading Policy and Assignments

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

35% Online Mastering Physics Assignments (must be completed online before due dates; no re- scheduling or make up)
15% In-class exam 1 (multiple-choice, no individaul re-scheduling or make up)
15% In-class exam 2 (multiple-choice, no individaul re-scheduling or make up)
15% Laboratory grade
20% Cumulative final exam grade

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

A	[90, 100] ,	**A**–	[88, 90)		
B+	[85, 88) ,	**B**	[80, 85) ,	**B**–	[78, 80)
C+	[75, 78) ,	**C**	[70, 75) ,	**C**–	[68, 70)
D	[60, 68) ,				
F	[0, 60] .				

Overall numerical grades will *not* be rounded (i.e., 87.9 is still a B+).

Your overall grade will become available on Athena Email me only if you strongly believe there was a mistake in my calculation. Do not ask for a bump-up, a curve, or any extra credit. Make sure to include your class and section number.

Exams

There will be two in-class midterm exams on selected chapters 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.*

There will be no make-up exams. If you need to miss a midterm exam for a *serious, documentable* reason, your final exam grade will substitute for the missed exam. 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 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 homework assignments in the form of *Online Mastering Physics Assignments*. These must be completed online before due dates; no rescheduling or make ups. The due dates for assignments may change depending on class pacing. Each student is responsible for keeping track of such changes by attending class and/or checking the appropriate updates.

There will also be some selected end-of-chapter problems that would help practice your problem solving skills. These extra homework assignments will not be graded but you are responsible to work them out. Questions in exams (including the final exam) may come from the extra homework assignments.

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.

Academic Honesty

As a University of Georgia student, you have agreed to abide by the University's academic honesty policy, "A Culture of Honesty," and the Student Honor Code. All academic work must meet the standards described in "A Culture of Honesty" found at: www.uga.edu/honesty. Lack of knowledge of the academic honesty policy is not a reasonable explanation for a violation. Questions related to course assignments and the academic honesty policy should be directed to the instructor.

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*.

Tentative Topics & Schedule:

PHYS 1112 Class Schedule
Fall 2022

The schedule below is **tentative** and subject to changes 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	R 18 Aug	25.2, 25.3	Course Intro, Nature of Light
2	T 23 Aug	26.1, 26.2, 26.3	Geometrical Optics
3	R 25 Aug	26.3, 26.4	Geometrical Optics
4	T 30 Aug	26.5, 26.8, 26.7	Geometrical Optics
5	R 01 Sep	26.6	Geometrical Optics
6	T 06 Sep	27.1 - 27.3	Optical Instruments
7	R 08 Sep	27.4, 27.5	Optical Instruments
8	T 13 Sep	28.1	Wave Optics: Interference
9	R 15 Sep	28.2	Wave Optics: Interference
10	T 20 Sep	28.4	Wave Optics : Diffraction
11	R 22 Sep	28.5, 28.6	Wave Optics: Diffraction Gratings
12	T 27 Sep	19.1, 19.2, 19.6	Electric Charge & Electric Force
13	R 29 Sep	19.4 -19.6	Electric Fields, Gauss' Law
14	T 04 Oct	19.7, 20.1, 20.2	Gauss's Law, Electric Potential
15	R 06 Oct	**EXAM # 1**	Chapters 26, 27, 28, 19
16	T 11 Oct	20.3 - 20.5	Electric Potential, Capacitors
17	R 13 Oct	20.5, 20.6	Capacitors, Energy
18	T 18 Oct	21.1, 21.2, 21.4	Current and Resistance, DC circuits
19	R 20 Oct	21.4, 21.5	DC Circuits
20	T 25 Oct	21.3, 21.6	DC Circuits
21	R 27 Oct	22.1, 22.2	Magnetic Fields
22	T 01 Nov	22.3, 22.4	Magnetic Fields
23	R 03 Nov	22.5, 22.6	Currents and Magnetic Fields
24	T 08 Nov	22.7, 22.8	Currents and Magnetic Fields
25	R 10 Nov	23.1, 23.2	Magnetic Flux
26	T 15 Nov	**EXAM #2**	Chapters 20, 21, 22
27	R 17 Nov	23.3, 23.4	Faraday's Law of Induction, Lenz's Law
28	T 22 Nov	23.5, 23.6	Induction and Work
	R 24 Nov	Thanksgiving	
29	T 29 Nov	23.7, 23.9	Inductance
30	R 01 Dec	23.10	Transformers
31	T 06 Dec		Course Review
	W 07 Dec		Reading Day
	T 13 Dec	7:00–10:00 pm	**FINAL EXAM**, cummulative