PHYS 1252 Syllabus

University of Georgia, Spring 2022

Version 1 (220115-1430hbs)

Introduction

Welcome to Physics 1252! 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.

Objectives

As with last semester, the primary objective of this course is to engage you in a process that is central to physics: *Modeling physical phenomena by applying a small set of fundamental principles.* The modeling process encompasses explaining and predicting physical behaviors; making appropriate approximations and simplifications for complicated physical systems; and communicating results through mathematical and numerical expressions, diagrams and visualizations, graphs, and even "plain English."

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.

If you are not an engineering major, then this course is probably not for you! If you're considering a major in physics or astronomy, please talk to Dr. Wiegert (physics) or Dr. Caillault (astronomy) about other options.

Prerequisites

Some differential and integral calculus will be used in the course. It is important that you be registered for the second semester of the calculus sequence (Math 2260 or equivalent), if you haven't already taken it. In order to do well in this course, you should also have a *solid working knowledge* of college algebra, trigonometry, and plane geometry. A prior high school physics course is useful, but not required.

This course will continue to make use of the fundamental principles that you learned to work with in first-semester physics (forces, momentum, energy). Prepare to review that material if you're feeling rusty!

Basic Information

Instructor:	H.-B. Schüttler	Email: `hbs@uga.edu`
	313D Physics Building	Phone: 404-641-6522 (Cellph.)
Class:	Hybrid Format (Online + Face-to-Face), Zoom: https://tinyurl.com/rk67kws6	
	or https://zoom.us/j/98783842588?pwd=QTcycFJTQjZ6ODN6UkpaRmlMTmdxdz09	
Section:	CRN 45299, Tue. Periods 5–6 (02:20pm–05:10pm), Thu. Period 5 (02:20pm-03:35pm)	
Final Exams:	Mass Exam Mon. May 9, 2022, 07:00pm-10:00pm, Location: T.B.A.	
Office hours:	Tue., Thu. 5:00-6:00pm. By appointment (email) only! Online only!	
	Zoom: https://tinyurl.com/yckp8bfe	
	or https://zoom.us/j/98482467385?pwd=R0M3clgzc00vdkJRK2NBVmVaOWZqdz09	
Email:	The instructor will only receive and reply to emails sent to: `hbs@uga.edu`.	
	Do not send or reply to email on the eLC system: Instructor will not read it, nor reply!	
	Before you email the instructor, please read the last page of this syllabus!	

Course Resources

Required Materials

- OpenStax Free Textbook:

  University Physics, Volumes 1-3, by Ling, Sanny and Moebs.

  Download this free textbook, in three pdf-files, from the *OpenStax* website at

  Volume 1: https://OpenStax.org/details/books/university-physics-volume-1

  Volume 2: https://OpenStax.org/details/books/university-physics-volume-2

  Volume 3: https://OpenStax.org/details/books/university-physics-volume-3

  The PHYS1252 course covers mostly only material from Volumes 2 and 3. However, you should also download Volume 1, in order to review various materials from your first-semester physics course which you will need as pre-requisites for PHYS1252. All three volumes of the OpenStax free textbook are also integrated into the *Achieve* online pre-class system (see below). So you can easily read up on any material in the textbook while doing your online pre-class work.

  If you wish you may also use the for-pay textbook

  Physics for Scientists and Engineers, Volume 2, any edition, by Tipler and Mosca (W.H. Freeman and Company).

  You may use Tipler-Mosca in addition to, or instead of, the OpenStax free textbook. However, you are *not required* to buy Tipler-Mosca, if you are happy with the OpenStax free textbook.

- Online Pre-Class System *Achieve* (Macmillan), formerly known as *FlipItPhysics*. To create, and purchase your semester online access to, an *Achieve* account, go to

  https://achieve.macmillanlearning.com/courses/bw3s5f

  and follow the account creation, enrollment and/or payment instructions.

  Important: You **must enter your UGA MyID email address**, **MyID@uga.edu**, when setting up your *Achieve* account!! If you use any other version of your UGA email address, or any non-UGA email address, such as your gmail address *etc.*, you will receive zero credit for the pre-class work you are assigned to do on *Achieve*. Your MyID should be listed on your eLC webpage under "Username".

  Example: Suppose your name is *Jamie Smith*, your "Username" on eLC is listed as **jsmith7634**, but you also have and use the alternative UGA email address version *Jamie.Smith@uga.edu*. Then you **must enter jsmith7634@uga.edu** as your MyID@uga.edu email address when setting up the *Achieve* online account. *I.e.*, do not enter *Jamie.Smith@uga.edu*.

- Online *Turning Point (TP) Response System* app, required for submitting your responses to in-class quizzes and other in-class participatory activities. We will be using this system throughout the semester for in-class participatory activities. You can submit your in-class responses *only online*, from a TP app installed on your smartphone, laptop or tablet computer. Do *not* purchase a TP clicker device: you will *not* be able to use clicker to submit your responses during class.

  You therefore need a TP account license and the TP app installation. You can set up an account at https://account.turningtechnologies.com/account/. (=https://tinyurl.com/mr6pns35). You can purchase a TP license through the Turning website, or you can get it at the campus bookstore. in order to set up your TP Response online account and your Mobile ID and to purchase your TP Response subscription. Make sure to **select the "Mobile ID"** option when asked. Contact the tech support by phone or email given on that webpage if you need more help.

Very Important: You **must enter your official UGA MyID email address**, **MyID@uga.edu**, when setting up your *TH Response* online account. If you use any other version of your UGA email address, or any non-UGA email address, such as your gmail address *etc.*, you will receive zero credit for the in-class responses you try to submit through the *TH Response System*. See Example above on how to find out your official UGA MyID.

Note also: The previously used in-class response devices ("clicker") will not work in this course, since the course is taught all-online and neither you nor your instructor is in the same room. Therefore, you must purchase the TH Response subscription, even if you already own a Turning Point in-class "clicker" device. And, obviously, do not buy a "clicker" device for this course.

- A scientific calculator. A simple calculator such as the TI-30X series will do just fine, but a fancier graphing calculator is also acceptable.

Online Resources

- Your UGA email account will be subscribed to a low-volume announcement list. It is your responsibility to be informed of all announcements sent via this email list: check your UGA email daily!
- The eLearning Commons will serve as another repository of course information, esp. for exam grades, at `http://www.elc.uga.edu/`.
- Online assignments, both before and after class, are an essential part of the course. You'll complete this work both within FlipItPhysics and on the LON-CAPA homework system at `https://spock.physast.uga.edu/`. Every time you start on a new homework set, make sure to first read the instructions and hints in a file named *LON-CAPA_Failures+Hints ... .pdf*. This file will be posted on LON-CAPA and will also be emailed to you with your first homework assignment.
- Additional practice problems and solutions may be posted on the PHYS 1252 course web site at `http://www.physast.uga.edu/classes/phys1252/schuttler/`

Other Resources

- Office hours are your chance to get one-on-one or small-group help with homework assignments or with understanding topics from class. Please make use of this time; the instructor cannot address your questions if you don't ask!
- If you can't come to our regular office hours, or need additional help, please set up an appointment (by email, by phone, or in person) to see the instructor outside of class.
- Tutors are available either through the UGA Tutoring Program at Milledge Hall, or 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)
10% Homework grade
15% Laboratory grade (including lab final worth 30% of total)
5% Pre-class preparation
5% In-class participation

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**– 77.5 **C**+ 75.0 **C** 70.0 **C**– 67.5 **D** 60.0 **F**

Overall numerical grades will *not* be rounded (*i.e.*, 89.99 is still an A–).

Any requests for a regrade of an assignment or exam must be made no later than one week after it's returned. For a regrade, the instructor 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.

Like any other measurement, grades possess a degree of uncertainty. Factors such as improvement, effort, and participation *may* help borderline grades. Lobbying, however, will not, and requests for extra credit will be ignored, so don't ask!

Exams

All exams will be closed-book and closed-notes. You may use a scientific calculator *for arithmetic only*, not for algebra, calculus, or graphing; all memory and programs must be cleared. I'll provide you with a formula sheet for each exam, and will also post it to the Web before the exam. The formula sheet's purpose is to focus your study on understanding rather than memorizing.

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.

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 scores will be "rescaled" into numerical grades. This conversion is based mostly on the difficulty level of the exam and partly on the distribution of raw scores. Your rescaled grade will *never* be lower than your raw score. Also, unlike a "grade 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 missed midterms grade(s), making your final exam worth at least 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 the instructor 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 and nature of your illness.) Do not 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 legitimate, documentable reasons as explained above.

Homework

Sustained practice with physics problems is crucial to understanding physics, so you will have regular homework assignments. Assignments will be posted online through LON-CAPA and/or FlipIt Physics, and most problems will require you to submit your answers online. However, a few assignments may also have a handwritten component. Detailed solutions will be posted to the Web after the due date.

Assignments will be weighted equally unless otherwise specified. At the end of the semester, *provided that you complete an online course evaluation*, the instructor will drop your lowest two assignment percentages in calculating your overall score. (If you don't submit a course evaluation during the allotted time, then none of your

assignments will be dropped.) This dropped-assignment 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 won't be accepted or excused.* However, even if you miss the deadline to submit homework answers for credit, you should still make every effort to work through all the problems on every assignment, in order to master the topics covered. You will likely do very poorly on exams if you don't work through each assignment in its entirety.

Teamwork is an effective way to learn, so you are encouraged to collaborate with your classmates. Ask them questions; critique others' work; explain your reasoning to your study partners. However, *don't mistake teamwork for plagiarism.* You're responsible for understanding all the details of every solution, and *your solutions must be your own.* Copying 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.

Labs

Lab activities will usually take place during the longer class on either Tuesdays or Thursdays, although you might also perform "mini-labs" during some other classes. Lab work is a group effort; your group will hand in one report to be graded as a team. Because teamwork is so important to the success of labs, *there are no make-up labs.* You will have an opportunity to evaluate yourself and your groupmates on each person's contributions to the team; this evaluation will affect your lab grade.

For each scheduled lab, numbered LAB12 - LAB18 in the Class Schedule below, a lab manual pdf-file is posted on eLearning Commons (eLC) at `http://www.elc.uga.edu/`. You should download and and study the respective manual prior to each lab day, in order to be properly prepared for the lab activities.

Class Preparation

Pre-class lecture video viewing on FlipIt Physics and textbook reading take the place of in-class lectures. In addition, you will often receive pre-class preparation assignments from the PHYS1252 course web site, sent by your instructor to your UGA email address, typically within 18 hours before the beginning of class. This preparation *before* class is essential for you to learn well *in* class, just as it would be for a literature course. You'll regularly answer a few questions before class based on these materials to gauge your understanding.

In-Class Activities

You will often be asked in class to work on conceptual and quantitative questions, both individually and in small groups These activities allow you to demonstrate your sincere effort and active class engagement.

A fraction of these in-class activity scores will be "dropped" (similar to the fraction of dropped homework assignments) to compensate for the occasional absence or similar issue. For purposes of in-class participation credit, the instructor will *not* excuse any absence from class: if you miss a quiz due to absence, your score for that quiz will be zero.

Academic Honesty

UGA has a comprehensive academic honesty policy document, *A Culture of Honesty*, which is available from Office of the Vice President for Instruction at

`http://ovpi.uga.edu/academic-honesty/academic-honesty-policy`.

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 the instructor for clarification.

The instructor takes the issue of academic honesty very seriously: it is the instructor's responsibility to uphold

the University's policy. This means, among other things, that the instructor will not hesitate to report our 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.
- **Attendance is required.** Class attendance keeps you well connected to the course and to the members of your group. In physics courses, each new concept builds on earlier ones, so mastering key concepts is critical. If your schedule makes it difficult to attend class regularly and on-time, you shouldn't take this course.

  The most common causes of missed classes are lack of sleep and time pressure from other obligations. If this happens to you, you need to seek out advice on how to set priorities and manage your time effectively.

  If you miss class, it's your responsibility to find out what you missed. Talk to your groupmates, and notify them of your absence in advance if possible. They're relying on you to be caught up by the time you return to class.
- You *must* prepare for class. Class time is valuable and limited. Using that time effectively requires that you've had some exposure to the necessary concepts, so that you can ask good questions and practice applying those concepts in class. Evidence from other courses with this format suggests that the time you spend preparing for class *significantly* reduces the amount of time needed for homework. Finally, *class discussion will not cover all of the assigned material.*
- One 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'll get very little value out of homework if you procrastinate, or if you depend on the efforts of others. If you start to get behind, get help early before the problem gets worse!
- 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 *Undergraduate Bulletin* and the Registrar's Office website describe the University policies regarding withdrawals and incompletes. If you don't complete the initial required administrative tasks of the course or are demonstrably not attending class and completing work, the instructor may withdraw you from the course for "excessive absence".

  If you are considering withdrawing from the course, you should discuss your choice with the instructor beforehand. In many cases, students are doing better in the course than they think they are.

PHYS 1252 Class Schedule
Spring 2022

The schedule below is approximate and subject to modification, *including possible changes in exam dates*, material covered on exams, and lab dates. Significant schedule changes will be announced in class and/or by email to your UGA email address. It is your responsibility to keep track of all such schedule changes by attending class and by regularly checking your UGA MyID email.

Deadline for withdrawal from courses is **Thu. March 24, 2022**.

Schedule of Labs and Daily Class Topics: T.B.A.

How to Contact Your Instructor by Email for Problem Solving Help or Other Communications

Please read the following carefully, before you try to contact the instructor by email:

- The instructor will only receive and reply to emails sent to

  `hbs@uga.edu` .

  Please do not send or reply to email on/from the eLearning Commons (eLC) system: The instructor will not receive it and will not reply to it! Instead, use your UGA email account to send email; and send it to the instructor email address given above.

- Clearly identify yourself and your course section:

  In the "**Subject**" line of your email write **PHYS1252 Schuttler**, followed by a brief, ≤5-word description of what your email is about.

  In the body of your email state your **(1) full name, (2) UGA 800-ID, (3) UGA email address** (=your email address ending in `...@uga.edu`), (4) course id (PHYS1252), and (5) course section (A=TuTh 09:30am or B=TuTh 12:30pm).

- If you are asking for help with the solution of a problem (LON-CAPA homework, practice exam problem, ... *etc.*) you must provide **complete information about your problem and your difficulties**, anything you've tried to solve it, and any conceptual difficulty you may have encountered. Do this:

  Send the **complete problem statement**. The easiest way to do this is to take and email a screenshot or photo of the problem statement, as shown in your browser on the LON-CAPA or PHYS1252 course website. Otherwise, write or copy the problem statement into your email, including all input parameter values and other information given.

  Send a detailed **step-by-step description of your solution attempt(s).** The easiest way to do this is to write out all the following neatly, legibly and in a well-organized format on one or a few clean sheets of paper, then scan or by cellphone take a photo of each sheet and email them. Ideally send all sheets as a single pdf-file. Or, if you must send multiple files, make sure they are clearly named so the instructor can tell in which order they should be read. Do this by using file names starting with p01..., p02..., *etc.*, for the file for page 1, page 2, ..., respectively, attached to your email.

  For each solution step state or show:

  (0) the drawing(s) you have made to visusalize the problem;

  (1) the general equation(s) you are using, without numbers plugged in;

  (2) the input variable names, with symbols clearly defined in words, which you're plugging into the equation(s), and the value you've used for each input variable;

  (3) the intermediate or final output variable name(s), with symbols clearly defined in words, which you want to calculate from the general equation(s);

  (4) any algebra you did to solve for the output variables you've identified in (3);

  (5) the value(s) you've obtained for the output variable(s) you've identified in (3);

  (6) a concise verbal description (as best you can!) of any conceptual difficulties you have.

  Most difficulties and errors in trying to solve problems arise from the fact that you have failed to *first make a neat, clean, big drawing* of the problem setup. If that's the case, the instructor may simply reply to you with one word: *Drawing?* You may then ask for help again, but only after you've honestly tried to make the drawing(s) that would help you visualize the problem.