

Syllabus for PHYS 3700: Modern Physics

University of Georgia, Spring 2022

Tue & Thu, Period 2 (11:10AM-12:25PM)

Online at <https://zoom.us/j/91760755096?pwd=dTlqenZjWklKU0h6d01FV0g1RFNBZz09>

Or: <https://tinyurl.com/4ykrkcd>

Basic Information

- Instructor:** Heinz-Bernd Schüttler Email: hbs@uga.edu
Phone: 706-542-2485 (Dept.) 404-641-6522 (Mobile)
- Office hours:** Tue. & Thu. 6:00pm-7:00pm, by appointment only. In case of time conflict, email me all other available time slots to request an appointment.
- Homework:** Weekly problem sets are due *by 11:59pm* every Friday, unless otherwise announced by email. See below for more detailed information.
- Clinic:** An *optional* (but highly recommended) problem-solving clinic will be held weekly; day, time, and location to be announced.
- Textbook:** *Modern Physics, 2rd Edition*, by Randy Harris.
- Website:** Homework, handouts, grades, and other information will be distributed via eLC, <https://elc.uga.edu>; and also by email via UGA ListServ.
- Prerequisites:** PHYS 1212-1212L or PHYS 1312-1312L
- Pre/Corequisites:** MATH 2270 or MATH 2500 or MATH 3500 or MATH 3500H
- Email:** You are expected to check your email *daily* for course announcements.

Grading Policy

Grade components: Your overall grade will be determined from your course performance, as measured by your semester average, which will be computed as follows:

- Cumulative final exam: 30%
- Two in-class exams: 45%
 - Best 30%
 - Worst 15%
- Homework average: 20%
- Reading quizzes: 5%

Letter grades: Ranges for letter grades will be *no worse for you* than the following:

A+ [Nonexistent]	B+ = [83-85)	C+ = [73-75)	D± [Nonexistent]
A = [87-100]	B = [77-83)	C = [67-73)	D = [50-65)
A- = [85-87)	B- = [75-77)	C- = [65-67)	F = [0-50)

Here a square bracket means the end point is included in the range, and a round bracket (parenthesis) means the end point is not included in the range. Actual grade ranges may end up having lower cutoffs, depending on the overall level of performance.

Final exam grade boost: The comprehensive final exam is your opportunity to demonstrate that you have broadly and coherently mastered the course material. This is, after all, the main goal of the course. Therefore, I will give a grade boost for getting a higher grade on the final than for the semester as a whole, provided you haven't neglected the course during the semester. Here's how the boost works. At the end of the semester, I will calculate two letter grades for each student: one based on the formula given above ("formula-based grade") and one based *only* on the final exam ("final-exam grade"). If you meet **all four** of the following criteria, then the course grade I assign you will be one grade step higher than your formula-based grade (e.g., B+ → A-); otherwise, your course grade will be your formula-based grade. The criteria for the grade boost are:

- (a) you have not missed *any* regular exams,
- (b) your regular-exam average is 65% or higher,
- (c) your homework average is 65% or higher, *and*
- (d) your final-exam grade is higher than your formula-based grade.

Regrade requests: Any requests for a regrade of an assignment, quiz, or exam must be made *no later than one week after the graded item is returned*. Any regrade requests made after this one-week window will be declined without further review. Keep in mind that a regrade may end up raising *or* lowering your score. Correcting arithmetic errors made in totaling up points does not count as a regrade and is not subject to the above time limitations.

Borderline grades: Like any other measurement, grades possess a degree of uncertainty. Therefore, factors such as improvement *may* help borderline grades. (Lobbying, however, will not.) There is no extra credit in this course, so please don't ask.

Withdrawals/Incompletes: The [Undergraduate Bulletin](#) and the website of the [Office of the Registrar](#) describe University policies regarding withdrawals and incompletes. Make sure you are familiar with them. The withdrawal deadline is **Tue, March 24, 2022**. Any student showing serious neglect for this course (e.g., routinely failing to turn in homework, rarely attending class, etc.) may be asked to withdraw. Any student missing 3 consecutive classes or failing to turn in 2 consecutive homework assignments, without adequate prior explanation, will be considered eligible for an instructor-initiated withdrawal from the course.

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

A grade of Incomplete is intended for a student who has completed a substantial part of the course, but, for non-academic reasons beyond their control, was unable to complete all of the course. An Incomplete is not appropriate for a student who has missed a large portion of the course assessments, regardless of the reason. Nor is an Incomplete appropriate for a student who is unhappy with their performance in the course and wants to avoid getting a low grade. In both of these cases, withdrawal from the course is the appropriate action.

Exams

Number and rules: There will be two in-class midterm exams and a *cumulative* final exam. They will all be closed-book and closed-notes. You may use a scientific calculator on exams *for arithmetic only*, not algebra, calculus, graphing, or information storage; all programs and memory registers must be cleared. Unless told otherwise, you must show work on each exam 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 eLC after each exam.

Formula sheets: I will provide you with a formula sheet on each exam. Its purpose is to focus your studying on understanding rather than memorization. If 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.

Missed midterm exams: *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 the missed exam, making your final exam worth 40–52% 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 presume that your situation or documentation merits an excused absence; that determination is not your prerogative. *Unexcused exam absences will result in a grade of zero.*

Final exam schedule: Tues., May 10, 12:00 - 3:00 pm, Room or Online: TBA.

Homework

Logistics: There will be 9-11 problem sets. Each will be due at 4:00 PM on the due date given on the assignment sheet (usually a Friday), unless otherwise stated. The pace of the class and changes to the schedule may necessitate changes to the due dates, which will be announced in class and/or by email from eLC or ListServ. Your write-ups should be scanned into a pdf-file and uploaded to eLC, each set into a designated eLC dropbox folder. *Do not* slide assignments under my office door or into my mailbox in Physics 201: if you do, your assignment will not be graded. Detailed homework solutions will be posted to eLC after the homework is due.

Write-up format: The following rules must be adhered to for all write-ups handed in for credit: (a) Use letter-size (8½"×11") paper, not legal-size paper. (b) Number your pages *in order* in the upper left corner. (c) Write your first and last name clearly in the upper right corner of each page. (d) On the last page of your write-up, list all classmates you worked with and any sources you used other than the course textbook. (e) Write legibly so that the grader can read your work easily. Rule of thumb: If the person grading can't read it, then it's wrong.

Grading: Problem sets will be graded by a graduate student assigned as the grader for this course (I will grade exams) and returned to you in a timely fashion. Disputes about the grading should be directed to me, and I will act as the final arbiter. Homework problems

will be graded not only for correctness of the end result, but also on process. Be sure to express, clearly and legibly, the reasoning for your solutions.

Dropping lowest two: If you complete the online student evaluation for this course during the official period at the end of the semester when the evaluations website is up, then I will drop your lowest two scores when calculating your homework average for semester grades. If you do not complete the evaluation, then all homework scores will be included in your homework average. This policy serves two functions: (a) it gives you an incentive to submit a course evaluation, and (b) it compensates for unavoidable circumstances that may prevent you from submitting homework on time (*e.g.*, illness, scheduled event, emergency, etc.). *Late problem sets will not be accepted without my prior authorization.*

Teamwork vs. plagiarism: Teamwork can be a very good way of learning, so I encourage you to interact with your classmates on homework. However, do not mistake teamwork for plagiarism; it is unacceptable, for example, to divvy up the problems and then swap solutions. The work you hand in *must be your own*, not copied, reworded, or paraphrased from someone else's work. I will choose problems from a variety of sources, including my own imagination. It is likely that solutions for many of the assigned problems can be found on the internet or other sources. I know this, and now you do too. It is unacceptable for you to solve homework problems by "mining" for existing solutions. Nor is it acceptable to consult existing solutions for hints. Both of these constitute forms of plagiarism. Remember, the only way you will learn the subject is by sweating through problems on your own and/or with your study team.

Final comment: Working physics problems is *by far* the best way to learn physics, so it is important that you make every effort to do an honest and thorough job.

Readings

Reading Assignments: Each week (with a few exceptions) there will be a reading assignment of 20-30 pages, which will be listed well in advance on eLC. All students are expected to complete a given week's reading assignment by the start of class on Tue. or Thu. of that week, as assigned.

Rationale: There are two pedagogically important reasons to keep up with reading assignments: (a) Your time spent in class will be more meaningful and beneficial if you read the textbook *in advance*. Ample research shows that having some familiarity with the material to be discussed in class will help you focus on understanding the nuances and challenging concepts and techniques in a way that's not possible if the material is completely unfamiliar to you. (b) It is simply not possible to cover *in class* everything you need to learn. Fortunately it is not necessary to do so either, because there are plenty of things you are all fully capable of learning on your own through reading.

Reading Quizzes: To motivate you to complete reading assignments on time, there will be a brief (~5 minute) reading comprehension quiz *at the start of class* on either Tue or Thu or most weeks (except, of course, in weeks with no reading assignment). You will not be expected to have mastered the material for these quizzes, but rather to have comprehended what you were assigned to read. There is no making up reading quizzes. If you miss one

(e.g., by arriving to class after the quiz is over), then you will get a zero on that week's quiz. However, I will *drop your lowest two reading quiz scores* of the semester.

Academic Honesty

The University of Georgia has a comprehensive policy on academic honesty known as *A Culture of Honesty*. This policy not only describes required and prohibited conduct, as pertains to academic honesty, but also provides a detailed procedure for resolving matters of alleged academic dishonesty, including a description of consequences for honesty violations. The complete policy can be found online at <http://www.uga.edu/honesty/>. All students are responsible for knowing, understanding, and abiding by this policy. If you have any questions about the appropriateness of your work in this course, you are obligated to ask me for clarification.

I take issues of academic honesty very seriously, and it is my responsibility to uphold the University's policy. This means, among other things, that I will not hesitate to report my suspicions of dishonesty (*e.g.*, plagiarism, unauthorized assistance, etc.) to the Office of Instruction. This extends not only to exams but also to reading quizzes and homework.

Disclaimer

Unexpected circumstances and concurrent course reassessment may require changes to the rules and information contained in this syllabus. If so, such changes will be done as fairly as possible, and you will be kept informed of the changes and their causes.

How to Contact Your Instructor by Email for Problem Solving Help and 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 **PHYS3700**, followed by a brief, ≤ 6 -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 (PHYS3700)**.

- If you are asking for help with the solution of a problem (homework *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. 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 visualize 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 output variables you've identified in (3);
- (5) the value(s) you've obtained for 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.