

PHYS 1112 (52481): Introductory Physics-Electricity and Magnetism, Optics, Modern Physics

The University of Georgia, Summer 2021

Syllabus

Instructor: Abed Mohamadzade

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Zoom Lectures: MTWRF 10:30 am - 11:30 am (find zoom link in eLC announcements)

In-person lecture room: Physics Auditorium(202)

Office Hours: by appointment (just e-mail me)(not through eLC)

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. If you are a prospective physics or astrophysics major, then this course is probably not for you. Please talk to Dr. Cooley (Physics) or Dr. Caillault (Astrophysics) about other options.

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

25% Cumulative final exam grade

40% Two midterm exams (25%/15% for highest/lowest grades)

20% Homework grade

15% Laboratory grade

3% Bonus points for In-class activities and 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, 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;
 - 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!**
 - **Bonus point:** There will be in-class assignments in which you can work on the problem in the class and upload your answer on eLC as one PDF file.
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Textbook:

- Physics, 5th ed., by James S. Walker (Pearson). You may use older editions if you wish, or even any other algebra-based Introductory Physics textbook, but you are responsible for knowing about any changes in content;

Attendance Policy:

- The lecture will be hybrid synchronous and is done through Zoom. (The auditorium can seat 50 students with distancing. If there are more than 50 students who want to attend in person, I will split the class into 2 groups, and the groups can attend every two days). Although in-person attendance is optional, **being present on zoom at the class time is mandatory**, and there will be bonus points for class activities.
- Attending class (in-person or zoom) will be very important in developing your understanding of the subject. The book is intended to supplement (not substitute) the lectures, and there will be many things I say that will not be explicitly written in the text. While I will not be taking attendance in the usual sense, there will be in-class activities. As a reward for your attentiveness and preclass preparation, I will be giving a bonus of 3 points on your FINAL CLASS GRADE. Please note, This is enough to boost your grade from an A- to an A, or a B+ to an A-, or ...; you get the idea.

Lab Sessions:

- Labs begin on June 21 and 22.
- **Lab syllabus is different** from lecture class. You can find the syllabus on the physics website. For information about the lab section for this course, please consult the lab syllabus available at <https://www.physast.uga.edu/courses>
- **This course also requires a laboratory component**, PHYS 1112L, that will account for a portion of your grade (you sign up for the laboratory section separately). No course grade will be assigned until the laboratory requirement is completed.

Exam:

Midter exam 1: (Optics) TBD

Midterm exam 2: (electricity and circuits) TBD

Final exam: (all covered chapters) **August 05 2021 , noon - 3:00 pm.**

- 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. The formula sheet's purpose is to release you from memorizing formulas and allow you to focus your studying on understanding the principles and concepts involved;
- The exams are not going to be open for the entire day. The mid-term exams will be **at the class time** (1hour + few minutes for Grade Scope uploading and submission). (If there are registration through DRC, and accommodation is needed, please email me and let me know)

- 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 “re-scaled” into numerical grades. This conversion is based mainly on the difficulty level of the exam and partly on the distribution of raw scores. Your re-scaled 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 severe and documentable reason, your final exam grade will be substituted for 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 (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 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.**

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 most problems will require you to submit your answers online. However, a few assignments may also have a handwritten component.
- Assignments will be weighted equally unless otherwise specified. 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 I encourage you 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.

Prerequisites/ Corequisites:

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).

Online Resources:

- The eLearning Commons (<http://www.elc.uga.edu/>) will serve as a repository of course information: homework and exam solutions, grades, announcements, etc.
- Please check your UGA email and eLC (eLearning Commons) daily. The UGA email system and eLC will be used (infrequently) for announcements.
- **Online assignments** are an essential part of the course. You'll complete this work on the **LON-CAPA** homework system at <https://spock.physast.uga.edu/>

Course Policies

- Academic Honesty
 - UGA has a comprehensive academic honesty policy, A Culture of Honesty, which is available from the Office of Instruction at <http://honesty.uga.edu/>. This policy covers all academic work. All students are responsible for fully understanding and abiding by this policy. If you have any questions 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 evidence of dishonesty to the Office of the Vice President for Instruction. Typical consequences of academic dishonesty on homework or an exam range from receiving a zero for that grade, to failing the course, to being suspended from the university.
- Disability Accommodations:
 - I will make every reasonable effort to accommodate students with documented disabilities. Students requesting accommodations must provide documentation from the Disability Resource Center during the first two weeks of class (or within two weeks of DRC certification).
- Withdrawals/ Incompletes:
 - The Undergraduate Bulletin (<http://www.bulletin.uga.edu/>) and the Registrar's Office website describe the University policies regarding withdrawals and incompletes (<http://reg.uga.edu/policies/withdrawals>). If you don't complete the initial required administrative tasks of the course (e.g., the questionnaire), or are demonstrably not attending class and completing work, I may withdraw you from the course for "excessive absence";
 - 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 they are);
 - A grade of incomplete is not appropriate for a student who has missed a large portion of the course assessments, for whatever reason.
- Student Distress:
 - If your course performance is significantly affected by issues beyond your control, I urge you to let me know and to seek assistance promptly from Student Care and Outreach (<http://sco.uga.edu/>), part of the Office of the Dean of Students. It is always easier to

address exceptional circumstances when these issues are raised as early as possible. Waiting until the end of the semester to take action may limit my ability to provide appropriate support.

- Technology Policy:
 - Cell phones should be turned to silent or off during class. Texting, checking email, posting to Facebook, etc., are not allowed during class. These activities are distracting and disrespectful to your fellow students.
- 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 interact and able to ask or answer questions freely. Courtesy also implies that you arrive on time, stay until the end of class, and remain focused during class.
 - Attendance is required (on zoom or in-person). 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 are 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 starts happening 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 from other students what you missed. Talk to your group-mates, 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 reduces the amount of time needed for homework. Finally, class discussion will not cover all of the assigned material.
 - **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. It's your responsibility to show me what you do and don't understand through your questions so that I can help you learn. You help influence the pace of the course. Silent confusion benefits no one.
 - 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'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!