

Physics 270: Electromagnetism, Light, Relativity and Modern Physics

Sections 0301 to 0304 — Professor Shawhan — Fall 2013

The most up-to-date version of the syllabus can always be found on the course web site, reachable via <http://ter.ps/shawhan270>

Contact information

Prof. Peter S. Shawhan, room 4205B in the Physics Building, pshawhan@umd.edu, 301-405-1580

Lectures: Mon, Wed, Fri 12:00-12:50 in room 1410 of the Physics Building

Office hours: normally Tue, Thu 2-3:30, Wed 3:30-5:00. (Check course web site for exceptions)

If you have a question or issue that can't be handled during office hours, please email or call.

Christopher Eckberg (eckbergc@umd.edu), TA for sections 0301 (Wed 1:00) and 0304 (Fri 3:00)

Office hours: normally Mon, Tue 1-2 and Wed 3-4 in room 0104 of the Physics Building

Kiersten Ruisard (kruisard@umd.edu), TA for sections 0302 (Wed 2:00) and 0303 (Fri 2:00)

Office hours: normally Tue 3:30-4:30 and Fri 3:00-4:00 in room 3103B of the Physics Bldg

Overview

As you know, this is the third and final semester of the general physics sequence designed for engineers. This is when things get interesting! To some extent, we will build on basic concepts that were covered in the previous two semesters, such as force and motion, oscillations, and electrical circuits. However, this course is more about rich topics that bring us up to the modern era: electrodynamics, Maxwell's equations and electromagnetic waves, classical geometric optics, wave optics (interference and diffraction), relativity, and quantum mechanics. These things enable most of the technologies that make modern life what it is, and tell us most of what we know about the universe around us.

This course will move quickly, and it is important for you to keep up! I will expect you to read the textbook—I'll tell you what sections, and try not to give you more than necessary—and attend the lectures and your scheduled discussion sessions. Participation will be factored in when calculating your course grade. My lectures will not simply repeat things that you can read in the textbook, and will often be interactive—please come ready to think and respond, not just to take notes! Homework each week will be a combination of online work and written-on-paper problems that you'll turn in in class. To do well in the course, it is up to you to make sure you fully understand everything we cover. I and the TAs will explain it as well as we can and help when you have questions, but real learning happens inside your head, not in front of your eyes.

Physics is fundamentally an experimental science—there is plenty of theory and mathematics, but everything is grounded in what happens in real life. The Engineering School and the Physics Department consider lab experiments to be an important part of your physics learning, but have organized them under a separate course number (PHYS 271) for scheduling flexibility. Both PHYS 270 and PHYS 271 must be taken in the same semester and the scores for the courses will be combined to calculate a single grade that will be entered for both courses. It is your responsibility to make sure that you are enrolled in both courses; note that total enrollment may be limited by the number of seats available in PHYS 271 even if there are seats available in PHYS 270. To pass, students must complete passing work in both PHYS 270 and PHYS 271. (If you are transferring a PHYS 271 score from a previous semester, let me know early in the semester.)

Required course materials

The textbook for this course is “University Physics with Modern Physics” (Second Edition) by Wolfgang Bauer and Gary D. Westfall, published by McGraw-Hill. Fortunately, we have arranged with the publisher to give you free access to the eBook version this semester, in connection with our test of the recently upgraded McGraw-Hill Connect and LearnSmart online homework and self-study systems. These features look very promising as an efficient way to learn effectively, and studies have apparently shown that students who use these tools get better grades. I hope you all will confirm that. :) I will be happy to receive feedback from you about the good and/or bad points of the system or the textbook at any time during the semester. Access codes for the Connect service (with the eBook and LearnSmart) will be distributed at the beginning of the semester. Check the course web site for notes about registering with Connect.

If you would like to buy a printed copy of the textbook, look for “University Physics with Modern Physics, Volume 2 (Chapters 21-40), 2nd Edition”, ISBN 978-0-07-740960-9. Volume 2 is all you need for PHYS 270. There is also the single-volume edition (chapters 1-40) with ISBN 978-0-07-351388-1, but of course that is bigger, heavier, and more expensive.

You will need to pay for one thing: an account with the Learning Catalytics service, which is a new interactive classroom response system—kind of like clickers without the clicker hardware, and with more capabilities that help get the most out of the interactive part of the class. The service costs \$12 for the semester, which you should pay using a credit card when you register at <https://learningcatalytics.com/>. You will then need to bring a smartphone, tablet or laptop to each class to use the service to participate in the questions and group activities. (If you’re not able to bring one of those devices to class, please contact me to discuss this.)

Course grade calculation

Your scores from the different parts of Physics 270 will be combined as follows:

5%	Participation (lecture interactions, discussion attendance, end-of-semester survey)
20%	Homework (including online and written-on-paper parts)
45%	Midterm exams (15% each)
30%	Final exam

Participation scores will allow for missing up to three class sessions and one discussion meeting with no deduction, no excuse needed. However, please make sure I’m aware of any excused absences, e.g. for illness. No homework or midterm exam scores will be dropped—all will be used to calculate your grade. Finally, your overall PHYS 270 score will be combined with your PHYS 271 (lab) score to calculate the letter grade that will be submitted for both courses.

Course policies

Late or missed work:

Assignments must be completed and turned in when they are due unless you have a valid excuse according to university policy, e.g. illness, in which case an extension will be granted. Please let **me** (not just your TA) know your situation as soon as possible, and I will tell you if I need documentation for the reason for your absence. No credit will be given for work turned in late without a valid excuse. In the case of illness, we will follow the university policy posted at

<http://www.president.umd.edu/policies/v100g.html>: The *first* time you miss a due date during the semester, I will accept a self-signed note from you (without a doctor's note) explaining the dates of your illness and stating that the information is true and correct. If illness causes you to miss more than one due date during the semester, or to miss an exam, I will require a doctor's note. If you do miss an exam, I will schedule a make-up time with you as soon as possible—it starts to cause problems if it's more than a few days later. In any case, whatever the reason for your absence, it is important that you contact me as soon as you reasonably can.

Policy on collaborating:

Working together with other students is part of the course, e.g. in the lectures, discussions, and PHYS 271 labs. Working together to study and figure out the homework is also encouraged, but you must do and turn in **your own work!** This simple rule applies: **Never look at someone else's written solution.** That applies to your classmates as well as anything you find on the web. Talking about how to work the problem is fine if it helps you to understand it better, but copying a solution is strictly forbidden (and will not enable you to succeed on the exams). Work that appears to have been copied will receive zero credit and may lead to an academic integrity referral (see below).

Honor Code:

The University of Maryland has a nationally recognized Code of Academic Integrity, administered by the Student Honor Council. This Code sets standards for academic integrity at Maryland for all undergraduate and graduate students. As a student you are responsible for upholding these standards for this course. I will ask you to sign the Honor Pledge on exams; I won't ask you to sign it on each homework assignment, but it should be understood that the Honor Code still applies to homework. It is very important for you to be aware of the consequences of cheating, fabrication, facilitation, and plagiarism. Violations will be taken very seriously and may result in an XF grade for the course and possible suspension. As your teacher, I have an obligation to uphold the Honor Code and have had to submit some Academic Integrity Referrals over the past few years, unfortunately, which led to XF grades. For more information on the Code of Academic Integrity or the Student Honor Council, please visit <http://shc.umd.edu/SHC/Default.aspx> .

Religious observances:

If you need to miss class, discussion, a homework deadline, or an exam due to a religious observance, please notify me in advance—preferably at the beginning of the semester—so that we can make appropriate arrangements.

Students with disabilities:

Accommodations will be provided to enable students with documented disabilities to participate fully in the course. Please discuss any needs with me at the beginning of the semester so that appropriate arrangements can be made.

Weather or emergency closures:

If the University is closed due to weather or some emergency situation on a day when homework is due, then that homework must be turned in at the beginning of the next class when the University is open. If the University is closed on the scheduled date of an exam, then the exam will be given during the next class period when the University is open. If the University is closed on any non-exam day, including just before an exam, then the exam will still be given according to

the original schedule. If for some reason the University is closed for an extended period, I will continue the course by recording video lectures and posting them on the web, and will ask you to watch them, read, and do homework assignments on your own. In these or other exceptional circumstances, I will attempt to send out information by email.

Course announcements by email:

I will occasionally send important announcements to the class, specifically to each student's **umd.edu** email address. If you use some other email system, please make sure that mail sent to your umd.edu address is successfully forwarded to the address you use most regularly.

Privacy:

You have a right to privacy of your educational records, including the fact that you are enrolled in this course, but I hope you won't mind if the TAs and I may call you by name in the presence of other students. If that may be an issue or if you are ever uncomfortable with the class environment, please don't hesitate to let me know.

Help Resources (in addition to discussion meetings and office hours)

The Slawsky Physics Clinic is staffed by volunteers who offer free assistance with studying and homework Monday through Friday from 10:00 to 3:00. In the past, the Clinic has occupied rooms 1208 and 1214. However, the Office of Student and Education Services staff are currently in those rooms while the OSES offices are being reconstructed. I am not sure whether the Slawsky Clinic will set up in those rooms again when the construction is finished.

If you are interested in hiring a private tutor, the Physics Department maintains a list of people who offer such services – see <http://umdphysics.umd.edu/academics/tutoring-a-academic-support.html> .

Note: Although you may get help in many forms, remember the **Policy on collaborating** described above! Please remind the people you are working with that they should explain and help you learn, not simply show you the answer to a problem, since you are not allowed to copy anyone else's written answer (and you wouldn't learn much, if anything, from it). Also, it is ultimately your responsibility to understand and arrive at (your own) correct answers. There is not much I can do if someone else gives you an ambiguous or incorrect line of reasoning, and even professionals make mistakes from time to time. Therefore, receive help with a healthy skepticism and cross-check your understanding to make sure it really holds together.

If you are experiencing difficulties in keeping up with the academic demands of this course and/or your overall course load, I encourage you to contact the Learning Assistance Service, 2202 Shoemaker Building, 301-314-7693. Their educational counselors can help with time management, reading, math learning skills, note-taking and exam preparation skills. All of their services are free to UMD students.

Copyright Protection of Course Materials

I hope you get a lot out of this course, but not by taking and selling the course materials! ☺ Please understand that my lecture slides, handouts, homework and exam problems and solutions, and the lectures themselves (including any audio or video recordings) are copyrighted by me and/or by other people and may not be distributed or reproduced without explicit permission.