PHYS260

Vibration, Waves, Heat, and Electricity

Spring 2020

Dr. Matt Severson
mseverso@umd.edu (*no* "n", *not a typo*)
PHY 1330

Lecture
MWF 10:00 - 10:50 PHY 1410

Office hours
Tentatively M,Th 2-3 or by appt

Sec	*Discussion*	*TA*	*email*	*Office hours*
0101	W 2-2:50 PHY 1219	Sanket Doshi	sdoshi1@umd.edu	W 4-5 PHY 3260
0102	F 12-12:50 MTH 0106	Stefan Heller	stheller@umd.edu	Th 4-5 PHY 1214 (Slawsky Clinic)
0103	F 2-2:50 PHY 1219	Sanket Doshi	↑	↑
0104	W 12-12:50 PHY 0405	Sergio Smith	srsmith@umd.edu	W 5-6 PHY 3103B

NOTE: Details in this syllabus should be taken as tentative. I will notify you when changes are made.

Course Description

The 161-260-270 course sequence gives an introduction to the concepts of classical and modern physics intended for students studying engineering or other similarly mathematical sciences. This second course in the sequence will cover waves, thermodynamics, electricity, and basic circuits.

Prerequisites: PHYS161 and MATH141

Corequisite: PHYS261 (mandatory for engineering majors)

Recommended Textbook:
S&Z's UNIVERSITY PHYSICS, 14th ed. H. Young and R. Freedman (Pearson, 2016). ***No Mastering Physics.*** Electronic version is available.

Assignments

Homework: I will assign homework almost every week (9-11 total); the homework will be designed to develop your **ability** to ***set up and*** *solve* problems pertaining to the mathematical physical laws studied in each chapter; required exercises will be completed in **Expert TA** online (see more below). I will also assign some recommended exercises from the book to be worked out on paper; solutions to those will be provided after the fact.

A late assignment may incur a penalty, depending on the extent and circumstances. I will drop your lowest assignment score before computing your average.

Quizzes: You will have about 7-8 quizzes, which will take place in the first $\sim$10 minutes of most discussion sections. Quizzes will be closed book, but all formulae will be provided for you. The quiz problems will be largely straightforward and are intended to check your basic competency in topics from recent homework assignments. I will drop your lowest quiz score before computing your average.

Exams: You will also have 4 exams, consisting of a couple short-answer questions about basic concepts and several homework-like problems to solve. The fourth exam will be cumulative, despite my preferences, due to Engineering dept regulations. See the course schedule at the end of this document for tentative dates.

Expert TA

You will need to purchase an ***Expert TA*** *account* in order to complete the required portion of the homework exercises through their online system.

The registration fee is inexpensive, and paid most cheaply directly through the system website *TheExpertTA.com* during registration. A code can also be purchased at the bookstore at some additional cost. Details about how to register will be posted on ELMS before classes begin.

The financial obligation involved here is an unfortunate aspect of extreme class sizes, but (a) the system is more affordable than corporate alternatives and (b) it provides state of the art (not just saying that) assignment feedback to make up for the cost.

Discussion

Discussion sessions will consist of the short quizzes mentioned above followed by about 40 minutes of time to work with the TA or your peers on any problem or difficulty you have come across in the homework assignments.

Grading Scheme

Homework	30%
Quizzes	25%
Exams (4)	45%

ELMS Posts and Communicating with Me

I will clearly post all announcements, assignments, due dates, and other important information on the course ELMS page. I will also use ELMS to send course-wide emails when necessary. *It is **your responsibility** to find such information on ELMS.* Please check the page regularly for updates. I will be rather inflexible in dealing with problems that arise due to your failure to know things that have been said on ELMS.

That said, the TA or I will be happy to answer any other questions about course material, trouble with assignments, etc as they arise. Please feel free to send me email at any time for such reasons.

Attendance, Religious Observances, and University Closures

Your TA and I will be paying attention to who is here, who is participating, who comes to office hours, etc. Playing along in these ways will be quite beneficial to you, especially in the event of borderline performance in the course. For instance, if you wind up at the cutoff between two letter grades at the end of the semester, the effort you put forth throughout the course will be pivotal in my decision as to where to draw the line.

All that said, if you already know this material well, and you're only taking the course because your department is making you, I will not be offended by your regular absence in the classroom, and you will not be penalized for it, as long as you're present for exams, and quizzes, all of your assignments are turned in promptly, and your performance is satisfactory.

***If you need to miss a deadline or an exam** for a religious observance or other legitimate reason, **please notify me in advance**, and preferably ASAP.* If you miss a lab or exam due to illness or emergency, please get in touch ASAP after the fact. In all cases, a makeup exam will be arranged accordingly.

If the university is closed due to inclement weather or some emergency situation on or near an exam day or other important date, I will contact you on ELMS with further instructions.

Academic Integrity

Learning to solve problems in physics can be a difficult and tedious process; often students find it beneficial to work with a partner on such problems. This sort of behavior is encouraged, although you should avoid much larger groups to discourage stragglers.

That said, it is crucial that all students create and submit *their own* assignments. ExpertTA monitors the internet for people posting their solutions. I expect you to avoid sharing too much input with each other in any GroupMe's etc. And I'll be watching you (yes, actually) during the exams. If I see or hear that you are not playing fair, there will be zero tolerance. Such actions may result in an XF grade for the course and/or further action taken by the Student Honor Council.

Students with Disabilities

Accommodations will be provided to enable students with 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. Students who are registered with ADS and plan to take exams at their facilities should provide the pertinent authorization forms (electronic format is fine) *at least* one week prior to the first exam date.

PHYS 260
Tentative Schedule Outline
Spring 2020

Wk	*Week of*	*Ch(s)*	*Content*
1	Jan 27	15	traveling and standing waves
2	Feb 3	16	sound, decibel scale, standing sound waves
3	Feb 10	16,17	resonance, interference, Doppler effect, temperature
4	Feb 17	17,18	thermal expansion, heat, heat transfer **Exam 1 - Fri, Feb 21, Ch 15-16**
5	Feb 24	18	thermal properties of matter, phases
6	Mar 2	19	1st law of thermo, internal energy, ideal gas
7	Mar 9	20	2nd law, engines, refrigerators, entropy
8	Mar 16		*No class due to Spring Break holiday*
9	Mar 23	21	charge, electric force, Coulomb's law **Exam 2 - Fri, Mar 27, Ch 17-20**
10	Mar 30	21,22	electric fields, electric flux
11	Apr 6	22	Gauss's law, conductors
12	Apr 13	23	electric potential energy, voltage
13	Apr 20	24	capacitors, dielectrics, current
14	Apr 27	25	resistance, circuits **Exam 3 - Fri, May 1, Ch 21-24**
15	May 4	25	EMF, series and parallel circuits
16	May 11	25	RC circuits **Final Exam - Fri, May 15** 6:30 - 8:30pm - location TBA!