University of Maryland
Department of Physics
Physics 270 – FALL 2024
"General Physics: Waves, Optics, Relativity and Modern Physics"

Instructor: Dr. Hailu Gebremariam **email:** hailu@umd.edu
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Sections 0101 – 0103: **Lecture Date and Time: Tu, Th 5:00 – 6:15 PM**
Lecture Room: 1410 Physics Building

Office Hours: **Tu, Th 2 PM – 3 PM or by appointment**

Discussion schedule:

Section	Date and Time	Room	TA
0101	Th 2:00 – 2:50 PM	PHY 0405	Kelsey Jackson, kaj22475@umd.edu
0102	Th 4:00 – 4:50 PM	PHY 0405	Taylor St Jean, tstjean@umd.edu
0203	W 9:00 – 9:50 AM	PHY 0405	Kelsey Jackson, kaj22475@umd.edu

Textbook: ***University Physics Volume 1 and 3 from OpenStax,***

Chapter refers to OpenStax University Physics Volumes 1 and 3:
https://openstax.org/details/books/university-physics-volume-1
https://openstax.org/details/books/university-physics-volume-3

Good news: *your textbook for this class is available for free online, in web view and PDF format! You can also purchase a print version, if you prefer, via the campus bookstore or from OpenStax on Amazon.com.*

You can use whichever formats you want. Web view is recommended -- the responsive design works seamlessly on any device. If you buy on Amazon, make sure you use the link on your book page on openstax.org so you get the official OpenStax print version. (Simple printouts sold by third parties on Amazon are not verifiable and not as high-quality.)

- ***You will need to buy an expert TA account to access and complete the required Homework assignment.***

Course Description:
Prerequisite: PHYS261, MATH241, and PHYS260.
Corequisite: PHYS271.

Third semester of a three-semester calculus-based general physics course. Waves, sound, electromagnetic waves, optics, special theory of relativity, and modern physics.

Midterm Exams: September 26, October 24, November 21

Final Exam: Saturday December 14, 1:30 PM – 3:30 PM

Important Notes:

1. **Lectures:**

Students are required to attend lectures, where announcements will be given, exams will be announced and administered, and the course material will be presented.

Not all material will be directly covered in lectures. Students are responsible for reading and understanding all material in assigned chapters, whether or not this material is explicitly treated in the lectures.

This Physics course is extremely fast paced and demanding. You will be learning new concepts every lecture and missing even one lecture can make you fall behind simply because the concepts build on the ones covered in earlier sessions. Hence, attendance to lectures and discussions are mandatory.

2. **Discussions:**

You must attend your discussion section, and you must go to the section you have been assigned. Your TA will cover material (homework and exams) that may not be covered elsewhere. Please come prepared so you can ask questions, i.e. read the assigned chapter and work on the homework problems. Remember, the TA is there to explain things and give help when you are stuck, not to dole out answers.

3. **Quizzes:**

Several 20-minute quizzes will be conducted throughout the session administered on ELMS. Each quiz will be available weekly (due at the end of the week). The quizzes will be a chance to check on how you are doing conceptually.

There will be no makeup for missed quizzes. You will be exempt if you have a valid, documented excuse for missing the quiz.

4. **Homework Assignments:**

Homework will be done through ***Expert TA***. You must submit your answers for the homework problems over the internet using the ***Expert TA*** web site.

You will need to purchase an ***Expert TA*** *account* in order to complete the required homework assignment. The codes can be purchased at the bookstore (or elsewhere) or can be obtained independently through the system website: *TheExpertTA.com*.

Since ***Expert TA*** is synchronized with canvas, when you click on the first HW in canvas it will take you to *theexpertTA.com* and you will purchase the access code for the assignments. The first HW will not be actual questions from the course but it is for the purpose of making sure that you have access to the HW assignments and familiarize yourself with expert TA.

There are several advantages to electronic homework submission:

(1) You will know right away if your answer is right or wrong

(2) If you give a wrong answer, you can go back and try again to see if you can get the correct solution. You will be allowed 5 attempts for each question, so don't waste them. **For multiple choice or True/False questions, it will take points off for each wrong attempt. For other questions no point will be taken off for wrong attempts.**

Note that the software may randomize the numbers each time you make a new attempt on a problem, so be careful and remember that other students working on exactly the same problems are likely to have different numbers. The best way to do physics problems is first to work out carefully a general analytical solution to the problem and then plug in the numbers at the end. This is especially true if the numbers are being randomized each time so everyone has different numbers.

Why You Need to do the Homework: One of the main ways you can understand Physics is by doing the homework. Do not wait until the night before it's due to start working on your homework. The homework can be expected to be difficult and it counts a lot towards your final grade in enabling you to succeed on your exams. A sure way to get an F in this course is to not do the homework or not give yourself enough time to work on it. Late homework will incur a penalty. **For every day you are late you will incur 10% penalty. All homework assignments will be closed for submission by the end of the class date.**
It is your responsibility to check elms.umd.edu frequently to make sure you do not miss any due date.

5. Exams

There will be three 60-minutes mid-term exams and a 2 Hr. Final exam. You must take the Final exam in order to pass the course.
All exams are closed book and closed note exams. For each exam, you may have one "cheat sheet" that contains physical constants and formulas. You may also have a calculator.
NO Exam will be dropped.

6. Grading:

The final grade will be based on the components with the following weights:

Mid-term exams: 3 x 15 %	= 45 %
Comprehensive Final Exam	= 25 %
Homework	= 20 %
Quizzes	= 10 %

At the end of the semester all the exam, quiz and homework grades will be added with the above weighting and a final letter grade will be assigned depending on the total scores.

I will be guided by the University of Maryland grading policy, quoted below:

- A+, A, A- denotes excellent mastery of the subject and outstanding scholarship. (90-100)
- B+, B, B- denotes good mastery of the subject and good scholarship. (80-90)
- C+, C, C- denotes acceptable mastery of the subject and the usual achievement expected. (70-79)
- D+, D, D- denotes borderline understanding of the subject. It denotes marginal performance, and it does not represent satisfactory progress toward a degree. (60-70)
- F denotes failure to understand the subject and unsatisfactory performance. (< 60)

A histogram of total scores for the entire class will be plotted. Assuming that the distribution is reasonably bell-shaped, letter grades will be assigned so that students with scores in the top 20% will receive an A (A+, A, A-), the next lower 40% will receive a B (B+, B, B-), the next lower 25% will receive a C (C+, C, C-), and the remaining 15% will be split between D and F.

If the total score distribution allow the number of students getting A's, B's, C's, D's and F's match or more than the percentage stated above, there will be no curving. If the number of students getting A's, B's, and C's, are lower than the stated percentage, then there will be curving.

7. Excuses

Missing an exam is not allowed without a valid documented excuse as defined by the University (medical problem, religious holiday, or serious family crisis). In all cases, a makeup exam must be completed in a reasonable amount of time or you will receive a score of zero for the exam. The makeup test or assignment, and the due date, must be arranged by consulting with the Professor as soon as possible after it becomes apparent that an exam date will be missed.

There is NO makeup for missed Quiz. If you miss a quiz and you have a valid excuse supported by a document, you will be exempted from that quiz. If you miss **more than** one quiz with a valid excuse supported by a document, you should discuss it with the instructor to arrange a special makeup for the second (or more) missing quiz.

Turning in late homework is not encouraged as it will result in a reduction of 10% of the points for every day late. If you are going to miss an assignment because of a religious holiday, it is your responsibility to inform the instructor in advance so that suitable arrangements can be made.

8. Students with Disabilities:

Students with disabilities should meet with the instructor at the beginning of the semester so that appropriate arrangements can be made to accommodate the student's needs.

9. Academic Integrity:

All students will be expected to comply with the University of Maryland's academic integrity policies, including the code of academic integrity and the honor pledge. Failure to comply will result in a failing grade and will be reported to the Honor Council.

10. University closure:

In the event of a University Closure the department will do its best to accommodate students by scheduling make-up sessions or revision of the lab schedule.

Phys 270 Schedule for FALL 2024 (subject to change)

	Dates	Topics	Vol, Chapter
Week 1	08/27, 08/29	Introduction, Syllabus Traveling waves	1, 16
Week 2	09/03, 09/05	Standing waves; resonance;	1, 16
Week 3	09/10, 09/12	Sound perception, standing sound waves; decibel scale; Doppler	1, 17
Week 4	09/17, 09/19	Light; ray model; reflection; refraction; Snell's law;	3, 1
Week 5	09/24	Geometric optics	3, 2
Week 5	**09/26**	**Exam 1**	
Week 6	10/01, 10/03	Interference	3, 3
Week 7	10/08, 10/10	Diffraction	3, 4
Week 8	10/15, 10/17	*Relativity; simultaneity; time dilation; Lorentz transformation*	3, 5
Week 9	10/22	*Relativity; simultaneity; time dilation; Lorentz transformation*	3, 5
Week 9	**10/24**	**Exam 2**	
Week 10	10/29, 10/31	*Relativistic kinematics; Doppler effect*	3, 5
Week 11	11/05, 11/07	*Blackbody Radiation; Compton scattering; Photoelectric effect*	3, 6
Week 12	11/12, 11/14	*Bohr model, matter waves, wave-particle duality*	3, 6
Week 13	11/19	*Wave functions, uncertainty principle, Schrödinger eq.*	3, 7
Week 13	**11/21**	**Exam 3**	
Week 14	11/26	Schrodinger Eq.	3, 7
Week 14	**11/28**	**NO CLASS - Thanksgiving**	
Week 15	12/03, 12/05	*Particle in a box, quantum harmonic oscillator*	3, 7

Saturday, December 14, 2024
1:30 – 3:30 PM
Final Exam