

Physics 122 – Fundamentals of Physics II

Fall 2024



Sections	Lecture Hours
101-102-105	MWF 1 pm – 1:50 pm Room 1410

Instructor: **Dr. Heidarian**

Email: nheidari@umd.edu

Office: room 3109 Toll Physics building

PLEASE READ CAREFULLY!

- I kindly request that each of you read all the announcements I post on ELMS carefully until the end of the semester. Should you not be receiving notifications for my announcements, I urge you to regularly check the announcement section of your Canvas account at a minimum of two times per week. Crucial instructions, alterations, and class plans will solely be conveyed through announcements accessible on your ELMS account. I will not accommodate individuals who overlook or fail to see the announcements made in the ELMS page of this course on Canvas.
- Please read the **schedule of the labs** and the tentative plan for the chapters covered in this course on the **last pages of this syllabus**.
- Please pay attention to my **Grade Breakdown** and **Grading Scheme** as you might find it different from other classes you are taking. **To avoid any surprises at the end, plan accordingly.** Take every single assignment seriously. **I will not provide any extra/bonus activity after the final exam,** and you cannot boost your grade at the end of the semester. **You need to start working toward your desired grade NOW!** I don't respond to emails asking for points or change of grade at the end of the semester (unless there is a mistake in the grading of course).

- **Please read my make-up policies for quizzes, homework, and exams carefully.**
- **Recommended Textbook:** “College Physics: A Strategic Approach” by Knight, Jones and Field, published by Addison-Wesley / Pearson. This textbook is recommended for the course. You can also use other editions of the book or any other General Physics books you can find.
- **Website:** The class schedule and any class related activity (grades, assignments etc.) will be posted on ELMS. <http://elms.umd.edu>
- **IT IS YOUR RESPONSIBILITY TO LOGIN TO YOUR ELMS ACCOUNT AND READ ALL ANNOUNCEMENTS, ASSIGNMENT DUE DATES, EXAM DATES CAREFULLY.**
- **Office Hours:** Will be announced soon on the syllabus page.
- **All labs and Homework will be carried out with Expert TA.** You need to purchase and register for both ExpertTA lab and ExpertTA homework. **They need to be purchased separately. Please see the Lab and Homework section of this syllabus for registration links and instructions.**
- If you have any questions, please reach out via email, ensuring that you **include your course number and section number in all communications.** Since I teach multiple classes, specifying the class and section you are enrolled in when you email me, will facilitate a prompt response. For questions related to the Labs, kindly direct them to your Lab TA.

Course Description:

PHYS 122 is the second of a two-semester series in general physics. The course is a continuation of PHYS 121, and covers waves, electricity and magnetism, optics, and modern physics. This survey course, together with PHYS 121, generally satisfies the minimum requirement of medical and dental schools. Below is an overview of the main topics we will discuss in class:

<p>Oscillations and Waves</p> <ul style="list-style-type: none"> • Oscillations • Traveling Waves and Sound • Superposition and Standing Waves <p>Electricity and Magnetism</p> <ul style="list-style-type: none"> • Charges and Forces • Electric potential • Current and Resistance • Circuits • Magnetic Fields and Forces • EM Induction and EM Waves • AC Electricity 	<p>Optics</p> <ul style="list-style-type: none"> • Ray Optics • Wave Optics • Optical Instruments <p>Modern Physics</p> <ul style="list-style-type: none"> • Quantum Physics • Physics of Atoms
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ESSENTIAL INFORMATION ABOUT THE COURSE

PLEASE READ CAREFULLY!

Lectures And Lecture-Quiz

- We will try to go over one chapter per week. **At the end of each week, expect a new Homework assignment.**
- Please note that we cover many topics during the semester, therefore, there is not enough time to work on many example problems in class. Problem solving is the only way you can learn these concepts.
- **You will have in-lecture pop quizzes. The lowest lecture quiz grade will be dropped which counts toward an unexcused absence for which you don't need to provide documents.**
- **You need to have access to your ELMS account during the lecture which means you need to have an electronic device connected to the internet with you to login when the quiz is announced during the lecture.**
- The combination of all activities during Lecture hours, Labs, and discussion sessions will help you learn the concepts. **Remember, you do not learn physics by reading the textbook only. Physics is Problem Solving!** You will learn the concepts through practicing and working on problems. **I will upload practice problems on ELMS with a key before the exams.** The complete solution to practice problems will Not be provided. I usually discuss some of them in class or upload separate videos on the practice problem sets. The earlier you start working on problem set questions, the better!
- **Try not to work on the problem set questions in order!** Challenge yourself!

- We have created a **Piazza** board for this course where you can post your questions and our TAs are there to help you.
- If you miss a lecture, I cannot provide any videos, or material in addition to the PowerPoint slides provided each week on the ELMS page of the course. You need to catch up with the rest of the class asap and provide note/documents for your excused absence.

Pop Quiz Make Up Policy:

- If you miss the lecture quiz, and if you have documents for your excused absence you need to contact me asap with your course number, section number and document, as well as your availability to make up the quiz for the following week. **You should make up any lecture quizzes you missed no later than ONE WEEK after the original date of the assignment. I will NOT provide any accommodations beyond that date.**

- Laboratory work will be carried out with the assistance of the **Expert TA** software, whose website is (<https://theexpertta.com/>). This website is how you will access your lab manual, lab videos, data, and additional assignments. You can purchase the access directly from the Expert TA website. The table below displays the class codes that you will use to purchase access to your section of the lab. To purchase your code, you should visit <https://login.theexpertta.com/registration/classregistration.aspx>

and you will be prompted to enter a class code. When you enter your class code, you will be prompted to register and pay. **(If you encounter any errors, try to enter the code manually)**

Labs

Section	Class Registration URL
101	http://goeta.link/USH22MD-5E2131-2S5
102	http://goeta.link/USH22MD-51F1D9-2S4
105	http://goeta.link/USH22MD-00AB2B-2S3

- Each week you will do the designated laboratory exercise, coordinated by your Teaching Assistant, and complete the assigned experiment.
- You must submit your pre-lab (via the ExpertTA account) BEFORE your lab.
- You should read the lab description beforehand. **For each lab, you must submit to ELMS complete lab report and answers to the questions BEFORE the due date.**
- **Please check the guidelines and ask your TA as how to prepare your lab report to avoid missing points.**
- **Lab reports are due one week after the date of the experiment.**

	<ul style="list-style-type: none"> • Late lab reports will not be accepted unless there is a valid excuse Doctor's note/document, and it should be communicated with your TA beforehand. • Your lab grade will be based on your lab report, your presence in the lab, and your pre-lab grade. • Please see the last page of the syllabus for the schedule of your labs. • The format expected for the lab reports is the one given in the TOC and Introduction part of the lab manual. <p>Lab Make Up Policy:</p> <ul style="list-style-type: none"> • If you miss a lab, there will be a make-up week (See the schedule on the last page of this syllabus). You should make up the missed experiment during the make-up week and communicate that with your TA. You cannot make up more than two labs during the makeup week.
<p>Discussions</p>	<ul style="list-style-type: none"> • Discussion sessions are a great place to clear any confusions about the materials and ask questions about the homework problems. • You will have a quiz during your discussion class each week. • These discussions sessions will be conducted by Teaching Assistants, where problems will be worked on with student participation. <p>Discussion Quiz Make Up Policy:</p> <ul style="list-style-type: none"> • If you miss a quiz, contact your TA immediately with documents for your excused absence and schedule your make up quiz no later than one week after the original date.
<p>Homework</p>	<ul style="list-style-type: none"> • Homework will be carried out with via Expert TA. • Your homework assignments are accessible through Canvas. To access them, go to the Assignments tab on your Canvas course page and click on the homework assignment labeled "HW1." This will direct you to the Expert TA registration process, where you'll need to complete the required payment. Always sign in through Canvas when accessing homework assignments. • It is your responsibility to check the due dates regularly and make sure you do not miss any assignments. Late work is NOT accepted and no partial credit for late work is provided unless there is document provided and discussed with me BEFORE THE DUE DATE!! I do NOT accept requests for extensions AFTER the due date!!!

Homework Extension Policy

- I assign one homework per week and the due date will be either on **the 15th** or the **end of each month, which means you will have more than one assignment due on the same day!** You need to start working on your assignment as soon as possible and over time!
- **Don't wait until the night before the due date to start your work!** Unexpected things can happen, and you don't want to miss out on earning your homework points.
- In case of an emergency, contact me with your documents and I can extend the HW for you by only a few days. **Extensions will only be granted if you have previously attempted the assignments and need additional time to complete the work missed due to an excused absence.**
- **I will not accept requests to re-do or extend HW at the end of the semester. If your grade is important to you, start working on it as soon as it is published**

Exams

- There will be **three** mid-term exams and **one** final exam.
- You will need a regular calculator with standard trigonometry functions.
- **It is your responsibility to bring your own calculator** and check the batteries before each exam. Extra calculators will NOT be provided, and points will be taken off if the final answers are not calculated properly.
- **A formula sheet will be provided, and you are not allowed to bring your formula sheet to the exam. I will upload the formula sheet along with the practice problems prior to the exam, and I highly recommend that you use my formula sheet to practice for the exam and familiarize yourself with all the formulas and notations.**
- Exams must be taken on the scheduled dates. Unless it is discussed otherwise.
- **The lowest of three scores in the midterm exams will be dropped at the end.**
- **This means midterm 3 is optional**, and if you are happy with your midterms 1 and 2 grades, you don't need to take midterm 3.
- There will be an extra credit question on each exam (including the final exam).
- **The final exam is mandatory, and it makes up %15 of your Total grade!**
- **You cannot replace midterm 3 with the final exam.**
- For the final exam, make-up exams will be given only under extraordinary circumstances if arrangements are made with me ahead of time.
- Exams will cover the material discussed in the class, lecture notes, problems solved in class, and problem set questions.
- A problem set will be uploaded before each exam for you prepare for the exam. Start working on those questions as soon as you can! Over time! **Remember, the**

more problems you solve, the faster you get and the easier it is to find the correct formula an approach on the exam!

Exam Make Up Policy

- There will be **NO make-up for Midterms without provided documents.**
- If you miss a midterm exam, you need to contact me **during the same week** as the original date and schedule your make up exam for the following week.
- **When you email me to request a make-up exam, you should include your course number, section number, your availability for the following week and your document for the excused absence all in one email.**

Homework	% 20
Discussion Quiz	% 10
In-lecture Quiz	% 5
Lab	% 20
Mid-term exams	% 30 (%15 each)
Final exam	% 15

Format Of Each Exam

- Each midterm and the final exam will have multiple choice and comprehensive questions.
- The multiple-choice section of the final exam will be cumulative. The chapters included in the free response section will be announced.
- The final grade will be set at the end of the semester after all work is completed.
- The final grade will be determined by the University of Maryland grading policy, quoted below:
- A excellent mastery of the subject and outstanding scholarship.
- B good mastery of the subject and good scholarship.
- C acceptable mastery of the subject and the usual achievement expected.
- D borderline understanding of the subject. It denotes marginal performance, and it does not represent satisfactory progress toward a degree.

Grading Scheme

A+ 100 % to 98.0%
A < 98.0 to 95.0%

Course
Grade break-
down

A- < 95.0 to 90.0%
B+ < 90.0 to 88.0%
B < 88.0 to 85.0%
B- < 85.0 % to 80.0%
C+ < 80.0 % to 78.0%
C < 78.0 % to 75.0%
C- < 75.0 % 70.0%
D+ < 70.0 % to 68.0% etc.

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Please note, there will be NO extra points/activities available beyond the extra credit questions on each exam, so plan ahead. If you are struggling with the material, reach out before it is too late. The last day of classes is NOT a good time to reach out and ask for help!

I will not add any points to anyone's grade on an individual basis regardless of how close you are to the next cut-off, or how important your grade is for your scholarship or the program you are applying for, so Please do not email me about that. Your performance during the semester will determine your grade so plan ahead of time and take every single assignment seriously.

Tutoring and Help

- You have access to various resources including my office hours, your TAs for the course, discussion sessions, and the Piazza platform.
- Feel free to assist one another on the Piazza discussion board whenever you come across a problem for which you know the solution! Your valuable comments will be beneficial to everyone involved.
- We are here to help you learn, so please do not hesitate to reach out and make sure you understand the course material before it's too late.

Course Evaluation

- Your participation in the evaluation of courses through CourseEvalUM is a responsibility you hold as a student member of our academic community.
- Your feedback is confidential and important to the improvement of teaching and learning at the University.
- You can go to the CourseEvalUM website (<https://courseevalum.umd.edu/>) to evaluate the course.

<p>Students with disabilities</p>	<ul style="list-style-type: none"> • Students with disabilities should contact the instructor at the beginning of the semester so that appropriate arrangements can be made to accommodate the student's needs. Accommodations will be provided to enable students with documented disabilities to participate fully in the course. • Please schedule your test with the ADS center at least one week prior to each exam! There is no guarantee that the required steps will be taken on my side if you schedule your exam last minute! 																					
<p>Academic Integrity</p>	<ul style="list-style-type: none"> • You must work by yourself on exams. • You must work on the homework by yourself. • Discussions with other students are strongly encouraged. But you should not just directly copy from anyone. Doing so is not only dishonest but will hurt your ability to do the problems on the exams. • You must sign the honor pledge in the beginning of each exam. 																					
<p>Course Related Policies</p>	<p style="text-align: center;">Know Your Rights! Know the University of Maryland Policies for Undergraduate Students</p> <p style="text-align: center;">For more information, please visit this webpage: http://www.ugst.umd.edu/courserelatedpolicies.html</p>																					
<p>Discussion and lab schedules: See Testudo</p>	<table border="1"> <thead> <tr> <th>Section</th> <th>Teaching Assistant</th> <th>email</th> </tr> </thead> <tbody> <tr> <td>101 lab</td> <td>Schram, Joshua</td> <td>joschram@terpmail.umd.edu</td> </tr> <tr> <td>101 dis</td> <td>Schram, Joshua</td> <td></td> </tr> <tr> <td>102 lab</td> <td>Mentzell, Alex</td> <td>mentzell@terpmail.umd.edu</td> </tr> <tr> <td>102 dis</td> <td>Mentzell, Alex</td> <td></td> </tr> <tr> <td>105 lab</td> <td>Han, Zhaochong</td> <td>hanc@umd.edu</td> </tr> <tr> <td>105 dis</td> <td>Han, Zhaochong</td> <td></td> </tr> </tbody> </table>	Section	Teaching Assistant	email	101 lab	Schram, Joshua	joschram@terpmail.umd.edu	101 dis	Schram, Joshua		102 lab	Mentzell, Alex	mentzell@terpmail.umd.edu	102 dis	Mentzell, Alex		105 lab	Han, Zhaochong	hanc@umd.edu	105 dis	Han, Zhaochong	
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Lecture/Exam Schedule

The content of the mid-term exams may change depending on how the course develops and based on the need of students

Week Beginning	Chapters covered during the week
Week of Aug 26	Chapter 14 Oscillations
Sept 2 - Labor Day No Class on Monday	Chapter 14- Chapter 15 Traveling Waves and Sound
Sept 9	Ch15- Chapter 16 Superposition and Standing Waves
Sept 16	Ch16- Chapter 20 Electric Fields and Forces
Sept 23	Chapter 20 Electric Fields and Forces
Midterm 1- Friday Sept 27	Chapters 14-15-16-20
Sept 30	Chapter 21 Electric Potential
Oct 7	Chapter 22 Current and Resistance
Oct 14	Chapter 23 Circuits
Oct 21	Chapter 23 Circuits-Exam
Midterm 2 - Friday Oct 25	Chapters 21-22-23-maybe 24 (see announcements for potential changes)
Oct 28	Chapter 24 Magnetic Fields and Forces – Ch25
Nov 4	Chapter 25 EM Induction and EM Waves
Nov 11	Chapter 17 Wave Optics – Chapter 18
Nov 18	Chapter 18 Ray Optics
Midterm 3 – Friday Nov 22	Chapters 24-25-17-part18
Nov 25 (Monday class not canceled)	Chapter 18- Chapter 19 Optical Instruments
November 27-Decemabr 1 (Wednesday-Sunday)	Thanksgiving Recess
Dec 2	Chapter 19 Optical Instruments
Dec 9 – Last Day of Class	Ch29 Atomic spectra
Final Exam	Thursday, December 12 -4pm - 6pm SEE TESTUDO FOR POTENTIAL CHANGES

Physics 122 Labs, Fall 2024

Monday - Wednesday

Instructors: Dr. Heidarian & Dr. Hall

nheidari@umd.edu

Wk	Week of	Expt #	Experiment
1	Aug 26	--	No Labs
2	Sep 2	--	No Labs
3	Sep 9	1	The Pendulum
4	Sep 16	2	Sound and the Oscilloscope
5	Sep 23	3	Standing Waves on a Vibrating String
6	Sep 30	4	Voltage and Equipotential Surfaces
7	Oct 7	5	Charge to Mass Ratio of an Electron
8	Oct 14	1 - 5	Make-Up Labs
9	Oct 21	6	Resistance and Ohm's Law
10	Oct 28	7	Polarization of Light
11	Nov 4	8	Diffraction and Interference of Light
12	Nov 11	9	Ray Optics
13	Nov 18	10	Atomic Spectroscopy
14	Nov 25	--	No Labs – Thanksgiving Break
15	Dec 2	6 - 10	Make-Up Labs