

Physics 273 Syllabus - Fall 2020

Official Course Description: PHYS275 - Experimental Physics I: Waves

(3 credits) (Prerequisites: MATH241 and PHYS272)

Grade Method: REG/P-F/AUD.

What the course is about: Physics 273 is about the physics of the oscillations and waves. It will cover the physics of mechanical waves, electromagnetic waves as well as aspects of optics. The course will also cover the mathematical tools and techniques required for describing waves and oscillations.

Class time:

TuTh 12:30pm - 1:45pm ONLINE

Friday 11:00am -11:50am ONLINE

All classes meet online via Zoom meetings that are scheduled in the ELMS page.

***Contact Information for Course Instructors:**

Prof. Hassan Jawahery

jawahery@umd.edu

3208G Physical Sciences Complex

301-405-6062

*** Teaching Assistants**

Adam Dirican

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*** Required Texts:**

(1) "*Introduction to Vibrations and Waves*" – 2nd Edition, H.J. Pain and Patricia Rankin

(2) Lectures by David Morin (Harvard) on Waves. Available for free access at:

<http://www.people.fas.harvard.edu/%7Edjmorin/book.html>.

Lectures

The lectures will follow the content described in the schedule and the reading assigned from the above two textbooks.

Assignments and Grading Policies

Problems sets will be assigned on a weekly basis, usually on Tuesday. The list will be put on ELMS. They are due (via upload to ELMS) on Monday the following week at mid-night.

- You are permitted to work with classmates on problem sets. However, simply copying a classmate's assignment is not allowed.
- We will discuss the problem sets *before* they are due, typically in class on Fridays, the class before they are due. It is important that you attempt the problem set *before* Friday's class.
- One problem set grade will be dropped.
- Only a subset of the problems will be graded. Solutions will be provided online for all the problems. To simplify the preparation of solutions exemplary student solutions may be reproduced (with the names omitted) as the solution. If you do not wish your solutions to be used in this manner, please indicate this on your homework.

Exams. There will be one midterm exam and a final.

Grades:

For Physics 273:

Mid-term exam: 40%

Final Exam: 40%

HW problems: 20%

For Physics 273H:

Mid-term exam: 35%

Final Exam: 35%

Project: 15%

HW problems: 15%

Honors Section/PHYS 273H

The honors version of the course, PHYS 273H, meets at the same time and place as PHYS 273 meets. In addition to the work in PHYS 273, students in the honors section are responsible for an independent research project on a special topic related to waves. The goal of your research project is to learn in detail about a topic that is not covered in depth in class. At the end of the semester you will submit a paper describing the results of your project. You will also give a 10-minute presentation to the whole class.

Project Types: You are free to decide the scope and style of your project, subject to approval by the instructor.

Project Proposal: Write a brief proposal for your project, including the type of project and its topic. I will

approve the proposal or suggest changes. You must turn in your project proposal to me by Friday September 25th

and get final approval by Oct. 2nd.

Physics 273- Preliminary Schedule Fall 2020

Sept. 1 – Sept. 4	Simple Harmonic Oscillations <i>Reading: Chapter 1 (Pain and Rankin), Morin Chapter 1</i>
Sept. 8 – Sept. 11	Damped oscillations and Forced Oscillations <i>Reading: Chapters 2 and 3 (Pain and Rankin), Morin Chapter 1</i>
Sept. 15 – Sept. 18	Coupled Oscillators <i>Reading: Chapters 2 and 3 (Pain and Rankin) and Morin Chapter 2</i>
Sept 22 – Sept 24	Transverse Waves <i>Reading: Chapters 5 and 6 (Pain and Rankin) and Morin Chapter 5</i>
Sept. 29 – Oct. 2	Transverse Waves <i>Reading: Chapters 5 and 6 (Pain and Rankin) and Morin Chapter 5</i>
Oct. 6 - 9	Longitudinal Waves <i>Reading: Chapters 7 (Pain and Rankin) and Morin Chapter 4</i>
Oct. 13 - 16	Review & Mid-term Exam
Oct. 20 - 23	E&M Waves: Transmission lines <i>Reading: Chapter 8 (Pain and Rankin)</i>
Oct. 27 - 30	E&M Waves: <i>Reading: Morin Chapter 8 & Chapter 9 (Pain and Rankin)</i>
Nov 3 – 6	E&M Waves: <i>Reading: Morin Chapter 8 & Chapter 9 (Pain and Rankin)</i>
Nov. 10-13	Interference and Diffraction <i>Reading: Morin Chapter 9 & Chapter 12 and 13 (Pain and Rankin)</i>
Nov. 17-20	Interference and Diffraction <i>Reading: Morin Chapter 9 & Chapter 12 and 13 (Pain and Rankin)</i>
Nov. 24	Fourier Methods <i>Reading: Chapter 11 (Pain and Rankin) and Morin Chapter 3</i>
Dec. 1-4	Other topics
Dec. 8-11	Physics 273H presentations & Review
Dec. 15-18	Final Exam

*The University of Maryland, College Park 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. It is very important for you to be aware of the consequences of cheating, fabrication, facilitation, and plagiarism.