

Fall 2023

PHYS 234 - HM1: Physics III Lecture

Andres Jerez

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Instructor: Andres Jerez: jerez@njit.edu
(When writing, please include course and section in the subject: Phys 234 HM1)

Lectures: Mondays and Wednesdays, 1:00 PM – 2:20 PM, TIER LECT 2

Office hours: Mondays, 2:30 PM – 3:30 PM, Wednesdays, 11:30 AM – 12:30 PM, TIER 455, and by appointment.

PREREQUISITE: Math 112 or 112H

FAILURE TO MEET EITHER CO-Requisites or PRE-Requisites will result in student being dropped from class.

COURSE MATERIAL:

- **Mastering Physics Homework System (REQUIRED):** Each student must enroll in the course specified by the instructor by obtaining access to Mastering Physics for University Physics with Modern Physics, 15th edition, Young and Freedman, Pearson (July 6th 2019) - Copyright © 2020. There are several purchase options based on duration and whether or not the e-book is included. Please see this link <https://www.pearson.com/store/p/university-physics-with-modern-physics/P100002510958>
Here are the instructor and course information needed for registration (*See below for instructions on how to register for this particular section*):
 - Instructor's Course ID: jerez29648
 - Course Name: PHYSICS III, PHYS 234 HM1, Fall 2023Assignments will be posted online in Mastering Physics. Students log-in, solve the assigned problems, and submit answers to the automated grading system.
- **Textbooks:** The homework and the structure of the course follows University Physics with Modern Physics, 15th edition, Young and Freedman, Pearson, which can be obtained as an ebook with the Mastering Physics registration. It is not a requirement, as opposed to MasteringPhysics. However, I strongly encourage you to have access and use to a College Physics textbook. An alternative to consider may be the Openstax textbooks, <https://openstax.org/details/books/university-physics-volume-3> (and volume 1 as well).

HONORS REQUIREMENTS: As part of your Honors course expectations, I would like you to do one of the following activities:

- Investigate a topic in Optics or Quantum Physics not covered in the course
- Explore connections between your major area(s) of interest and the subject on the course

We will meet individually over the semester to discuss the assignments. You can find more information about honors requirements [here](#).

CANVAS: The Learning Management System at NJIT is [Canvas](#). Lecture notes, quizzes, grades, exams, and additional course material will be managed through Canvas.

LECTURES: It is expected that students will attend all lectures and recitations. Attendance will be taken at all classes and exams. More than 3 unexcused absences (in total) are excessive. If you have excusable absences contact the Dean of Students. If you must withdraw from the course, do it officially through the Registrar. Do not simply stop attending and taking exams: that forces the instructor to assign a course grade of "F."

EXAMS:

Common Exams: There will be three common exams during the semester. The exams will take place Mondays on campus, at locations that will be announced before each exam. The common exam schedule is:

- Common Exam 1: Monday, September 25th 4:15 – 5:45 PM
- Common Exam 2: Monday, October 30th 4:15 – 5:45 PM
- Common Exam 3: Monday, November 27th 4:15 – 5:45 PM

The general policy is that students who miss a common exam will receive a score of zero for that Exam. That score will be included in the calculation of your final grade. Students that miss two common exams automatically fail the course. Students who anticipate an absence from a common exam should discuss their situation with their instructor **PRIOR TO** their absence. In order to be qualified to receive a "make-up" common exam score (a very rare occurrence), the student should present documentation for not being able to take the test as scheduled. As is the standard policy of NJIT, this documentation should be presented to the student's Physics 234 instructor AND to the Dean of Students dos@njit.edu - (973) 596-3466, Campus Center, Room 255. BOTH the Physics 234 instructor and Dean of Students must concur in permitting a "make-up" common exam. Students who miss common exams that do not present documentation within 7 days of the common exam will receive a score of zero for the common exam.

In the event that the above qualification is met, a separate make-up test for the missed common quiz will not be offered. Instead, the portion of the final exam relevant to the contents of the missed test will be considered for giving a grade for the missed test. The instructor will evaluate the final exam questions from those chapters and normalize this portion of the student's grade for the missed common quiz.

Final Exam: TBD

QUIZZES: There will be quizzes during the lecture and other activities on the topics covered.

HOMEWORK: assignments will be posted online using the Mastering Physics System: www.masteringphysics.com (see above).

TUTORIALS: assignments will be posted online using the Mastering Physics System: www.masteringphysics.com (see above).

GRADING: Your final letter grade in Phys 234 will be based on a composite score that includes the quizzes, the common exams, the final exam, the homework, and the tutorials.

- **48%** for the three common exams (16% each)
- **24%** for the final exam
- **10%** for the quizzes
- **9%** for the total of homework work
- **9%** for the tutorials

The cutoff percentages for various letter grades will be in the range of:

85% for A
80% for B+
70% for B
65% for C+
50% for C
40% for D
F below 40 %

Final grades are not negotiable: A score of 84.999999% is a B+, not an A.

LAST DAY TO WITHDRAW: November 13th.

HONOR CODE STATEMENT: NJIT has a zero-tolerance policy for cheating of any kind and for student behavior that disrupts learning by others. Violations will be reported to the Dean of Students. The penalties range from a minimum of failure in the course plus disciplinary probation up to expulsion from NJIT. Avoid situations where your own behavior could be misinterpreted as dishonorable. **Students are required to agree to the NJIT Honor Code on each exam, assignment, quiz, etc. for the course.**

- Statement on Academic Integrity:
 - *“Academic Integrity is the cornerstone of higher education and is central to the ideals of this course and the university. Cheating is strictly prohibited and devalues the degree that you are working on. As a member of the NJIT community, it is your responsibility to protect your educational investment by knowing and following the academic code of integrity policy that is found*

at: <http://www5.njit.edu/policies/sites/policies/files/academic-integrity-code.pdf>.

Please note that it is my professional obligation and responsibility to report any academic misconduct to the Dean of Students Office. Any student found in violation of the code by cheating, plagiarizing or using any online software inappropriately will result in disciplinary action. This may include a failing grade of F, and/or suspension or dismissal from the university. If you have any questions about the code of Academic Integrity, please contact the Dean of Students Office at dos@njit.edu”

HELP: Contact your instructor if you are having trouble with the course; do not simply hope for a miracle and fall further behind. There is online tutoring offered by the Physics Department. For information and appointments follow this link: <https://physics.njit.edu/physics-tutoring-sign-sheet>

To register for PHYSICS III, PHYS 234 HM1, Fall 2023:

1. Go to <https://mlm.pearson.com/enrollment/jerez29648>
2. Sign in with your Pearson student account or create your account.
3. Select any available access option, if asked.
 - a. Enter a prepaid access code that came with your textbook or from the bookstore.
 - b. Buy instant access using a credit card or PayPal.
 - c. Select Get temporary access without payment for 14 days.
4. Select Go to my course.
5. Select PHYSICS III, PHYS 234 HM1, Fall 2023 from My Courses.
6. If you contact Pearson Support, give them the course ID: jerez29648

To sign in later:

1. Go to <https://mlm.pearson.com>.
2. Sign in with the same Pearson account you used before.
3. Select PHYSICS III, PHYS 234 HM1, Fall 2023 from My Courses.

LEARNING OUTCOMES:

- Recall the definitions and relationships involving oscillations and waves, such as wavelength, frequency, angular frequency, amplitude, phase, wave speed, restoring force, longitudinal and transverse waves, standing waves, damping, interference, diffraction, Doppler shift, and other wave phenomena.
- Comprehend the meaning of the equations governing oscillations and waves, and be able to manipulate them to obtain any desired quantitative relationship. Understand the extension of these equations to the quantum realm (wave-particle duality) for free particles, atoms and nuclei. Generalize the concepts underlying the equations, such as restoring force, inertia, and energy.
- Apply the equations governing oscillations and waves to mechanical systems for various boundary conditions, to optical systems, and to quantum physics in atomic and nuclear systems. Calculate unknown quantities based on physical relationships, boundary conditions, and known quantities.
- Analyze graphs of oscillatory and wave phenomena to obtain wavelength, frequency, amplitude, phase, particle and wave position, velocity, acceleration, damping time constant, as a function of time. Identify and distinguish types of wave motion such as transverse, longitudinal, standing waves, reflection, and refraction.
- Evaluate the soundness and precision of your answers. Explain and interpret your solutions to problems in a way that shows deeper understanding. Identify and appraise the range of applicability of your results, and their limitations.

TOPIC	TEXT STUDIES
Week 1 Oscillations and Waves	Chapter 14 – Sections 1-3, 5-8 Chapter 15 – Sections 1-8
Week 2 Sound	Chapter 16 – Sections 1-5, 6-8
Week 3 Light	(Chapter 32 – Sections 1-3) Chapter 33 – Sections 1-7
Week 4 Geometric Optics	Chapter 34 – Sections 1-4
Week 5 Interference	Chapter 35 – Sections 1-4
Week 6 Diffraction	Chapter 36 – Section 1-7
Week 7 Relativity	Chapter 37 – Sections 1-8
Week 8 Photons	Chapter 38 – Sections 1-4
Week 9 Particles and Waves	Chapter 39 – Sections 1-6
Week 10 Quantum Mechanics	Chapter 40 – Sections 1-5
Week 11 Atomic Structure	Chapter 41 – Sections 1-6
Week 12 Molecules and Condensed Matter	Chapter 42 – Sections 1-3
Week 13 Band Structure, PN Junction, & Transistors	Chapter 42 – Sections 4-7

FIRST DAY OF CLASSES: Tuesday, September 5

LAST DAY TO WITHDRAW: Monday, November 13

Thursday Classes Meet: Tuesday, November 21

Friday Classes Meet: Wednesday, November 22

THANKSGIVING RECESS: November 23 – November 27

LAST DAY OF CLASSES: Wednesday, December 13

READING DAYS: Thursday, December 15; Friday, December 16th

FINAL EXAM PERIOD: December 18 – December 22

FINAL GRADES DUE: December 25