NJIT New Jersey Institute of Technology

Jordan Hu College of Science and Liberal Arts
Department of Physics

PHYSICS III

Course Outline | **Phys 234 102 (CRN: 15379)** | **Spring 2026**

Instructor: **Trevor A. Tyson**: tyson@njit.edu
(When writing to instructor, please include course and section in the subject: Phys 234 102)

Lecture: Wednesdays, 6:00 PM – 8:50 PM, FMH 408

Office hour: Wednesdays, 5:00 PM – 6:00 PM, TIER 454, 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 obtain access to Mastering Physics with Pearson e-Text Standalone Access Card, ISBN: 0135491193, in order to be to access the Homework and Tutorial assignments, as well as additional practice materials.
  - Select "Access Pearson" in the Canvas Course Navigation.
  - Select "Open Pearson"; A new tab opens.
  - Link your student Canvas and Pearson account. You may need to create a Pearson account.
  - If prompted, select an access option
  - Select "go to my courses"
- The assignments should be accessed through Canvas.

- **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 Mastering Physics. 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).

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."

Eating in the classroom is prohibited. Beverages are allowed only in containers with secure lids and must not cause distractions. Designated breaks will be provided for courses of extended duration.

Please, be mindful of your classmates: do not create noise in class that interferes with the work of other students or the instructor.

Internet use is permitted solely for accessing the instructor's course notes and the official e-textbook. All other internet activity is prohibited.

Unauthorized student recordings of class sessions are prohibited. If a student needs to record a class because of an accommodation, they need to reach out to the Office of Accessibility Resources and Services (OARS).

EXAMS:

Exams consist of open-ended questions. You must show your work/reasoning when you solve the problems. The exams are closed book, closed notes. Relevant formulas and physical constants are provided with each exam.

You should bring a scientific calculator to each exam. ***Graphing calculators and any devices that can connect to the internet are forbidden***. Calculator sharing is not allowed.

Phones, earphones, headphones, smartwatches, wireless devices, laptops, and messaging devices are strictly prohibited during exams.

Students unable to remain in the exam room for the full scheduled duration due to a documented medical or physical condition must seek accommodation through OARS.

Contacting or receiving assistance from tutoring services or other unauthorized sources during an exam is strictly prohibited.

By enrolling in this course, students acknowledge that examination rooms may be recorded to protect both the integrity of the exams and the students themselves.

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, February 23rd 4:15 – 5:45 PM
- Common Exam 2: Monday, March 23rd 4:15 – 5:45 PM
- Common Exam 3: Monday, April 20th 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.

If there is a **schedule conflict** between common exams, you must fill out an application using the following link https://physics.njit.edu/common-and-final-exams. Application deadlines and additional information can also be found following the link. EMAILS ARE NO LONGER ACCEPTED.

- IMPORTANT: This form is for students who have a conflict with the Physics common exam, such as a class or another common exam on Monday or Wednesday during the regularly scheduled common exam, 4:00 - 6:00 pm. Students will be issued an alternate exam time and location. This form is NOT for students who are ill or have personal reasons for missing an exam. They must go to the Dean of Students.
- There are NO MAKE-UP EXAMS; therefore, their rescheduled exam will be at 6:00 - 8:00 pm on the SAME DAY as their regularly scheduled common exam.

- Please note that students only need to apply once per semester for each exam conflict. Once they have received a validated conflict email, they may use it for the rest of the semester.
- Once the student's application is approved and processed, they will be notified by email with exam details, and their name will be placed on a rescheduled exam roster. **If the student's name is not on the rescheduled roster, they cannot take the common exam.**

Final Exam: TBD

QUIZZES: There will be quizzes during the lectures 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 are:

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: *April 6th*.

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"*

- Statement on Generative AI:

  Student use of artificial intelligence (AI) is permitted in this course as a study tool. It is not permitted to be used in exams, quizzes, and other assignments, as doing so would undermine student learning and achievement of course learning outcomes. If you have any questions or concerns about AI technology use in this class, please reach out to your instructor prior to submitting any assignments.

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

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	Chapter 37 – Sections 1-8

Relativity	
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, January 20
ADD/DROP PERIOD ENDS: Monday, January 26
LAST DAY TO WITHDRAW: Monday, April 6
SPRING BREAK RECESS: March 15 – March 21
GOOD FRIDAY, NO CLASS: Friday, April 3
LAST DAY OF CLASSES (Follows Friday Schedule): Tuesday, May 5
READING DAYS: Wednesday, May 6; Thursday, May 7
FINAL EXAM PERIOD: May 8 – May 14
FINAL GRADES DUE: May 17

Updated by Dr. T. A. Tyson – January 2026
Department of Physics, Physics 234 Course Syllabus, Spring 2026