NJIT
New Jersey Institute of Technology

Jordan Hu College of Science and Liberal Arts
Department of Physics

Course Outline	**Physics 102**	Fall 2025

General Information

- Description: Physics 102 is an algebra-based physics course introduction to Mechanics. It includes motion in one and two dimensions, Newton's laws of motion and their applications, work and energy, linear momentum and collisions, rotational motion, and principles of conservation.
- Number of Credits: 3
- Prerequisite: Satisfactory completion of two high school mathematics courses and two high school science courses.

Course-Sections and Instructors:

Course-Section	Instructor
Phys 102-001	Professor S. Kane
Phys 102-003	Professor S. Kane
Phys 102-005	Professor K. Ahn
Phys 102-007	Professor K. Ahn
Phys 102-009	Professor S. Kane
Phys 102-101	Professor J. Stefan
Phys 102-103	Professor S. Azizighannad
Phys 102-105	Professor J. Stefan

Office Hours for All Physics 102 Instructors: https://physics.njit.edu/students/office

Laboratory - Physics 102A

The laboratory component of the course is Phys 102A. The lab course must be taken concurrently unless you have previously taken and passed Phys 102A. The grading for the laboratory is separate from the course/recitation (Phys 102) and the grades are given by the laboratory instructors. Latest edition of **Lab manual "Physics 102A Laboratory Manual"** can be purchased from NJIT Bookstore.

YOU MUST REGISTER FOR THE LECTURE/RECITATION (Phys 102) AND THE LABORATORY COURSE (Phys 102A) SEPARATELY. WITHDRAWAL FROM ANY OF THESE WILL CAUSE A SIMULTANEOUS WITHDRAWAL FROM ALL Phys 102 COURSES.

Learning Outcomes:

For this course, you can expect to be assessed on the following learning outcomes:

1. Recall the definitions and relationships involving position, velocity, speed, acceleration, vectors, Newton's Laws, circular motion, free-body diagrams, friction, work, energy, linear and angular momentum, torque, angular velocity and acceleration, and gravitation.
2. Apply the equations governing 1-D and 2-D constant acceleration to mechanical systems for various initial conditions. Calculate unknown quantities based on physical relationships, initial conditions, and known quantities.
3. Comprehend the meaning of the equations governing net force and acceleration (Newton's Laws), and be able to manipulate them in conjunction with a free-body diagram to obtain any desired quantitative relationship. Understand the extension of these equations to rotational motion, and gravitation.
4. Generalize the concepts underlying the equations of motion, such as work, kinetic and potential energy, conservation of energy, and equilibrium.
5. Comprehend the meaning of equations governing momentum, impulse, and collisions. Apply the equations governing momentum, impulse, and collisions mechanical systems for various initial conditions. Understand under what conditions momentum is conserved and how to use this relation to calculate unknown quantities based on physical relationships, initial conditions, and known quantities.
6. Understand the extension of linear motion equations to rotational motion. Comprehend the meaning of the equations governing rotational motion and acceleration, and be able to manipulate them in conjunction with a free-body diagram to obtain any desired quantitative relationship.

Course Materials

Textbook:
Physics - Principles with Applications, 7th ed. by Giancoli, ISBN **0135497590** (Publisher: Pearson)

Mastering Physics Online Homework System:
Be sure that your textbook is sold bundled with a Mastering Physics student access code card. You can also buy the student access code card separately either from NJIT bookstore or online. Homework assignments will be posted on-line. Students login, download and solve the assigned problems, and submit answers to the automated grading system. Instructions can be found on the student access code card.

Specific Information for the enrollment in Pearson Mastering (PM) homework system is given in the pdf "Student Registration Instructions for Canvas" which will be posted on Canvas course.

Verify Enrollment Duration: During the registration process, double-check the duration of your enrollment to ensure that it covers the entire duration of the semester.
Email:
NJIT email will be routinely used for announcements and to distribute material. Be sure to check the NJIT email every day.

Attendance will be taken at all classes and exams. More than 3 unexcused absences (in total) is excessive. For excused absences, please contact the Office of the Dean of Students for support and notify your course instructor promptly.

Office of the Dean of Students
Location: Central King Building (CKB), Room L71 (Lower Level)
Phone: (973) 596-3466
Email: dos@njit.edu
Website: https://www.njit.edu/dos/student-excusals.

Students may sign in only for themselves on attendance sheets; do not sign in for absent students. Attendance sheets are the official university documents; signing the attendance sheet on behalf of another student is considered as "Misuse of Documents". No student shall intentionally furnish false information nor shall a student forge, alter, destruct, or misuse any university documents or data.

Reading Assignments

The text readings are listed below. You should read the assigned sections of the text before the lecture covering that material.

Homework

It is almost impossible to succeed on this course without working on a lot of problems: do the homework. Each student must download the weekly homework assignments from Mastering Physics online homework system, work on the problems, and submit the solutions online before each assignment is due. Late work will not be accepted. See Course Materials section above.

Help: If you are struggling with the course, do not wait for a miracle, reach out to your instructor by visiting them in person or emailing them for assistance.

Additionally, you can get support from tutors at the Physics Tutoring Center, located in CKB G12.

In-person tutoring sessions will begin on **Tuesday, September 09**, and run through **Thursday, December 11, 2025** (the last day of class). The tutoring schedule will be available at: https://physics.njit.edu/physics-tutoring-sign-sheet.

Grading

Final grades will be based on a composite score for the term's work that includes three common exams, the final exam, homework score, written quizzes, iClicker REEF quizzes, and class participation.

The approximate weights we expect to use in calculating the composite score are:

- **48%** for all three common exams (16% each)
- **32%** for the final exam
- **10%** for the total of homework work
- **10%** for the **IN-CLASS** quizzes

The cutoff percentages for various letter grades will be in the range of 84.0% for A, 76.0 % for B+, 68.0% for B, 60.0% for C+, 52.0% for C, 44.0% for D, F below 44.0 %.

C or better grade is required to take further physics courses. If you get D in Physics 102, you cannot take the next level physics course.

Exams

There will be three Common Exams plus a comprehensive Final Exam. The schedule is:

• **Common Exam 1**: Wednesday, September 24, 2025;   4:15 -- 5:45 PM
• **Common Exam 2**: Wednesday, October 22, 2025;   4:15 -- 5:45 PM
• **Common Exam 3**: Wednesday, November 12, 2025;   4:15 -- 5:45 PM

- **Comprehensive Final Exam** TBA, 2.5 hours long

The final exam will emphasize the work covered after common exam 3, but also re-caps the whole course.

Note: Common Exams and Final Exam are all going to be Multiple-Choice questions. Students are going to submit exam questions and scantron cards to be collected at the end of each exam. There is not going to be any partial credit for multiple-choice questions, however students are required to show work to support their answers.
It is the student's responsibility to take the exam in the class that is scheduled.

Quizzes

In-class quizzes covering the preceding or current work will be given during lectures and/or recitations. Those scores count toward your final course grade. **There are no make-ups for in class activities**. Students missing a quiz will receive a grade of zero for that item.

If your instructor assigns quizzes through Canvas, you must have the Canvas app installed on your laptop. Quizzes taken remotely will not be accepted.

Missed Exams

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 the Dean of Students PRIOR TO their absence. In order to be qualified to receive an "excused absence" for the common exam (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, the student should present this document to the **Dean of Students - (973) 596-3466, Central King Building (CKB), Room L71 (Lower Level)** for evaluation. BOTH the Physics 102 instructor and Dean of Students must concur in permitting a "excused absence" for the 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 exam 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 exam.

Conflict common exams are usually held from 6:00 to 7:30 PM on exam days; contact Mrs. Oertel (christine.a.oertel@njit.edu) for arrangements.

Course Policies

It is expected that NJIT's University Code on Academic Integrity will be followed in all matters related to this course.

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: **https://www.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***"*

- Students must affirm the NJIT Honor Code on each exam.

- 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.

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

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

- Only calculators without wireless capabilities are permitted. Calculator sharing is prohibited.

- Unauthorized recordings of class sessions are prohibited. Students must follow NJIT's Policy for Recording Classes: NJIT Recording Policy.

- 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.**

- 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.

Withdrawal: If you must withdraw from the course, do it officially through the Registrar before the last withdrawal date. If you simply stop attending and taking exams your instructor will have to assign a failing grade in the course.

Physics 102 Class Schedule for Fall 2025

Weeks	Lecture Topics	Text Reading	Recommended Problems
Week 1	Math Review, Introduction Measurement and Units	Appendix A-4, Ch 1, Sec 1-6	3, 13, 17, 18, 22
Week 2	Motion in One Dimension	Ch 2, Sec 1-8	4, 8, 12, 13, 17, 19, 26, 27
Common Exam 1 – September 24		**Covers: Math Review, Chapter 1 and 2**	
Week 3	Vectors and Two-Dimensional Motion	Ch 3, Sec 1-6	2, 13, 17, 18, 20, 21, 22, 27, 29
Week 4	The Laws of Motion - Forces and Newton's Laws	Ch 4, Sec 1-5	1, 5, 7, 8, 12, 16,
Week 5	The Laws of Motion - Applications of Newton's Laws	Ch 4, Sec 6-8	40, 42, 49, 56, 60,
Week 6	Circular motion	Ch. 5, Sec. 1, 2, 4	1, 3, 5, 7, 9
Week 7	Energy -Work, Kinetic Energy, Work-Energy Theorem	Ch. 6, Sec. 1, 3	3, 9, 15, 17, 18, 21
Common Exam 2 – October 22		**Covers: Chapters 3, 4, 5 (sec. 1-4) and 6 (sec. 1 and 3)**	
Week 8	Energy -Potential Energy, Mechanical Energy, Energy conservation, Power	Ch. 6, Sec. 4-7, 9, 10	28, 31, 35, 47, 54, 59, 64
Week 9	Momentum and Collisions -Momentum, Impulse, Conservation of Momentum	Ch. 7, Sec. 1-3	1, 3, 10, 15, 21
Week 10	Momentum and Collisions -Collisions	Ch 7, Sec. 4-8, 10	25, 26, 39, 41, 49, 50
Week 11	Rotational Motion, Rotational Dynamics I	Ch 8, Sec 1-3	6, 14, 17, 18, 20
Week 12	Rotational dynamics II	Ch.8, Sec. 4-8	24, 28, 32, 37, 39, 52, 58, 61
Common Exam 3 – November 12		**Covers: Chapters 6 (sec. 4-7, 9,10), 7 and 8**	
Week 13	Static Equilibrium	Ch. 9, Sec. 1-4	2, 4, 6, 12, 13, 17

| Week 14 | The Law of Gravity | Ch 5, Sec. 5-7 (excluding Kepler's Laws) | 28, 30, 31, 46 |
| **Date to be announced** | **Final Exam** | Everything learned in class | |

* The professor will discuss changes to the syllabus during class if they arise.

Fall 2025 Academic Calendar

Sept	1	Labor Day. University Closed
Sept	2	First Day of Classes
Sept	8	Last Day to Add/Drop a Class
Sept	8	Last Day for 100% Refund, Full or Partial Withdrawal
Sept	9	W Grades Posted for Course Withdrawals
Sept	15	Last Day for 90% Refund, Full or Partial Withdrawal - No Refund for Partial Withdrawal after this date
Sept	29	Last Day for 50% Refund, Full Withdrawal
Oct	2	Wellness Day. No Classes
Oct	20	Last Day for 25% Refund, Full Withdrawal
Nov	10	Last Day to Withdraw from Classes
Nov	25	Thursday Classes Meet
Nov	26	Friday Classes Meet
Nov	27	Thanksgiving Recess Begins. No Classes
Nov	30	Thanksgiving Recess Ends

Dec	11	Last Day of Classes
Dec	12	Reading Day
Dec	13	Saturday Classes Meet
Dec	14	Final Exams Begin
Dec	20	Final Exams End
Dec	22	Final Grades Due

Updated by Dr. E. Vataj – September 2025
Department of Physics, Physics 102 Course Syllabus, Fall 2025