

DEPARTMENT OF PHYSICS

COURSE OUTLINE

PHYSICS 111

Summer 2025

General Information

Description: Physics 111 is a calculus-based introduction to Mechanics, emphasizing fundamental concepts and applications. It is the first course in a three-course sequence. 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

Corequisite: Math 111, Phys 111A.

Note: The Laboratory Course, PHYS 111A, must be taken concurrently with PHYS 111. The student must register for both the LECT/REC and the Lab Course. Withdrawal from either Course will cause a simultaneous withdrawal from both courses. Otherwise, the Lab course is run separately from the Lect/Rec course – see <https://centers.njit.edu/introphysics/welcome/>.

Course-Section and Instructors:

Course-Section	Instructor
Phys 111-011, 9:00AM-11:50AM	Professor H. Hijazi
Phys 111-111, 6:00 PM- 8:50 PM	Professor E. Vataj

Office hours will be announced in class by each section instructor

Learning outcomes: For this course, which is the first of the introductory Physics series, you can expect to be assessed on the following learning outcomes:

1. Manipulate vectors in components form and as magnitude/direction. Perform vector operations such as addition, subtraction, scalar, and cross products.
2. Recall the definitions and relationships involving position, velocity, speed, acceleration.
3. Apply the equations governing 1-D constant acceleration to mechanical systems for various initial conditions.
4. Apply the equations governing 2-D constant acceleration to mechanical systems for various initial conditions.
5. Comprehend the meaning of the equations governing net force and acceleration (Newton's Laws) for linear motion, and be able to manipulate them in conjunction with a free-body diagram to obtain any desired quantitative relationship.
6. Understand the extension of free-body diagrams and Newton's laws to rotational motion.
7. Understand the extension of free-body diagrams and Newton's laws to frictional forces.
8. Comprehend the definitions and application of work, energy, and conservation of energy principles to solving mechanical and non-conservative systems.
9. 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.
10. Define and calculate the center of mass of a system as well as the moment of inertia.
11. Extend the concepts and equations of 1-D constant acceleration to rotational motion for various initial conditions.
12. 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.
13. Understand the extension of work, energy, and conservation of energy principles to rotational motion.
14. Recall the definitions of angular momentum. Apply this concept to conservation of angular momentum.
15. Apply concepts of Newton's Laws to equilibrium of linear and rotational motion.
16. Understand the extension of conservation of energy and mass equations to fluid dynamics.
17. Understand the extension of Newton's Laws and energy concepts to gravitation.

Course material

Access to electronic version of the textbook and online homework can be obtained through purchasing of: **Mastering Physics with Pearson eText -- Standalone Access Card -- for University Physics with Modern Physics (by Young & Freedman), 15th edition, ISBN: 9780135206348**. Note: only the card for the 15th edition will allow you the access eText and homework; similarly, you must login through **Pearsonmastering.com** (other addresses, even from the same publisher, can bring you to the wrong course). However, if you would also like a hardcopy version of the textbook, you can use any recent edition of the Young & Freedman's text. We use Chapters 1 to 13 which sometimes you can get separately from the rest.

Homework assignments will be posted on-line. Students login, download and solve the assigned problems, and submit answers to the automated grading system.

For your own reference, record your login ID and password. Instructors cannot access forgotten logins or passwords.

Details for enrolling in the Pearson Mastering (PM) homework system can be found in the PDF titled "Student Registration Instructions for Canvas." This document will be available on the 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.

NJIT Canvas System: lecture notes, problems, grades, etc. are posted on Canvas (PHYS 111-). So, check there often.

Attendance will be taken at all classes and exams. More than 3 unexcused absences (in total) is excessive. If you have excusable absences, contact your instructor or the Dean of Students (973.596.3466, Central King Building (CKB), Room L71 (Lower Level)). 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.

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.

Help

Students are encouraged to take advantage of their instructor's scheduled office hours for academic support.

Additional assistance is also available through the Physics Tutoring Center, located in FMH 110.

In-person tutoring will be offered from **Wednesday, May 28** through **Thursday, June 26, 2025**, during the following days and times:

Days: Monday, Wednesday, and Thursday

Hours: 12:00 PM – 6:00 PM

No appointment is necessary; students are welcome to drop in during any of the open sessions.

Grading: Your final letter grade in Phys 111 will be based on a composite score for term's work that includes the common exam scores, the final exam, lecture/recitation quizzes, and the homework score.

Final Letter Grades: Here are the approximate weights to be used for calculating the composite score:

- **30%** for the Midterm Exam
- **34%** for the Final exam
- **15%** for the total of homework work
- **21%** for the **IN-CLASS** quizzes (during recitation period, be prepared to have canvas app on phone, iPad or laptop. Note: Quizzes taken remotely will be disregarded and counted against you).

The cutoff percentages for various letter grades will be:

Percentage	Letter Grade
> 85%	A
85 - 80	B+
80 - 70	B
70 - 65	C+
65 - 55	C
55 - 50	D
< 50	F

Final grades are not negotiable: A score of 84.99% is a B+, not an A.

Exams

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

- **Midterm Exam, June 11 (held during scheduled class time)**
- **Comprehensive Final Exam June 30, 2.5 hours long (held during scheduled class time)**

Note: All Exams will consist of multiple-choice questions. Students must submit both their completed exam and scantron card at the end of each exam. No partial credit will be awarded for multiple-choice questions. Although students are required to show their work, grading will be based exclusively on the answers recorded on the scantron card. It is the student's responsibility to ensure their responses are accurately marked on the scantron.

Additionally, students must take the exam during their scheduled class time and in the assigned classroom.

In-class quizzes covering the preceding or current work may 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.

Missed Exams

The general policy is that students who miss an exam will receive a score of zero for that Exam. That score will be included in the calculation of your final grade. Students who anticipate an absence from an 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 111 instructor and Dean of Students must concur in permitting a "excused absence" for the common exam. Students who miss 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 exam will not be offered. Instead, the final exam grade will be considered for giving a grade for the missed test.

Accommodation of Disabilities

Students who need academic accommodation in connection with a disability must initiate the request with NJIT Office of Accessibility and Resources (OARS). Students need to register with the Office of Accessibility in order to officially disclose their disability status to the College and to determine eligibility for appropriate reasonable accommodations (including any prior IEPs or 504s). Please contact OARS at the start of the semester (or as soon as possible) to coordinate any accommodation request/s: <https://www.njit.edu/accessibility/>, Room 201 (Kupfrian Hall) or email us at OARS@NJIT.EDU

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 are required to agree to the NJIT Honor Code on each exam.
- Please do not eat, drink, or create noise in class that interferes with the work of other students or instructors.

Interfering with an instructor's ability to conduct the class or the ability for other students to learn is considered as “Disruptive Conduct”.

The use of any internet services other than following the instructor's course notes and e-textbook is disruptive for the instructor and the other students.

- Turn off all phones, wireless devices, laptops, and messaging devices of all kinds during classes and exams.
- Students will be allowed to use non-programmable scientific calculator. However, sharing of calculator will not be permitted in the examination.
- **Student recordings:** Unauthorized student recordings of class sessions are prohibited. If a student needs to record a class because of accommodation, they need to reach out to the Office of Accessibility Resources and Services (OARS).
<https://www.njit.edu/registrar/njit-policy-recording-classes>
- If the student cannot be continuously present in the exam room for the entire duration of the scheduled exam for any physical/medical reason, the student needs to seek accommodation through OARS in order to take the exam separately.
- Needless to say, do not contact any “tutoring services” for help during an exam.

PHYSICS 111 Class Schedule for First Summer Session 2025

TOPIC	TEXT STUDIES	NOTES	Recommended Problems
May 28 Units, Physical Quantities, and Vectors	Chapt.1		6, 31, 36, 40, 56,71, 85
May 29 Motion in One Dimension	Chapt. 2		1, 7, 15, 30, 31, 38, 68
June 02 Motion in Two Dimensions	Chapt. 3	Optional: Sect. 3.5	8, 10, 16, 28, 30, 34, 57,
June 04 Newton's Laws of Motion	Chapt. 4		2, 7, 8, 19, 23, 30, 38
June 05 Applying Newton's Laws	Chapt. 5	Optional: Sect. 5.5	1, 6, 15, 25, 34, 36, 45, 74
June 09 Work, Kinetic Energy	Chapt. 6	Refresh: scalar (dot) product	1, 7, 8, 10, 28, 37, 45, 85
Midterm Exam, June 11, 2025		Chapters 1 to 6	
June 12 Potential Energy, Conservation of Energy	Chapt. 7	Optional: Sect. 7.5	5, 14, 30, 31, 39, 57, 60, 72
June 16 Linear Momentum and Collision	Chapt. 8	Optional: Sect. 8.6	10, 21, 30, 42, 44, 46, 75
June 18 Rotation, Moment of Inertia	Chapt. 9		6, 9, 12, 27, 33, 37, 49, 53
June 19 Dynamics of Rotational Motion	Chapt. 10 – Sections 1-6	Refresh: vector (cross) product	1, 6, 14, 15, 16, 24, 38, 42
June 23 Static Equilibrium	Chapt. 11 – Sections 1-3		13, 15, 17, 23, 51, 53, 69
June 25 Fluid Mechanics	Chap.12 – Sections 1-5		11, 21, 26, 34, 41, 49
June 26 Universal Gravitation	Chap. 13	Optional: Sect. 13.6, 13.7	4, 14, 18, 25, 31, 32
June 30, Last Day of Class	Final Exam	Comprehensive Exam Chapters 1 to 13 with emphasis on 7 to 13	

First Summer Session: May 27, 2025 - June 30, 2025

May	27	First Summer Session Begins
May	29	Last day to Add/Drop for First Summer Session
May	29	100% Refund Ends
May	30	W Grades Posted for all Withdrawals from First Summer Session
May	30	80% Refund Begins
Jun	2	80% Refund Ends
Jun	3	60% Refund Begins
Jun	5	60% Refund Ends
Jun	6	40% Refund Begins
Jun	8	40% Refund Ends
Jun	9	20% Refund Begins
Jun	11	20% Refund Ends
Jun	15	Last day to withdraw from a class in First Summer Session
Jun	20	Juneteenth Holiday - No Classes Scheduled. University Closed
Jun	30	Last Day of Classes – First Summer Session
Jul	3	Final Grades Due

Updated by Dr. E. Vataj – May 2025
Department of Physics, Physics 111 Course Syllabus, Summer 2025