New Jersey Institute of Technology

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Fall 2021

PHYS 111-025: Physics I

Dale Gary

Recommended Citation

COURSE OUTLINE   **PHYSICS 111 Sections 023 and 025**   **Fall 2021**

CLASS SCHEDULE:
Phys 111 Lecture (Combined sections 023 and 025)
CKB 217 Thursdays 8:30 AM – 9:50 AM

Phys 111 Recitation
Section 023: TIER 113 Tuesdays 8:30 AM – 9:50 AM
Section 025: CULM 110 Mondays 1:00 PM – 2:20 PM

Instructor Information
Instructor: Prof. Dale Gary   Office: 101 Tiernan Hall   Email: dgary@njit.edu
Office Hours: Mondays 10:00 – 11:30 AM, Tuesdays 2:00 – 3:30 PM, or by appointment

PREREQUISITE: Math 131 (if not originally placed in Math 111)
COREQUISITE: Math 111 or Math 132, Phys 111A.

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

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 13: 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. Specific Information for the **Pearson Mastering (PM)** homework system are as follows:

You first create an account on the PM platform and then need a valid Pearson Mastering access code to sign up for the course.

The pearsonmastering.com homework course ID is:
- **gary41047** for students in Section 023
- **gary84970** for students in Section 025

For your own reference, record the unique course identifier announced by your instructor, and your login ID and password. Instructors cannot access forgotten logins or passwords.

NJIT Canvas System: lecture notes, problems, grades, etc. are posted on Canvas (PHYS 111023 and PHYS 111025). So check there often.

NOTE: THE LABORATORY COURSE, PHYS 111A, MUST BE TAKEN CONCURRENTLY WITH PHYS 111. THE STUDENT MUST REGISTER FOR BOTH THE LEC/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 lec/rec course – **see** https://centers.njit.edu/introphysics/welcome/.

ATTENDANCE: 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 First Year 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".

GETTING HELP: Visit or email your instructors if you are having trouble with the course; do not simply hope for a miracle and fall further behind. The Physics Dept. office on the 4th floor of Tiernan has specific information on tutoring. Physics tutoring is available through the CAPE organization, and possibly elsewhere.

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.

1) Common Exams Three common exams will be given during the semester. The exam schedule is:

- **Common Exam 1**: Monday, September, 27, 2021 4:15 -- 5:45 PM
- **Common Exam 2**: Monday, October, 18, 2021   4:15 -- 5:45 PM
- **Common Exam 3**: Monday, November, 22, 2021 4:15 -- 5:45 PM

Missed Exams
Students who miss a common exam will receive a score of zero for that exam unless they present a valid excuse within 7 days of the exam. Students expecting to be absent from a common exam should discuss their situation with their instructor PRIOR TO their absence. Students who miss two or more common exams automatically fail the course unless they have acceptable excuses. In order to qualify for a (rare) "make-up" common exam a student needs to document the reason for not being able to take the test as scheduled (due for example to an exam conflict or documented illness). NJIT policy requires the documentation to be presented to the Dean of Students – (973) 596-3466, Room 255 Campus Center. Conflict common exams are usually held from 6:00 to 7:30 PM on exam days; contact Ms. Oertel (christine.a.oertel@njit.edu) for arrangements.

If the above qualification for illness 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 used to decide the 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.

2) **Lecture Quizzes** A short quiz covering the preceding or current work will be given during each lecture/recitation period. 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.

3) **Homework** Homework assignments will be posted on-line using the Pearson Mastering Homework System, as described on the previous page.

4) **Final Exam** **A Comprehensive Final Exam will be given** during Final Exam Period (December 15-21, 2021).

Note: Common Exams and Final Exam will be Multiple-Choice questions. Students submit the completed exam pages and scantron cards to be collected at the end of each exam. There is no partial credit for multiple-choice questions, but the students' exam pages must show work to support their answers.

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

- **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 as in the table.

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

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

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.**

Turn off all cellular phones, wireless devices, computers, and messaging devices of all kinds during classes and exams. Please do not eat, drink, or create noise in class that interferes with the work of other students or instructors. Creating noise or otherwise interfering with the work of the class will not be tolerated.

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.

PHYSICS 111 Section 023/025 COURSE SYLLABUS

TOPIC	TEXT STUDIES	NOTES
Week 1 Units, Physical Quantities, and Vectors	Chapt.1	
Week 2 Motion in One Dimension	Chapt. 2	
Week 3 Motion in Two Dimensions	Chapt. 3	Optional: Sect. 3.5
Week 4 Newton's Laws of Motion	Chapt. 4	
Week 5 Applying Newton's Laws	Chapt. 5	Optional: Sect. 5.5
Common exam 1 – 09/27		**Units, Vectors + kinematics in 1D and 2D (Chapt. 1, 2 and 3)**
Week 6 Work, Kinetic Energy	Chapt. 6	Refresh: scalar (dot) product
Week 7 Potential Energy, Conservation of Energy	Chapt. 7	Optional: Sect. 7.5
Week 8 Linear Momentum and Collision	Chapt. 8	Optional: Sect. 8.6
Common exam 2 – 10/18		**Newton's laws, Work, Energy (Chapt. 4, 5 and 6)**
Week 9 Rotation, Moment of Inertia	Chapt. 9	
Week 10 Dynamics of Rotational Motion	Chapt. 10 – Sections 1-6	Refresh: vector (cross) product
Common exam 3 – 11/22		**Energy, Momentum and Collisions, Impulse, Center-of-mass, Rotational Kinematics, Rotational Energy (Chapt. 7, 8 and 9)**
Week 11 Static Equilibrium	Chapt. 11 – Sections 1-3	
Week 12 Fluid Mechanics	Chap.12 – Sections 1-5	
Week 13 Universal Gravitation	Chap. 13	Optional: Sect. 13.6, 13.7
Week 14	Review for final exam	
Final Exam		**Comprehensive Exam Chapters 1 to 13 with emphasis on 10 to 13**

Fall 2021 Academic Calendar

September	1	Wednesday	First Day of Classes
September	4	Saturday	Saturday Classes Begin
September	6	Monday	Labor Day
September	8	Wednesday	Monday Classes Meet
September	8	Wednesday	Last Day to Add/Drop a Class
September	8	Wednesday	Last Day for 100% Refund, Full or Partial Withdrawal
September	9	Thursday	W Grades Posted for Course Withdrawals
September	15	Wednesday	Last Day for 90% Refund, Full or Partial Withdrawal - No Refund for Partial Withdrawal after this date
September	29	Wednesday	Last Day for 50% Refund, Full Withdrawal
October	20	Wednesday	Last Day for 25% Refund, Full Withdrawal
November	10	Wednesday	Last Day to Withdraw from Classes
November	25	Thursday	Thanksgiving Recess Begins
November	28	Sunday	Thanksgiving Recess Ends
December	10	Friday	Last Day of Classes
December	11	Saturday	Saturday Classes Meet
December	12	Sunday	Sunday Classes Meet
December	13	Monday	Reading Day 1
December	14	Tuesday	Reading Day 2
December	15	Wednesday	Final Exams Begin
December	21	Tuesday	Final Exams End
December	23	Thursday	Final Grades Due