Spring 2022

PHYS 111-102: Physics I

Robert Duffin

COURSE OUTLINE **PHYSICS 111 Section 102 (CRN 14682)** **Spring 2022**

Instructor: Prof. Robert Duffin
Office: 323 Tiernan Hall (From Elevator turn Left, then Right at Corridor, office on the right)
Email: rtd24@njit.edu

Office Hour: Monday: 5:00 - 5:50 pm

Lecture/Recitation: Monday 6:00 - 8:50 pm, KUPF 105
Delivery Mode: Face-to-Face (Delivery of instruction is structured around in-person classroom meeting times. Instruction is delivered in person and students are expected to attend class).

First Lecture on 01/24 is online
Webex Online Lecture/Recitation login information:
First login to: njit.webex.com
Then go to this link for the lecture:
https://njit.webex.com/njit/j.php?MTID=mbd5a78c1c8a1b590d61fb8a89879d597

Course website: NJIT Canvas

CO-REQUISITE: Math 111, Phys 111A
FAILURE TO MEET EITHER CO-Requisites will result in student being dropped from class.

COURSE MATERIAL:

Access to electronic version of 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. 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: duffin48148

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.

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: 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 instructor to assign course grade: "F"

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 midterm and final, lecture/recitation quizzes, and homework score.

1) Exams:

- **Midterm Exam (Chapter 1-8)**: Monday, 02/28/2022, 6:00 - 8:45
- **Final Exam (Chapter 1-13):** During Final Exam Period (May 6-12, 2022).

Missed Exams

The general policy is that students who miss the midterm 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 the midterm exam should discuss their situation with their instructor PRIOR TO their absence. In order to be qualified to receive a "make-up" midterm 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, the student should present this document to the **Dean of Students - (973) 596-3466, Room 255 Campus Center** for evaluation. BOTH the Physics 111 instructor and Dean of Students must concur in permitting a "make-up" midterm exam. Students who miss the midterm exam that do not present documentation within 7 days of the midterm exam will receive a score of zero for the midterm exam.

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

2) Lecture Quizzes A short quiz covering preceding or current work will be given during each lecture period. Those scores count toward 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 page 1.

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

- **35%** Midterm exam
- **35%** for the final exam
- **10%** for the total of homework work
- **20%** for the in-class participation (including in-class quizzes)

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.

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.

TOPIC	TEXT STUDIES	NOTES
Week 1 01/24 Units, Physical Quantities, and Vectors	Chapt. 1	Online Class (only on 01/24)
Week 2 01/31 Motion in One Dimension	Chapt. 2	
Week 3 02/07 Motion in Two Dimensions	Chapt. 3	Optional: Sect. 3.5
Week 4 02/14 Newton's Laws of Motion	Chapt. 4	
Week 5 02/21 Applying Newton's Law	Chapt. 5	Optional: Sect. 5.5
Week 6 02/28 Work, Kinetic Energy	Chapt. 6	Refresh: scalar (dot) product
Week 7 03/07 Potential Energy, Conservation of Energy	Chapt. 7	Optional: Sect. 7.5
Week 9 03/21 Linear Momentum and Collision	Chapt. 8	Optional: Sect. 8.6
Week 8 Midterm Exam 03/28		**Chapters 1 to 8**
Week 10 04/04 Rotation, Moment of Inertia	Chapt. 9	
Week 11 04/11 Dynamics of Rotational Motion	Chapt. 10 – Sections 1-6	Refresh: vector (cross) product
Week 12 04/18 Static Equilibrium	Chapt. 11 – Sections 1-3	
Week 13 04/25 Fluid Mechanics	Chap.12 – Sections 1-5	
Week 14 05/02 Universal Gravitation	Chap. 13	Optional: Sect. 13.6, 13.7
Final Exam		**Chapters 1 to 13**

Spring 2022 Academic Calendar

January	17	Monday	Martin Luther King, Jr. Day
January	18	Tuesday	First Day of Classes
January	22	Saturday	Saturday Classes Begin
January	24	Monday	Last Day to Add/Drop a Class
January	24	Monday	Last Day for 100% Refund, Full or Partial Withdrawal
January	25	Tuesday	W Grades Posted for Course Withdrawals
January	31	Monday	Last Day for 90% Refund, Full or Partial Withdrawal, No Refund for Partial Withdrawal after this date
February	14	Monday	Last Day for 50% Refund, Full Withdrawal
March	7	Monday	Last Day for 25% Refund, Full Withdrawal
March	14	Monday	Spring Recess Begins - No Classes Scheduled - University Open
March	19	Saturday	Spring Recess Ends
April	4	Monday	Last Day to Withdraw
April	15	Friday	Good Friday - No Classes Scheduled - University Closed
April	17	Sunday	Easter Sunday - No Classes Scheduled - University Closed
May	3	Tuesday	Friday Classes Meet
May	3	Tuesday	Last Day of Classes
May	4	Wednesday	Reading Day 1
May	5	Thursday	Reading Day 2
May	6	Friday	Final Exams Begin
May	12	Thursday	Final Exams End
May	14	Saturday	Final Grades Due
TBA			Commencement