Spring 2020

PHYS 111-016: Physics I

Roland Levy

COURSE OUTLINE **PHYSICS 111 Sections 014 and 016** **Spring 2020**

Instructor: Prof. Roland Levy Office: 472 Tiernan Hall Email: levyr@njit.edu

Office Hours: By appointment

Webpage: https://web.njit.edu/~levyr/ (Lecture Notes)

Class Schedule:

Phys 111 Lecture (014 & 016)
Room: TIER LECT 2 Fridays 10:00 – 11.20 AM
Phys 111 Recitation
Section 014 TIER 111 Tuesdays 4:00 – 5:20 PM
Section 016 TIER 113 Wednesdays 11:30 AM - 12:50 PM

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), 13th edition, ISBN 9780321741257** . Note: only the card for the 13th edition will allow you the access eText and homework; similarly you must login through masteringphysics.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 **Mastering Physics (MP)** homework system are as follows:
You first create an account on the MP platform and then need a valid Mastering Physics access code to sign up for the course.

The masteringphysics.com homework course ID is:

MPLEVY3425077 for students in Section 014

MPLEVY1468987 for students in Section 016

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.

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".

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 February 24 4:15 -- 5:45 PM
- **Common Exam 2**: Monday March 30 4:15 – 5:45 PM
- **Common Exam 3**: Monday April 13 4:15 – 5:45 PM

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. 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 to the **Dean of Students - (973) 596-3466, Room 255 Campus Center**. BOTH the Physics 111 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.

2) Lecture Quizzes A short quiz will be given during each lecture/recitation period.
3) Homework Homework assignments will be posted on-line using the Mastering Physics Homework System, as described on the previous page.
4) Final Exam **Comprehensive Final Exam will be given** during Final Exam Period (May 8-14, 2020).

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 all 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.

Syllabus

TOPIC	TEXT STUDIES	NOTES
Week 1 Units, Physical Quantities, and Vectors	Chapter1	
Week 2 Motion in One Dimension	Chapter 2	
Week 3 Motion in Two Dimensions	Chapter 3	Optional: Sect. 3.5
Week 4 Newton's Laws of Motion	Chapter 4	
Week 5 Applying Newton's Laws	Chapter 5	Optional: Sect. 5.5
Common Exam 1 2/24		**Units, vectors + kinematics in 1D and 2D + forces as vectors**
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 3/30		**Newton's laws, work, energy**
Week 9 Rotation, Moment of Inertia	Chapter 9	
Week 10 Dynamics of Rotational Motion	Chapt. 10 – Sections 1-6	Refresh: vector (cross) product
Week 11 Static Equilibrium	Chapt. 11 – Sections 1-3	
Common Exam 3 4/13		**Energy, momentum and collisions, rotational kinematics, rotational energy**
Week 12 Fluid Mechanics	Chap.12 – Sections 1-5	
Week 13 Universal Gravitation	Chap. 13	Optional: Sect. 13.6, 13.7
Week 14	REVIEW	
Final Exam		**Torque, angular momentum, statics, fluids, gravitation + all previous topics**

Spring 2020 Academic Calendar

January 20 Monday Martin Luther King, Jr. Day

January 21 Tuesday First Day of Classes

January 25 Saturday Classes Begin

January 31 Friday Last Day to Add/Drop a Class

January 31 Friday Last Day for 100% Refund, Full or Partial Withdrawal

February 1 Saturday W Grades Posted for Course Withdrawals

February 3 Monday Last Day for 90% Refund, Full or Partial Withdrawal, No Refund for Partial Withdrawal after this date

February 17 Monday Last Day for 50% Refund, Full Withdrawal

March 9 Monday Last Day for 25% Refund, Full Withdrawal

March 15 Sunday Spring Recess Begins - No Classes Scheduled - University Open

March 22 Sunday Spring Recess Ends

April 6 Monday Last Day to Withdraw

April 10 Friday Good Friday - No Classes Scheduled - University Closed

May 5 Tuesday Friday Classes Meet

May 5 Tuesday Last Day of Classes

May 6 Wednesday Reading Day 1

May 7 Thursday Reading Day 2

May 8 Friday Final Exams Begin

May 14 Thursday Final Exams End

May 16 Saturday Final Grades