Fall 2020

PHYS 111-017: Physics I

Wenda Cao

COURSE OUTLINE **PHYSICS 111 Section 017** **Fall 2020**

Instructor: Prof. **Wenda Cao** Office: **104 Tiernan Hall** Email: cao@njit.edu
Office Hours: Mondays: 9:00 AM – 12:30 PM via webex: https://njit.webex.com/meet/vataj
Fridays: 3:00 PM – 5:00 PM via webex: https://njit.webex.com/meet/cao

CLASS SCHEDULE:

- **Phys 111 Lecture:** KUPF 210A Fridays 12:30 PM – 1:50 PM
  Webex Lecture: Meeting number: 120 917 5316 Password: njit
  Webex link: https://njit.webex.com/njit/j.php?MTID=mbd95c031a35f5996bf981e6ba6f267d1
  Prof. Wenda Cao Email: cao@njit.edu
- **Phys 111 Recitation:** Section 015: KUPF 210 Mondays 12:30 PM – 1:50 PM
  Section 017: KUPF 117 Mondays 07:30 AM – 8:50 AM
  Webex course link: https://njit.webex.com/meet/vataj
  Dr. Esmeralda Vataj Email: esmeralda.vataj@njit.edu

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:

- **Textbook:** *Sears & Zemansky's University Physics with Modern Physics*, 15th Edition Technology Update, by Young and Freedman. The publisher is PEARSON. 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: 978-0-13-515955-2.** Note: only the card for the 15th edition will allow you the access eText and homework; similarly, you must login through Pearonmastering.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.
- **Pearson Mastering Homework System:** 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: cao81256** . 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 used to be taken concurrently with the PHYS 111. Because of the COVID19 issues, the Department allows students to take the PHYS 111 without the PHYS 111A, thus allowing one to take the PHYS 111A in a later semester.

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

1) **Common Midterm Exam:** One midterm exam will be given on **Monday, Nov 09, 2020 from 4:15 – 5:45 PM**.
2) **Lecture Quizzes:** A short quiz will be given during each lecture period.
3) **Homework:** Homework assignments will be posted on-line using the Pearson Mastering Homework System.
4) **Final Exam:** **Comprehensive Final Exam will be given** during Final Exam Period (December 15-21, 2020).

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 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 **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.

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

- **20%** for the common midterm exam
- **30%** for the final exam
- **25%** for the total of homework work
- **25%** 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.

PHYSICS 111 Section 017 COURSE SYLLABUS

TOPIC	TEXT STUDIES	NOTES
Week 1 – Sept. 4 Units, Physical Quantities, and Vectors	Chapter 1	
Week 2 – Sept. 11 Motion in One Dimension	Chapter 2	
Week 3 – Sept. 18 Motion in Two Dimensions	Chapter 3	Optional: Sect. 3.5
Week 4 – Sept. 25 Newton's Laws of Motion	Chapter 4	
Week 5 – Oct. 2 Applying Newton's Laws	Chapter 5	Optional: Sect. 5.5
Week 6 – Oct. 9 Work, Kinetic Energy	Chapter 6	Refresh: scalar (dot) product
Common Midterm Exam – Nov. 9	**Chapter 1 – 6**	**Units, Vectors, Kinematics in 1D and 2D, Newton's laws, work, energy**
Week 7 – Oct. 16 Potential Energy, Conservation of Energy	Chapter 7	Optional: Sect. 7.5
Week 8 – Oct. 23 Linear Momentum and Collision	Chapter 8	Optional: Sect. 8.6
Week 9 – Oct. 30 Rotation, Moment of Inertia	Chapter 9	
Week 10 – Nov. 6 Dynamics of Rotational Motion	Chapter 10 – Sections 1-6	Refresh: vector (cross) product
Week 11 – Nov. 13 Static Equilibrium	Chapter 11 – Sections 1-3	
Week 12 – Nov. 20 Fluid Mechanics	Chapter 12 – Sections 1-5	
Week 13 – Nov. 25 Universal Gravitation	Chapter 13	Optional: Sect. 13.6, 13.7
Week 14 – Dec. 4	REVIEW	
Final Exam	**Chapter 1 – 13**	**Comprehensive Exam Chapters 1 to 13 with emphasis on Chapters 7 to 13**

Fall 2020 Academic Calendar

September 1	Tuesday	First Day of Classes
September 5	Saturday	Saturday Classes Begin
September 7	Monday	Labor Day
September 8	Tuesday	Monday classes meet
September 8	Tuesday	Last Day to Add/Drop a Class
September 8	Tuesday	Last Day for 100% Refund, Full or Partial Withdrawal
September 9	Wednesday	W Grades Posted for Course Withdrawal
September 14	Monday	Last Day for 90% Refund, Full or Partial Withdrawal - No Refund for Partial Withdrawal after this date
September 28	Monday	Last Day for 50% Refund, Full Withdrawal
October 19	Monday	Last Day for 25% Refund, Full Withdrawal
November 9	Monday	Last Day to Withdraw
November 25	Wednesday	Friday Classes Meet
November 26	Thursday	Thanksgiving Recess Begins
November 29	Sunday	Thanksgiving Recess Ends
December 10	Thursday	Last Day of Classes
December 11	Friday	Reading Day 1
December 14	Monday	Reading Day 2
December 15	Tuesday	Final Exams Begin
December 21	Monday	Final Exams End
December 23	Wednesday	Final Grades Due