Fall 2020

PHYS 111-023: Physics I

Haimin Wang

COURSE OUTLINE **PHYSICS 111 Sections 019, 021 and 023** **Fall 2020**

Instructor: Prof. Haimin Wang Office: 468 and 104 Tiernan Hall Email: haimin.wang@njit.edu

Office Hours: Wednesdays 9am to 10:40am, 468 Tiernan

Class Schedule:

Phys 111 Lecture (019, 021 & 023)
Campus Center BALLROOM B Wednesdays
11:00 AM – 12:20 PM
njit.webex.com

Meeting number (access code): 120 421 8394

Meeting password: Physics111

Phys 111 Recitation (instructors will contact you about the web link)
Section 019 GITC 1100 Tuesdays 7:30 AM – 8:50 AM
Prof. Vernon Henry vernon.a.henry@njit.edu
Section 021 KUPF 118 Mondays 7:30 AM – 8:50 AM
Prof. George Georgiou georgiou@njit.edu
Section 023 KUPF 118 Fridays 9:00 AM –10:20 AM
Prof. Vernon Henry vernon.a.henry@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:
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 9780135159552** . 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.

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:

wang63816

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.

1) Common Midterm Exam There will be one common midterm exam given during the semester. The exam schedule is as follows:

- **Common Midterm Exam:** Monday, Nov 09, 2020 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 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 Pearson Mastering Homework System, as described on the previous page.
4) Final Exam **Comprehensive Final Exam will be given** during Final Exam Period (December 15-21, 2020).

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 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 8/31 Units, Physical Quantities, and Vectors	Chapt.1	
Week 2 9/7 Motion in One Dimension	Chapt. 2	
Week 3 9/14 Motion in Two Dimensions	Chapt. 3	Optional: Sect. 3.5
Week 4 9/21 Newton's Laws of Motion	Chapt. 4	
Week 5 9/28 Applying Newton's Laws	Chapt. 5	Optional: Sect. 5.5
Week 6 10/05 Work, Kinetic Energy	Chapt. 6	Refresh: scalar (dot) product
Week 7 10/12 Potential Energy, Conservation of Energy	Chapt. 7	Optional: Sect. 7.5
Common Mid-term Exam 11/9		**Chapters 1 through 7.**
Week 8 10/19 Linear Momentum and Collision	Chapt. 8	Optional: Sect. 8.6
Week 9 10/26 Rotation, Moment of Inertia	Chapt. 9	
Week 10 11/2 Dynamics of Rotational Motion	Chapt. 10 – Sections 1-6	Refresh: vector (cross) product
Week 11 11/09 Static Equilibrium	Chapt. 11 – Sections 1-3	
Week 12 11/16 Fluid Mechanics	Chap.12 – Sections 1-5	
Week 13 11/23 Universal Gravitation	Chap. 13	Optional: Sect. 13.6, 13.7
Week 14 11/30	REVIEW	
Final Exam		**Chapters 1-13, more Weight on Chapters 8-13**

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