COURSE OUTLINE   **PHYSICS 111 (Section 010)**   **Spring 2023**

Class Schedule

- Lecture: KUPF 211 Tuesdays 10:00 AM – 11:20 AM
- Recitation: KUPF 204 Thursdays 4:00 PM – 5:20 PM

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).

Instructor Information

Prof. Wenda Cao
Office: 104 Tiernan Hall
Office Hour: Wednesdays: 1:00 PM – 3:00 PM
E-Mail: *cao@njit.edu*
Webex room: *https://njit.webex.com/meet/cao*

Dr. Esmeralda Vataj
Office: 454 Tiernan Hall
Office Hour: Thursdays 12:20 PM – 2:20 PM
E-Mail: *ev96@njit.edu*
Webex room: *https://njit.webex.com/meet/ev96*

General Information

- Description: Physics 111 is a calculus-based introduction to Mechanics, emphasizing fundamental concepts and applications. It is the first course in a three-course sequence. It includes motion in one and two dimensions, Newton's laws of motion and their applications, work and energy, linear momentum and collisions, rotational motion, and principles of conservation.
- Corequisite: MATH 111, PHYS 111A.

Note: The Laboratory Course, PHYS 111A, must be taken concurrently with PHYS 111. The student must register for both the Lecture/Recitation 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 Lecture/ Recitation Course **– see** *https://centers.njit.edu/introphysics/welcome/*.

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, and 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.

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: 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: cao68079**
- 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, lecture quizzes, problems, grades, etc. are posted on Canvas (PHYS 111010). So, check there often.

Attendance

Attendance will be taken at all classes and exams. More than 3 unexcused absences (in total) is excessive. If you have excusable absences contact your instructor or the Dean of Students (973.596.3466, Room 255 Campus Center). Students may sign in only for themselves on attendance sheets; do not sign in for absent students. Attendance sheets are the official university documents; signing the attendance sheet on behalf of another student is considered as "Misuse of Documents". No student shall intentionally furnish false information nor shall a student forge, alter, destruct, or misuse any university documents or data. Please find the details at *https://www.njit.edu/dos/sites/njit.edu.dos/files/Code%20of%20Student%20Conduct-Updated%20October%202022.pdf* .

<u>Withdrawal:</u> If you must withdraw from the course, do it officially through the Registrar before the last withdrawal date. If you simply stop attending and taking exams your instructor will have to assign a failing grade in the course.

<u>Help:</u> 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.

<u>Grading:</u> 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.

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 (during lectures/recitations, be prepared to have canvas app on phone, iPad or laptop. Note: Quizzes taken remotely will be disregarded and counted against you).

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

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

Exams

There will be three Common Exams plus a comprehensive Final Exam. The schedule is:

- **Common Exam 1**: Monday, 02/13/2023, 4:15 – 5:45 PM
- **Common Exam 2**: Monday, 03/27/2023, 4:15 -- 5:45 PM
- **Common Exam 3**: Monday, 04/24/2023, 4:15 -- 5:45 PM
- **Comprehensive Final Exam**: TBA, 2.5 hours long

Common Exams and Final Exam are all going to be Multiple-Choice questions. Students are going to submit exam questions and scantron cards to be collected at the end of each exam. There is not going to be any partial credit for multiple-choice questions, however students are required to show work to support their answers. The Final Exam will emphasize the work covered after common exam 3, but also re-caps the whole course. **It is the student's responsibility to take the exam in the class that is scheduled.**

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. **<u>There are no make-ups for in class activities</u>**. Students missing a quiz will receive a grade of zero for that item.

Missed Exams

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 the Dean of Students PRIOR TO their absence. In order to be qualified to receive an "excused absence" for the common exam (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 "excused absence" for the 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 final exam grade will be considered for giving a grade for the missed test. 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.

Course Policies

It is expected that NJIT's University Code on Academic Integrity will be followed in all matters related to this course. ***Academic Integrity is the cornerstone of higher education and is central to the ideals of this course and the university. Cheating is strictly prohibited and devalues the degree that you are working on. As a member of the NJIT community, it is your responsibility to protect your educational investment by knowing and following the academic code of integrity policy that is found at:*** *https://www.njit.edu/policies/sites/policies/files/academic-integrity-code.pdf*

Please note that it is my professional obligation and responsibility to report any academic misconduct to the Dean of Students Office. ***Any student found in violation of the code by cheating, plagiarizing or using any online software inappropriately will result in disciplinary action. This may include a failing grade of F, and/or suspension or dismissal from the university.*** If you have any questions about the code of Academic Integrity, please contact the Dean of Students Office at *dos@njit.edu*.

- Students are required to agree to the NJIT Honor Code on each exam.
- Please do not eat, drink, or create noise in class that interferes with the work of other students or instructors. Interfering with an instructor's ability to conduct the class or the ability for other students to learn is considered as "Disruptive Conduct".
  https://www.njit.edu/dos/sites/njit.edu.dos/files/Code%20of%20Student%20Conduct-Updated%20October%202022.pdf
  The use of any internet services other than following the instructor's course notes and e-textbook is disruptive for the instructor and the other students.
- Turn off all phones, wireless devices, laptops, and messaging devices of all kinds during exams.
- Students will be allowed to use non-programmable scientific calculator. However, sharing of calculator will not be permitted in the examination.
- Student recordings: Unauthorized student recordings of class sessions are prohibited. If a student needs to record a class because of accommodation, they need to reach out to the Office of Accessibility Resources and Services (OARS). Please find the details at
  https://www.njit.edu/registrar/njit-policy-recording-classes.
- Needless to say, do not contact any "tutoring services" for help during an exam.

Physics 111 Section 010 Course Syllabus

TOPIC	TEXT STUDIES	NOTES
Week 1 – January 17 Units, Physical Quantities, and Vectors	Chapter 1	
Week 2 – January 24 Motion in One Dimension	Chapter 2	
Week 3 – January 31 Motion in Two Dimensions	Chapter 3	Optional: Sect. 3.5
Week 4 – February 7 Newton's Laws of Motion	Chapter 4	
Common Exam 1 – February 13	**Chapters 1 – 3**	**Units, Vectors, Kinematics in 1-D and 2-D Motion**
Week 5 – February 14 Applying Newton's Laws	Chapter 5	Optional: Sect. 5.5
Week 6 – February 21 Work, Kinetic Energy	Chapter 6	Refresh: scalar (dot) product
Week 7 – February 28 Potential Energy, Conservation of Energy	Chapter 7	Optional: Sect. 7.5
Week 8 – March 7 Linear Momentum and Collision	Chapter 8	Optional: Sect. 8.6
Week 9 – March 21 Rotation, Moment of Inertia	Chapter 9	
Common Exam 2 – March 27	**Chapter 4 – 7**	**Newton's Law & Applications, Work, Kinetic Energy, Potential Energy, and Energy Conservation**
Week 10 – March 28 Dynamics of Rotational Motion I	Chapter 10 – Sections 1-6	Refresh: vector (cross) product
Week 11 – April 4 Dynamics of Rotational Motion II, Angular Momentum	Chapter 10 – Sections 1-6	
Week 12 – April 11 Static Equilibrium	Chapter 11 – Sections 1-3	
Week 13 – April 18 Fluid Mechanics	Chapter 12 – Sections 1-5	

Common Exam 3 – April 24	Chapter 8 – 10	**Momentum and Collisions, Rotational Kinematics, and Dynamics of Rotational Motion**
Week 14 – April 25 Universal Gravitation	Chapter 13	Optional: Sect. 13.6, 13.7
Week 15 – May 3-4	REVIEW	Reading Days
Final Exam	**Chapter 1 – 13**	**Comprehensive Exam**

Spring 2023 Academic Calendar

January	16	Monday	Martin Luther King, Jr. Day
January	17	Tuesday	First Day of Classes
January	21	Saturday	Saturday Classes Begin
January	23	Monday	Last Day to Add/Drop a Class
January	23	Monday	Last Day for 100% Refund, Full or Partial Withdrawal
January	24	Tuesday	W Grades Posted for Course Withdrawal
January	30	Monday	Last Day for 90% Refund, Full or Partial Withdrawal - No Refund for Partial Withdrawal after this date
February	13	Monday	Last Day for 50% Refund, Full Withdrawal
March	6	Monday	Last Day for 25% Refund, Full Withdrawal
March	13	Monday	Spring Recess Begins – No Classes Scheduled – University Open
March	18	Saturday	Spring Recess Ends
April	3	Monday	Last Day to Withdraw
April	7	Friday	Good Friday – No Classes Scheduled – University Closed
April	9	Sunday	Easter Sunday – No Classes Scheduled – University Closed
May	2	Tuesday	Friday Classes Meet
May	2	Tuesday	Last Day of Classes
May	3	Wednesday	Reading Day 1
May	4	Thursday	Reading Day 2
May	5	Friday	Final Exams Begin
May	11	Thursday	Final Exams End
May	13	Saturday	Final Grades Due