Spring 2022

PHYS 111-016: Physics I

Satoshi Inoue

Class Schedule:

Day and Time: Tuesday and Friday (2:30-3:50pm)
Room: Kupfrian Hall 104 from January 31
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

Instructor: Satoshi Inoue, Ph.D.
Center for Solar-Terrestrial Research (CSTR), New Jersey Institute of Technology (NJIT)
Office: 423C (Tiernan Hall)
Office Hour: Monday (1:30pm-3:30pm) in person or virtual, other times by appointment
Phone: 973-642-4059
E-Mail: Satoshi.Inoue@njit.edu
URL: http://inosato78.wixsite.com/inosatopage
Webex room:

COREQUISITE: 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 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: inoue14377

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, problems, grades, etc. are posted on Canvas (PHYS 111016). So, check there often.

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 – **see** 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 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, 02/28/2022, 4:15 -- 5:45 PM
- **Common Exam 2**: Monday, 03/28/2022, 4:15 -- 5:45 PM
- **Common Exam 3**: Monday, 04/25/2022, 4:15 -- 5:45 PM

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 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, 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" 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. 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.

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.

2) Lecture Quizzes A short quiz covering the preceding or current work will be given during each lecture/recitation period. 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.

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 (May **6-12**, 2022).

Note: 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.
It is the student's responsibility to take the exam in the class that is scheduled.

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 participation (in-class quizzes and clickers)

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 Units, Physical Quantities, and Vectors	Chapt.1	
Week 2 Motion in One Dimension	Chapt. 2	
Week 3 Motion in Two Dimensions	Chapt. 3	Optional: Sect. 3.5
Week 4 Newton's Laws of Motion	Chapt. 4	
Common Exam 1		**Units, Vectors + kinematics in 1D and 2D**
Week 5 Applying Newton's Laws, I	Chapt. 5	Optional: Sect. 5.5
Week 6 Applying Newton's Laws II	Chapt. 5	
Week 7 Work, Kinetic Energy	Chapt. 6	Refresh: scalar (dot) product
Common Exam 2		**Newton's laws, work, energy**
Week 8 Potential Energy, Conservation of Energy	Chapt. 7	Optional: Sect. 7.5
Week 9 Linear Momentum and Collision	Chapt. 8	Optional: Sect. 8.6
Week 10 Rotation, Moment of Inertia	Chapt. 9	
Week 11 Dynamics of Rotational Motion	Chapt. 10 – Sections 1-6	Refresh: vector (cross) product
Week 12 Static Equilibrium	Chapt. 11 – Sections 1-3	
Common Exam 3		**Energy, momentum and collisions, rotational kinematics, rotational energy**
Week 13 Fluid Mechanics	Chap.12 – Sections 1-5	

Week 14 Universal Gravitation	Chap. 13	Optional: Sect. 13.6, 13.7
Week 15	REVIEW	
Final Exam		**Comprehensive Exam Chapters 1 to 13 with emphasis on 11 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