

Spring 2020

PHYS 111-022: Physics I

Gordon Thomas

Follow this and additional works at: <https://digitalcommons.njit.edu/phys-syllabi>

Recommended Citation

Thomas, Gordon, "PHYS 111-022: Physics I" (2020). *Physics Syllabi*. 165.
<https://digitalcommons.njit.edu/phys-syllabi/165>

This Syllabus is brought to you for free and open access by the NJIT Syllabi at Digital Commons @ NJIT. It has been accepted for inclusion in Physics Syllabi by an authorized administrator of Digital Commons @ NJIT. For more information, please contact digitalcommons@njit.edu.

Physics 111 Syllabus

Spring 2020

Instructor Information

Name

Gordon Thomas

Emails

thomasg@njit.edu

Information

482 TIER: T/R 9:30-11 am, appt. preferred

Class meetings: Section 018: Room: Tier 107; Monday and Wednesday 11:30-12:50.
Section 022: Room: Tier 107: Monday and Wednesday 1:00-2:20

General Information

Description

Prerequisite: MATH 131; Co-requisite: MATH 111 or MATH 132 and PHYS 111A.

Our class is a section of multi-section PHYS 111, with common material and exams. The course covers an introduction to motion with an emphasis on its fundamental concepts, laws and applications. The Course Schedule below lists topics covered. Professors will try to help the students succeed by using active learning.

See: <https://physics.njit.edu/>

Course Schedule

Classes start Tuesday Jan. 21; Grades are due on or about Friday May 17.

The homework software cuts off submission at midnight before the dates shown in the Schedule and in Canvas.

You will learn more if you read about the topics in the Schedule. There will be quizzes during class. Students are scheduled to complete classes, quizzes, homework and 111A labs, before exams on related topics.

Learning Expectations, Goals and Outcomes

The student will be able to understand and calculate the following:

1. Units, estimates and significant figures in the evaluations of events and objects of realistic significance.
2. Magnitude and direction of vector combinations using addition, subtraction, scalar, and cross product.
3. Position, velocity and acceleration of an object moving in a straight line under constant acceleration and motion in a plane using orthogonality.
4. Net force, mass and acceleration (Newton's Laws) as the basis of motion.
5. The same quantities using geometry, free body diagrams and frictional forces.
6. Acceleration and force of circular motion at constant speed.
7. The same quantities taking into account conservation and non-conservation of energy for linear and rotational motion.
8. The momentum and impulse under realistic circumstances and events.
9. Work, energy, and conservation of energy of mechanical and non-conservative systems for linear and rotational motion.
10. Center of mass of a system as well as its moment of inertia in the context of static and dynamic conditions.
11. Parameters of static and linear motion of fluids using pressure, conservation of energy and mass.
12. Mass and distance in the force and potential energy involved in the gravitational field.

Professors and students will measure Outcomes by the performance on assessments as listed below under final grade calculations.

Schedule of course events:

Week, starting	Topic	Homework due	Open Stax Section # and name:
1 - 1/22	Units and vectors	A1 - 1/30	1.Units and 2. Vectors
2 - 1/29	1D Motion	A2 - 2/6	3.Motion on straight line
Drop/Add - 1/31 Last day to drop or add a course			
3 - 2/5	2D Motion	A3 - 2 /13	4.Motion in 2D
4 - 2/12	Newton's laws	A4 - 2/20	5.Newton's Laws
5 - 2/19	Applying Newton's Laws	A5 - 2/27	6.Applications of Newton's
Exam 1 - 2/24	Concepts from Weeks 1-3 only		
6 - 2/26	Work, Friction, Kinetic energy, dot product		7.Work and Kinetic Energy
7 - 3/4	Potential energy, conservation	A6,7 - 3/12	8.Potential Energy and Conservation
! - 3/9	Spring Break		
8 - 3/18	Linear Momentum and Collisions	A8 - 3/26	9.Linear momentum and collisions
9 - 3/25	Moments of Inertial rotation	A9 - 4/2	10.Fixed axis rotation
Exam 2 - 3/30	Concepts from Weeks 4,5,6,7		
10 - 4/1	Torque, Rotational motion, X-products	A10 - 4/9	11.Angular momentum
11 - 4/8	Static equilibrium	A11 - 4/16	12.Static Equilibrium
Exam 3 - 4/13	Concepts from weeks 8,9,10		
12 - 4/15	Fluid mechanics	A13 - 4/23	14.Fluid mechanics
13 - 4/22	Gravitation	A14 - 4/30	13.Gravitation
14 - 4/29	Review		
Final May 8-14	All topics, emphasis on weeks 11, 12 ,13		

Course Materials

Text:

Free text: <https://openstax.org/details/books/university-physics-volume-1>
along with homework created by the instructor using Canvas.

***Canvas is required for this course and supplements the text. Some quizzes and Homework will be online via Canvas
Information on Canvas is also be available through [NJIT Canvas - Student Orientation](#).

Final Grade Calculation:

The Weights for parts of the course are as follows:	
Quizzes and Class Participation	10%
Homework	10%
Exams (Exam 1= 16%, Exam 2= 16%, Exam 3= 16%, Final= 32%)	80%

Class participation and Active Learning: (10 % of grade.) Active Learning is designed to help you do well. For logistical reasons, you should take participate during class. These exercises will also automatically record attendance and [Verification of Presence related to Scholarships](#).

Homework: (10% of grade) Students are expected to complete and understand homework independently, as in an exam. After a try, they are encouraged to work with Tutors to learn the concepts. The Tutoring Center is in room G12 in the basement of CKB. Data show that effective study is reflected in Exams and in long-term retention.

Exams: (80% of grade) Each of the 3 Exams during the semester is scheduled from 4:15-5:45pm on dates 2/24, 3/30, 4/13. The Final exam is after classes end on a date to be determined. The amount of new material covered determines the exam weight, unless otherwise specified. The exam questions are multiple-choice with content common to all students. The professors will help you as much as possible by covering all concepts and all settings of exam questions in class and with special review sessions. See the schedule below for details. Make-ups for missed exams 1, 2 and 3 are only at 6-7:30PM on the exam day and only with advance permission from both your instructor and the Dean of Students. The Final will emphasize the weeks of work after Exam 3, plus an overview of the whole course. The Final exam is not scheduled yet.
More info at: <https://physics.njit.edu/common-and-final-exams-5/>

The conversion of numerical to letter grades is as follows:

> 85% A; >80 to 85 B+; >70 to 80 B; >65 to 70 C+; >55 to 65 C; >50 to 55 D and <50 F.

Course Policies

Tutors: If you need any extra information about class, quiz or exam questions, your easiest and most effective source is a tutor. Tutors are useful throughout the course. Tutors are free and know our course material well. They are available without an appointment, except just before exams when they are over-crowded in CKB **G12**

Tutoring will begin on Tuesday, January 28 and end Tuesday, May 5, 2020

Hours of operation: Monday & Wednesday, 10:00 am – 6:00 pm, Tuesday & Thursday, 10:00 am – 7:00 pm and Friday, 10:00 am to 2:30 pm

<https://physics.njit.edu/physics-tutoring-sign-sheet>

Tutoring is available for the following classes: PHYS102, 103, 111, 121 and 234. Students can walk in during the hours of operation. Appointments and one on one tutoring is not available.

Information after our last class: In fairness to all students, only review sessions that are open to all students will be available. In the same principle of fairness, there will be no discussion after the final exam.

Honor Code: The NJIT Student Council dictates: “NJIT has a zero-tolerance policy for cheating of any kind and for student behavior that disrupts learning by others.” The NJIT Student Senate has requested a zero-tolerance policy for cheating of any kind and for behavior that disrupts learning. The Senate wants fairness for all students. The Dean of Students determines punishments and requires professors to report any incidents. The penalties include failure in the course plus disciplinary probation up to expulsion from NJIT. Avoid situations where anyone could misinterpret your behavior 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 follow the NJIT academic policy on behavior:
<https://www5.njit.edu/undergradstudies/best-practices/>

Missed Active Learning and exams: There are no make-ups for in-class activities. If you miss an exercise, you will receive a grade of zero. If you miss an exam and the evening make-up time following an exam(see below), you will receive a score of zero for that Exam. That score will be included in the calculation of your final grade. If you miss two exams, you will automatically fail the course. To get credit for an exam, *you must notify your instructor PRIOR TO the exam you will miss, as above.*

Late work: Homework is due by times and dates indicated in the Mastering web site. You cannot make up a Quiz that you miss.

Class attendance: The NJIT attendance policy is the following: “It is expected that students will attend all classes. Your teacher will take attendance at all classes and exams. More than 3 unexcused absences (in total) are excessive.” If you have excusable absences, contact your instructor or the **Dean of Students - (973) 596-3466, Room 255 Campus Center**. If you have to miss class, attend the next physics tutoring session and let your professor know. Some professors use i-clickers.

Withdrawal: If you must withdraw from the course, do it officially through the Registrar by the deadline, Jan 31, to get a course grade of W, rather than F.

Electronics: Cell phones and laptops must be off during classes and exams, except as indicated by the instructor.

National Science Standards: Students at engineering colleges need to learn to do the following:

1. Identify questions and concepts that guide scientific investigations
2. Design and conduct scientific investigations
3. Use technology and mathematics to improve investigations and communications (uncertainty)
4. Formulate and revise scientific explanations and models using logic and evidence (how uncertainty affects data)
5. Recognize and analyze alternative explanations and models (analyze data)
6. Communicate and defend a scientific argument (data presentation)

Additional Information and Resources

Resources for NJIT Students

[Academic Advising Success Center](#)

“...assist in the advisement of students who are undecided in their major, transitioning into another major at NJIT, and those students who need additional support to graduate successfully and in a timely manner.”

[Academic Support and Student Affairs](#)

“From questions about becoming a student at NJIT - to student engagement - to searching for information on career development, the Division of Academic Support and Student Affairs Staff is here to help.”

[Additional Tutoring Centers](#)

[Physics Learning Center](#); [Math Learning Center](#); [Chemistry Learning Center](#); [The Writing Center](#); [ECE Study Groups](#)

[Center for Counseling and Psychological Services](#)

“The NJIT Center for Counseling and Psychological Services (C-CAPS) is committed to assisting students in the achievement of their academic goals as well as benefiting from their personal experience on campus. College life can be personally challenging and stressful at times. We believe that the educational process is an important component of the development of the individual as a whole person. Our goal is to optimize the college experience and improve the quality of the lives of our students by promoting their mental health and facilitating students’ personal, academic and professional growth.”

[Department of Public Safety](#)

“The Department of Public Safety, conveniently located at 154 Summit St. on the first level of the Parking Deck, provides police protection 24 hours a day, seven days a week.”

[Disability Support Services](#)

“If you need accommodations due to a disability please contact Chantonette Lyles, Associate Director of Disability Support Services, Fenster Hall Room 260 to discuss your specific needs. A Letter of Accommodation Eligibility from the Disability Support Services office authorizing your accommodations will be required.”

[Health Services](#)

“To ensure the good health of our students, the NJIT Student Health Service provides quality healthcare to all eligible NJIT registered students.”

[IST Service Desk](#)

“The IST Service Desk is the central hub for computing information and first point of contact for getting help and reporting issues related to computing technology at NJIT. There is much technology here at NJIT, and many ways to find information or get help with it.”

[The Learning Center](#)

“Our mission is to assist students both in the classroom and beyond by providing tutorial services, academic coaching, academic and personal enrichment workshops and staff and peer support so students can meet the demands of their coursework and are prepared for life after graduation.”

[Moodle Help Page](#)

Tutorials for students.

[NJIT/Rutgers Shuttle Service](#)

“The shuttle bus is operated jointly with Rutgers-Newark and provides transportation for the University community between the two campuses, major mass transit systems, and Harrison and Kearny. As a courtesy, shuttle service is free to the Rutgers/NJIT community who present identification.”

[Office of Global Initiatives](#)

Resources for international students and study abroad programs.

[Robert W. Van Houten Library](#)

“The Van Houten Library offers electronic and print resources essential to the mission of New Jersey’s science and technology university, including a core collection of academic books, databases, and journals, as well as research and consultation services.”

[Student Financial Aid Services](#)

“Student Financial Aid Services (SFAS) at NJIT is committed to providing you with every opportunity to obtain funding to support your educational costs at NJIT.”