

Spring 2019

# PHYS 111-016: Physics I

Vitaly Shneidman

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# Physics 111 Syllabus

Fall 2018

## Instructor Information

### Instructors

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### Office Location & Hours

482 TIER: W 10-12 and by appt.

**Section 002: Class meetings: Room CKB 116; Monday and Wednesday 1:00-2:20.**

**Lab meeting: CKB 116: Friday, 1:00-2:50**

## 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 make an effort to help the students succeed by using active learning.

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

### 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.

**National Science Standards:** Students at engineering colleges need to learn to do the following. The labs are a particular opportunity to gain experience with these talents:

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)

## Course Materials

### Text

There are many copies of this economical and comprehensive text available on the web:

**University Physics Plus Modern Physics Plus MasteringPhysics with eText -- Access Card Package (13th Edition)**

ISBN-13: 978-0321675460

Our course only requires a Mastering access card and any text that covers our material. For example, the 14<sup>th</sup> edition is OK, but not required.

\*Be sure that your purchase includes a Mastering Physics “student access code card” for the homework at

[www.masteringphysics.com](http://www.masteringphysics.com)

\*\*\*Moodle is required for this course and supplements the text. Some quizzes may be online via Moodle> Assignments, information and grades will be on Moodle.

### Final Grade Calculation:

The Weights for parts of the course are as follows:	
Quizzes and Class Participation	8%
Homework	7%
Exams (Exam 1= 16%, Exam 2= 16%, Exam 3= 16%, Final= 32%)	85%

**Class participation and Quizzes: (8 % of grade with details at Instructors discretion)** Students are expected to work actively in class. Effective participation shows up in Exams and in long-term understanding.

**Homework: (7% of grade)** Students are expected to complete and understand homework independently and to work with Tutors when needed. The Tutoring Center is in room G11 in the basement of CKB. Data show that effective study is reflected in Exams and in long-term retention.

The [masteringphysics.com](http://masteringphysics.com) homework course title is MPNJIT111S2019.

Each Professor will copy the master course ID onto a unique Course ID for his or her class. All records will reside in the unique Course ID file.

**Exams: (85% of grade)** Each of the 3 Exams during the semester are scheduled from 4:15-5:45pm on dates 2/25, 3/25, 4/15. The Final exam is after classes end on a date tbd. 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.

If you need any extra information about class, quiz or exam questions, ask a tutor. Tutors are a useful source throughout the course. After the Final exam, the course ends, and questions and grades are not open to discussion.

## Course Policies

**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 do not eat, drink, or create noise in class that interferes with the work of other students or instructors.

**Missed quizzes and exams:** There are no make-ups for in-class activities. If you miss a quiz, you will receive a grade of zero. If you miss an exam and the evening make-up time (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, otherwise your course grade will be F.

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

## Course Schedule

Classes start Tuesday Jan. 22; Grades are due on or about Friday May 17.

Mastering Physics software cuts off homework submission at midnight before the first day of each week

We recommend that you read all chapters in our textbook as indicated below before class. Professors may give quizzes both before and after they cover material in class. The combination of reading and discussion helps learning.

Note as below that professors will help you by making an effort to teach all **topics in class the week before the Lab** on that topic.

Our intention is to include, whenever possible, topics in exams only after students have completed both the Lab work and the class work on that topic to help you learn the concepts.

Week	Topic	Reading in text	Labs and Topics in Phys111A
1 (1/22/19)	1D Motion and Units	Ch. 1.1-1.6, Ch. 2	Introduction
2 (1/28/19)	2D Motion and Vectors intro	Ch. 1.7-1.9, Ch. 3.1,3.3, 3.5	109. 1D Motion
3 (2/4/19)	Newton's laws	Ch. 4	111. Projectile Motion
4 (2/11/19)	Linear Static Forces	Ch. 5.1, 11.1-11.3	112 Newton's 2 <sup>nd</sup> Law
5 (2/18/19)	Friction	Ch. 5.2-3	103 Linear Statics
6 (2/25/19)	Work, Kinetic Energy and 3D vector dot products*	Ch. 1.10, Ch. 6	106 Friction
7 (3/4/19)	Potential and Conservation of Energy	Ch. 7	6a1 Work and Kinetic Energy
8 (3/11/19)	Momentum and Collisions	Ch. 8	125 Conservation of Energy
9 (3/25/19)	Circular motion	Ch 3.4 and 5.4	126 Conservation of momentum
10 (4/1/19)	Angular energy	Ch. 9	114 Circular motion
11 (4/8/19)	Torque and rotational motion** and 3D vector x products	Ch. 10.1-6 And Ch. 1.10	9a1 Energy in Rotational Motion
12 (4/15/19)	Static torques	Ch. 11.1-11.3	127 Torque and Rotation
12 (4/22/19)	Thanksgiving		
13 (4/29/19)	Fluids	Ch. 12.1-5	121 Static torques
14 (5/6/19)	Universal Gravitation	Ch. 13.	7 Archimedes' Principle

### \*Exams: Mondays 4:15 - 5:45pm

- |         |  |           |
|---------|--|-----------|
| 1. 2/25 | 1D motion; 2D motion and vectors; Newton's laws; Linear static forces              | Weeks 1-4 |
| 2. 3/25 | Friction; Work and 3D dot products; Kinetic, potential and conservation of energy; | Weeks 5-7 |
| 3. 4/15 | Momentum and collisions; circular motion; angular energy; 3D X products            |           |
|         | Weeks 8-10   |           |

Final exam: tbd. Content: some coverage of Weeks 1-10; more coverage of Weeks 11-14.

## 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.”