

Fall 2020

## PHYS 102-001: General Physics

N. Ravindra

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**Course Outline**  
**Physics 102 Sect. 001 and 003**  
**Fall 2020**

Prof. N.M. Ravindra (Ravi)  
Lab - 973-596-6453  
Cell. – 908.477.1722  
Lab - 414 Tiernan Hall

Lecture and recitation for **Section 001**: Synchronous Online  
Monday 9.00 AM – 10.20 AM  
Thursday 2.30 PM – 3:50 PM

Lecture and recitation for **Section 003**: Synchronous Online  
Monday 9.00 AM – 10.20 AM  
Wednesday 12.30 PM – 1.50 PM

Online office hour via Webex:  
11.00 AM to 1.00 PM on Fridays  
(Email me by 5pm Monday with any time constraint you may have.)

Course Notes: Each week, I will send you the Course Notes by email.

**Pre- and Co-requisite Courses**

Prerequisite: Satisfactory completion of two high school mathematics courses and two high school science courses.

**Laboratory - Physics 102A**

The laboratory component of the course is Phys 102A. This laboratory course may be optional for your major; confirm it with your department. **Due to COVID-19, Physics 102A does not have to be taken concurrently with Physics 102, although I recommend that you take it with the Course.** It will help you enormously to understand the course content. The grading for the laboratory is separate from the course/recitation (Phys 102) and the grades are given by the laboratory instructors. Latest edition of **Lab manual “Physics 102A Laboratory Manual”** can be purchased from NJIT Bookstore.

**Course Materials**

**Textbook:**

**Physics - Principles with Applications, 7th ed.** by Giancoli (Publisher: Pearson)

Students may purchase e-textbook along with the access to the Mastering Physics Online Homework system. Or, students may buy a physical textbook, for example, from NJIT bookstore. **No iClicker is required.**

### **Mastering Physics Online Homework System:**

You can buy the Mastering Physics student access code online. If you buy a physical textbook, you may buy the physical textbook bundled with a Mastering Physics student access code card. Homework assignments will be posted on-line. Students login, download and solve the assigned problems, and submit answers to the automated grading system.

**Please see the attached Student Registration Instructions from Pearson.**

### **Email:**

NJIT email will be routinely used for announcements and to distribute material. Be sure check the NJIT email every day.

### **Computer:**

Students are required to have access to a computer with high speed internet connection, webcam (internal or external), microphone and audio (internal or external), and Windows/Mac operating system. (Webcam and Window/Mac operating system are for online exams.)

### **Course Notes:**

GMAIL is used for sharing the Course Notes etc.

### **Webex:**

All lectures/recitation will be given with Webex.  
Check information on <http://ist.njit.edu/webex/>

### **Attendance**

#### **Verification of Presence will be conducted during the first week of the Course.**

Attendance at lectures and recitations, either online or in-classroom, is mandatory; it may constitute a portion of the final grade. Missing more than three lectures will be reported to the Dean of Freshman Studies throughout the semester and can result in failing the course. Students with absences need to discuss their extenuating circumstances for missing the classes with the Dean. Students are allowed to attend the course 100% online.

## Exams

There will be two midterm Exams and one Final Exam during the term. The exam schedule is:

Exam 1: Monday, September 28, 9.00 AM – 10.20 AM

Exam 2: Monday, November 2, 9.00 AM – 10.20 AM

Final Exam: To be announced

There will be no makeup exams.

**All exams will be given remotely through online, using an online proctoring service “ProctorU”. Students need access to a computer with high speed internet connection, webcam (internal or external), microphone and audio (internal or external), and Windows/Mac operating system.**

## Grading

Final grades will be based on a composite score for the term’s work that includes Exam 1, Exam 2, Final exam, homework, iClicker REEF quiz, and class participation. The approximate weights we expect to use in calculating the composite score are:

- 23 % for Exam 1
- 23 % for Exam 2
- 35 % for Final Exam
- 12 % for Homework grade
- 7 % quiz + Class participation

Extra credit may be given for active class participation, etc. Negative credit may be applied for lateness, creating noise, or otherwise interfering with class work.

The cutoff percentages for various letter grades will be in the range of 84.0% for A, 76.0 % for B+, 68.0% for B, 60.0% for C+, 52.0% for C, 44.0% for D, F below 44.0 %.

**C or better grade is required to take further physics courses. If you get D in Physics 102, you cannot take the next level physics course.**

## Reading Assignments

The text readings are listed below. You should read the assigned sections of the text before the lecture covering that material.

## Homework

It is almost impossible to succeed in this course without working a lot of problems: do the homework. Each student must download the weekly homework assignments from Mastering

Physics online homework system, work the problems, and submit the solutions online before each assignment is due. Late work will not be accepted. See Course Materials section above.

### **Honor Code Violations or Disruptive Behavior**

NJIT has a zero-tolerance policy for cheating of any kind and for student behavior that disrupts learning by others. Incidents will be immediately reported to the Dean of Students. The penalties for violations range from a minimum of failure in the course with disciplinary probation up to expulsion from NJIT. Avoid situations where your own behavior could be misinterpreted, even if it is honorable. Students are required to agree to the NJIT Honor Code on each exam. Turn off all cellular phones, wireless devices, computers, and messaging devices of all kinds during exams. Please do not create noise in class that interferes with the work of students or instructors.

### **Help**

Students are encouraged to meet with their instructor during their office hours. Physics Department also offers tutoring as will be posted on <http://physics.njit.edu/>.

### **Learning Outcomes:**

For this course, you can expect to be assessed on the following learning outcomes:

- Recall the definitions and relationships involving position, velocity, speed, acceleration, vectors, Newton's Laws, circular motion, free-body diagrams, friction, work, energy, linear and angular momentum, torque, angular velocity and acceleration, and gravitation.
- Apply the equations governing 1-D and 2-D constant acceleration to mechanical systems for various initial conditions. Calculate unknown quantities based on physical relationships, initial conditions, and known quantities.
- Comprehend the meaning of the equations governing net force and acceleration (Newton's Laws), and be able to manipulate them in conjunction with a free-body diagram to obtain any desired quantitative relationship. Understand the extension of these equations to rotational motion, and gravitation.
- Generalize the concepts underlying the equations of motion, such as work, kinetic and potential energy, conservation of energy, and equilibrium.
- 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.

- 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.

**2020 Fall Course Schedule for Phys 102-001, 003**

<b>Dates</b>	<b>Lecture Topics</b>	<b>Text Reading</b>
Week 1	Math Review, Introduction Measurement and Units	Appendix A-4, Ch 1, Sec 1-6
Week 2	Motion in One Dimension	Ch 2, Sec 1-8
Week 3	Vectors and Two-Dimensional Motion	Ch 3, Sec 1-6
<b>9/28 M</b>	<b>Exam 1 9.00 AM – 10.20 AM</b>	<b>Ch. 1 - Ch.3.4</b>
Week 4 – 9/28	The Laws of Motion - Forces and Newton’s Laws	Ch 4, Sec 1-5
Week 5	The Laws of Motion - Applications of Newton’s Laws	Ch 4, Sec 6-8
Week 6	Circular motion	Ch. 5, Sec. 1, 2, 4 (excluding highway curves)
Week 7	Energy -Work, Kinetic Energy, Work-Energy Theorem	Ch. 6, Sec. 1, 3
Week 8	Energy -Potential Energy, Mechanical Energy, Energy conservation, Power	Ch. 6, Sec. 4-7, 9, 10 (excluding spring)
<b>11/2 Monday</b>	<b>Exam 2 9.00 AM – 10.20 AM</b>	<b>Ch.3.5-3.6, Ch. 4.1-4.8, Ch. 5.1-5.4, Ch.6.1-6.3</b>
Week 9	Momentum and Collisions -Momentum, Impulse, Conservation of Momentum	Ch. 7, Sec. 1-3
Week 10	Momentum and Collisions -Collisions	Ch 7, Sec. 4-8, 10
Week 11	Rotational Motion, Rotational Dynamics I	Ch 8, Sec. 1-3
Week 12	Rotational dynamics II	Ch.8, Sec. 4-8
Week 13	Review	
Week 13	Static Equilibrium	Ch. 9, Sec. 1-4
Week 14	The Law of Gravity	Ch. 5, Sec. 5-7 (excluding Kepler’s Laws)
<b>Date to be announced</b>	<b>Final Exam</b>	Everything learnt in class

**\* Professor will discuss changes to the syllabus during class if they arise.**