

Spring 2021

PHYS 102-004: General Physics

N. Ravindra

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Course Outline
Physics 102 Sections 004 & 006
Synchronous Online
Spring 2021

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Lecture for Section 004 & 006: 11.00 AM to 12.20 PM - Wednesdays

Recitation for Section 004:

9.00 AM to 10.20 AM - Fridays

Recitation for Section 006:

7.30 AM to 8.50 AM – Mondays

Office Hours:

Open-Door on Tuesdays and Thursdays.

All Classes will be held via WebEx:

<https://njit.webex.com/join/ravindra>

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; you will need to confirm it with your department. If it is required for your major, it would help to take it concurrently unless you have previously taken and passed Phys 102A. 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.

NJIT has determined that all labs require a “face-to-face/in-person” component. Because of this requirement, along with COVID operating conditions, the labs are not a co-requisite for the corresponding or for the subsequent lecture component of a class. Also note that:

- **If the student has an approved medical accommodation from the Dean of Students, the student can take the lab course entirely online.**

- **If the student does not have an approved medical accommodation, then the lab cannot be taken online and has to be face-to-face or postponed to a later time.**

YOU MUST REGISTER FOR THE LECTURE/RECITATION (Phys 102) AND THE LABORATORY COURSE (Phys 102A) SEPARATELY.

Course Materials

Textbook:

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

Mastering Physics Online Homework System:

Be sure that your textbook is sold bundled with a Mastering Physics student access code card. You can also buy the student access code card separately either from NJIT bookstore or online. Homework assignments will be posted on-line. Students login, download and solve the assigned problems, and submit answers to the automated grading system. Instruction can be found on the student access code card. **To enroll for this section of the course, here are the course IDs.**

Email:

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

Attendance

Attendance at lectures and recitations 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.

Exams

There will be Two Exams and a Final Exam during the term. The exam schedule is as follows:

- **Exam I: Wednesday, February 17, 11.00 AM to 12.30 PM**
- **Exam II: Wednesday, March 24, 11.00 AM to 12.30 PM**

Final Exam: To be announced

There will be no makeup exams.

Grading

Final grades will be based on a composite score for the term's work that includes two exams, the final exam, homework score, written lecture quiz, and class participation. The approximate weights we expect to use in calculating the composite score are:

- 48 % for two Exams (24% for each) - Open Ended Problems
- 33 % for Final Exam - Open Ended Problems
- 12 % for Homework grade
- 7 % Algebra Quiz + Lecture Quizzes + 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 90.0% for A, 80.0 % for B+, 70.0% for B, 60.0% for C+, 50.0% for C, 40.0% for D, F below 40.0 %.

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: it would help to 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.

I will be informing you of the Course ID for the Homework shortly.

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 posted on <http://physics.njit.edu/>, for which students do not need to sign up but just can go to open sessions provided in the schedule.

Learning Outcomes:

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

1. 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.
2. 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.
3. 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.
4. Generalize the concepts underlying the equations of motion, such as work, kinetic and potential energy, conservation of energy, and equilibrium.
5. 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.
6. 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.

2021 Spring Course Schedule for Phys 102-004 & 006

Dates	<u>Lecture Topics</u>	Text Reading
1/20 W, 1/22 F, 1/25M	Math Review, Introduction Measurement and Units	Appendix A-4, Ch 1, Sec 1-6
1/27 W, 1/29 F, 2/1 M	<u>Motion in One Dimension</u>	Ch 2, Sec 1-8
2/3 W, 2/5 F, 2/8 M	<u>Vectors and Two-Dimensional Motion</u>	Ch 3, Sec 1-6
2/10 W, 2/12 F, 2/15M	The Laws of Motion - Forces and Newton's Laws, Review	Ch 4, Sec 1-5
2/17 W	<u>Exam I (11.00 AM to 12.30 PM)</u>	Ch. 1 - Ch.3.4
2/19 F, 2/22 M, 2/24 W	The Laws of Motion - Applications of Newton's Laws	Ch 4, Sec 6-8
2/26 F, 3/1	Circular motion	Ch. 5, Sec. 1, 2, 4 (excluding highway curves)
3/3 W, 3/5 F, 3/8 M	Energy -Work, Kinetic Energy, Work-Energy Theorem	Ch. 6, Sec. 1, 3
3/10 W, 3/12 F, 3/22 M <i>3/14-3/21 – Spring Break</i>	Energy -Potential Energy, Mechanical Energy, Energy conservation, Power, Review	Ch. 6, Sec. 4-7, 9, 10 (excluding spring)
3/24 W	Exam II (11.00 AM to 12.30 PM)	Ch. 3.5-3.6, Ch. 4, Ch. 5.1, 5.2, 5.4
3/26 F, 3/29 M	Momentum and Collisions -Momentum, Impulse, Conservation of Momentum	Ch. 7, Sec. 1-3
3/31 W	Momentum and Collisions -Collisions	Ch 7, Sec. 4-8, 10
4/2 F, 4/5 M, 4/7 W	<u>Rotational Motion, Rotational Dynamics I</u>	Ch 8, Sec. 1-3
4/9 F, 4/12 M, 4/14 W	Rotational dynamics II	Ch.8, Sec. 4-8
4/16 F, 4/19 M, 4/21 W	<u>Static Equilibrium</u>	Ch. 9, Sec. 1-4
4/23 F, 4/26 M, 4/28W	The Law of Gravity	Ch. 5, Sec. 5-7 (excluding Kepler's Laws)
5/3 M, 5/4 T(Friday Schedule)	Review Session	
Date to be announced	Final Exam	Everything learnt in class

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

Spring 2021 Academic Calendar

January	18	Monday	Martin Luther King, Jr. Day
January	19	Tuesday	First Day of Classes
January	23	Saturday	Saturday Classes Begin
January	25	Monday	Last Day to Add/Drop a Class
January	25	Monday	Last Day for 100% Refund, Full or Partial Withdrawal
January	26	Tuesday	W Grades Posted for Course Withdrawals
February	2	Tuesday	Last Day for 90% Refund, Full or Partial Withdrawal, No Refund for Partial Withdrawal after this date
February	15	Monday	Last Day for 50% Refund, Full Withdrawal
March	8	Monday	Last Day for 25% Refund, Full Withdrawal
March	14	Sunday	Spring Recess Begins - No Classes Scheduled - University Open
March	21	Sunday	Spring Recess Ends
April	2	Friday	Good Friday - No Classes Scheduled - University Closed
April	5	Monday	Last Day to Withdraw
May	4	Tuesday	Friday Classes Meet
May	4	Tuesday	Last Day of Classes
May	5	Wednesday	Reading Day 1
May	6	Thursday	Reading Day 2
May	7	Friday	Final Exams Begin
May	13	Thursday	Final Exams End
May	15	Saturday	Final Grades Due