

Spring 2022

## **PHYS 102-002: General Physics**

Jan Opyrchal

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**Course Outline**  
**Physics 102 Sect.002**  
**Spring 2022**

Prof. Jan Opyrchal  
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Lecture and recitation for **Section 002**:

**Wednesday 1.10 pm** – 2:20pm, Tiernan 114

**Friday 1.00 pm** – 2:20pm, Tiernan 114

Office hours: Online

Mondays 1.10 PM : <https://njit.webex.com/njit/j.php?MTID=m00ea34fef691bd6ca0c7577c1e1825f>

Fridays 2.30 PM : <https://njit.webex.com/njit/j.php?MTID=m165af6433dd18e7ccdabf968d5cf31a0>

Course Website: [Canvas](#) link to: [canvas.njit.edu](https://canvas.njit.edu)

**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. If it is required for your major, it must be taken 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.

**YOU MUST REGISTER FOR THE LECTURE/RECITATION (Phys 102) AND THE LABORATORY COURSE (Phys 102A) SEPARATELY. WITHDRAWAL FROM ANY OF THESE WILL CAUSE A SIMULTANEOUS WITHDRAWAL FROM ALL Phys 102 COURSES.**

**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, use course ID**

**“ NJIT Spring 2022 Physics 102 Sect. 002”.**

**Lecture Quizzes:**

Each class starts from the Lecture Quiz. There will be 4 to 5 questions during a lecture quiz. The quizzes will open on Canvas at 1.00 PM and close at 1.15 PM - Wednesdays and Fridays. There is no “makeup” for any lecture quiz – even if one is sick. They are available online – from home too.

**Email:**

NJIT email will be routinely used for announcements and to distribute material. Be sure 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.

## COVID-19 Policy

Students must follow the rules set by NJIT regarding COVID-19.

## Exams

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

- Common Exam 1: **Wednesday 2/16/2022**, 4:15 – 5:45 pm
- Common Exam 2: **Wednesday 3/23/2022**, 4:15 – 5:45 pm

## **Comprehensive Final Exam after May 5, 2.5 hours long**

There will be no makeup exams.

## Grading

Final grades will be based on a composite score for the term's work that includes two common exams, the final exam, homework score, lecture quizzes **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 % for 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, not following COVID-19 rules, or otherwise interfering with class work.

The cutoff percentages for various letter grades will be in the range of

**A** for > 84.0%, **B+** for > 76.0 %, **B** for > 68.0%, **C+** for > 60.0%, **C** for > 52.0%, **D** for > 44.0%, **F** for < 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 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.

## 2022 Fall Course Schedule for Phys 102-002

<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
Week 4	The Laws of Motion - Forces and Newton's Laws	Ch 4, Sec 1-5
<b>Wednesday 2/16/2022</b>	<b>Common Exam 1 (4:15-5:45pm)</b>	<b>Math Review, Ch. 1 - Ch. 3.6</b>
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>Wednesday 3/23/2022</b>	<b>Common Exam 2 (4:15-5:45pm)</b>	<b>Ch. 4, Ch.5.1-Ch.5.4, Ch.6.1, Ch.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	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 learned in class

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

## 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
May		TBA	Commencement