

Spring 2019

# PHYS 103-002: General Physics

Jan Opyrchal

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**INSTRUCTOR:** Halina Opyrchal, email: [opyrchal@njit.edu](mailto:opyrchal@njit.edu), Office: TIER 454

**Office hours:** *Monday, 2:30 – 4:00 PM*      *Friday, 10:00 -11:30 AM*

**PRE-REQUISITES AND CO-REQUISITES:**

- **Pre-requisites:** Phys 102 with grade C or better
- **Co-requisites:** Phys 103A (the lab course) unless previously taken

**FAILURE TO MEET EITHER CO-Requisites or PRE-Requisites will result in student being dropped from class.**

**COURSE MATERIAL:**

1. **Textbook:** “Physics: Principles with Application, Seventh Edition by Douglas C. Giancoli, Prentice Hall, ISBN – 13: 978-0-321-62592-2
- **Classroom Response System** called “**IClicker**”: “I Clickers” are available in the NJIT bookstore. Please bring your clicker to the class.
  - **Mastering Physics Homework System:** Be sure that your textbook is sold bundled with a Mastering Physics student access code card. Each student must enroll in the course specified by his/her instructor. Homework assignments will be posted on-line. Students login, download and solve the assigned problems, and submit answers to the automated grading system.

**NOTE: THE LABORATORY COURSE, PHYS 103A, MUST BE TAKEN CONCURRENTLY WITH PHYS 103 THE STUDENT MUST REGISTER FOR BOTH THE LEC/REC AND THE LAB COURSE. WITHDRAWAL FROM EITHER COURSE WILL CAUSE A SIMULTANEOUS WITHDRAWAL FROM BOTH COURSES. FOR THE LABORATORY COURSE, YOU WILL NEED PHYS 103A LAB MANUAL 6<sup>th</sup> EDITION**

**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. Moodle is required for this course. Lecture Notes, some assignments, information and grades will be on Moodle.

**HELP:** Visit or email your instructors if you are having trouble with the course; do not simply hope for a miracle and fall further behind. The Physics Dept. office on the 4<sup>th</sup> floor of Tiernan has specific information on tutoring.

**GRADING:** Your final letter grade in Phys 103 will be based on a composite score for term’s work that includes the common exam scores, the final exam, lecture quizzes or Iclickers, and the homework score.

1) **Common Exams** Three common exams will be given during the semester.

The schedule is:

- **Common Exam 1:** Wednesday, February 20      4:15 – 5:45 PM
- **Common Exam 2:** Wednesday, March 27      4:15 – 5:45 PM
- **Common Exam 3:** Wednesday, May 01      4:15 – 5:45 PM

The general policy is that students who miss a common exam will receive a score of zero for that Exam. That score will be included in the calculation of your final grade. Students that miss two common exams automatically fail the course unless they have acceptable excuses. Students who anticipate an absence from a common exam should discuss their situation with their instructor PRIOR TO their absence. In order to qualify for a “make-up” common exam a student needs to document the reason for not be able to take the test as scheduled. NJIT policy requires the documentation to be presented to the student’s Physics 103 instructor AND to the Dean of Students, both of whom must agree to permit a “make-up” common exam. Make-ups for exams 1, 2 and 3 are usually held from 6-7:30 PM on the exam day and only with advance permission from both your instructor and the Dean of Students. Contact Ms. Oertel for arrangements.

2) **Lecture Quizzes** In-class I-Clicker Questions/quizzes covering the preceding or current work will be given during lectures and/or recitations. Those scores count toward your final course grade. **There are no make-ups for in class activities.** Students missing an I-Clicker question/ quiz will receive a grade of zero for that item.

3) **Homework** Homework assignments will be posted on-line using the Mastering Physics (MP) Homework System. You need a valid Mastering Physics access code to sign up for the course your instructor sets up on MP. With the access code please register for your section using login: [www.masteringphysics.com](http://www.masteringphysics.com).

**Course Identifier to enroll to your specific homework class is:**

Section 006 – **SPRING19PHYS103006**

Section 008 – **SPRING19PHYS103008**

4) **Final Exam** **Comprehensive Final Exam will be given** during Final Exam Period.

**Final Letter Grades:** Here are the approximate weights to be used for calculating the composite score:

- **51%** for all three common exams (17% each)
- **29%** for the final exam
- **12%** for the total of homework work
- **8%** for the all in-class quizzes

**The conversion of numerical to letter grades** will use the following cutoff values:

**> 80% for A, >75% to 80% for B+; >66 % to 75% for B; >58%-66% for C+; >50%-58% for C; <50 for D and F.**

**HONOR CODE STATEMENT:** NJIT has a zero-tolerance policy for cheating of any kind and for student behavior, that disrupts learning by others. Violations will be reported to the Dean of Students. The penalties range from a minimum of failure in the course plus disciplinary probation up to expulsion from NJIT. Avoid situations where your own behavior could be misinterpreted 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. Creating noise or otherwise interfering with the work of the class will not be tolerated.

**LEARNING EXPECTATIONS, GOALS, OUTCOMES:** For this course, you can expect to be assessed on the following learning outcomes:

1. Comprehend the meaning of equations governing the fluid at rest and fluid in motion. Understand the extension of conservation of energy and mass equations to fluid dynamics.
2. Define temperature scales.
3. Understand the phenomena of thermal expansion and Ideal Gas Law,
4. Understand the concept of heat and comprehend the meaning of equations governing the calorimetry and heat transfer.
5. Understand the basics concepts of thermodynamics.
6. Comprehend the meaning of equations governing oscillations and mechanical waves and apply those concepts to solve related problems.
7. Understand the concept of electric charge, electric field, electric potential, and electric current. Apply those concepts to solve simply circuits.
8. Understand the basic concepts of geometrical optics and learn how to apply them for lenses and optical fibers.
9. Comprehend the wave theory of light and apply it understand the phenomena of interference and diffraction.

Learning outcomes are assessed by means of 3 common exams, a final exam, scores on homework assignment and in-class quizzes.

Any changes to the syllabus will be consulted with students.

	Topic	Text Study	Recommended Problems	
Week 1 January 22 – January 28	Solids, Elasticity, Density and Pressure, Fluids at Rest	Chapt. 9 Sect. 5-6 Chapt. 10 Sect 1-7	p. 285 prob. 2, 12, 14, 19, 23 27, 34,	<b>Intro</b>
Week 2 January 29 – February 04	Fluids in Motion	Chapt. 10 Sect. 8-10	p. 285 prob. 47, 48, 49, 50, 53, 80	<b>A</b>
Week 3 February 05 – February 11	Temperature, Thermal Expansion, The Ideal Gas Law	Chapt. 13 Sect. 1-8	p.385 prob. 5, 12, 15, 19, 24, 31, 39, 78	<b>7</b>
Week 4 February 12 – February 18	Specific Heat, Calorimetry, Latent Heat,	Chapt. 14 Sect. 1-5	p.408 prob. 2, 13, 14, 25, 27, 34, .	<b>D</b>
Week 5 February 19 – February 25	Transfer of Heat	Chapt. 14 Sect. 6 - 8	p.408 prob. 38, 42, 43, 54	<b>E</b>
Week 6 February 26– March 04	Thermodynamics	Chapt. 15 Sect. 1-7	p. 438 prob. 1, 18, 19, 24, 32,	<b>F</b>
Week 7 March 05 – March 11	Simple Harmonic Motion, Waves, Standing Waves	Chapt. 11 Sect. 1-12	p. 322 prob.3, 7, 8, 14, 18, 27, 36, 37, 40, 49, 52,	<b>B1</b>
Week 8 March 12 – March 17	Sound	Chapt. 12 Sect.1-7	p. 354 prob. 3, 4, 9, 14, 27, 28, 56, 63	<b>W</b>
<b>Week 9</b> <b>March 17 – March 24</b>	<b>Spring Recess</b>			
Week 10 March 25 – April 01	Electric Charges, Electric Field, Electric Potential	Chapt.16 Sect.1-5,7 Chapt 17 sect. 1-2	p. 468 prob. 2, 3, 19, 21, p. 496 prob. 3, 4, 6, 9	<b>J</b>
Week 11 April 02 – April 08	Electric Current, Resistance, Electric Power	Chapt.18 Sect. 1-7	p.521 prob.1, 9, 13, 17, 28, 37, 47, 54	<b>H</b>
Week 12 April 09 – April 15	Electric Circuits	Chapt.19 Sect. 1- 5, 7	p. 552 prob. 1, 4, 12, 15, 16, 77	<b>215</b>
Week 13 April 16 – April 22	Light: Reflection, Mirrors, Refraction	Chapt . 22 Sect 3-4 Chapt. 23 Sect. 1-3	p. 673 prob. 4, 9, 12, 25, 26, 28, 29, 72	<b>K</b>
Week 13 April 23 – April 29	Light: Total Internal Reflection, Lenses	Chapt. 23 Sect. 4-8	p. 673 prob. 35, 36, 41, 43, 47, 48	<b>M</b>
Week 14 April 30 – May 07	Interference, Diffraction Grating, Resolution	Chapt. 24 Sect. 1,3-6 Chapter 25 Sect. 7-9	p. 707 prob.1, 4, 7, 33, 38, p. 740 prob. 53, 55, 67, 83,	<b>N</b>

**SPRING RECESS – MARCH 17-24**

**GOOD FRIDAY – APRIL 19**

**MAY 7, TUESDAY FOLLOWS FRIDAY SCHEDULE**

**READING DAYS – MAY 8-9**

**FINAL EXAM PERIOD – MAY 10 -16**

