

Physics 101

Basic Concepts of Physics with Laboratory Exercises

Department of Physics and Astronomy, Hunter College CUNY

* Three Credit, one three-hour period each week, consisting of one-hour lecture/recitation + two-hour lab

* Pre-requisite *or* Co-requisite: PHYS 100

Course mode of instruction: P

Location: 1239 HN

Instructors (Spring 2019): Robert Marx, email rbtmarx1@gmail.com

Angela Padilla, email npadilla@hunter.cuny.edu

Office hours: will be informed by instructor during first lab meeting

Times: Sec 01 Mon 10.10am - 1pm

Sec 03 Tu 3.35pm - 6.25pm

Textbook: *Conceptual Physics, 12th Edition*, by Paul G. Hewitt (Pearson, Addison-Wesley, 2014); but note that 9th, 10th, and 11th editions are also fine.

Lab: Physics 101 Lab Manual, Department of Physics and Astronomy, Hunter College of CUNY.

Grading:

% Toward Grade

Homeworks 50%

Lab Reports 50%

Total 100.00%

- PHYS 101 fulfillstheLife and Physical Sciences category of Pathways. The pre/co-requisite course Physics 100 satisfies the Scientific World category of the Flexible Core of Pathways (but you may take 100 without taking 101).
- Note that this is a *one-semester terminal* physics course, and it does *not* fulfill the pre-med physics requirement.

Syllabus Approach and Topics

Lecture/Recitation

The lecture/recitation follows closely the topics of the co/pre-requisite course, PHYS 100. Almost all areas in physics are covered at an introductory level, emphasizing the concepts while using only the most basic formulas to enable a quantitative understanding. There will be a short presentation by the instructor on an example illustrating one or several essential concepts covered in detail in the co-requisite PHYS 100, followed by a problem-solving session. Students will work on problems, mostly conceptual and some quantitative, relevant to the material, in small groups, guided by the instructor. These problems will form most, but not all, of the homework problems that each student will write up individually and turn in the following week.

Lecture/Recitation Topic

Week	Lecture/Recitation Topic	Chapters
1	Introduction	
2	Newton's 1 st and 2 nd Laws of classical physics and linear motion	2--4
3	Newton's 3 rd law and Momentum	5--6
4	Energy and Rotation	7--8
5	Gravity and Atomic Structure	9--11
6	Liquids and Gases	13-14
7	Heat	15
8	Vibrations and waves, Sound	19-20
9	Electrostatics and Electric current	22-23
10	Magnetism and Electromagnetic induction	24-25
11	Light and Color	26-27
12	Reflection and Refraction	28
13	Light waves and quanta	30-31
14	Introduction to Quantum mechanics and Radioactivity	32-33

Lab

The laboratory component of PHYS 101 consists of twelve experiments, to be done in groups of three or four, that complement the lecture component of PHYS 101 as well as the lecture material of PHYS 100. The topics are as follows:

Week	Laboratory Exercise
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Experiment

- 1 Motion on Inclined Plane
- 2 The Simple Pendulum
- 3 Density
- 4 Archimedes Principle
- 5 Gas laws
- 6 Heat exchange
- 7 Mechanical equivalent of heat
- 8 Vibrations of Taut String - the sonometer
- 9 Circuits
- 10 The wavelength of light
- 11 Reflection of light
- 12 Refraction of light
- 13
- 14 Review

E. Learning Outcomes:

This course satisfies all the learning outcomes specified by Pathways for the Life and Physical Sciences requirement of the Common Core. Students will:

- (i) identify and apply the fundamental concepts and methods of classical physics, including Newton's laws of motion, energy, momentum, rotational motion, electricity and magnetism, waves, sound, light, and introductory quantum mechanics. There will be discussion of problems during recitation, solving problems via simple calculations and arguments based on the fundamental concepts, which students will then write up, and students will carry out experiments that use methods of classical physics and test fundamental concepts.
- (ii) apply the scientific method to explore physical phenomena, including hypothesis development, observation, experimentation, measurement, data analysis, and data presentation. Problems discussed during recitation require analysis and interpretation, and evaluation of data and evidence. Hypothesis development, observation, experiment, data analysis and presentation are all directly involved in carrying out the experiment and writing up the report.
- (iii) use tools of experimental and theoretical physics to carry out collaborative laboratory investigations every

week, and solve problems via simple calculations and scientific arguments.

(iv) gather, analyze, and interpret data and present it in an effective written laboratory report, every week, which will be graded.

(v) identify and apply research ethics and unbiased assessment in gathering and reporting scientific data.

Interpreting and reporting results of the laboratory experiments is required for the weekly written lab report; the results and their assessment must be unbiased, with error estimates given, for a passing grade.

Further, students will develop skills in both oral and written scientific communication, via small-group problem-solving during recitation, and written lab reports and written homework.

Academic Integrity Statement

Academic Integrity Statement Hunter College regards acts of academic dishonesty (e.g., plagiarism, cheating on examinations, obtaining unfair advantage, and falsification of records and official documents) as serious offenses against the values of intellectual honesty. The college is committed to enforcing the CUNY Policy on Academic Integrity and will pursue cases of academic dishonesty according to the Hunter College Academic Integrity Procedures.

ADA Policy

In compliance with the American Disability Act of 1990 (ADA) and with Section 504 of the Rehabilitation Act of 1973, Hunter College is committed to ensuring educational parity and accommodations for all students with documented disabilities and/or medical conditions. It is recommended that all students with documented disabilities (Emotional, Medical, Physical, and/or Learning) consult the Office of AccessABILITY, located in Room E1214B, to secure necessary academic accommodations. For further information and assistance, please call: (212) 772- 4857 or (212) 650-3230

Hunter College Policy on Sexual Misconduct

In compliance with the CUNY Policy on Sexual Misconduct, Hunter College reaffirms the prohibition of any sexual misconduct, which includes sexual violence, sexual harassment, and gender-based harassment retaliation against students, employees, or visitors, as well as certain intimate relationships. Students who have experienced any form of sexual violence on or off campus (including CUNY-sponsored trips and events) are entitled to the rights outlined in the Bill of Rights for Hunter College.

a. Sexual Violence: Students are strongly encouraged to immediately report the incident by calling 911, contacting NYPD Special Victims Division Hotline (646-610-7272) or their local police precinct, or contacting the College's Public Safety Office (212-772-4444).

b. All Other Forms of Sexual Misconduct: Students are also encouraged to contact the College's Title IX Campus Coordinator, Dean John Rose (jtrose@hunter.cuny.edu or 212-650-3262) or Colleen Barry (colleen.barry@hunter.cuny.edu or 212-772-4534) and seek complimentary services through the Counseling and Wellness Services Office, Hunter East 1123.

CUNY Policy on Sexual Misconduct Link: <http://www.cuny.edu/about/administration/offices/la/Policy-on-Sexual-Misconduct-12-1-14-with-links.pdf>