

COURSE OUTLINE
PHYS-111
General Physics II (Calculus)
4 Semester Hours
Science Core Course

HOWARD COMMUNITY COLLEGE

Description

General Physics 111 is the second semester of a three-semester calculus-based physics course. The course will enable the student to solve problems, using calculus methods when applicable, for the major concepts in physics to include: oscillatory motion; wave motion; sound; electrostatics; DC and AC circuits; magnetism; and electro-magnetic interactions. The student will develop the ability to interpret and apply the experimental laws and fundamental principles of physics to describe the behavior of the physical world. In the laboratory program, the student will develop the ability to appraise, use and interpret data collected (often by MBL) to express mathematically and/or explain the physical phenomena observed. Prerequisite: PHYS-110; Eligible to enroll in ENGL-121; Pre- or Co-requisite: MATH-150 or MATH-182. (3 hours lecture, 3 hours lab)

Statement on General Education and Liberal Learning

A liberal education prepares students to lead ethical, productive, and creative lives and to understand how the pursuit of lifelong learning and critical thinking fosters good citizenship. General education courses form the core of a liberal education within the higher education curriculum and provide a coherent intellectual experience for all students by introducing the fundamental concepts and methods of inquiry in the areas of mathematics, the physical and natural sciences, the social sciences, the arts and the humanities, and composition. This course is part of the general education core experience at Howard Community College.

Overall Course Objectives

Upon completion of this course, the student should be able to:

1. Identify and address their physics alternate concepts (misconceptions).
2. Interpret physics facts and principles.
3. Apply physical principles to solve problems and explain practical physics applications to include an oral explanation to the class.
4. Develop the ability to appraise, use and interpret experimental laboratory data and/or computer data collected to correctly solve and/or explain the physical phenomena observed (including one short lab group oral summary of the previous week's lab).
5. Demonstrate an understanding of the terminology of physics including units, name of equipment and vocabulary.
6. Develop skill in performing elementary physics experiments to obtain satisfactory results and conclusions.
7. Operate correctly each piece of apparatus.
8. Observe all safety regulations in the laboratory.
9. Write, using correct data collection, organization and analysis techniques, a complete laboratory report (utilizing proper grammar) to include: title of experiment, objectives, data and observations, results and conclusions.

10. Utilize a microcomputer for collection and analysis of lab data (microcomputer-based labs with probes), simulation, and problem/concept drill.
11. Prepare and present a 15 minute oral report to the class on a topic of interest going into more depth than what was covered in class.

Major Topics

- I. Wave Motion
 - A. Harmonic Motion and Oscillations
 - B. Physical Properties and Applications of Wave Motion
 - C. Sound Including Doppler Effect
 - D. Superposition and Standing Waves

- II. Static and Current Electricity
 - A. Electrostatic Field Properties Including Gauss' Law and Electric Potential
 - B. Electric Current Including EMF, Resistance and Ohm's Law, Electric Power, and Measuring Instruments
 - C. Direct Current Circuit Theory and Networks
 - D. Electronics Including Semi-Conductors, Transistors, and Integrated Circuit Devices

- III. Magnetism and Electromagnetism
 - A. Magnetic Field Properties and Applications
 - B. Electromagnetic Interactions, Fields and Devices; e.g., Motor and Generator
 - C. Capacitance
 - D. Inductance Including RCL Circuits
 - E. Alternating Current Theory and Circuits

Course Requirements

Grading/exams: Grading procedures will be determined by the individual faculty member but will include the following:

Final grades will be calculated on the basis of exams, assigned homework problems, and lab experiments. The course includes a final comprehensive exam. Written formal lab reports will be required.

Writing: Specific writing assignments will be determined by the individual faculty member but will include formal lab reports.

Oral Communications: Specific oral communications assignments will be determined by the faculty member but will include at least two of the following: an oral report to the class, a group lab oral summary, and problem solution explanation to the class.

Other Course Information

This course is a Science core course, Science elective and an Arts and Sciences elective.