

Course discipline/number/title: PHYS 1103: Principles of Physics

A. CATALOG DESCRIPTION

1. Credits: 3
2. Hours/Week: 2 Lecture, 2 Lab
3. Prerequisites (Course discipline/number): MATH 0099 or equivalent
4. Other requirements: None
5. MnTC Goals (if any): Goal 3/Natural Sciences

B. COURSE DESCRIPTION: This course is a one-semester algebra-based general introduction to physics covering the topics of motion, force, energy, fluids, waves, basic electricity, radioactivity, and emission of radiation. Problem solving is practiced both individually and in groups. The laboratory includes the acquisition of experimental data, analysis, and graphing. Group presentations on physics topics are included in the course.

C. DATE LAST REVISED (Month, year): February, 2025

D. OUTLINE OF MAJOR CONTENT AREAS:

1. Background
  - a) Measurements, significant figures
  - b) Unit systems, conversions
2. Mechanics
  - a) Linear and Circular Motion, Kinematics
  - b) Newton's Laws of Motion, Force Analysis
  - c) Energy
3. Fluids
  - a) Gas Laws, Pressure
  - b) Bernoulli's Principle
  - c) Poiseuille's Law
4. Electricity
  - a) Electrostatics
  - b) Ohm's Law
  - c) Series and Parallel circuits
5. Vibrations and Waves
  - a) Oscillations
  - b) Longitudinal and Transverse Waves
  - c) Sound
  - d) Electromagnetic Waves
6. Radioactivity
  - a) Nuclear notation
  - b) Alpha, Beta, Gamma decays
  - c) Nuclear Reactions

E. LEARNING OUTCOMES (GENERAL): The student will be able to:

1. Use common definitions of terms found in physics.
2. Explain and apply basic physics principles to their everyday lives.
3. Use critical thinking and problem-solving skills to evaluate physical systems and predict future behavior.
4. Predict the behavior of many physical systems.

F. LEARNING OUTCOMES (MNTC):

Goal 3/Natural Sciences: The student will be able to:

1. Demonstrate understanding of scientific theories.
2. Formulate and test hypotheses by performing laboratory, simulation, or field experiments in at least two of the natural science disciplines. One of these experimental components should develop, in greater depth, student's laboratory experience in the collection of data, its statistical and graphical analysis, and an appreciation of its sources of error and uncertainty.

- F. LEARNING OUTCOMES (MNTC): Continued. . .
3. Communicate their experimental findings, analyses, and interpretations both orally and in writing.
- G. METHODS FOR EVALUATION OF STUDENT LEARNING: Methods may include but are not limited to:
1. Objective exams
  2. Lab exams
  3. Research papers
  4. Quizzes
  5. Written homework
  6. Online homework
  7. Small group projects
  8. Oral presentations
  9. Laboratory reports
- H. RCTC CORE OUTCOME(S). This course contributes to meeting the following RCTC Core Outcome(s):  
Critical Thinking. Students will think systematically and explore information thoroughly before accepting or formulating a position or conclusion.
- I. SPECIAL INFORMATION (if any):
1. A scientific calculator is required