

PHY 110
CONCEPTUAL PHYSICS

COURSE DESCRIPTION:

Prerequisites: MAT 060 or DMA 010, 020, 030 or satisfactory score on placement test
Corequisite: PHY 110A (Conceptual Physics Lab)

This course provides a conceptually-based exposure to the fundamental principles and processes of the physical world. Topics include basic concepts of motion, forces, energy, heat, electricity, magnetism, and the structure of matter and the universe. Upon completion, students should be able to describe examples and applications of the principles studied. Laboratory experiments and computer-based exercises enhance and consolidate the understanding of basic physical principles and applications. *This course has been approved to satisfy the Comprehensive Articulation Agreement general education core requirement in natural sciences/mathematics.* Course Hours Per Week: Class, 3. Lab, 2. Semester Hours Credit, 4.

LEARNING OUTCOMES:

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

- a. Demonstrate knowledge of physical principles.
- b. Describe examples of and applications of physical principles.
- c. Demonstrate use of physical principles through lab experiments.

OUTLINE OF INSTRUCTION:

- I. Measurement
 - A. Scientific measurements.
 - B. The scientific method and physical world.
 - C. Techniques of measurement
 - D. Significant digits, accuracy and precision

- II. Mechanics
 - A. Newton's first law of motion – Inertia
 - B. Linear motion
 - C. Velocity
 - D. Acceleration
 - E. Newton's second law of motion – Acceleration
 - F. Newton's third law of motion – action and reaction
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- A. Atomic structure
 - B. Molecules
 - C. States of matter
 - D. Properties of gases, liquids and solids
 - E. Archimede's principle
 - F. Surface tension
 - G. Pressure
 - H. Gas laws
 - I. Density and specific gravity
- IV. Heat
- A. Temperature
 - B. Heat
 - C. Thermal expansion
 - D. Conduction
 - E. Radiation
 - F. Thermodynamics
 - G. First and second laws of thermodynamics
 - H. Entropy
 - I. Heat engines
- V. Sound
- A. Vibrations and waves
 - B. Nature of sound
 - C. Properties of sound waves
- VI. Electricity and magnetism
- A. Static electricity
 - B. Electric fields
 - C. Electric current
 - D. Magnetism
 - E. Magnetic poles and fields.
 - F. Electromagnetic induction
 - G. Generators and motors
 - H. Alternating-current electricity
 - I. Transformer and power transmission
- VII. Light
- A. Properties of electromagnetic waves
 - B. Colors of the visible spectrum
 - C. Reflection
 - D. Refraction
 - E. Diffraction
 - F. Interference

H. Quanta of light: concept of light's duality.