PHYS 1010

Division: Natural Science and Mathematics
Department: Physics
Course: PHYS 1010
Title: Elementary Physics
Catalog Description:

PHYS 1010 is a general one semester physics course with a laboratory. This course is designed for nonscience majors to help fulfill general education requirements in physical science. It is recommended for students majoring in wildlife management, nursing, industrial arts, physical therapy, and others who need more rigor than the conceptual physics course. The fundamental principles of physics with emphasis on how a problem is approached and solved are central to the course. Topics include Newton's Laws, gravity, momentum, energy thermodynamics, waves, electricity, optics, nuclear physics.

General Education Requirements: Physical Science
Semesters Offered: Fall, Spring
Credit/Time Requirement: Credit: 3; Lecture: 3; Lab: 0
Clock/Hour Requirements: 0
Offered for Non-Credit: No
Prerequisites: Intermediate Algebra (MATH 1010) or equivalent

Corequisites: Elementary Physics Laboratory (PHYS 1015)

Justification:

PHYS 1010 is a crucial component of offerings in the Physical Science area of general education. Also, because it is a one semester course with a lab, it fills the physics requirement for various major fields of study. Similar courses are offered at other colleges and universities.

Student Learning Outcomes:

Upon successful completion of this course, students will:

- be familiar with the basic theories of physics
- appreciate the historical context in which our current theories of physics have evolved
- recognize how basic physics principles help us understand phenomena observed in everyday life
- be able to use simple algebra in the application of physics theories to make quantitative predictions regarding a variety of phenomena.

Content:

This course will include:

- physical measurements
    - standard metric units

        - methods of measurements
        - converting units
    - the study of motion
        - speed and acceleration in one dimension
        - velocity and acceleration in two dimensions
        - vectors
        - circular motion
    - Newton's Laws of motion
        - inertia
        - acceleration related to force and mass
        - action and reaction
    - basic forces in nature
        - gravity and planetary motion
        - electromagnetic force
        - nuclear forces
    - energy and the conservation laws
        - work and thermal energy
        - potential energy and kinetic energy
        - conservation of energy and conservation of momentum
    - electricity and magnetism
        - Ohm's Law and simple circuits
        - electric power and energy
        - magnetic fields and magnetic forces
    - wave motion
        - simple harmonic motion
        - standing waves and resonance
        - interference and diffraction of waves
        - the Doppler Effect
    - sound and light
        - music
        - optics, reflection, refraction
    - nuclear physics
        - radioactive decay modes
        - half life and radioactive dating methods
        - nuclear energy: fission versus fusion.

General Education Outcomes:

6) Apply computational skills to a variety of contexts.
Most physical concepts are expressed as a quantitative relationship among various quantities. Students must learn to see how an equation or a formula represents a physical phenomena. They must be able to use simple algebra to solve an equation for a desired quantity.

7) Apply scientific reasoning to a variety of contexts.
Students must recognize how the theories presented in class apply to a given situation. They must be able to apply the theories and predict the outcome of hypothetical experiment.

Key Performance Indicators:

- Daily homework assignments(15-20%), quizzes(15-20%), midterm tests(50-60%), and a final exam will be administered -- all related to the above outcomes. These will be evaulated and recorded. Students will often work in discussion groups to answer given questions and find solutions to problems posed by the instructor.li>

Representative Text and/or Supplies:

- Wheeler Kirkpatrick, *Physics A World View*, current edition, Harcourt.

Optimum Class Size: 30
Maximum Class Size: 40

Signatures:

I hereby submit this course syllabus:

Ted Olson, , Professor

I hereby find this course consistent with the goals and resources of the Physics Department:

Ted Olson, , Professor, Chair

I hereby find this course consistent with the goals and resources of the Natural Science and Mathematics Division:

Dan Black, EdD, Associate Professor, Dean

I have discussed the need for library resources related to this class with the person submitting the syllabus:

Lynn Anderson, MLIS, Technical Services Librarian (Main Campus)

Michelle Olsen, MLS, Campus Librarian (Richfield Campus)