Course Name: General Physics I

Course Number: PHY* E121

Credits: 4

Catalog description: Begins with a review of essential arithmetic operations, dimensional analysis, and systems of measurements. Then basic concepts in mechanics, energy, rotation, properties of matter, and heat are developed. Specific topics covered include: motion, Newton's three laws, vectors, uniformly accelerated motion, forces, motion due to gravity, work and energy, momentum, angular motion, rotation, mechanical properties of matter, and temperature and heat transfer. 3 hours of lecture and 3 hours of Laboratory

Prerequisite: MAT*137 with a grade of "C" or higher, or equivalent.

Corequisite, or Parallel: none

General Education Competencies Satisfied:

HCC General Education Requirement Designated Competency Attribute Code(s):
☒ SCKX   **Scientific Knowledge & Understanding**

Additional CSCU General Education Requirements for CSCU Transfer Degree Programs:
☒ SCRX   **Scientific Reasoning**

Embedded Competency(ies):
None.

Discipline-Specific Attribute Code(s):

☒ SCI   **Science elective**

Course objectives:

General Education Goals and Outcomes:

☒ **Scientific Knowledge & Understanding:** Students will gain a broad base of scientific knowledge and methodologies in the natural sciences. This will enable them to develop scientific literacy, the knowledge and understanding of scientific concepts and processes essential for personal decision making and understanding scientific issues.
☒ **Scientific Reasoning (*for CSCU Transfer Degree Programs*):** Students will become familiar with science as a method of inquiry. Students will develop a habit of mind that uses quantitative skills to solve problems and make informed decisions.

Course Specific Objectives:

1. Create graphs.
2. Differentiate among various systems of units of measurement.
3. Manipulate a scientific and/or graphing calculator.
4. Learn how to add vectors together.
5. Analyze uniformly accelerated motion in a straight line.
6. Analyze freely falling bodies.
7. Understand relative velocity.
8. Study motion in a plane.
9. Use energy considerations to solve problems.
10. Use momentum considerations to solve problems.
11. Study Bernoulli's Equation.
12. Develop skill in converting between temperature scales.
13. Solve problems in calorimetry.

Course Content:

Introduction
        Dimensions and units in measurement
        Converting between systems of units
        Addition and subtraction of vectors
        Rectangular components of vectors

Uniformly accelerated motion
        Displacement and average velocity
        Instantaneous velocity
        Acceleration
        Uniformly accelerated linear motion
        Freely falling bodies
        Projectile motion

Newton's Laws of Motion
        Inertia and mass
        Mass and its relation to weight
        Friction forces
        Weight and weightlessness
        Motion on an incline

Static equilibrium
        The first condition and second condition for equilibrium

The center of gravity

Work and energy
The definition of work Kinetic energy
Gravitational potential energy

Laws of conservation of energy

Linear momentum
Conservation of linear momentum
Elastic and inelastic collisions

Motion in a circle
Angular displacement, velocity, and acceleration
Angular motion equations
Tangential quantities
Centripetal force and acceleration

Rotational work, energy and momentum
Rotational work and kinetic energy
Rotational inertia
Combined rotation and translation
Angular momentum

Mechanical properties of matter
States of matter
Density and specific gravity
Hooke's Law
Buoyancy
Bernoulli's Equation

Thermal properties of matter
Temperature scales
Thermal energy and heat units
Specific heat capacity
Calorimetry
Thermal conduction

Date Course Created:

Date of Last Revision: 03/03/2017