HOUSATONIC COMMUNITY COLLEGE

Course Name: Calculus-Based Physics II

Course Number: PHY* E222

Credits: 4

Catalog description: A solid foundation for engineering majors in periodic motion, hydrostatics, temperature, heat, Coulomb's Law, electric field, Ohm's Law, DC circuits, light, reflection, refraction, interference, and the diffraction of light, lenses, and mirror. 3 hours lecture and 3 hours laboratory.

Prerequisite: MAT*256

Corequisite, or Parallel: MAT*256

General Education Competencies Satisfied:

HCC General Education Requirement Designated Competency Attribute Code(s):
None.

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 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 measurement.

3. Manipulate a scientific and/or graphing calculator.
4. Solve circuit parameters using Ohm's Law.
5. Apply differential equations to the solution of SHM problems.
6. Solving problems utilizing Archimedes' Principle of Buoyancy
7. Apply Bernoulli's Equation to airplane flight.
8. Use calorimetry to determine the equilibrium temperature.
9. Utilize Doppler Effect to measure speed of vehicles.
10. Predict image formation using geometrical optics concepts.
11. Determine the critical angle in total internal reflection.
12. Simplify circuits with resistors in series and parallel

Course Content:

Periodic motion
       Elastic restoring forces
       Equations of Simple Harmonic Motion (SHM)
       Motion of body suspended from a coil spring
       The simple pendulum

Fluid Statics
       Density
       Pressure in a fluid
       Buoyancy
       Fluid flow
       Bernoulli's Equation and its applications

Temperature and Expansion
       Temperature and thermal equilibrium
       Thermometers
       Temperature scales-Celsius, Fahrenheit, Kelvin, and Rankine
       Thermal expansion of solids and liquids

Heat and Heat Measurements
       Heat Transfer
       Quantity of heat
       Heat capacity
       Phase changes

Coulomb's Law
       Electric charges
       Atomic structure
       Conductors and insulators
       Electrical interactions

The Electric Field
    Electric field and electrical forces
    Field lines
    Calculation of electric field
    Gauss' Law

Current, Resistance, and Electromotive Force
    Current
    Resistivity and resistance
    Electromotive force
    Ohm's Law
    Energy and power in electrical circuit

Direct-Current Circuits and Instruments
    Resistors in series and in parallel
    Kirchhoff's Rules
    Ammeters and voltmeters
    The ohmmeter

The Nature and Propagation of Light
    The nature of light
    The speed of light
    Waves, wave fronts, and rays
    The laws of reflection and refraction
    The index of refraction
    Total internal reflection

Images Formed by a Single Surface
    Reflection at a plane surface
    Reflection at a spherical surface
    Focus and focal length
    Refraction at a plane surface
    Refraction at a spherical surface

Lenses
    The thin lens
    Diverging lenses
    Images as objects for lenses
    The eye
Date Course Created:

Date of Last Revision: 03/03/2017