Course Name: General Physics II

Course Number: PHY* E122

Credits: 4

Catalog description: Discussion of basic concepts in sound, wave motion, electricity, magnetism, and light. Specific topics covered include: wave motion, sound, electrostatics, circuit elements, direct current circuits, magnetism, properties of light, reflection and refraction of light, lenses, mirrors, and other optical devices. 3 hours of lecture and 3 hours of laboratory. NOTE: PHY* 122 may be taken before PHY* 121 if a student has a strong background; permission of instructor is required.

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 calculator.
4. Solve circuit parameters using Ohm's Law.
5. Analyze data in conversion of forms of energy.
6. Combine vectors using techniques of vector addition.
7. Prescribe corrective lenses for eyesight deficiencies.
8. Analyze home electrical wiring systems.
9. Predict graphically the location of images formed by optical systems.
10. Choose design parameters for microscope and telescope systems.

Course Content:

Vibrations and waves
- Periodic Motion
- Energy in a Hooke's law spring
- Simple Harmonic Motion (SHM)
- Frequency of vibration in SHM
- Sinusoidal motion
- The simple pendulum
- Wave Terminology
- Reflection of a wave
- Wave resonance
- Transverse waves
- Longitudinal waves
- Standing compressional waves on a spring

Sound
- The origin of sound
- Sound waves in air
- The speed of sound
- The frequency response of the ear
- Sound pitch and quality
- Interference of sound waves
- Beats
- Resonance of air columns
- The Doppler effect

Electric forces and fields
- Atoms as the source of charge
- Forces between charges

- Coulomb’s Law

The electric field
- Insulators and conductors
- The electric field of point charges

Electric potential
- Electric potential energy
- Potential difference
- Batteries as sources of energy
- Electric current
- A simple electric circuit Ohm's law
- Resistivity and its temperature dependence
- Kirchhoff's rules
- Resistors in series and in parallel
- Solving circuit problems
- Ammeters and voltmeters
- The emf and terminal potential of a battery

Magnetism
- The magnetic field of an electric current
- The force on a current in a magnetic field
- Induced currents and fields
- Particle motion in a magnetic field
- Moving-coil meters

The properties of light
- The concept of light
- The speed of light
- The reflection of light
- Plane mirrors
- The refraction of light: Snell's law
- Total internal reflection
- Lenses
- Ray diagrams for thin lenses
- The thin-lens formula
- Combinations of lenses
- The eye

Date Course Created:

Date of Last Revision: 03/03/2017