Course Information Form (CIF)

Course Code: PHY 112

Course Title: Applied Physics: Heat and Electricity

Department: Natural Sciences
PCS Code: 1.2 - Occupational/Technical Instruction
CIP Code: 40.0801
Repeatability: 0

Effective Date: Summer 2026

Credit Hours

Catalog Notation: 2-2-3
Credit Hour Distribution:

Lecture: 2	Lab: 2	Clinical: 0	**Total: 3**

General Course Information

Catalog Description

For students in two-year technology curricula. Heat, temperature, sources of emf, resistance, current, electrical circuits motors, transformers, generators, light, optics, and radioactivity.

General Course Objectives

The course provides technical and vocational students a physical background to aid in their own fields and serve as a basis for growth.

Minimum Placement Levels

English	Reading	Math
None	Placement out of CCS 098	Placement out of MAT 072 or credit in MAT 131 with a grade of C or higher

Prerequisites

None

Methods of Evaluation

10-12 homework assignments, 10-12 lab reports, 3 one-hour exams, no quizzes, final exam.

Instructional Materials and Additional Supplies

The Physics of Everyday Phenomena, Griffith, McGraw-Hill, 2015.

Course Content

General Learning Outcomes (GLOs)

- Reasoning and Inquiry: Students will demonstrate the ability to solve problems using deductive reasoning and logic, quantitative reasoning, or the scientific method.

Course Segments and Student Learning Outcomes

Course Segment	Learning Outcomes	Lecture Hours	Lab Hours	Clinical Hours
Pre-Test	1. Assess preconceptions of physics.	0	2	0
Measurement and Units	1. Define measurement and solve unit conversions.	1	0	0
Problem Solving	1. Formulate procedures and orderliness in problem solving.	1	0	0
Math Review	1. Solve problems to assess algebra skills.	0	3	0
Process of Science	1. Investigate the scientific method through critical analysis of web-based claims.	0	2	0
Temperature and Heat	1. Define temperature and heat, and its measurement.	2	0	0
Specific Heat	1. Calculate the specific heats of several metals.	0	3	0
Thermal Expansion and Heat Transfer	1. Calculate the changes in lengths, areas, and volumes of objects during a temperature change.	2	0	0
Gas Laws	1. Solve problems of pressure, temperature, and volume.	1	0	0
Change of State	1. Calculate the energies that are required to change state.	2	0	0
Latent Heat	1. Determine the latent heat of fusion of water.	0	2	0
Static Electricity	1. Relate the concepts of charge, conduction, potential, and electric fields.	2	0	0
Static Electricity	1. Categorize static charge and examine the role of capacitors in storing charge; and manage data.	0	2	0
Current, Resistance, and Ohm's Law	1. Analyze a number of DC circuits and derive Ohm's Law.	2	0	0
Resistivity	1. Identify the resistance of resistors using a voltmeter and ohmmeter.	0	3	0
DC Sources	1. State sources of DC power.	1	0	0
Series and Parallel Circuits	1. Measure voltages of current with varying loads in both series and parallel arrangements.	0	2	0

Course Segment	Learning Outcomes	Lecture Hours	Lab Hours	Clinical Hours
Magnetism	1. Relate magnetism and charges in motion.	2	0	0
Magnetic Fields	1. Examine and interpret the law of magnetism and charges in motion.	0	2	0
Magnetic Inductions	1. Analyze voltage in a wire loop and describe how a generator works.	2	0	0
AC Circuits and Rectifiers	1. Diagram AC signals and rectification.	2	0	0
Transformers	1. Assemble a transformer and calculate its efficiency.	0	2	0
Motors and Generators	1. Analyze principles of motor operation.	2	0	0
Radioactivity	1. Record radioactive decay and calculate half-life.	0	2	0
Radioactivity	1. Explain why materials are radioactive and how to handle them.	2	0	0
Light, Wavelength, and Frequency	1. Describe light as an electromagnetic wave.	2	0	0
Light, Spectra, and Illumination	1. Categorize differences in emission spectra and derive the inverse square law.	0	3	0
Reflection, Refraction, and Dispersion	1. Analyze ray diagrams and calculate image characteristics using the mirror equation.	2	0	0
Optics	1. Diagram images formed by plane and spherical mirrors.	2	0	0
Basic Optics	1. Examine light rays through prisms, lenses, and mirrors.	0	2	0

Total Contact Hours

Lecture Hours	Lab Hours	Clinical Hours
30	30	0