

EASTERN ARIZONA COLLEGE

General Physics II

Course Design
2018-2019

Course Information

Division Science
Course Number PHY 112 (SUN# PHY 1112)
Title General Physics II
Credits 4
Developed by Karen Preston
Lecture/Lab Ratio 3 Lecture/3 Lab

Transfer Status

ASU	NAU	UA
PHY 112 (3) & PHY 114 (1) , Natural Science - Quantitative (SQ), Natural Science - Quantitative (SQ)	PHY 112; Lab Science [LAB]	PHYS 182 --and-- PHYS 103

Activity Course No
CIP Code 40.0801
Assessment Mode Final Exam (8 Questions/50 Points)
Semester Taught Spring
GE Category Lab Science
Separate Lab Yes
Awareness Course No
Intensive Writing Course No
Diversity and Inclusion Course No

Prerequisites

PHY 111

Educational Value

Students interested in medical and technical fields.

Description

Covers the fundamental principles of electricity, magnetism, and optics. Problem solving is on the algebraic level, with some trigonometric problems included.

Supplies

Scientific calculator

Competencies and Performance Standards

1. Quantify electrical interactions using electrical force, field, potential and energy concepts.

Learning objectives

What you will learn as you master the competency:

- a. Apply Coulomb's law to electrical interaction.
- b. Determine the potential due to electrical charges.
- c. Relate electrical field and potential.

Performance Standards

You will demonstrate your competence:

- o on tests
- o on homework
- o during class discussions

Your performance will be successful when:

- o learner determines the net electrical force due to discrete charge distribution
- o learner determines the net electrical field due to discrete charge distribution
- o learner determines the potential due to discrete charge distribution
- o learner determines the potential energy due to discrete charge distribution

2. Analyze DC circuits with resistors and capacitors.

Learning objectives

What you will learn as you master the competency:

- a. Apply Ohm's law and Kirchhoff's law to analyze electrical circuits with resistors.
- b. Analyze circuits with capacitors.
- c. Analyze resistors and capacitors based on their properties.

Performance Standards

You will demonstrate your competence:

- o on homework
- o during labs
- o on tests

Your performance will be successful when:

- o learner determines the total resistance in series and parallel combination of resistors
- o learner determines the total current, and individual currents in resistors and voltages across resistors
- o learner determines the total capacitance in a circuit
- o learner determines the total charge, charge on individual capacitor, and voltage across each capacitor
- o learner determines the voltage and current in a capacitor at any time during the charging and discharging of the capacitor

3. Investigate magnetism due to various sources.

Learning objectives

What you will learn as you master the competency:

- a. Describe the magnetism of permanent, temporary, electromagnet, natural magnet and the earth as a magnet.
- b. Describe magnetism due to a conductor carrying an electric current, and a solenoid.
- c. Describe the difference between ferro, para and di magnetic materials.

Performance Standards

You will demonstrate your competence:

- on homework
- on tests
- during labs
- during class discussions

Your performance will be successful when:

- learner distinguishes between permanent and temporary magnets
- learner describes the magnetic field due to various combination of magnets
- learner distinguishes between ferro, para, and diamagnetic materials

4. Investigate the functioning of a generator, a motor, and a transformer.

Learning objectives

What you will learn as you master the competency:

- a. Apply Faraday's law of induction and Lenz's law to explain the functioning of a generator and a motor.
- b. Distinguish between a motor and a generator.
- c. Explain the functioning of a transformer.

Performance Standards

You will demonstrate your competence:

- on homework
- on tests
- during labs

Your performance will be successful when:

- learner analyses the dependence of an electromotive force on a magnetic field, an angle, an area of coil, and the number of turns in a coil
- learner analyses the back EMF of a motor
- learner analyses the dependence of a current and a voltage in the secondary number of turns in the coils of primary and secondary circuits

5. Analyze AC circuits with inductance, capacitance, and resistance.

Learning objectives

What you will learn as you master the competency:

- a. Analyze AC circuits with resistance and capacitance.
- b. Analyze AC circuit with resistance and inductance.

- c. Analyze AC circuit with resistance, capacitance and inductance.

Performance Standards

You will demonstrate your competence:

- o on homework
- o during labs
- o during class discussions
- o on tests

Performance will be satisfactory when:

- o learner determines the capacitive reactance in a circuit
- o learner determines the inductive reactance in a circuit
- o learner determines the resonance frequency of a circuit
- o learner explains the function of variable capacitor in tuning a radio

6. Investigate properties of light.

Learning objectives

What you will learn as you master the competency:

- a. Describe the electromagnetic spectrum.
- b. Describe the nature of light.
- c. Describe the reflection of light.
- d. Describe the refraction of light.
- e. Describe the dispersion of light.
- f. Describe the diffraction of light.
- g. Describe the interference of light.
- h. Describe the photoelectric effect.

Performance Standards

You will demonstrate your competence:

- o on homework
- o during class discussion
- o during labs
- o on tests

Performance will be satisfactory when:

- o learner relates speed with frequency and wavelength, color, and energy with frequency
- o learner explains particle, wave, and the quantum nature of light
- o learner explains day to day phenomena based on reflection, refraction, dispersion, polarization, scattering, diffraction and the interference of light
- o learner uses Snell's law to determine the refractive index of the medium of light

7. Investigate light phenomena e.g. reflection, refraction, etc.

Learning objectives

What you will learn as you master the competency:

- a. Describe the laws of reflection, refraction, and diffraction.
- b. Apply mirror and lens formulas in solving problems.

- c. Describe total internal reflection and apply it to fiber optics.

Performance Standards

You will demonstrate your competence:

- o on homework
- o on tests
- o during labs
- o class demonstrations

Your performance will be successful when:

- o learner explains light phenomena e.g. reflection, refraction, etc.

8. Investigate the functioning of optical instruments.

Learning objectives

What you will learn as you master the competency:

- a. Distinguish between the functions of a periscope, a kaleidoscope, mirrors used in a car, surveillance equipment, etc.
- b. Distinguish between the functions of binoculars, the human eye, a camera, a microscope, and a telescope.

Performance Standards

You will demonstrate your competence:

- o on homework
- o on tests
- o during labs

Performance will be satisfactory when:

- o learner compares the nature of images made by various mirrors
- o learner compares the nature of images formed by lenses

Types of Instruction

Classroom presentation, demonstrations, and discussions

On campus laboratory

Grading Information

Grading Rationale

Labs	25%
Tests	30%
Homework	10%
Class work	10%
Quizzes	10%
Final Exam	15%

Grading Scale

A	87.5% and above
B	77.5 to 87.4%
C	67.5 to 77.4%
D	57.5 to 67.4%
F	below 57.4%