PHYS 1082: Engineering Physics II

A. COURSE DESCRIPTION

Credits: 4

Lecture Hours/Week: 3

Lab Hours/Week: 2

OJT Hours/Week: *.*

Prerequisites:

This course requires the following prerequisite

PHYS 1081 - Engineering Physics I (Number of Years Valid: 5)

Corequisites: None

MnTC Goals: Goal 03 - Natural Science

This course is the second portion of a comprehensive two-semester sequence of calculus-based physics. The sequence is intended for students in science and engineering. The topics of wave motion, geometric optics, and electricity and magnetism are introduced at the level of calculus. The course presents these topics as a foundation for further studies in science while at the same time developing problem-solving skills that will be useful for students in practically any endeavor they choose to undertake.

B. COURSE EFFECTIVE DATES: 03/29/2021 - Present

C. OUTLINE OF MAJOR CONTENT AREAS

1. Wave mechanics superposition and interference sound waves standing waves
2. Geometric optics refraction reflection dispersion image formation magnification light interference diffraction
3. Electricity Coulomb's Law Gauss's Law potential and voltage capacitance and dielectrics current and resistance circuits direct current alternating current
4. Magnetism magnetic forces magnetic sources and fields electromagnetic induction AC circuits electromagnetic waves

D. LEARNING OUTCOMES (General)

1. Analyze oscillatory and wave motion using calculus.
2. Apply the laws of geometric optics to determine magnification and the position of images.
3. Explain limitations of optical devices.
4. Analyze circuits using the principles of electromagnetism.
5. Calculate the electric and magnetic fields produced by a variety of electrostatic or magnetostatic sources.
E. Minnesota Transfer Curriculum Goal Area(s) and Competencies

Goal 03 - Natural Science

1. Demonstrate understanding of scientific theories.
2. Formulate and test hypotheses by performing laboratory, simulation, or field experiments in at least two of the natural science disciplines. One of these experimental components should develop, in greater depth, students' laboratory experience in the collection of data, its statistical and graphical analysis, and an appreciation of its sources of error and uncertainty.
3. Communicate their experimental findings, analyses, and interpretations both orally and in writing.
4. Evaluate societal issues from a natural science perspective, ask questions about the evidence presented, and make informed judgments about science-related topics and policies.

F. LEARNER OUTCOMES ASSESSMENT

As noted on course syllabus

G. SPECIAL INFORMATION

None noted