MISSOURI WESTERN STATE UNIVERSITY
COLLEGE OF LIBERAL ARTS AND SCIENCES
DEPARTMENT OF COMPUTER SCIENCE, MATHEMATICS, AND PHYSICS

COURSE NUMBER: PHY 211

COURSE NAME: University Physics II

COURSE DESCRIPTION:

This course is a comprehensive study of electricity, magnetism, and optics involving simulations, applications, and experimentation. Course assignments require the student to have a thorough knowledge of college algebra, trigonometry, and calculus. Three hours lecture, two hours computer-aided instruction laboratory, two hours experimentation laboratory. Offered spring semester.

PREREQUISITE:

PHY 210, MAT 177 (MAT 287 recommended)

TEXT:

Physics: F/SCI + Eng., Hybrid-W/Access, Serway, Edition 9th 16, Cengage L, ISBN 9781305116429

COURSE OBJECTIVES:

The primary objective for this course is to introduce students to the basic concepts of physics using advanced calculation techniques. The primary teaching strategy is the development of problem solving skills by example and experimentation. Students who complete this course will have met the following objectives:

1.   Relate basic physical principles to their application in quantitative and conceptual problem solving.

2.   Become intimately familiar with the fundamental laws of nature and be able to discuss these laws in "plain language."

3.   Formulate and solve problems in the theory of electricity and magnetism.

4.   Formulate and solve problems in the theory of light and optics.

5.   To develop a working knowledge of the technological applications of physics.

STUDENT COMPETENCIES:

In order to meet the above objectives, successful students will be competent to perform the following functions.

1. Identify and formulate complex problems in physics employing advanced mathematical techniques.

2. Calculate the electric force between charged objects and simple charge distributions.

3. Calculate the electric field of highly symmetric distributions of charge using Gauss' law.

7. Calculate the electric potential from the electric field and charge distributions.

8. Find the capacitance of arrays of conductors.

9. Solve plane circuit diagrams for the current through, and potential across each component using Kirchoff's circuit laws.

10. Calculate the magnetic field of given current distributions using the law of Biot-Savart.

11. Calculate the magnetic field of highly symmetric current distributions using Ampere's Law.

12. Derive the parameters of systems of mirrors and lenses using the law of reflection, Snell's law, and Brewster's law.

13. Determine the transmission and absorption properties via interference of thin films of common materials.

COURSE OUTLINE:

I. Electricity

    A. Electric Fields
    B. Gauss' Law
    C. Electric Potential
    D. Capacitance and Dielectrics
    E. Current and Resistance

II.   Magnetism
        F.   Magnetic Fields
        G.   Faraday's Law
        H.   Ampere's Law
        I.   Inductance
        J.   Magnetization
        K.   Alternating Current Circuits

III.   Light and Optics

        A.   Electromagnetic Radiation
        B.   The Nature of Light
        C.   Geometric Optics
        D.   Physical Optics
        E.   Interference of Light Waves
        F.   Diffraction and Polarization