

Physics 200
Electricity and Magnetism
Cuyamaca College

Fall 2015

Instructor: Jerry Riley

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Description:

This course deals with the electric and magnetic behavior of matter. The primary emphasis will be on Maxwell's Equations and their applications.

This course along with Physics 190 and 210 satisfies the lower division physics requirement for astronomy, chemistry, physics, engineering and pre-med majors.

Course Prerequisites:

Physics 190 or equivalent and credit for or concurrent enrollment in Mathematics 280
(Calculus 2) **(a strong background in integration and word problems recommended)**

WITHOUT THE FOLLOWING SKILLS, COMPETENCIES AND/OR KNOWLEDGE, YOU WILL BE HIGHLY UNLIKELY TO SUCCEED IN THIS COURSE:

Ability to solve algebraic word problems by using substitution or simultaneous equations
Knowledge of trigonometric functions and their identities
Ability to solve linear, quadratic and trigonometric equations
Knowledge of related rates and derivatives
Ability to integrate polynomial, exponential and trigonometric functions
Ability to use the relationship between force, mass and acceleration to solve dynamics problems
Ability to use conservation of energy and conservation of momentum concepts
Understand simple harmonic motion and can apply its concepts to analyze oscillating systems

Course Objectives (Expected Student Learning Outcomes)

Students will be able to:

- 1) Recognize the basic concepts concerning electric fields, electric potential, capacitance, resistance, current, DC circuits, magnetic fields, inductance, AC circuits, Maxwell's Equations, and use algebraic, trigonometric and advanced calculus expressions to represent physical situations involving these subjects.
- 2) Investigate and delineate the relationship between the theoretical principles of physics and their practical applications, and explain how this relationship affects real world problem solving.
- 3) Investigate, interpret and analyze the fundamental principles of physics based on reading assignments and in-class discussions.
- 4) Calculate solutions to physics problems using the fundamental principles of physics and symbolic logic skills.

- a. Analyze simple static charge distributions and calculate the resulting electric field and electric potential
- b. Analyze simple current distributions and calculate the resulting magnetic field.
- c. Predict the trajectory of charged particles in uniform electric and magnetic fields.
- d. Analyze DC and AC circuits in terms of current, potential difference and power dissipation for each element.

During the lab students will:

- 1) Design experiments using the scientific method.
- 2) Collect and analyze data using both traditional and computer data acquisition methods; interpret and analyze numerical data, including appropriate use of error propagation, units and significant figures, and generate a visual representation of the data.
- 3) Using concepts covered in class, evaluate and interpret the experimental results.

Text:

Physics for Scientists and Engineers, Ninth Edition Combined, by Serway and Jewett

Grading:

80 % 4 Exams (Drop the lowest one) **There are no make-up exams!**
 20 % Lab Reports/ Computer Work

Grade Cut Offs

A 90 % to 100 %
 B 80 % to 89.99 %
 C 60 % to 79.99 %
 D 50 % to 59.99 %
 F 0 % to 49.99 %

Tentative Outline

Chap 23 The Electric Field
 Chap 24 Gauss's Law
 Chap 25 The Electric Potential
Exam 1

Chap 26 Capacitors and Dielectrics
 Chap 27 Current and Resistance
 Chap 28 Direct Current Circuits
Exam 2

Chap 29 The Magnetic Field
 Chap 30 Sources of the Magnetic Field
 Chap 31 Faraday's Law of Induction
Exam 3

Chap 32 Inductance
 Chap 33 Alternating Current Circuits

Chap 34 Electromagnetic Waves
Exam 4

This course adheres to the policies outlined in the Cuyamaca College catalogue. For further information, see Academic Policies stated in the catalogue.

I recommend you use the Supervised Tutoring services that are available to you. Refer to the class schedule for more information.