

**Physics 200**  
**Electricity and Magnetism**  
**Cuyamaca College**

**Spring 2012**

**Instructor:** Jerry Riley

**Office:** H 241

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**Office Hours:**

Monday 7:30 to 7:55 AM and 12:30 PM to 1:50 PM

Tuesday 7:30 to 7:55 AM and 12:30 PM to 1:50 PM

Wednesday 7:30 to 7:55 AM

Thursday 7:30 to 7:55 AM

**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:

1. Calculate the "Electric Field Strength" for a given charge distribution using Coulomb's technique and "Gauss's Law".
2. Determine the current and voltage in a "Direct Current" circuit.
3. Use "Biot-Savart Law" and Ampere's Law" to calculate the "Magnetic Field Strength" for a given current configuration.

4. Solve for current and voltage in an "Alternating Current" circuit.
5. Calculate the capacitance and the inductance of a circuit element.
6. Solve problems involving "Electromagnetic Waves" using "Maxwell's Equations", the "Poynting Vector" and radiation pressure.

During the lab students will:

1. Design experiments using the scientific method
2. Demonstrate laboratory technique by collecting data using both traditional and computer data acquisition methods, using computers to interpret and analyze numerical data and to generate a visual representation of the data
3. Evaluate the experimental results using techniques presented in class

**Text:**

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

**Grading:**

80 % 4 Exams (Drop the lowest one) **There are no make-up exams!**  
 20 % ~ 10 Lab Reports/ Computer Work (Drop the lowest one) **There are no make-up labs!**

**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.