Physics 210
Wave Motion and Modern Physics

Spring 2012

Instructor: Jerry Riley
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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 hydrostatics, hydrodynamics, wave behavior, geometric and physical optics, relativity, light as a particle, matter as a wave, the hydrogen atom and the Schrodinger Equation, electrical conductivity of solids, lasers and nuclear physics.

This course along with Physics 190 and 200 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 281 (Calculus 3) **(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

Objectives:

Students will:

1. Analyze transverse and longitudinal waves.
2. Solve hydrostatic and hydrodynamic problems.
3. Solve thins lens problems using geometric optics techniques.
4. Use concepts of waves to solve diffraction and interference problems in optics.

5. Use the basic concepts of modern physics: special relativity, photon behavior, matter waves, the uncertainty principle, quantum mechanics in one and three dimensions, statistical physics and nuclear physics to solve problems in those areas.

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

Modern Physics, Third Edition, by Serway, Moses and Moyer

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 14 Fluid Mechanics
Chap 16 Wave Motion
Chap 17 Sound Waves
Chap 18 Superposition and Standing Waves
Exam 1

Chap 35 Nature of Light and the Laws of Geometric Optics
Chap 36 Geometric Optics
Chap 37 Interference of Light Waves
Chap 38 Diffraction and Polarization
Exam 2

Chap 1 Relativity I
Chap 2 Relativity II
Chap 3 Quantum Theory of Light
Chap 4 Particle Nature of Matter
Chap 5 Matter Waves

Chap 6 Quantum Mechanics in One Dimension
Chap 7 Tunneling Phenomena (optional)
Exam 3

Chap 8 Quantum Mechanics in Three Dimensions
Chap 9 Atomic Structure
Chap 10 Statistical Physics
Chap 12 Solid State (optional)
Chap 13 Nuclear Structure
Chap 14 Nuclear Physics Applications
Chap 15 Elementary Particles (optional)
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.