

SYLLABUS  
PART I  
EDISON STATE COMMUNITY COLLEGE  
PHY 122S COLLEGE PHYSICS II  
5 CREDIT HOURS

**COURSE DESCRIPTION**

Continuation of PHY 121S. Force, energy, and momentum concepts are applied to electricity, magnetism, circuit theory, and optics. Additional topics in modern physics, such as relativity, quantum mechanics, and particle physics will be introduced. Includes four hours of lecture and two hours of lab each week. Prerequisite: PHY 121S. Lab fee.

**COURSE GOALS**

The student will:

Bloom's Level		Gen Ed Outcomes
3	1. Calculate electric force, field strength, and potential energy for static and moving electric charges.	3
2	2. Explain the definitions of capacitance, inductance, potential difference, current, and resistance and use the relations among these quantities to solve simple AC and DC circuits.	1,3
2	3. Describe the effects of a magnetic field on an electric charge and vice versa.	1,3
2	4. Explain the operation of electric motors and generators.	1
4	5. Analyze the reflection and refraction of light using Huygen's Principle, ray diagrams, and optical properties of various media.	1
2	6. Locate and describe the image formed by mirrors and thin lenses.	1
1	7. Describe interference, diffraction, and polarization of light in terms of wave theory.	1
2	8. Explain the operation and limitations of optical instruments such as microscopes and telescopes.	1
3	9. Calculate the energy and relative velocity of objects moving at speeds approaching the speed of light and recognize the consequences of these calculations.	3
2	10. Explain how blackbody radiation and the photoelectric effect defy explanation by classical physics and account for these phenomena with quantum mechanics.	1,3
2	11. Explain the Bohr Theory of atomic structure for hydrogen. Describe how this theory provided a starting point for the quantum mechanical description of the electrons in an atom.	1,3
3	12. Relate the observed energy and spectra of molecules to the Band Theory of Solids.	1
1	13. Describe nuclear decay processes and their products.	1
3	14. Classify subatomic particles by the forces through which they interact and by rest mass, spin, and decay products.	1,3

## CORE VALUES

The Core Values are a set of principles that guide in creating educational programs and environments at Edison State Community College. They include communication, ethics, critical thinking, human diversity, inquiry/respect for learning, and interpersonal skills/teamwork. The goals, objectives, and activities in this course will introduce/reinforce these Core Values whenever appropriate.

## TOPIC OUTLINE

1. Electric Forces and Fields
2. Electric Energy and Capacitance
3. Current and Resistance
4. Direct Current Circuits
5. Magnetism
6. Induced Voltages and Inductance
7. Alternating Current Circuits
8. Electromagnetic Waves
9. Reflection and Refraction of Light
10. Mirrors and Lenses
11. Wave Optics
12. Optical Instruments
13. Relativity
14. Quantum Physics
15. Atomic Physics
16. Molecules and Solids
17. Nuclear Physics
18. Nuclear Physics Applications
19. Elementary Particles