

# PHYS C125: ALGEBRA BASED PHYSICS: ELECTRICITY AND MAGNETISM

Item	Value
Top Code	190200 - Physics, General
Units	4 Total Units
Hours	108 Total Hours (Lecture Hours 54; Lab Hours 54)
Total Outside of Class Hours	0
Course Credit Status	Credit: Degree Applicable (D)
Material Fee	No
Basic Skills	Not Basic Skills (N)
Repeatable	No
Grading Policy	Standard Letter (S)
Local General Education (GE)	<ul style="list-style-type: none"> <li>CL Option 1 Natural Sciences (CB1)</li> </ul>
California General Education Transfer Curriculum (Cal-GETC)	<ul style="list-style-type: none"> <li>Cal-GETC 5A Physical Science (5A)</li> <li>Cal-GETC 5C Laboratory Activity (5C)</li> </ul>
Intersegmental General Education Transfer Curriculum (IGETC)	<ul style="list-style-type: none"> <li>IGETC 5A Physical Science (5A)</li> <li>IGETC 5C Laboratory Activity (5C)</li> </ul>
California State University General Education Breadth (CSU GE-Breadth)	<ul style="list-style-type: none"> <li>CSU B1 Physical Science (B1)</li> <li>CSU B3 Laboratory Activity (B3)</li> </ul>

## Course Description

The course covers Electricity, Magnetism, Light/Optics, and Modern Physics. It satisfies the physics requirement of biological science programs and technical programs, except physics, chemistry, or engineering. It satisfies requirements as a liberal arts elective. PREREQUISITE: PHYS C120. Transfer Credit: CSU; UC: Credit Limitation: PHYS C120, PHYS C125 and PHYS C185, PHYS C280 combined: maximum credit, 1 series. C-ID: PHYS 110, PHYS 100 S.C-ID: PHYS 110, PHYS 100 S.

## Course Level Student Learning Outcome(s)

1. Display problem solving skills related to electricity and magnetism.
2. Display problem solving skills related to geometrical optics.
3. Display problem solving skills related to modern physics.

## Course Objectives

- 1. Analyze and solve problems related to electromagnetism.
- 2. Analyze and solve problems related to DC circuits.
- 3. Analyze and solve problems related to geometrical optics.
- 4. Analyze and solve problems related to special relativity and quantum physics.

## Lecture Content

ELECTRICITY and MAGNETISM Electric Forces and Electric fields  
Electrical Energy and Capacitance Current and resistance Direct Current  
Circuits Magnetism Induced Voltages and Inductance LIGHT and OPTICS:  
Geometric Optics Mirrors and Lenses Wave Optics MODERN PHYSICS  
Special Relativity Quantum Physics Atomic Physics Nuclear Physics  
Nuclear Energy and Elementary Particles

## Lab Content

Collect data with appropriate sensors and significant figures. Analyze data in graphical form. Perform experiments involving electric and magnetic fields. Perform experiments involving electric circuits. Perform experiments involving geometrical optics. Perform experiments involving wave optics.

## Method(s) of Instruction

- Lecture (02)
- DE Live Online Lecture (02S)
- DE Online Lecture (02X)
- Lab (04)
- DE Live Online Lab (04S)
- DE Online Lab (04X)

## Instructional Techniques

A variety of instructional techniques will be employed to encompass different student learning styles. These may include, but are not limited to, lecture, discussion, and small group activities. Instructional will be supplemented, where appropriate, by PowerPoint presentations, videos, simulations, and other electronic resources and technologies.

## Reading Assignments

Students will complete reading assignments from the textbook as well as any supplemental reading based upon handouts, Internet resources, and assignments from the Coastline Library.

## Writing Assignments

Lab Reports, Quiz and Test questions, and Discussions will require the student to demonstrate and communicate a qualitative understanding of scientific concepts.

## Out-of-class Assignments

Outside of the classroom, students will do the required reading, study for quizzes and exams, and conduct research, where applicable, to prepare for discussions.

## Demonstration of Critical Thinking

Students will demonstrate critical thinking through written work such as lab reports as well as active participation in class discussions.

## Required Writing, Problem Solving, Skills Demonstration

Problem-Solving will be emphasized in the class through homework assignments, quiz and test questions, and testing predictions based on simulations and hands-on experiments. Writing skills will be demonstrated by essay questions and lab reports.

## Eligible Disciplines

Physics/Astronomy: Masters degree in physics, astronomy, or astrophysics OR bachelors degree in physics or astronomy AND masters

degree in engineering, mathematics, meteorology, or geophysics OR the equivalent. Masters degree required.

### **Textbooks Resources**

1. Required Knight, R.; Jones, B.; Field, S. College Physics, A Strategic Approach, 4th ed. Pearson, 2019 Rationale: - 2. Required Urone, P.; Hinrichs, R. College Physics, A Strategic Approach, 1st ed. OpenStax College, 2020

### **Other Resources**

1. Coastline Library