### COURSE OUTLINE OF RECORD

**Number:** PHYS G125  
**TITLE:** Algebra Based Physics: Electricity/Magnetism

| ORIGINATOR: | James Almy | EFF TERM: | Fall 2011 |
| FORMERLY KNOWN AS: | | DATE OF OUTLINE/REVIEW: | 03-20-2009 |
| CROSS LISTED COURSE: | | TOP NO: | 1902.00 |
| SEMESTER UNITS: | 4.0 | CID: | PHYS 110 |

**HRS LEC:** 54.0  
**HRS LAB:** 54.0  
**HRS OTHER:** 0.0  
**CONTACT HRS TOTAL:** 108.0  
**STUDY NON-CONTACT HRS RECOMMENDED:** 108.0

**CATALOG DESCRIPTION:**

This is an algebra/trigonometry based general physics course in the areas of electricity, magnetism, light and modern physics. Topics studied include electric charges and fields, DC circuits, magnetic fields, electromagnetic induction, reflection, refraction, interference of light, quantum theory, matter waves, radioactivity and nuclear reactions. Three hours lecture and demonstration, three hours laboratory a week. This course may not be offered each semester. UC credit limitations: PHYS G120, PHYS G125 and PHYS G185, PHYS G280, PHYS G285 combined – maximum credit, 1 series. Deduct credit for duplication of topics. C-ID: PHYS 110, 100S.

**JUSTIFICATION FOR COURSE:**

**PREREQUISITES:**
- PHYS G120: Algebra Based Physics: Mechanics with a minimum grade of C or better  
- PHYS A120: Algebra Based Physics: Mechanics with a minimum grade of C or better  
- PHYS C120: Algebra Based Physics: Mechanics with a minimum grade of C or better

**COREQUISITES:**

**ADVISORIES:**

**ASSIGNED DISCIPLINES:**
- Physics/Astronomy

**MATERIAL FEE:** Yes [ ] No [X] Amount: $0.00

**CREDIT STATUS:** Noncredit [ ] Credit - Degree Applicable [X] Credit - Not Degree Applicable [ ]

**GRADING POLICY:** Pass/No Pass [ ] Standard Letter [X] Not Graded [ ] Satisfactory Progress [ ]

**OPEN ENTRY/OPEN EXIT:** Yes [ ] No [X]

**TRANSFER STATUS:** CSU Transferable[ ] UC/CSU Transferable[X] Not Transferable[ ]

**BASIC SKILLS STATUS:** Yes [ ] No [X]  
**LEVELS BELOW TRANSFER:** Not Applicable

**CALIFORNIA CLASSIFICATION CODES:** Y - Not Applicable

**NON CREDIT COURSE CATEGORY:** Y - Not applicable, Credit Course

**OCCUPATIONAL (SAM) CODE:** E

**REPEATABLE ACCORDING TO STATE GUIDELINES:** No [X] Yes [ ] NUMBER REPEATS:

**REQUIRED FOR DEGREE OR CERTIFICATE:** No [ ] Yes [X]

Liberal Arts: Emphasis in Science(Associate in Arts)

**GE AND TRANSFER REQUIREMENTS MET:**

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COURSE LEVEL STUDENT LEARNING OUTCOME(S) Supported by this course:

1. solve problems involving electromagnetic theory.
2. solve problems involving circuit theory.
3. solve problems involving geometrical optics.
4. solve problems involving nuclear physics.

COURSE OBJECTIVES:
1. solve problems involving electromagnetic theory.
2. solve problems involving circuit theory.
3. solve problems involving geometrical optics.
4. solve problems involving nuclear physics.

COURSE CONTENT:

LECTURE CONTENT:

A. Electricity
   1. Charge and Matter
   2. Conductors and Insulators
   3. Coulomb's Law
   4. Electric Fields and Lines of Force
   5. Gauss's Law
   6. Electric Potential and Capacitors
B. Current Electricity
   1. Current and Potential Difference
   2. Ohm's Law
   3. Simple DC Circuits; resistors in series and parallel
   4. Multiloop Circuits; Kirchhoff's Laws
C. Electromagnetism
   1. Properties of Magnets
   2. Magnetic Fields
   3. Magnetic Forces and Torques
   4. Induced EMF
D. Light
   1. Nature and Propagation of Light; Speed of Light
   2. Geometrical Optics
      a. Reflection
      b. Refraction (Snell's Law)
      c. Lenses
      d. Mirrors
   3. Wave Optics (Physical Optics)
      a. Interference
      b. Diffraction
      c. Polarization
      d. Spectra
E. Modern Physics
1. Special Relativity
2. Quantum Theory
3. Atomic Physics
4. Nuclear Physics Lab content:
   a. Collect data with appropriate sensors and significant figures.
   b. Analyze data in graphical form.
   c. Perform statistical error analysis.
   d. Perform experiments involving electric and magnetic fields.
   e. Perform experiments involving electrical circuits.
   f. Perform experiments involving mirrors and lenses.
   g. Perform experiments analyzing radioactive decay.

LABORATORY CONTENT:
1. Collect data with appropriate sensors and significant figures.
2. Analyze data in graphical form.
3. Perform statistical error analysis.
4. Perform experiments involving electric and magnetic fields.
5. Perform experiments involving electrical circuits.
6. Perform experiments involving mirrors and lenses.
7. Perform experiments analyzing radioactive decay.

METHODS OF INSTRUCTION:
A. Lecture:
B. Lab:
C. Independent Study:

INSTRUCTIONAL TECHNIQUES:

COURSE ASSIGNMENTS:
Reading Assignments
Textbook

Out-of-class Assignments
Students are encouraged to read some of the current popular scientific articles found in newspapers and popular scientific journals and magazines, and to watch some of the scientific programs on television.
Discussion is encouraged.

Writing Assignments
Regular homework assignments are given which stress problem solving ability, and exams are given which test the students ability to solve such problems. The laboratory portion of the course is designed to give the student practice in making measurements and using equipment, and proficiency is determined by lab exams in which the student is expected to demonstrate the ability to use a piece of equipment to the instructor. In addition, students are expected to maintain lab notebooks which contain calculations and an analysis of each experiment.

METHODS OF STUDENT EVALUATION:
Midterm Exam
Final Exam
Short Quizzes
Report
Problem Solving Exercises
Demonstration of Critical Thinking:
Students will demonstrate the ability to think critically by analyzing given physical situations (reading word problems and interpreting them), applying the basic laws of physics toward the solution of such problems, deducing valid conclusions from their results, and then explaining these results in terms of non-mathematical ideas. From data collected in the lab, the students will be able to verify and "discover" the basic laws of physics, and use graphs to predict the results of other experiments. The student will then take these ideas and write a lab report which describes the results of his work, as well as answering questions related to the performance of the experiment.

Required Writing, Problem Solving, Skills Demonstration:
Regular homework assignments are given which stress problem solving ability, and exams are given which test the students ability to solve such problems. The laboratory portion of the course is designed to give the student practice in making measurements and using equipment, and proficiency is determined by lab exams in which the student is expected to demonstrate the ability to use a piece of equipment to the instructor. In addition, students are expected to maintain lab notebooks which contain calculations and an analysis of each experiment.

TEXTS, READINGS, AND RESOURCES:
TextBooks:

Manuals:

LIBRARY:
Adequate library resources include:
Comments:

Attachments:
Attached Files