### Official Course Outline Information

Students are advised to keep course outlines in personal files for future use.

Shaded headings are subject to change at the discretion of the department and material will vary - see course syllabus available from instructor.

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**Faculty/Department:** Physics

**Course Name/Number:** PHYS 112  
**Form Former Course Number:**  
**UCFV Credits:** 4

**Course Name/Number:** Electricity and Magnetism

**Calendar Description:** The course follows PHYS 111 and is designed for students who are planning to continue their studies in physics or any of the other sciences. Topics include electric fields, Gauss’s law, electric potential, circuits, Kirchhoff’s laws, magnetic fields, magnetic induction, and finally, a study of Maxwell’s equations. The laboratory portion of the course uses experiments to reinforce the theory covered in class.

**Prerequisites:** PHYS 101 with a B+ or better, or PHYS 111

**Pre or Corequisites:** MATH 112

**Synonymous Course(s):** N/A

(a) Replaces: N/A

(b) Cannot take N/A for further credit

**Total Hours per Term:** 73

**Structure of Hours:**

- Lectures: 43 hrs
- Seminar: hrs
- Laboratory: 30 hrs
- Field Experience: hrs
- Student Directed Learning: hrs
- Other (Specify): hrs

**Maximum Enrolment:** 36

**Expected Frequency of Course Offering:** Yearly

**Will Transfer Credit Be Requested?** (Lower-level courses only)  YES  NO

**Will Transfer Credit Be Requested?** (Upper-level requested by department)  YES  NO

**Transfer Credit Exists in BC Cat Transfer Guide:**  YES  X  NO

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**Authorization Signatures:**

Course designer(s): Peter Mulhern  
Chairperson: (Curriculum Committee)

Department Head: Peter Mulhern  
Dean: J. Snodgrass

PAC Approval in Principle Date:  
PAC Final Approval Date: December 14, 2001
LEARNING OBJECTIVES / GOALS / OUTCOMES / LEARNING OUTCOMES:

Students who enroll in this course have completed Physics 111 and Math 111 (Calculus) or their equivalents. The course is intended for students who are planning to study engineering, science, and life sciences. Students will be able to:

1. understand the fundamental laws of electricity, and magnetism, and learn how to apply the theory to solve related problems
2. apply physics to everyday situations and phenomena in engineering, science, and life sciences
3. use and investigate modern apparatus, perform fundamental laboratory experiments, and interpret data obtained
4. develop a feeling for the order of magnitude of physical quantities in real experiments
5. emphasis will be placed on assigning problems which require the student to use calculus in their solutions

METHODS:

This course will be presented using lectures and laboratory experiments. Films or other audio-visual aids will be used where appropriate. Problems will be assigned on a regular basis which are to be handed in and marked. Problems that require the use of calculus will be emphasized. Close coordination will be maintained between laboratory and classroom work. Computer-assisted learning programs will be used to increase the understanding of the concepts being studied.

PRIOR LEARNING ASSESSMENT RECOGNITION (PLAR):

Credit can be awarded for this course through PLAR YES ______ NO ______

METHODS OF OBTAINING PLAR:

If a student can show evidence of skill equivalent to the lab part of the course, we are willing to consider that plus successful completion of a final exam as equivalent to the course.

TEXTBOOKS, REFERENCES, MATERIALS:

[Textbook selection varies by instructor. An example of texts for this course might be:]


References:

F. Sears & M. Zemansky, University Physics, 5th ed., Addison Wesley, 1979
R. Serway, Physics for Scientists and Engineers, Holt, Rinehart and Winston, 1993

SUPPLIES / MATERIALS:
STUDENT EVALUATION:
[An example of student evaluation for this course might be:]

Assignments  20%
Midterm        25%
Laboratory work  15%
Final exam     40%

COURSE CONTENT:
[Course content varies by instructor. An example of course content might be:]

1. Coulomb’s Law, electric field, potential, capacitance, Gauss’ Law
2. electric current, electromotive force, Ohm’s Law, Joule’s Law, Kirchhoff’s Laws, RC time constant
3. magnetic field, currents, force on a moving charge
4. sources of magnetic field, Ampere’s Law, production of B fields, B of long straight wire
5. magnetic induction, induction, induced emf, Faraday’s Law, Lenz’s Law, mutual inductance, energy in a magnetic field
6. Maxwell’s Equations, E and B waves, energy in E/m waves
7. introduction to time varying electric and magnetic fields