### 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 – see course syllabus available from instructor.

<table>
<thead>
<tr>
<th>PHYS 112</th>
<th>Physics</th>
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<tbody>
<tr>
<td>COURSE NAME/NUMBER</td>
<td>5</td>
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<tr>
<td>FACULTY/DEPARTMENT</td>
<td>UCFV CREDITS</td>
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<tr>
<td>Electricity and Magnetism</td>
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### 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 111 or (PHYS 101 with a B+, MATH 112 recommended) or (PHYS 101 and 105, MATH 112 recommended)

### COREQUISITES:

- PRE or COREQUISITES: MATH 112

### SYNONYMOUS COURSE(S):

(a) Replaces: 
(b) Cross-listed with: 
(c) Cannot take: 

### SERVICE COURSE TO:

(department/program)

### TOTAL HOURS PER TERM: 120

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<th>STRUCTURE OF HOURS:</th>
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<tr>
<td>Lectures: 75 Hrs</td>
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<tr>
<td>Seminar:</td>
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<td>Laboratory: 45 Hrs</td>
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<tr>
<td>Field experience:</td>
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<td>Student directed learning:</td>
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<td>Other (specify):</td>
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### TRAINING DAY-BASED INSTRUCTION:

Length of course: 
Hours per day: 

### OTHER:

- Maximum enrolment: 36
- Expected frequency of course offerings: Yearly (every semester, annually, every other year, etc.)

### WILL TRANSFER CREDIT BE REQUESTED? (lower-level courses only)

- Yes [ ]  
- No [x]  

### WILL TRANSFER CREDIT BE REQUESTED? (upper-level requested by department)

- Yes [ ]  
- No [x]  

### TRANSFER CREDIT EXISTS IN BCCAT TRANSFER GUIDE:

- Yes [x]  
- No [ ]

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**Course designer(s):** Tim Cooper  
**Department Head:** Norm Taylor  
**Supporting area consultation (UPACA1)**  
**Curriculum Committee chair:** Norm Taylor  
**Dean/Associate VP:** Dan Ryan  
**Undergraduate Program Advisory Committee (UPAC) approval**  

**Date approved:** May 11, 2009  
**Date of meeting:** May 22, 2009  
**Date approved:** May 29, 2009  
**Date approved:** October 6, 2009  
**Date of meeting:** October 30, 2009
LEARNING OUTCOMES:
Upon successful completion of this course, students will be able to:

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

METHODS: (Guest lecturers, presentations, online instruction, field trips, etc.)
This course will be presented using lectures and laboratory experiments. Films or other audio-visual aids may 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.

METHODS OF OBTAINING PRIOR LEARNING ASSESSMENT RECOGNITION (PLAR):
☒ Examination(s) ☐ Portfolio assessment ☐ Interview(s)
☐ Other (specify): Evidence of skill equivalent to the lab part of the course
☐ PLAR cannot be awarded for this course for the following reason(s):

TEXTBOOKS, REFERENCES, MATERIALS:
[Textbook selection varies by instructor. An example of texts for this course might be:] 
Young and Freedman, University Physics, 12th ed. (UFV edition), Pearson, 2008

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 10%
Midterm 20%
Laboratory work 15%
Final exam 45%
Quizzes 10%

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, Bio Savart Law, Ampere’s Law, and production of B fields
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 and behaviour of AC circuits