

Syllabus for
PHY 331—Electromagnetic Theory
3 Credit Hours
Fall 2008

I. COURSE DESCRIPTION

A study of electrostatics, electric and magnetic circuits and fields, electromagnetic induction, and Maxwell's equations in differential and integral forms.

Prerequisites: PHY 112 and MAT 211.

Course fee: \$35.

II. COURSE GOALS

The course is designed to enable the student to do the following:

- A. Obtain a working understanding of the concepts of electricity, magnetism, and electromagnetic propagation.
- B. Become competent in solving problems relating to electricity, magnetism, and electromagnetic propagation.
- C. Learn to use vector operations in different coordinate systems.
- D. Understand the concepts of electric potential, potential difference, and energy.
- E. Understand the theory of charges in conductors, semiconductors, and dielectrics.
- F. Understand the concepts of magnetic field, magnetic force, and magnetic circuits.
- G. Learn Faraday's law.

III. STUDENT LEARNING OUTCOMES FOR THIS COURSE

As a result of successfully completing the course, the student will be able to do the following:

- A. Apply theory to the understanding, analysis, and design of electromagnetic devices.
- B. Employ creative thinking skills in analyzing complicated electromagnetic systems
- C. Construct simplified models of complicated electromagnetic systems and to recognize the consequences of simplification.
- D. Derive equations for electric field and apply them in various cases.
- E. Apply Maxwell's equations to understand the concept of the propagation of plane waves.

IV. TEXTBOOKS AND OTHER LEARNING RESOURCES

Required Materials

Textbook

Sadiku. Elements of Electromagnetics, 4th edition. New York: Oxford University Press, 2007.

V. POLICIES AND PROCEDURES

A. University Policies and Procedures

1. Attendance at each class or laboratory is mandatory at Oral Roberts University. Excessive absences can reduce a student's grade or deny credit for the course.
2. Students taking a late exam because of an unauthorized absence are charged a late exam fee.
3. Students and faculty at Oral Roberts University must adhere to all laws addressing the ethical use of others' materials, whether it is in the form of print, video, multimedia, or computer software. By submitting an assignment in any form, the student gives permission for the assignment to be checked for plagiarism, either by submitting the work for electronic verification or by other means.
4. Final exams cannot be given before their scheduled times. Students need to check the final exam schedule before planning return flights or other events at the end of the semester.
5. Students are to be in compliance with University, school, and departmental policies regarding ePortfolio requirements. Students should consult the ePortfolio handbooks for requirements regarding general education and the students' majors.
 - a. The penalty for not submitting electronically or for incorrectly submitting an ePortfolio artifact is a zero for that assignment.
 - b. By submitting an assignment, the student gives permission for the assignment to be assessed electronically.

B. Course Policies and Procedures

1. Evaluation Procedures

Grading

Exam 1	20%
Exam 2	20%
Exam 3	20%
Class Activity/Project	20%
Homework	20%
Final	<u>20%</u>
	100%

2. Other Policies and Procedure

- a. The first three absences (excused or unexcused) will result in no grade reduction. Each absence thereafter will result in a 3% reduction in the final score (100 percent maximum), which determines the grade.
 - b. Two tardies will count as one absence.
3. ePortfolio Requirements
None.

VI. COURSE CALENDAR

Week	Topic	Chapter	Sections	Lectures
1	Vector Algebra	1	2,3,4,5,6,7,8	2
2	Coordinate Systems	2	2,3,4,5	2
3	Vector Calculus	3	2,3,4,5,6,7	3
			EXAM 1	
4	Electostatic Fields	4	2,3,4,5,6,7,8	4
			Class Activity	
5	Electrostatic Fields in Material Space	5	2,3,4,5,6,7,8,9	4
6	Electrostatic Boundary Value Problems	6	1,2,3,5	1
			EXAM 2	
7	Magnetic Field; Magnetic Flux	7	2,3,4,5,6	6
8	Magnetic Forces, Materials and Devices	8	2,3,4,5,6,7,8,10	7
			EXAM 3	
9	Maxwell's Equations	9	2,3,4,5	2
10	Wave Propagation	10	2,4,5,6,7,8	3
11	Transmission Lines	11	2,3,4	2
			Final	

Course Inventory for ORU's Student Learning Outcomes

PHY 331- Electromagnetic Theory Fall 2008

This course contributes to the ORU student learning outcomes as indicated below:

Significant Contribution – Addresses the outcome directly and includes targeted assessment.

Moderate Contribution – Addresses the outcome directly or indirectly and includes some assessment.

Minimal Contribution – Addresses the outcome indirectly and includes little or no assessment.

No Contribution – Does not address the outcome.

The Student Learning Glossary at <http://ir.oru.edu/doc/glossary.pdf> defines each outcome and each of the proficiencies/capacities.

OUTCOMES & Proficiencies/Capacities		Significant Contribution	Moderate Contribution	Minimal Contribution	No Contribution
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1	Outcome #1 – Spiritually Alive Proficiencies/Capacities				√
1A	Biblical knowledge				√
1B	Sensitivity to the Holy Spirit				√
1C	Evangelistic capability				√
1D	Ethical behavior				

2	Outcome #2 – Intellectually Alert Proficiencies/Capacities				
2A	Critical thinking	√			
2B	Information literacy		√		
2C	Global & historical perspectives			√	
2D	Aesthetic appreciation				√
2E	Intellectual creativity			√	

3	Outcome #3 – Physically Disciplined Proficiencies/Capacities				
3A	Healthy lifestyle				√
3B	Physically disciplined lifestyle				√

4	Outcome #4 – Socially Adept Proficiencies/Capacities				
4A	Communication skills			√	
4B	Interpersonal skills				√
4C	Appreciation of cultural & linguistic differences				√
4D	Responsible citizenship			√	
4E	Leadership capacity				√

(Revised 12/15/06)