

WEST VIRGINIA UNIVERSITY
College of Engineering & Mineral Resources
Lane Department of Computer Science & Electrical Engineering

EE 345 Engineering Electromagnetics
Fall 2019 - 3 Credit Hours

Instructor: Dr. Dimitris Korakakis *Phone:* 304-293-9697
Office AER 235 *Email:* dimitris.korakakis@mail.wvu.edu

Office Hours: 11:00-13:00 Tue. and Thurs. or by appointment

Class Time: 14:00-15:15 Tue. and Thurs. Class Location: ESB-E G78A

Prerequisites: Physics 112, Math 261

Required Text: *Elements of Electromagnetics, Matthew N.O. Sadiku, 6th Ed., Oxford, 2007.*

Description: Introduction to electromagnetic theory and applications. Transmission line transient and steady state analysis, Maxwell's equations, plane waves, wave interaction with materials and boundaries, electrostatics and magnetostatics.

Objectives: To provide students with the physical and engineering fundamentals of electromagnetic waves in transmission lines, bounded, and unbounded media, and static electric and magnetic fields.

Outcomes:

1. Students will be able to successfully engage in problem solving and understand at a basic level TEM transmission lines, plane waves propagation in unbounded and bounded media, behavior in lossy materials, and basic electric and magnetic fields necessary for EM wave understanding in the above contexts.
2. Students will become aware of the broad technological/application impact of electromagnetics, and the environmental implications of electromagnetics design (e.g. interference, radiation safety, etc).

Tentative Lecture Schedule and syllabus for EE 345:

<u>Week</u> (approx)	<u>Subject</u>	<u>Topic</u>
1.	Vector algebra, coordinate systems. (Ch. 1-2)	
2.	Transformations, vector calculus. (Ch. 2-3)	
3.	Electrostatic fields. (Ch. 4)	
4.	Electric fields, boundary-value problems (Ch. 5-6)	
5.	Magnetostatic fields. (Ch. 7)	
6.	<i>EXAM 1</i>	
7.	Magnetic forces, materials, devices. (Ch. 8)	
8.	Maxwell's equations. (Ch. 9)	
9.	EM wave propagation. (Ch. 10)	
10.	Transmission Lines. (Ch. 11)	
11.	Waveguides. (Ch. 12)	
12.	<i>EXAM 2</i>	
13.	Antennas. (Ch.13)	
14.	Numerical Methods. (Ch. 14)	
	<i>FINAL</i>	

RULES OF OPERATION FOR EE 345

General: Attendance will be taken intermittently by sign-in sheet and used in grading. The lectures will explain, expand upon, and supplement the assigned reading material and will in many instances provide background information for assignments, therefore, attendance is strongly recommended. Handouts,

verbal instructions and demonstrations cannot always be scheduled in advance but will occur when appropriate for the topic. Students missing a class are responsible for all material covered.

Grading: Semester grades will be computed roughly as follows:

				EE 345
Quizzes and attendance:				10% (6-10 assignments)
1st Mid Term Examination:	10/3/18			20%
2nd Mid Term Examination	12/3/18			30%
Final Examination:	12/20/19	8 a.m.		40%

Tests will seek to determine your level of mastery of fundamental principles and methods developed in the lectures, text and reinforced/expanded upon through homework assignments. Grades will generally be:

A:	80-100%
B:	65-79%
C:	50-65%
D:	40-49%

Homework sets: Homework will be assigned about a week prior to a scheduled in-class quiz. Students are encouraged to discuss homework assignments. Homework assignments are meant to provide guidance and to help students understand the material better. If you do not fully understand any material, see me promptly. Homework will not be collected nor graded. However, any students that wish to receive feedback on their work are encouraged to meet with me during office hours or by appointment.

Academic Honesty: The integrity of the classes offered by any academic institution solidifies the foundation of its mission and cannot be sacrificed to expediency, ignorance, or blatant fraud. Therefore, I will enforce rigorous standards of academic integrity in all aspects and assignments of this course. For the detailed policy of West Virginia University regarding the definitions of acts considered to fall under academic dishonesty and possible ensuing sanctions, please see the Student Conduct Code at <http://www.arc.wvu.edu/admissions/integrity.html>. Should you have any questions about possibly improper research citations or references, or any other activity that may be interpreted as an attempt at academic dishonesty, please see me before the assignment is due to discuss the matter.

The West Virginia University community is committed to creating and fostering a positive learning and working environment based on open communication, mutual respect, and inclusion.

If you are a person with a disability and anticipate needing any type of accommodation in order to participate in this class, please advise me and make appropriate arrangements with the Office of Accessibility Services (293-6700). For more information on West Virginia University's Diversity, Equity, and Inclusion initiatives, please see <http://diversity.wvu.edu>