

EE 434 Electromagnetic Waves

Course title:

Electromagnetic Waves

Class hours:

Monday, Wednesday, Friday 13:00-13:50

Office hours:

Wednesday, Friday 14-16

Instructor:

Dr. Anders M. Jorgensen

Workman 227

Phone: 505-835-5450

e-mail: anders@nmt.edu

Classroom location:

Workman 109

Textbook:

- *Magdy F. Iskander*, Electromagnetic Fields and Waves, Waveland Press Inc, 2000.

Learning objectives:

1. Expand your basic knowledge of electromagnetic waves.
2. Improve your physical intuitive understanding of electromagnetic phenomena.
3. Understand and be able to use Maxwell's equations.
4. Understand the principles of wave reflection and transmission, wave guides, and antenna radiation.

Prerequisites:

EE 333 (Electricity and Magnetism)

Topics covered:

This course will build on the your knowledge of Maxwell's equations developed in EE 333. We will apply the concepts to several practical problems. Before spring break we will cover electrostatics and magnetostatics. After spring break we will cover waveguides and antennas.

1. Electrostatics, capacitance, energy storage. and transmission at interfaces.
2. Magnetostatics, inductance, energy storage.
3. Normal and oblique incidence reflection
4. Waveguides
5. Optical fibers
6. Antennas and antenna arrays

Course work:

1. Reading. I expect you to keep up with the course by reading the assigned sections in the book before each class.
2. Active participation in class. Show up and respond to questions.
3. Homework. Assigned approximately weekly.

4. Exams. There will be a total of four exams during the semester.

Grading policy:

1. Active participation in class 10%
2. Homework 30%
3. Best three of four exams 60%

Approximate Lecture Schedule:

Week of	Lecture	Exam
Jan 21	Electrostatics	
Jan 26	Electrostatics	
Feb 2	Magnetostatics	
Feb 9	Normal incidence reflection and transmission	
Feb 16	Normal incidence problem using Smith charts	1
Feb 23	Arbitrary angle reflection and incidence	
Mar 2	Perpendicular and parallel reflection coefficients	
Mar 9	SPRING BREAK	
Mar 16	Optical fibers	2
Mar 23	Wave guides, TM modes	
Mar 30	TE modes	
Apr 6	Mode excitation and energy flow	
Apr 13	Single-mode fibers	3
Apr 20	Antennas, radiation patterns	
Apr 27	Antenna characteristics	
May 4	Antenna arrays	4