

Spring Semester 2007
ELEG 5763 Advanced Electromagnetic Scattering and Transmission

MWF 10:30-11:20pm, MEEG 288,
Dr. Magda El-Shenawee, Office # 3176, Tel 5-6582

Instructor: Dr Magda El-Shenawee

Email: magda@uark.edu

Office hours: MWF 2:30-3:30pm

Text Book: Carl T.A. Johnk, Engineering Electromagnetic Fields and Waves, 1988, Wiley,
ISBN 0-471-09879-5

Grading Policy

Mid Term Exam	30 points (in class)
Project I	35 (25 solution + 10 presentation in class using power point)
Final Project II	35 (25 solution + 10 presentation in class using power point)

A: 90-100 %, B: 80-89 %, C: 70-79 %, D: 60-69 %, F: 0-59 %

Attendance

Attendance is expected from all students

Mid Term Exam

No make up exams unless it is an emergency.

Project Deadlines

Project deadlines are very strict.

Lecture**Topic**

Review Topics

- Dynamic Maxwell's equations
- Plane wave propagation

Topic 1 (Chapter 6): Wave Reflection and Transmission at Plane Boundaries

- Review of Maxwell Equations and Boundary Conditions
Boundary Value Problems
- Reflection from Plane conductor at normal incidence
- Two Region reflection and Transmission
- Normal Incidence for more than two regions
- Solution using reflection coefficient and wave impedance
- Reflection and Transmission at Oblique Incidence

Topic 2 (Chapter 7): The Poynting Theorem and Electromagnetic Power

- The Theorem of Poynting
- Time Average Poynting Vector and Power

Mid Term Exam (open book)**Topic 3 (Chapter 8): Mode Theory of Waveguides**

- Maxwell's relations when fields have $\exp(j\omega t)$ dependence
- TE, TM and TEM mode relationships
- TM mode solutions of rectangular waveguides
- TE mode solution of rectangular waveguides
- Dispersion in hollow waveguides
- Wall loss attenuation in hollow waveguides

Project I (to cover Topics 1-3)**Topic 4 (Open Subject): Introduction to Computational EM**

Papers & external book chapters will be needed based on the Instructor's guidance

FINAL PROJECT II (to cover Topic 4)