

**University of Delaware**  
**Department of Electrical and Computer Engineering**

**ELEG 648 Advanced Engineering Electromagnetics**  
**Fall 2009**

**INSTRUCTOR:** Daniel S. Weile, Assistant Professor of Electrical and Computer Engineering 311 Dupont Hall, Phone: (302) 831-8784, email: [weile@ee.udel.edu](mailto:weile@ee.udel.edu)

**TEXT:** C. A. Balanis, *Advanced Engineering Electromagnetics*, Wiley, 1989

**COURSE OBJECTIVES:**

By the end of the course, the student should be able to:

1. Quantitatively describe the propagation of electromagnetic energy in homogeneous media,
2. Solve problems involving multiple reflections in planar stratified media,
3. Use vector potentials to simplify the solution of electromagnetic problems,
4. Derive and use image theory, reciprocity, and the equivalence principle,
5. Solve simple electromagnetic guided wave problems.

Time permitting, the student will also be able to use addition theorems and plane wave decompositions to solve electromagnetic scattering problems, and use Green's functions to find fields due to complex source distributions.

**TOPICS COVERED:**

1. Maxwell's equations and boundary conditions
2. Solutions to the wave equation
3. Wave propagation in free space
4. Reflection and transmission of electromagnetic waves
5. Vector potentials
6. Electromagnetic theorems
7. Waveguides and cavities

Time permitting, scattering and Green's functions will also be covered.

**GRADING:**

Homework: 20%. Homework is due every Monday in class. Late homework will not be accepted.

Midterm: 30%. The exam will be given in class on October 20.

Final: 50%

**COURSE POLICY:**

Unless otherwise stated, exams will be closed books, closed notes, and calculator free. No makeup exams will be given without prior arrangement.

**OFFICE HOURS:**

For graduate classes, I see no need to post formal office hours, since so few students are involved. Come by my office any time.