

## EECS 210

Fall 2006  
Tu, Th 12:30-2  
400 Cory

## Applied Electromagnetic Theory

Office Hours  
M, (W), 11AM  
Tu, Th, (F) 10AM

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### Exam Midterm Specification Sheet Midterm In Class Tuesday, Oct 24 Open Book, Open Notes Bring Calculator, Paper Provided

#### I. Green's Functions and use in Theorems and Concepts

Green's Function for simple images and for free space in both statics and dynamics  
Reciprocity, Uniqueness, Equivalence in statics  
Poynting vector and impedance in dynamics  
Integral Representations and Integral Equations  
Reading: Chapter 1, 2, 3.12, 4, 5 Skip 1.12, 1.13, 2.11, 2.12, 5.12, 5.13, 5.14, 5.18B

#### II. Separation of Variables in Rectangular Coordinates

Green's Function both statics and dynamics  
Use of N-1 and N directional expansions  
Boundary conditions over N-1  
Source Expansion  
Eigenfunction expansion in N dimensions  
Applications to various sources  
Understanding of big picture trends  
Reading: Chapter 1, 2, 3.12, 4, 5 Skip 1.12, 1.13, 2.11, 2.12, 5.12, 5.13, 5.14, 5.18B

#### III. Time-Harmonic Maxwell Equations and Plane Waves

Maxwell's Equations (electrodynamics)  
Time-harmonic ME and Source free ME  
Poynting vector and impedance  
Fourier transform in time and inherent properties  
Plane waves: wave equation and k-vectors  
Transverse nature of plane-waves  
Plane wave representations in multi-layer dielectrics  
Kinematic boundary conditions  
Dynamic boundary conditions  
Physical effects in reflection and transmission  
Phase velocity, group velocity, pulse broadening  
Causality, non-local in time and Kramers Kronig relations  
Reading: Chapter 6 and 7 (Skip 6.5, 6.6, 6.10, 7.6, 7.7, and 7.11)