

EECE 561
Topics List for Qualifying Exam

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

EM interaction with materials Ch. 2

- Electric and magnetic susceptibility
- Conductivity
- Complex dielectric constant
- AC Variations in materials

Solutions to the Wave equation Ch. 3

- Time varying and Time Harmonic fields (3.2 – 3.3)
- Cartesian, Cylindrical, and Spherical Coordinates (3.4)

Plane wave propagation Ch. 4

- Plane waves in lossless and lossy media (4.1 – 4.3)
- Polarization, Stokes Vector and Poincaré Sphere (4.4)

Plane wave reflections Ch. 5

- Normal and Oblique incidence (5.2 – 5.3)
- Multiple Interfaces (5.5)
- Brewster angle, TIR (5.3)

Vector potentials, and Radiation Integrals Chs. 6

- Vector Potentials \mathbf{A} and \mathbf{F} (6.2 – 6.4)
- Wave equations and solutions for \mathbf{A} and \mathbf{F} (6.5-6.6)
- Far field approximate solutions (6.7)
- Radiation Integrals for \mathbf{A} and \mathbf{F} (6.8)