

ECEn 665 Midterm Exam Topics

1. Electromagnetic Radiation in Free Space
 - (a) Vector potential formulation, Green's functions
 - (b) Radiation integral
 - (c) Far field, vector current moment, spherical waves
2. Antenna Analysis
 - (a) Equivalent currents
 - (b) Radiation pattern, isotropic pattern, beamwidths, sidelobe level
 - (c) Directivity
 - (d) Radiation efficiency, gain
 - (e) Radiation resistance
 - (f) Polarization
 - (g) Receive antennas - reciprocity, Thevenin equivalent, effective aperture, Friis formula
 - (h) Noise, antenna temperature
3. Antenna Types
 - (a) Hertzian dipole
 - (b) Dipoles (linear antennas) - sinusoidal current model, method of moments
 - (c) Loop antennas
 - (d) Patch antenna - cavity model, modes, radiation pattern
 - (e) Aperture antennas - open ended waveguide, horns, reflectors
4. Arrays
 - (a) Array factor
 - (b) Pattern synthesis, Schelkunoff's representation
 - (c) Dolph-Chebyshev arrays
 - (d) Overlap integral formulation
 - (e) Mutual coupling and network relationships
 - (f) Receive arrays - network model, directivity