THE OHIO STATE UNIVERSITY
COLLEGE OF ENGINEERING

Antennas

ECE 5011

Credit Hours:
3.00

Course Levels:
Undergraduate (1000-5000 level)
Graduate (5000-8000 level)

Course Components:
Lecture

Course Description:
Electromagnetic radiation; fundamental antenna parameters; dipole, loops, patches, broadband and other antennas; array theory; ground plane effects; horn and reflector antennas; pattern synthesis; antenna measurements.

Prerequisites and Co-requisites:
Prereq: 3010 (312), or Grad standing in Engineering, Biological Sciences, or Math and Physical Sciences.

Course Goals / Objectives:
- Teach students basic antenna parameters, including radiation resistance, input impedance, gain and directivity
- Expose students to antenna radiation properties, propagation (Friis transmission formula) and wireless point to point communication connectivity requirements
- Study elementary antennas and their radiation properties
- Expose students to impedance matching techniques, and mutual coupling
- Study antenna arrays and array design methods
- Introduce students to commonly used wideband antennas such as spirals and log-periodics
- Introduce students to aperture antennas such as horns and reflectors

Course Topics:

- Review: Maxwell?s equations; boundary conditions; complex Poynting vector; real and reactive power; vector and Hertz potentials; radiation integral; duality; reciprocity
- Radiation by simple sources; antenna parameters and characterization properties: radiation resistance, radiation intensity, directivity and gain, effective aperture; Far-zone and Fresnel regions
- Elementary antennas and their properties; dipoles; loop antennas
- Linear and planar arrays; phased arrays; endfire arrays; Chebychev arrays and design techniques
- Impedance matching; mutual impedances
- Broadband antennas; matching techniques; folded dipole; helical and Yagi-Uda antennas; spiral and log periodic antennas; traveling wave antennas
- Microstrip antennas
- Aperture antennas; horns and reflectors; equivalence principle

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Designation:

Elective