

1. ECE 444: Antennas and Radiation
2. 3 credits: 2-75 minute lecture sessions/week
3. Branislav Notaros
4. Electromagnetics. Branislav M. Notaros. 2011.
5. Course Information
 - a. Retarded potential theory, antenna arrays, long wire antennas, dipoles, aperture antennas, receiving antennas
 - b. Prerequisites: ECE 342 with a C or higher
 - c. Selected Elective: Electrical Engineering; Computer Engineering
6. Goals for the Course
 - a. Course Learning Objectives
 - i. Know the antenna fundamentals, antenna arrays, and basic types of antennas for wireless communication
 - ii. Apply electromagnetic theory
 - iii. Apply the mathematical solution of Maxwell's equations for radiation problems
 - iv. Define and discuss basic antenna parameters
 - v. Analyze electrically small antennas
 - vi. Use the theory of receiving antennas
 - vii. Identify topics in antenna arrays include the array factor, pattern multiplication, multidimensional arrays, phased arrays, and smart antennas
 - viii. Evaluate several types of antennas including wire, microstrip, and aperture antennas
 - ix. Identify the concepts, tools, and practice of antenna analysis, measurement, and design
 - b. Student Outcomes
 1. An ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics
 4. An ability to recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts
7. Topics Covered
 - Electromagnetic fundamentals
 - Antenna and radiation fundamentals and definitions
 - Theory and applications of transmitting antennas
 - Theory and applications of receiving antennas
 - Wireless communication systems
 - Radar cross section and radar equation
 - Analysis and synthesis of antenna arrays

Resonant wire and patch antennas and arrays
Fundamentals of broadband and aperture antennas
Antenna analysis, measurements, and design