

EE 444

1. **Course Number & Name:** EE 444, Introduction to RF Communications
2. **Course Credit and Contact Hours:** 3 Units, 3 hours
3. **Course Coordinator:** Dr. Mohamed Salem
4. **Textbook:** David M. Pozar, *Microwave Engineering*, 4th Edition, John Wiley & Sons, 2012, ISBN 978-0-470-63155-3.
5. **Supplemental Materials:** None
6. **Specific Course Information:**
 - a. **Description:** Principles of transmission line theory, scattering matrix methods, impedance matching, waveguides, microstrip, coplanar lines, couplers, detectors, antennas, RF filters, RF amplifiers, passive RF/ microwave devices (mixers, diplexers, etc.), RF/microwave communications link design, system noise and distortion, common wireless protocols.
 - b. **Prerequisites:** (EE 442 and EE 442L with a C or better) or EE 430 with a C or better, or consent of instructor
 - c. **Co-Requisite:** None
 - d. **Status:** Required for EE program, Elective, Selected Elective
7. **Specific Goals for the Course:**
 - a. **Specific outcomes of instruction:** Upon successful completion of this course the students will be able to:
 - i. Calculate the voltage, current and impedance on a transmission line as a function of distance.
 - ii. Properly terminate a transmission line.
 - iii. Calculate the characteristics of a transmission line between a source and a load.
 - iv. Calculate linear models of RF and microwave circuits.
 - v. Use CAD software to design and simulate a matching network.
 - b. **This course supports the following ABET Student Outcomes:**
 - i. *SO-1: an ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics.*

8. Brief List of Topics to be Covered:

- a. Definitions and units
- b. Transmission-line theory (lumped-element model, lossless transmission-line, wave equations, characteristics impedance, termination of a transmission-line, reflection coefficient, average power, return loss, voltage standing wave ratio (VSWR), generator and load mismatch)
- c. Microwave network analysis theory and measurements (Smith chart, linear parameters, vector network analysis, non-linear scattering parameters, lossy transmission-lines, generator and load mismatch)