COURSE: EECS 411. **TITLE:** Microwave Circuits I. **PREREQUISITES:** EECS 330 or Graduate standing. **ELECTIVE.**

TEXTBOOK: D. Pozar, *Microwave Engineering*, 3rd ed., Wiley.

CATALOG DESCRIPTION: Transmission-line theory, microstrip and coplanar lines, S-parameters, signal-flow graphs, matching networks, directional couplers, low-pass and band-pass filters, diode detectors. Design, fabrication, and measurements (1-10GHz) of microwave integrated circuits using CAD tools and network analyzers.

COURSE OBJECTIVES:

1. To teach students the fundamentals of active and passive microwave circuit design
2. To teach students the laboratory skills of making microwave measurements
3. To teach students the design skills of microwave computer-aided-design (CAD)

COURSE OUTCOMES [Program Outcomes Addressed]

1. An ability to analyze transmission lines, including open and short; [1,11,13,14]
2. An ability to design matching networks and use directional couplers [1,2,3,5,11,13]
3. An ability to design low-pass and band-pass microwave filters [1,2,3,5,11,13,14]
4. An ability to design microwave integrated circuits using CAD tools [1,3,5,11,13,14]
5. An ability to present design results both orally and in reports [4,7]

PROGRAM OUTCOMES ADDRESSED: 1,2,3,4,5,7,11
PROFESSIONAL COMPONENT ADDRESSED: 13,14
PREPARED BY: Andrew E. Yagle on Nov. 19, 2004

CLASS/LABORATORY SCHEDULE:
LECTURES: 3 per week @ 50 minutes.
LABORATORY: 1 per week @ 5 hours

TOPICS COVERED:

1. Transmission & planar lines
2. S-parameters
3. Signal flow graphs
4. Low-noise amplifiers
5. Mixers and nonlinear circuits
6. Matching networks & couplers
7. Front-end electronics systems

ASSESSMENT (Course outcomes)

1. Weekly problem sets [1,2,3,4]
2. In-class exams [1,2,3,4]
3. Laboratory reports [5]
4. Project presentations [5]

COURSE DESCRIPTION: University of Michigan, College of Engineering, ELECTRICAL ENGINEERING PROGRAM