**COURSE:** EECS 215  
**TITLE:** Intro. to Electronic Circuits.  
**PREREQUISITES:** Math 116 & Engin 101; **Co-REQ:** Physics 240  

**CATALOG DESCRIPTION:** Introduction to electronic circuits. Basic concepts of voltage and current; Kirchhoff’s voltage and current laws; Ohm’s law; voltage and current sources; Thevenin and Norton equivalent circuits. DC and low frequency active circuits using operational amplifiers, diodes, and transistors; small-signal analysis; energy and power. Time- and frequency-domain analysis of RLC circuits. Basic passive and active electronic filters. Laboratory experience with electrical signals and circuits.

**COURSE OBJECTIVES:**
1. To acquaint students with the basic concepts and properties of electrical circuits and networks;
2. To provide basic laboratory experience with analyzing and building simple filters and amplifiers;
3. To teach students how to analyze electrical filters and amplifiers using op-amps, transistors & diodes
4. To teach students how to use phasors, impedance, and Bode plots for circuit frequency response;
5. To prepare students for follow-up courses in the Circuits area of the Electrical Engineering program.

**COURSE OUTCOMES [Program Outcomes Addressed]**
1. Ability to analyze circuits using Kirchhoff’s voltage & current laws, and node analysis; [1,13]
2. Ability to use small-signal analysis on circuits containing op-amps, diodes, and transistors; [1,14]
3. Ability to compute transient responses of simple circuits with capacitors and inductors; [1,14]
4. Ability to compute frequency responses of circuits containing capacitors and inductors; [1,3,13]
5. Ability to compute power dissipation, power factor, and maximum power transfer; [1,13]
6. Ability to use digital oscilloscopes, meters, and waveform generators in laboratory; [2,5,11]

**PROGRAM OUTCOMES ADDRESSED:** 1,2,3,5,11  
**PROFESSIONAL COMPONENT ADDRESSED:** 13,14  
**PREPARED BY:** Andrew E. Yagle on March 15, 2006

**ASSESSMENT (Course outcomes)**
1. Problem sets [1,2,3,4,5,6]
2. 5 laboratories [4,5,6]; students work in pairs; written reports
3. 3 closed-book examinations [1,2,3,4,5,6]

**TOPICS COVERED:**
1. Charge, current and voltage
2. Kirchhoff’s voltage & current
3. Node analysis laws
4. Ohm’s law and ideal sources
5. Thevenin & Norton equivalents
6. Ideal op-amps and basic circuits
7. DC diode & transistor model
8. Small-signal analysis; gain; limit
9. Inductors and capacitors
10. First and second order circuits
11. Phasors, impedance, filters

**CLASS/LABORATORY SCHEDULE:**
- **LECTURES:** 3 per week @ 50 minutes.
- **RECITATION:** 1 per week @ 50 minutes
- **LABORATORY:** 5 @ 2 hours.

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