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

TEXTBOOK: R.E. Thomas & A.J.Rosa, *Analysis and Design of Linear Circuits: Laplace Early*; A. Ganago, *Circuits Make Sense*; Wiley, 4th ed.

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

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

TOPICS COVERED:

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

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]

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