EEE 3300 — Electronics I **Fall 2010**

Instructor: Dr. Jim P. Zheng Room 346 Lecture Hours: MWF: 2:00-2:50 pm
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Prerequisites: EEL 3112 (grading C or better)

Required Textbooks:

Mark N. Horenstein, Microelectronic Circuits and Devices, 2nd ed., Prentice Hall, 1996.

Course Description:

This course covers diode models and circuits, DC biasing of bipolar-junction and field-effect transistors, small- and large-signal transistor models, and frequency analysis of single-stage AC amplifiers.

Course Objectives:

After completing the course the student will be able to

1. Analyze basic circuits using Ohm's, Kirchhoff's, and superposition laws, as well as Thevenin and Norton equivalent circuits. (Chapter 1)
2. Describe the nonlinear I-V characteristics of the p-n junction diode, and solve simple circuits containing two-terminal nonlinear elements. (Chapter 3)
3. Classify the electronic circuits made from two-terminal nonlinear elements, including clipping, limiting, and rectification, and analyze and design power-supply circuits. (Chapter 4)
4. Describe the I-V characteristics of three-terminal devices including field-effect transistor (FET) and bipolar junction transistor (BJT), and identify the type of device given the I-V characteristics. (Chapter 5)
5. Analyze and design basic circuits containing three-terminal devices, and determine the relationship between the input and output voltages, and determine the device parameters. (Chapter 6)
6. Analyze and design single transistor amplifier circuits, and determine the small-signal gains of the amplifier using the small-signal model. (Chapter 7)
7. Identify and determine high- and low-frequency capacitor in amplifiers, and derive frequency response of basic amplifiers, and design an amplifier to meet frequency response criteria. (Chapter 9)

Topics Covered:

1. Review of Circuit Analysis
2. Basic Semiconductor Theory
3. Operational Amplifier Circuits
4. Diodes and Applications
5. Bipolar Junction Transistor (BJT): DC Analysis and Biasing
6. BJT Amplifier Circuits: Small-Signal Analysis and Frequency Response

7. Metal Oxide Semiconductor Field Effect Transistor (MOSFET): DC Analysis and Biasing
8. MOSFET Amplifier Circuits: Small-Signal Analysis and Frequency Response
9. BJT and MOSFET Amplifier Circuit Configurations

Relationship to ABET Program Outcomes: A and C

Grading:

Two Examinations:	50%	(25% from each exam)
Homework:	10%	
Final Examination:	40%	(a comprehensive exam)

Grading scale: **A: ≥90%, B: 80-89.9%, C: 60-79.9%, D: 45-59.9%, F: <45%**
These breakpoints may be lowered slightly depending on overall class performance.

Policy Statements:

- Attendance is mandatory. The grade will be lower at least by one level, if one absents from class more than 3 times without approval.
- Coming late (5 minutes) or leaving early (5 minutes) will be considered as the absence from class.
- Homework is due at the beginning of class. No exception!
- The general policy is no makeup exams and quizzes. In the event of an excused absence, you must notify the instructor prior to the exam to discuss proper procedure.
- Cellular phones and beepers must be turned off in the classroom.
- There is renewed emphasis on the Honor Code. Violation of this code can result in course failure and/or dismissal from the College of Engineering.