Electrical and Computer Engineering 3410  
Microelectronics I  
Required

Course Description:  
Fundamentals of transistors, operational amplifiers, and other integrated circuits, along with their utilization in amplifiers, switches, and other applications.

Prerequisites:  
ECE 2290 and ECE 3620 (may be taken concurrently)

Textbook:  

Course Outcomes:  
1. Students will be able to understand the operation of the following fundamental devices of discrete and IC microelectronics: amplifiers, operational amplifiers, diodes, MOSFETS, and CMOS inverters.  
2. Students will be able to design, simulate, analyze, and test basic analog and digital circuits containing the fundamental devices listed above.  
3. Students will be able to understand the design, operation, and characterization of the basic amplifiers, using FET devices and incorporate these amplifiers into system design, based upon terminal characteristics.  
4. Students will be able to use appropriate modeling software to model, simulate, analyze, and optimize the devices and circuits of this course.

Topics Covered:  
- Ideal and non-ideal behavior of operational amplifiers  
- Diodes and their use in rectifiers, limiters, envelop detectors, and DC restoration  
- MOSFET transistor and circuits; emphasizing single-state amplifier design  
- Bipolar junction transistors and circuits, emphasizing single-state amplifier design

Outcome Assessments (Grades):  
Homework 15%  
Labs and SPICE 25%  
Quizzes 10%  
Midterm 25%  
Final 25%

Class Schedule:  
Class Three times a week for fifty minutes.  
Lab Once a week for two hours and forty-five minutes.

Contribution of course to meeting the requirements of Criterion 5:  
4 credit hours of Engineering Topics and contains significant engineering design content
Relationship of course to student outcomes:

a. An ability to apply knowledge of mathematics, science, and engineering.
c. An ability to design a system, component, or process to meet desired needs.
e. An ability to identify, formulate, and solve engineering problems.
k. An ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.

Instructor:
Kylee Sealy,
January 2014