

## **EE 310 ELECTRONIC DEVICES AND CIRCUITS I (3 Credits, Required)**

### **Catalog Description**

Electronic devices, including operational amplifiers, diodes, bipolar junction transistors and field-effect transistors, the basic circuits in which these devices are used, and computer-aided circuit analysis for these devices and circuits.

### **Prerequisites**

Prerequisite(s): EE202

Corequisite(s): EE310

### **Textbooks(s) and/or other required material**

Adel S. Sedra and Kenneth C. Smith, "Microelectronic Circuits," 5th Edition, Oxford University Press, 2004.

M.E.Herniter, "Schematic Capture with Cadence Pspice" 2nd ed., Prentice Hall, 2003.

### **Course Objectives**

Upon completion of the course, students will:

Understand the operating principles of major electronic devices, circuit models and connection to the physical operation of device

Be able to apply this knowledge to the analysis and design of basic circuits.

Have the ability to analyze and design discrete or integrated electronic circuits.

### **Topics Covered**

Introduction to analog and digital signals, amplifiers and amplifier circuit models, frequency response

Opamps and opamp circuits

Diode physical and circuit models, diode circuits, physical operation processes

Bipolar junction transistor (BJT) physical operation processes, I-V characteristics, small-signal models, dc biasing, single-stage amplifiers, internal capacitances

Metal-oxide-field effect transistors (MOSFET) physical structure and operation, I-V characteristics, DC biasing and small-signal models, single-stage amplifiers, internal capacitances and frequency response of MOSFET circuits.

### **Class / Lab Schedule**

Three 50-minute lectures per week

One 110-minute PSPICE recitation per week

### **Contribution of course to professional component/criterion 5**

Engineering Topics: Electronics Circuits

### **Relationship of course to program outcomes**

- (a) an ability to apply knowledge of mathematics, probability and statistics, computer science and electrical engineering as it applies to the fields of computer software and hardware
- (b) an ability to design and conduct experiments, as well as to organize, analyze, and interpret data.
- (e) an ability to identify, formulate, and solve hardware and software computer engineering problems using sound computer engineering principles
- (k) an ability to use the techniques, skills, and modern hardware and software engineering tools necessary for computer engineering practice

### **Persons who prepared this description and date of preparation**

Dr. Chu-Ryang Wie, Professor, June 2008 (reformatted for CEN by Carl Alphonse)