**EECE 3010: Electronic Devices and Applications**

**Class Schedule:** 3 Credit course, meeting the equivalent of 3-50 minute class periods per week.

**Course Coordinator:** James E. Richie

**Course Materials:**

**Required:** D. A. Neaman, Microelectronics: Circuit Analysis and Design, 4th Edition, New York, NY: McGraw-Hill, 2010.

**Course Description:**

Electronic components are discussed including semiconducting diodes, bipolar junction transistors, field effect transistors, etc. These devices will be analyzed from their terminal characteristics and their behavior in representative electronic circuits. Applications for devices include simple power supply analysis and design, class A amplifier analysis including transistor biasing and stability analysis, simple digital logic gates, etc.

**Prerequisites:** EECE 2010

**Required** in the Electrical and Computer Engineering programs and for the Bioelectronics major in the Biomedical Engineering program.

Contribution to Professional Component: Engineering Science 85%

Engineering Design 15%

**Course Goals:**

To introduce the student to diodes and transistors and their applications in electronics, including rectification and regulated power supplies, amplifiers and logic circuits. The device terminal characteristics are used to analyze and design logic gates, DC bias circuits, and single stage amplifiers.

**Course Objectives:**

*By the end of this course, you should be able to ....*

1. Use small signal linear approximations for various non-linear devices.
2. Draw and label the graphic characteristics of diodes, bipolar junction transistors, and various field effect transistors.
3. Identify, design, and analyze various rectification circuits.
4. Design and analyze various filtering and regulation methods used in simple power supplies.
5. Design and analyze transistor logic gates.
6. Design and analyze various transistor biasing circuits and determine the bias stability of such circuits for BJT and FET devices.
7. Apply knowledge of BJT and FET biasing and circuit analysis to design and analyze single stage Class-A amplifiers.
8. Use computer aided software tools to analyze and design simple power supplies, simple logic gates, and simple small and large signal amplifiers.

**Contribution to Program Objectives:** partial fulfillment of Criterion 3 objectives A, E, G, K

**Course Topics: In the Text**

History/Overview of Electronics

Semiconductors and Diodes Chapter 1

Power Supplies and Voltage Regulators Chapter 2

Diode Applications Chapter 2

Field-Effect Transistors Chapter 3

DC FET Biasing Chapter 3

FET SmallSignal Analysis Chapter 4

FET Logic Families Course Handouts

Bipolar Junction Transistors Chapter 5

DC BJT Biasing Chapter 5

BJT Transistor Modeling Chapter 6

BJT Small-Signal Analysis Chapter 6

Last Modified: December 4, 2017