ECE 20800 – Electronic Devices and Design Laboratory

Type of Course
Required for the CmpE and EE programs

Catalog Description
Laboratory experiments in the measurement of electronic device characteristics. Design of biasing networks, small signal amplifiers, and switching circuits.

Credits
1

Contact Hours
3

Prerequisite Courses
ECE 20700 and ECE 25500

Prerequisites by Topics
Basic understanding of circuits (voltage, current, Ohm's Law) and electrical components (resistors, capacitors, switches) as well as electronics (diodes, transistors, FETs, op amps)

Textbook
Laboratory Experiment Notes

Course Objectives
This course will provide a basic understanding of operational amplifiers, diodes, and transistors and their applications. Students should be able to analyze, design, simulate and measure the performance of simple electronic circuits. The statistical variation of systems is introduced.

Course Outcomes
Students who successfully complete this course will have demonstrated:
1. An understanding basic circuit elements and measurement variables (1).
2. An ability to formulate node or mesh equations (1).
3. An understanding of the models for amplifiers (1).
4. An ability to analyze simple electronic circuits (6).
5. An understanding of the responses of basic filters (1).
6. An ability to simulate electrical circuits to produce engineering solutions (2).
7. An ability to analyze and interpret results from electrical circuit and simulation results (6).
8. An ability to make simple circuit designs (6).

Laboratory Topics

1. Introduction to Analysis and Simulation Software
2. Introduction to Operational Amplifiers
3. Integrators and Differentiators
4. Schmitt Trigger Analysis, Simulation and Design
5. Filter Design and Simulation
6. Phase Shift Oscillator Design and Simulation using an op amp
7. Diode Characteristics (Si, Ge, LED), Modeling
8. Diode Applications
9. Power Supply Design—Rectifiers and Voltage Regulators
10. Parameter Measurements; Bipolar Junction Transistor
11. Darlington Pair transistor application: Switch
12. MOSFET Application: DC Motor Control
13. BJT Amplifier, Operating Point and Performance

Computer Usage

High

Laboratory Experience

High

Design Experience

High

Coordinator

Elizabeth A. Thompson, Ph.D.

Date

09/27/2018