ECE 20700 – Electronic Measurement Techniques

Type of Course
Required for the CmpE and EE programs

Catalog Description
Experimental exercises in use of laboratory instruments. Voltage, current, impedance, frequency and waveform measurements. Frequency and transient response. Elements of circuit modeling and design.

Credits
1

Contact Hours
3

Prerequisite Courses
ECE 20100

Prerequisites by Topics
NA

Textbook
First Designs in Electrical Engineering, Dimitrios Peroulis, Nithin Raghunathan, Barrett Robinson, Matthew Swabey, Kendall Hunt, 2014, ISBN No. 9780757593864

Course Objectives
This course provides a hands-on experience in electronics laboratory instruments and measurements.

Course Outcomes
A student who successfully fulfills the course requirements will have demonstrated:
1. An ability to competently operate basic laboratory equipment (6).
2. An ability to make voltage, current, impedance, transient, and frequency response measurements (6).
3. An ability to layout, wire and troubleshoot electronic circuits (6).
4. An ability to design operational amplifier circuits from a set of specifications (2).
5. An ability to keep a laboratory notebook and prepare a formal laboratory report (3).
6. An ability to do electronic soldering (6).
7. An ability for PCB layout design. (6)

Laboratory Topics

1. Experiment Title or Activity
2. Course overview; Intro to Oscilloscope, Ohmmeter, Voltmeter
3. Simple Op-Amp Circuit; Oscilloscope I
4. Op-Amp Equations; Current Measurement
5. Follower Circuit
6. Summing Amplifier
7. Integrator
8. Linear Scale Ohmmeter
9. Scope II: triggering, x-y mode
10. Lab practical exam
11. Step response and time constant measurement
12. AC bridge circuit
13. Frequency response measurement
14. Filter design
15. Soldering Technique
16. PCB Design
17. Lab practical exam

Computer Usage

Low

Laboratory Experience

High

Design Experience

Medium

Coordinator

Guoping Wang Ph.D.

Date

08/20/2024