C-ID Descriptor
Circuit Analysis Lab

Descriptor Details

- **Descriptor Title**: Circuit Analysis Lab
- **C-ID Number**: 260
- **Suffix**:
  - Lab Course (L)
- **Units**: 1
- **Date of Last Revision**: 10/12/2017 11:44:08 PM GMT+0000

General Description

An introduction to the construction and measurement of electrical circuits. Basic use of electrical test and measurement instruments including multimeters, oscilloscopes, power supplies, and function generators. Use of circuit simulation software. Interpretation of measured and simulated data based on principles of circuit analysis for DC, transient, and sinusoidal steady-state (AC) conditions. Elementary circuit design. Practical considerations such as component value tolerance and non-ideal aspects of laboratory instruments. Construction and measurement of basic operational amplifier circuits.

Prerequisites

No information provided

Corequisites

C-ID ENGR 260

Advisories

None

Content

1. Test and Measurement equipment: Use of each item for specific purposes
2. Circuit construction techniques for laboratory use (“breadboarding”)
3. Component identification and labeling; nominal and measured values; limitations on voltage, current, power dissipation
4. Verifying lecture concepts: KCL; KVL; Ohm’s Law; Voltage and Current Division; Power dissipation; Series and Parallel Circuits; Equivalent circuits; Thevenin equivalent circuit; and Superposition.
5. Operational Amplifiers and the practical voltage and current limits on the output of these devices.
6. Step response of RL, RC, and RLC circuits
7. Frequency response of RL, RC, and RLC circuits (including resonance)
8. Laboratory Safety

Lab Activities

No information provided

Objectives

Upon successful completion of the course, students will be able to:

1. Access and use the most basic functions of electrical test and measurement equipment including oscilloscopes, multimeters, function generators and power supplies.
2. Read circuit schematics and construct linear circuits using resistors, capacitors, inductors, and/or op amps.
3. Measure resistance, DC and AC voltages, current, and power, and experimentally verify the results for a variety of electrical circuits.
4. Test circuits, analyze data and compare measured performance to theory and simulation.
5. Use a circuit simulation program (PSPICE, MultiSIM) and other computer applications (MATLAB, MS Excel) to predict or describe circuit behavior.
6. Troubleshoot and repair simple electric circuits.
7. Record and document results of lab work using text and graphs.

8. Work effectively in groups by sharing responsibilities and collaborating on findings.

Evaluation Methods

Lab Practicals, laboratory reports, and other methods chosen by the instructor

Textbooks

Robert L. Boylestad - Laboratory Manual for Introductory Circuit Analysis

Joseph G. Tront – Pspice for Basic Circuit Analysis