Electrical Circuits and Electronic Devices Laboratory

ECE 2307

Credit Hours:
0.50 - 0.50

Course Levels:
Undergraduate (1000-5000 level)

Course Components:
Lab

Course Description:
Introduction to circuit analysis; circuit analysis concepts and mechanical systems analogies; applications of electronic devices; operational amplifiers; electrical instruments and measurements. Lab only.

Prerequisites and Co-requisites:
Prereq or concur: 2301.

Course Goals / Objectives:
- Master the basic laws of circuit theory
- Be competent to analyze simple resistive or dc circuits
- Be competent in the analysis of steady-state RC and RL circuits, including frequency domain concepts and filters
- Be competent in the transient analysis of RC and RL circuits
- Be familiar with the fundamentals of AC power circuits, including the distinction between three-phase and residential power wiring and distribution
- Be competent in the analysis of basic ideal and non-ideal operational amplifier circuits
- Be familiar with diodes and their application in rectifiers
- Be familiar with the basics of electronic instrumentation and measurements
Course Topics:
- Fundamentals of electric circuits: Kirchhoff’s current & voltage laws, power & sign conventions, Ohm’s law, practical sources & measuring devices
- Resistive network analysis: node voltage analysis, mesh current analysis, superposition & Thevenin equivalent, loading
- AC network analysis: capacitors and inductors, sinusoids and sinusoidal response; phasor analysis of sinusoidal circuits
- Transient analysis with emphasis on 1st order circuits and brief overview of 2nd order circuits
- Sinusoidal frequency response of RLC circuits, filter circuits
- Ideal op-amps, basic op-amp circuits
- Diodes: ideal diode model and constant-voltage-drop circuit models, applications in rectifiers and for snubbers
- Bipolar junction transistors: operations, circuit models and applications
- Field-effect transistors: operations, circuit models and applications

Designation:
Elective