

ENGR 37L: CIRCUIT ANALYSIS LABORATORY

Foothill College Course Outline of Record

Heading	Value
Units:	2
Hours:	1 lecture, 3 laboratory per week (48 total per quarter)
Corequisite:	Completion of or concurrent enrollment in ENGR 37.
Degree & Credit Status:	Degree-Applicable Credit Course
Foothill GE:	Non-GE
Transferable:	CSU/UC
Grade Type:	Letter Grade (Request for Pass/No Pass)
Repeatability:	Not Repeatable

Student Learning Outcomes

- The student will be able to:
- The student will be able to:

Description

Practical verification of theorems and concepts learned in ENGR 37 through experimentation. Included will be experiments in DC and AC circuits involving the utilization of a variety of instruments, such as DC/AC meters, regulated power supplies, signal generators, oscilloscopes and frequency counters.

Course Objectives

The student will be able to:

- make satisfactory measurements in circuits containing DC, AC and composite signals using equipment commonly found in an electrical engineering laboratory.
- understand the effect of a measuring instrument on a circuit under test.
- analyze resulting error.
- use computer program to simulate DC and AC circuits using simulation program, PSpice or MultiSIM; use Excel to predict or describe circuit behavior.

Course Content

- Test and measurement equipment
- Circuit construction techniques
- DC resistive circuits and measurements
 - Construct circuit and measurement using KCL, KVL, Ohm's Law, series and parallel connection, Thevenin equivalent circuit, and superposition
- Operational amplifiers in circuit and its input voltage constraints
- Transient circuits - the step response of RL, RC, and RLC circuits
- Frequency response of RL, RC, and RLC circuits, including resonance
- AC sinusoidal circuits and measurements
- Laboratory safety

Lab Content

- Introduction to electric lab - getting to know the equipment, bread board, and laboratory SAFETY issues

- Circuit with resistors, Ohm's Law
- Nodal/Mesh analysis and superposition
- Function generator and oscilloscopes
- Operational Amplifier
- Thevenin's Theorem
- Potential divider and maximum power transfer
- Step response of RC, RL and RLC transient circuit
- Frequency response of RC, RL, and RLC circuit
- AC Steady State Analysis

Special Facilities and/or Equipment

- Electrical engineering laboratory with equipment for building and measuring electric circuits.

Method(s) of Evaluation

- Quizzes (emphasizing equipment usage)
- End of quarter project
- Laboratory notebook
- Formal report

Method(s) of Instruction

- Laboratory.

Representative Text(s) and Other Materials

Sahah, Nassir H. [Circuit Analysis with PSpice](#). CRC Press, 2017.

Boylestad, Robert L. [Laboratory Manual for Introductory Circuit Analysis](#). Pearson, 2016.

Types and/or Examples of Required Reading, Writing, and Outside of Class Assignments

- Lab reports.

Discipline(s)

Engineering