De Anza College
Department of Engineering
Introduction to Circuit Analysis-Engr37.61

Summer 2019
Manizheh Zand
Lecture: Mon to Thurs 6:30 pm 8:45 pm Room S48
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Office Hours: By appointment

Course Description

Circuit laws and nomenclature, resistive circuits with DC sources, ideal operational amplifier, controlled sources, natural and complete response of simple circuits, steady- state sinusoidal analysis and power calculations.

Course Goals and Student Learning Objectives

The objective of this course is to introduce the basics of AC/DC and transient analysis. This course builds on the foundations of physics and mathematics and is essential for all upper division EE courses.

Topics Covered:

- Ohm's law and Kirchhoff's laws
- Series and parallel circuits
- Superposition
- Thevenin and Norton Equivalent
- Maximum power transfer
- Nodal and mesh analysis
- Active and op amp circuits
- Capacitors and inductors
- Transient analysis

- Steady state analysis
- AC power

Course Content Learning Objectives:

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

1. Determine voltages and currents in a DC circuit consisting of resistors, current sources, voltage sources, and dependent sources.
2. Determine Thevenin and Norton equivalent circuit of a DC circuit and find the maximum power output of a DC circuit.
3. Determine the DC gain and operating point of an OP amp circuit.
4. Determine the transient response of a first and second order circuit consisting of RLC.
5. Determine the sinusoidal steady state response of a circuit consisting of RLC.
6. Determine the power delivered and absorbed by an element in an RLC circuit

Textbooks

Floyd, Thomas L. (2013). Principles of Electric Circuits. (9th Edition). Upper Saddle River, New Jersey: Prentice-Hall.

"Fundamentals of Electric Circuits", 6'th or 5th Edition, by Alexander and Sadiku, McGraw Hill.

Course Evaluation

The total points earned on all the midterms, quizzes, assignments, lab project, research paper, and final exam will be divided by the total possible points and the resulting percentage will determine the course grade.

Midterms 40%;
Quizzes 10%; are unannounced
Homework Assignments/Class particiaption 10%
Project/Research paper 10%
Final exam 30%

The final grade will be determined according to the following scale:

A+ 97 -100%	B+ 87 - 89%	C+ 77 - 79%	D+ 66 - 69%
A 93 - 96%	B 83 - 86%	C 73 - 76%	D 60 - 65%
A- 90 - 92%	B- 80 - 82%	C- 70 - 72%	F 0 - 59%

I. **Midterms & Quizzes**

There will be two (2) midterms given. Final Comprehensive Exam will be given during the final exam period. No makeup will be allowed.

There may be several unannounced quizzes given during the semester as deem necessary. No makeup will be allowed.

II. **Homework Assignments**

Homework will be assigned during class hours and can be given from textbooks or from class discussions.

III. **Project**

TBA

IV. **Final Exam**

Last day of the class

Homework

All assignments are managed though the Canvas.

Exams

There will be two midterm examinations and a final exam. All exams will be closed-book. For midterms and the final exam, a calculator is allowed. An equation sheet will be provided for you. A photographic ID will be required. Unless there is a documented, serious explanation for missing an exam, make-up exams will not be allowed.

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Course Outline

Week	
1	**Series, Parallel, and combinational circuit** **Learn LTspice/Multisim** **Branch, Loop, and Node Analysis** **Thevenin, Norton, and Superposition, Transistor**
2	**Instantaneous and average Power, Effective or rms value, Apparent power and power factor** **Linearity, bias an LED, Power Supply, Dependent source**
3	**Review and Midterm#1** **Project**
4	**Non-ideal amplifier 5.2 Ideal amplifier** **Summing amplifier, Difference amplifier** **Cascade amplifier, Opamp Application** **Bode plot, Simple filters**

5	**Review and Midterm #2** **Source free RC circuit, Source free RL circuit** **Step Response of an RC and RL circuit**
6	**Finding initial and final values** **Source Free series parallel RLC circuit** **Final exam**

Student Learning Outcome(s):

*The student will be able to analyze circuits containing resistive, capacitive, inductive passive elements, along with op-amps interconnected to voltage and current sources.

*The student will be able to use circuit laws and network theorems to solve DC steady state circuits, RC, RL, and RLC DC circuit transients and sinusoidal AC steady state circuits.