

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

Summer 2020

Manizheh Zand

Lecture: Mon, Wed, Thurs 6:30 pm 8:45 pm via zoom

Lecture: Tue TBA

email: ZandManizheh@fhda.edu

Office Hours: By appointment

### **Course Description**

Circuit laws and nomenclature, resistive circuits with DC sources, ideal operational amplifier, controlled sources, the 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 the 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<sup>th</sup> or 5<sup>th</sup> Edition, by Alexander and Sadiku, McGraw Hill.

### **Course Evaluation**

The total points earned on all the midterms, quizzes, assignments, lab projects, research papers, and the 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 participation 10%  
 Project/Research paper 10%  
 Final exam 30%

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

A 94 -100%	B+ 87 - 89%	C+ 76 - 79%	D+ 66 - 69%
A- 90 - 93%	B 83 - 86%	C 70 - 75%	D 60 - 65%
	B- 80 - 82%		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 make-up will be allowed.

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

### II. Homework Assignments

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

### III. Project

TBA

### IV. Final Exam

Last day of the class

### **Homework**

All assignments are managed through the Canvas.

### **Exams**

There will be two midterm examinations and a final exam. All the 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.

### Course Outline

<b>Week</b>	
<b>1</b>	<b>Series, Parallel, and combinational circuit Branch, Loop, and Node Analysis Thevenin, Norton, and Superposition, Transistor</b>
<b>2</b>	<b>Learn LTspice/Multisim Instantaneous and Average Power, Effective or rms value, Apparent power, and power factor</b>
<b>3</b>	<b>Linearity, bias an LED, Power Supply, Dependent source Non-ideal amplifier 5.2 Ideal amplifier Summing amplifier, Difference amplifier Cascade amplifier Midterm 1</b>
<b>4</b>	<b>Op-amp Application Bode plot, Simple filters Source free RC circuit, Source free RL circuit</b>

	<b>Step Response of an RC and RL circuit</b>
<b>5</b>	<b>Non-ideal amplifier 5.2 Ideal amplifier Summing amplifier, Difference amplifier Cascade amplifier, Midterm 2</b>
<b>6</b>	<b>Source free RC circuit, Source free RL circuit Step Response of an RC and RL circuit Finding initial and final values Source Free series-parallel RLC circuit</b>

**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.