Engineering 37: Introduction to Circuit Analysis

Physical Sciences, Mathematics & Engineering (PSME) Division

Section 037.61, Summer 2016

Instructor:	Raji Lukkoor
Class Days/Time:	MTWTh: 6:30 PM – 8:45 PM Lecture
Location:	S42
Office Hours:	MTWTh 6:00 PM – 6:30 PM
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Course Description

Introduction to Circuit Analysis is designed to allow students to explore the major methods and techniques of circuit analysis using Ohm's Law; Kirchhoffs's voltage and current laws (KVL/KCL); Branch, Loop Current and Node Voltage theorems; Thevenin and Norton's theorems; Superposition and Linearity; Source conversions and Maximum Power Transfer theorem; basic Op-amp circuit analysis; Capacitors and Inductors; natural and forced responses relating to RC, RL, and RLC circuits; circuits with more than one energy storage element; phasors; and AC Voltage and Current.

Pre-requisites

Math 1D and Physics 4B (may be taken concurrently).

Text

Principles of Electric Circuits – conventional current version by Thomas L. Floyd, 9th Edition. Prentice Hall, an imprint of Pearson. 2010.

Course Objectives

Specific objectives of the course include:

1. Use Ohm's Law, KVL and KCL to calculate voltages and currents in a DC circuit consisting of resistors, current sources, voltage sources, and dependent sources.
2. Use Thevenin and Norton theorems to calculate the equivalent circuit of a DC circuit and then find the maximum power output of a DC circuit.
3. Determine the transient response of a first- and second-order circuit consisting of RC, RL and RLC circuits.
4. Determine the sinusoidal steady state response of a circuit consisting of RC, RL and RLC circuits.
5. Determine the power delivered and absorbed by an element in RC, RL and RLC circuits.

Student Learning Outcome (SLO)

SLOs for PSME Division

Name	SLO
ENGR37_SLO_1	The student will be able to analyze circuits containing resistive, capacitive, inductive passive elements, along with op-amps interconnected to voltage and current sources.
ENGR37_SLO_2	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.

Materials

Scientific Calculator (TI-89 recommended)

Attendance

Attendance is mandatory. Ensure that vacations, doctor's appointments, social engagements, etc. do not interfere with attendance. Active class participation, including the completion of all class exercises, is key to achieving educational success. Class activities cannot be made up if the class is missed. If you are absent from class, the onus of checking on announcements made while you were absent is on YOU.

Classroom Protocol

Please arrive to class on time. If you do happen to arrive to class late, please enter and take your seat quietly. Expected classroom courtesies include: no text messaging, no emailing, no checking emails, no gaming, no video watching. Likewise, no recording of lectures, no in-class picture taking of lecture slides, no making/receiving phone calls. No copying or sharing of instructional material, including videos, PowerPoint slides, notes, handouts, problems, solutions, quizzes, tests, simulations, etc.

Note that any inappropriate or disruptive behaviors, including offensive/vulgar expressions, disrespecting others' viewpoints or disrespecting the instructor could lead to removal from the classroom and/or disciplinary action, as warranted. De Anza College will enforce all policies and procedures set forth in the Standards of Student Conduct.

Communication

Email communication is most appropriate for administrative matters (notification of illness, scheduling appointments, clarification of homework problems, etc.). With all communication, please maintain a high degree of respect and professionalism. Homework problems or other course materials are best discussed in person during scheduled office hours and not by email.

Academic Integrity

De Anza College is committed to the highest standards of academic integrity and honesty. Students are particularly urged to familiarize themselves with the provisions of the Code of Student Behavior. Dishonesty is unacceptable and will not be tolerated. If you are found cheating, looking at others' exams, plagiarizing or engaging in dishonest activities, you will receive an "F" for that particular work and you will be reported to the Dean of PSME. You are expected to abide with the ideals of academic integrity and accept personal responsibility for your work. Also, during exams, protect your work. Any infringement will disqualify both parties.

Dropping and Adding Class

Students are responsible for understanding the policies and procedures about adding and dropping courses. Add/drop deadlines can be found on the current academic calendar web page at http://www.deanza.edu/calendar/summerdates.html. Be sure to note all current deadlines and penalties for dropping classes.

Coursework Expectation

At the beginning of the quarter, your instructor will create a *Dropbox* account and each student will receive your own *Dropbox* invitation link to view the lecture presentations. Please refer to the Greensheet folder for the Course Schedule. Each student is responsible to check the calendar folder on a regular basis to see if there is a change in the schedule. A tentative course schedule is attached.

Homework:

Relevant homework problems will be assigned throughout the quarter. Completing the homework problems in a timely manner will allow you to take numerically solved problems and build and test them on www.EveryCircuit.com (below) to simulate the behavior of the design. Partial solutions and answers could be given for each problem. The homework will not be collected.

Videos:

Relevant videos will be assigned throughout the quarter to enhance learning. Watching the videos is a required component of the curriculum.

Reading:

Specific topics from the required text will be assigned for reading during every class. Reading the assigned topics is a required component of the curriculum. All sections highlighted in yellow are for you to complete on your own.

Lab Sessions 1 & 2:

A minimum of two lab sessions will be conducted during the quarter. Attending and participating in these lab sessions is mandatory. Labs are specifically designed to enhance students' understanding of lecture material and develop circuit simulation skills.

Each student is required to create an account on www.EveryCircuit.com and re-create specific in-class problems on the online simulator. EveryCircuit.com is a full-featured free app for designing, sketching and simulating circuits in the browser. This animated editor and circuit simulator is easy to learn and use. You can make wire connections by clicking and dragging between two nodes, and then use labels to mark outputs or DC voltage sources, among other things.

Evaluation & Grading

There will be two midterm exams, and a final exam. The midterm exams will be closed-book; however, a sheet of formulae will be allowed for each exam. The final exam will be open-book. A photo ID will be required.

Note: Unless there is a documented, serious explanation for missing an exam, make-up exams will not be allowed.

Note: You must take both midterms and the final exam in order to pass this course.

Coursework will be weighted as follows:

Midterm 1	30%
Midterm 2	30%
Final Exam	40%

Note: The above weighting is subject to change, with fair notice given in class.

The final course grades will be assigned according to the following grading scale, with standard decimal rounding (i.e. 0.5 and greater rounded up):

A+ = 100-98%	A = 97-93%	A- = 92-90%
B+ = 89-87%	B = 86-83%	B- = 82-80%
C+ = 79-76%	C = 75-70%	
D+ = 69-67%	D = 66-60%	
F = 59-0%		

Note: The above grading rubric is subject to change, with fair notice given in class.

Study Tips and Strategies for Success

Regular attendance, completing homework in a timely manner, watching assigned videos, simulating circuit analysis using EveryCircuit.com, good note-taking skills, and a positive, can-do attitude will greatly increase the likelihood of success in this course. Plan on spending at least 6-10 hours weekly, outside of class time, for homework and study.

- To stay on track throughout the quarter, begin each week by consulting the *Circuit Analysis Course Schedule & Calendar*, which presents an overview of the weekly lecture topics and indicates due dates for taking midterms and the final exam.
- Become familiar with the portal *Dropbox*. Regularly check *Dropbox* Announcements for lecture updates, homework problems & solutions, copies of in-class problems, video list, and any changes in the *Circuit Analysis Course Schedule & Calendar*.
- Set up an EveryCircuit.com account using the instructions provided on the website.
- Form and work in study groups.
- Do your homework!
- Free tutoring is available in the Tutorial Center, S41. Register for a tutor.

Circuit Analysis Course Schedule & Calendar

* Note that the schedule below is subject to change with fair notice given in class.*

Week	Date	Lecture Topic [Chapter Reading]	Exam
1	June 27	Chp 1: Quantities and Units [1-1 to 1-5] Chp 2: Voltage, Current and Resistance [2-1 to 2-5]	
	June 28	Chp 2: Voltage, Current and Resistance [2-6 to 2-7] [2.8] Chp 3: Ohm's Law [3-1 to 3-4] [3.5]	
	June 29	Chp 4: Energy and Power [4-1 to 4-4] [4.5] Chp 5: Series Circuits [5-1 to 5-8] [5-9 to 5-10]	
	June 30	Chp 6: Parallel Circuits [6-1 to 6-8] [6-9 to 6-10]	
2	July 04	Holiday	
	July 05	Chp 7: Series-Parallel Circuits [7-1 to 7-6] [7-7] Chp 8: Circuit Theorems and Conversions [8-8]	
	July 06	Lab Session 1	
	July 07		**MIDTERM 1**
3	July 11	Chp 8: Circuit Theorems and Conversions [8-1 to 8-4]	
	July 12	Chp 8: Circuit Theorems and Conversions [8-5]	
	July 13	Chp 8: Circuit Theorems and Conversions [8-6 to 8-7]	
	July 14	Chp 9: Branch, Loop and Node Analysis [9-1]	
4	July 18	Chp 9: Branch, Loop and Node Analysis [9-3]	
	July 19	Chp 9: Branch, Loop and Node Analysis [9-4]	
	July 20	Chp 11: Introduction to Alternating Current and Voltage [11-1 to 11-6] [11-9]	
	July 21		**MIDTERM 2**
5	July 25	Chp 12: Capacitors [12-1 to 12-6] [12-7]	
	July 26	Chp 13: Inductors [13.1 to 13-5] [13-6]	
	July 27	Chp 15: RC Circuits [15-1 to 15-8] [15-9 to 15-10]	
	July 28	Chp 16: RL Circuits [16-1 to 16-7] [16-8 to 16-9]	
6	Aug 01	Chp 17: RLC Circuits [17-1 to 17-6]	
	Aug 02	Lab Session 2	
	Aug 03	TBA	
	Aug 04	@ 6:15 PM	**FINAL**