

California State University Northridge
Department of Electrical and Computer Engineering
Course: Electrical Engineering Fundamentals (ECE 240)

Section: 01
Summer, 2017

Instructor: Jack Ou, Ph.D.
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Office Hours: MW: 12:30p.m.-1:00 p.m.
Class Days/Time: MW 09:00 a.m.-12:30 p.m.
Classroom: JD2203

Course Description

This course introduces theory and analysis of electrical circuits. Basic circuit elements including the operational amplifier are covered. Analysis covered in this course include basic techniques of analyzing circuits, forced and natural responses of sinusoidal circuits, sinusoidal steady state analysis, impedance calculation and frequency response calculation. This course will conclude with an introduction of filter circuits.

Prerequisite: PHYSICS 220B/L and Math 250.
Co-requisite: MATH 280 or ECE 280.
Recommended Co-requisite: ECE240L

Required Textbook: "Introduction to Electric Circuits", Wiley, 9th edition.
(ISBN-13: 978-1-118-47750-2)

Course Objectives:

This course helps students cultivate reasoning skills they need to solve *unfamiliar* engineering problems. We will use a combination of lectures, in-class discussions, assignments and exams to achieve this goal. Upon completing this course, students should be able to

1. Solve D.C. circuit problems with independent and dependent sources, op-amps and resistors using nodal analysis, mesh analysis, superposition, source transformations and Thevenin/Norton equivalent circuits.
2. Find the complete response for first and second-order circuits to input signals modeled by waveforms that are dc, step, window, ramp, decaying exponential, and sinusoidal.
3. Apply phasors and the concept of impedance to analyze circuits with sinusoidal input under steady-state conditions and to find the frequency response of linear, time-invariant circuits.
4. Design simple first and second-order filters given specifications in terms of 3-dB bandwidth and center frequency.

Software:

1. Canvas
2. Course website
(<http://www.jackou.org/classes/ece240/2017s2/website/17s2/17s2.html>)
3. Falstad (optional) (<http://www.falstad.com/circuit>)

Teaching Pedagogy

I use *flipped* instructional model to facilitate student learning. In this teaching pedagogy, students are given an assignment *before* coming to class. The assignment reviews basic concepts that students should be familiar with before they learn new materials. *Once in class*, students are exposed to new ideas and provided with targeted feedback for their work. They are assigned additional assignments *after* class so they have additional opportunities to practice concepts they learned in class.

Assessment

1. **Exams** (80 %): midterm: 30 %, final: 50 %.
2. **Homework assignments** (20 %) There will be homework assignments throughout the course. Homework submissions must be stapled and have a cover sheet, otherwise they will not be accepted. Due to the sheer volume of assignments that must exchange hands, I will not be able to *allow submission of late homework assignments*. Assignments are collected in the beginning of the class, placed in an envelope, and handed over to the grader. Only *one* homework assignment will be excluded from the computation of homework assignment grades.

Grading scale: The course grade is computed from the cumulative *course total* percentage after the final exam is graded as follows: 100 – 94 = A, 93 – 90 = A-, 89 – 87 = B+, 86 – 83 = B, 82 – 80 = B-, 79 – 77 = C+, 76 – 73 = C, 72 – 70 = C-, 69 – 67 = D+, 66 – 63 = D, 62 – 60 = D-, 59 or < = F.

Cheating Policy Each students grade will be based upon his/her own work. **Any student found cheating on any graded material, will not be considered to have met the basic requirements of this course and thus will receive the grade of F.** Cheating will also result in the appropriate disciplinary action being taken.

Special accommodation If you have a disability and need accommodations, please register with the Disability Resources and Educational Services (DRES) office or the National Center on Deafness (NCOD). The DRES office is located in Bayramian Hall, room 110 and can be reached at (818) 677-2684. NCOD is located on Bertrand Street in Jeanne Chisholm Hall and can be reached at (818) 677-2054. If you would like to discuss your need for accommodations with me, please contact me to set up an appointment.

Tips for doing well in this course:

1. (*Before class*) Spend time to work on homework assignments. “*Homework is the best part of the class. A majority of my understanding comes from there.*” (Anonymous student, 16S)
2. (*During class*) Practice *active listening skills*. Ask questions. (e.g. Why? How does it work? Why am I stuck? What question should I be asking? What happens if I were to do....)
3. (*After class*) *Organize knowledge*. Use your *own* lecture notes together with the *visual aids* to stitch together a story for the lesson that makes sense to you.

Email communication: I do not answer emails on weekends and outside of regular work hours. Due to sheer number of emails, it normally takes up to 24 hours for an email to be replied.

Tentative schedule (Please Refer to the course website for updates)

Wk#	Date	Topic	Section	Lab
1	5/31	Course intro, Current, voltage, energy, power and units, resistors, and independent/dependent sources.	Sec. 1.1-1.5, 2.4-2.6, 2.7-2.9	Instruments and reports
2	6/5	KVL, KCL, series/parallel resistor, voltage/current divider, sources	Sec. 3.2-3.3, 3.4-3.6, 3.7	Oscilloscope
3	6/7	Nodal analysis and mesh analysis	Sec. 4.2-4.4, 4.5-4.7	DC Circuits
4	6/12	Superposition principle, Thevenin/Norton, maximum power transfer	5.1-5.6	PSPICE
5	6/14	operational amplifier, midterm	6.1-6.5	Design Experiment (1)
6	6/19*	Capacitor and inductor	7.1-7.8	Design Experiment (2)
7	6/21*	First order circuits	8.1-8.7	Operational amplifier
8	6/26	<i>Class meeting time reassigned.</i>	N/A	First order circuits
9	6/28	Second order circuits and steady-state analysis	9.2-9.7, 10.1-10.11	Design Experiment (3)
10	7/3	Frequency Response	13.1-13.6	Second order circuits
11	7/5	Filter circuits	16.1-16.5	Frequency Response
12	7/10	Final exam		

* Classes start at 9:15 a.m.