ECE 2005 (276) – ELECTRIC CIRCUITS

Course Syllabus for Session 001, Winter 2018

2017-18 Catalog Data: ECE 2005 (276) - Electric Circuits (4 credits)
Modeling and analysis of circuits with dependent sources; non-ideal operational amplifiers. Transient and forced responses in RC, RL and RLC circuits. Series and parallel resonant circuits. AC power, three-phase circuits, magnetically coupled circuits. Wye-delta transforms. Introduction to frequency response. Use of PSPICE. With laboratory.

Textbook: C.K. Alexander and M.N.O. Sadiku, *Fundamentals of Electric Circuits,* 6th Edition, McGraw Hill, 2013, ISBN 978-0-07-802822-9.

Instructor: Edward Gu, Professor of ECE, *guy@oakland.edu*, 334 EC, (248) 370-2219.

Prerequisite: ECE 2400 and Pre/Co-Requisite: APM 2555 (255).

Course Objectives: Upon successful completion of ECE 2005, the students will be able to

1. Analyze linear circuits using Ohm's Law and Kirchhoff's Laws via nodal and mesh analysis using both dependent and independent voltage and current sources.
2. Understand linear circuit properties and the principles of superposition, source transformations and be able to derive and use Thevenin and/or Norton equivalent circuits.
3. Understand and be able to use Operational amplifiers.
4. Calculate the natural response and the forced response of first order RC and RL circuits.
5. Calculate the time domain responses of second order RLC circuits and systems using time domain analysis (2nd order linear differential equations).
6. Understand and be able to use phasors, KCL and KVL for steady state AC circuits, Thevenin and Norton equivalent AC circuits and source transformations.
7. Understand and perform basic power analysis of AC circuits including the RMS system, complex power and power factor correction methods.
8. Understand and perform basic analysis of magnetically coupled circuits including the concept of mutual inductance and basic analysis of ideal transformers.
9. Define the transfer function and perform elementary circuit analysis in the frequency domain using the Laplace transform.
10. Use PSPICE to simulate circuits and MATLAB in analyzing the response of circuits and systems.

Class Schedule: 10:00 – 11:47 pm every Tuesday & Thursday at 104 MSB.

Grading System: Homework   10 %,   Labs   15 %,
Exam #1   25 %,   Exam #2   25 %,   Final Exam   25 %.

Policy: 1. No late homework or lab report due is acceptable;

2. No later make-up examination will be offered;

3. Open-book/open-notes exams, but no book/notes sharing, no calculator sharing, and no wireless devices are allowed in an exam;

4. Attending all the classes is highly encouraged.

Major Topics:

The one-semester lectures will cover from Chapter 2 through Chapter 15, plus Chapter 19 of the textbook. Homework and labs will be assigned biweekly in Moodle, about 7-8 assignments for homework and 8 assignments for the labs totally.

Mr. Wayne Morrel will be our main lab instructor at Room 556 EC.