EE 2350: ELECTRIC CIRCUITS I (MODIFIED)

As part of UTEP's mission to develop, promote and maintain safety, healthy learning the classes has been transition to online delivery, therefore the syllabus has been modified accordingly.

Course Description: Introduction to systematic methodologies for the analysis of electric circuits in DC and AC steady state. Use of simulation tools for steady state circuit analysis. Can be taken concurrently with PHYS 2421 and MATH 2326.

Pre-requisites: EE 1305, MATH 1312, PHYS 2421+ and MATH 2326+, each with a grade of C or better. (PHYS 2421+ and MATH 2326+ may be taken concurrently.)

Textbook:

- J.W. Nilsson and S.A. Riedel, **Electric Circuits**, 11th Edition, Prentice Hall, 2014.

Web tool:

- Circuit Tutor by Dr. Brian Skromme from ASU.

An ID will be assigned to you so that you can login into the website: https://www.circuittutor.com/web/

Instructor: Dr. Hector Erives
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Office Hours: M - Tr 9:00 am to 10:00 am through email (herivescon@utep.edu) or Webex (https://utep.webex.com/meet/herivescon).

Teaching Assistant: Ms. Ana Chavez Lopez (acchavezop@miners.utep.edu)

Grading policy: The final grade will be based on homework (20 %), quizzes (20 %), two partial exams (2×20 %), a final exam (20 %). Grades (for sure):

At least 90	A
At least 80	B
At least 70	C
At least 60	D
59 or less	F

An **incomplete** grade is given **only** for a valid reason when arrangements have been made with me and, in that case, only if the student was passing the course.

Homework: Homework is an essential part of the course. You will be assigned Homework for virtually every class period. Homework will be submitted and graded using Circuit Tutor.

Circuit Tutor is also an online system developed by Dr. Skromme at the Arizona State University with support from the National Science Foundations (NSF). Access to the Circuit Tutor online is free, and will be used in this class. You will be assigned an ID which will be used to loginto into the website.

Classroom Etiquette: **N/A**

Cheating and Plagiarism: Cheating is unethical and not acceptable. Plagiarism is using information or original wording in a paper without giving credit to the source of that information or wording: it is also not acceptable. Do not submit work under your name that you did not do yourself. You may not submit work for this class that you did for another class. If you are found to be cheating or plagiarizing, you will be subject to disciplinary action, per UTEP catalog policy.

Center for Accommodations and Support Services (CASS): If you have a disability and need classroom accommodations, please contact The Center for Accommodations and Support Services (CASS) at 747-5148, or by email to cass@utep.edu, or visit their office located in UTEP Union East, Room 106. For additional information, please visit the CASS website at www.sa.utep.edu/cass.

Course Learning Outcomes:

Students completing EE 2350 will be able to:

- Understand terminology used in conjunction with electric circuits of ideal circuit elements. (I)
- Mathematically model electric systems using ideal resistive, inductive, and capacitive elements. (I)
- Apply phasors and impedance transformations to the analysis of electric circuits. (C)
- Apply various systematic methods (node, mesh, terminal equivalency, and circuit theorems). (C)
- Apply various circuit analysis techniques to study circuits that include operational amplifiers. (C)
- Apply various circuit analysis techniques to study energy and power in dc and ac circuits. (C)
- Apply software tools to the analysis of electric circuits in steady state. (C)

Topics:

- Review: Circuit variables and units. Kirchhoff's laws. Ohm's law. Power and energy.
- Circuit elements and circuit abstractions: Passive and active circuits.
- Circuits equivalences: Thevenin and Norton equivalents and source transformation; Superposition theorem. Node and mesh analysis; Maximum power transfer theorem
- The ideal operational amplifier and its inverting and non-inverting configurations: Concept of amplification and active circuits. Introduction to two-port networks.
- Inductance (L), capacitance (C), mutual-inductance (M), and the ideal transformer
- Analysis of linear circuits in sinusoidal steady state (AC Circuits): phasor concept, impedance concept, circuit representation in the phasor domain,
- AC Circuit analysis using systematic methods: Thevenin and Norton equivalents and source transformation; Superposition theorem. Node and mesh analysis;
- Power in AC Circuits: instantaneous (p), average (P), reactive (Q), and complex (S); Power factor (pf); Power triangle; Maximum power transfer theorem for AC circuits.

- Three-phase circuits: three phase generation, analysis of 3-phase balanced circuits, Delta-wye transformations. Power in three-phase circuits.

Revised by Dr. Hector Erives in March 31, 2020.