CMPE 306 Introductory Circuit Theory

Fall 2015 Lecture: M, W 1:00 – 2:15 pm
Lab: Tu 11:00 am – 1:00 pm, 1:00 pm – 3:00 pm
F 9:00 am – 11:00 am

Classrooms: ITE 104 (lecture); ITE 242 (lab)

Instructor: Prof. Li Yan
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Office Hours: M, W 2:30 – 3:30 pm, or by appointment

Textbook: Fundamentals of Electrics Circuits, 5th Ed., by Alexander and Sadiku (McGraw-Hill)

Prerequisite: PHSY 122, MATH 225 (co-requisite)

This course introduces the fundamental linear passive elements of resistance, capacitance, inductance and the physical basis for their current voltage characteristics. It covers the basic analysis of circuits with these linear passive elements including Kirchoff' laws, node and mesh analysis and a solution of the resulting circuit differential equations for transient and steady-state responses. The Laplace transform is presented with its application to the solution of network problems. The transform (frequency) domain in introduced. The operational amplifier and circuits using these components is covered. The course includes a laboratory in which the student designs and makes measurements on simple test circuits using both real components and PSPICE simulation.

Grading:
~20% Labs
~10% Homework assignments
~40% Two midterm tests
~30% Final exam

Course Goals

1. Students learn the basic characteristics of linear circuit elements, including DC and AC current and voltage sources, resistors, capacitors, inductors, and transformers.
2. Students learn the fundamental laws of circuit analysis, including Ohm's Law, Kirchhoff's Current Law, and Kirchhoff's Voltage Law.
3. Students acquire skill in the application of the basic methods of linear circuit analysis, including nodal analysis, mesh analysis, and the use of PSPICE circuit analysis software.
4. Students acquire skills in the analysis of first order RL and RC circuits, including the determination of initial conditions and computation of transient response.
5. Students acquire skills in the analysis of second order RLC circuits, including the determination of initial condition and computation of transient response.
6. Students acquire skills in the analysis of circuits involving AC sources, including the computation of complex impedances, instantaneous power, real and average power, reactive power, apparent power and power factor.
7. Students become familiar with Bode plots of frequency domain performance.

8. Students acquire skill in the application of Thevenin's Theorem and Norton' Theorem to the analysis DC and AC circuits, including determination of the load impedance necessary form maximum power transfer.
9. Students learn the basics of analysis of circuits with magnetic coupling and transformers.
10. Students obtain sufficient skills to permit meaningful review and study of other texts and technical articles.
11. Students develop skills and familiarity with basic linear electrical circuits in a laboratory setting, including familiarity with standard test equipment (power sources, breadboards, oscilloscopes, multimeters, etc.) and the ability to perform basic circuit design and implementation.

Subjects and Approximate Schedule:

Week 1	(8/26)	Chapter 1	
Week 2	(8/31 9/02)	Chapter 2	Lab 1
Week 3	(9/09)	Chapter 3	Lab 2
Week 4	(9/14, 9/16)	Chapter 3, Chapter 4	Lab 3
Week 5	(9/21, 9/23)	Chapter 4	Lab 4
Week 6	(9/28, 9/30)	Chapter 5	Lab 5
Week 7	(10/05, 10/07)	midterm exam 1, Chapter 6	
Week 8	(10/12 10/14)	Chapter 7	Lab 6
Week 9	(10/19, 10/21)	Chapter 8	Lab 7
Week 10	(10/26, 10/28)	Chapter 9	Lab 8
Week 11	(11/02, 11/04)	Chapter 10, midterm exam 2	
Week 12	(11/09, 11/11)	Chapter 10, Chapter 11	Lab 9
Week 13	(11/16, 11/18)	Chapter 11	Lab 10
Week 14	(11/23, 11/25)	Chapter 13	
Week 15	(11/30, 12/02)	Chapter 14	Lab final
Week 16	(12/07,)	review	
Week 17	(12/16)	final exam	

Student Academic Integrity

"By enrolling in this course, each student assumes the responsibilities of an active participant in UMBC's scholarly community in which everyone's academic work and behavior are to be held to the highest standards of honesty. Cheating, fabrication, plagiarism, and helping others to commit these acts are all forms of academic dishonesty, and they are wrong. Academic misconduct could result in disciplinary action that may include, but is not limited to, suspension or dismissal. To read the full Student Academic Policy, consult the UMBC Student Handbook, the Faculty Handbook, or the UMBC Policies section of the UMBC Directory."

Late homework and lab reports will not be accepted. You may study together. You must do your own work and not copy from anyone else or from the solutions obtained elsewhere! Copying will result in zero points and cheating on the exams will be reported to the department and university.