UC DAVIS

Circuits I – Course Outline

ENG 17		Professor Spencer
Fall 2010		2041 Kemper Hall
Lecture:	MWF 4:10-5:00, 1003 Giedt Hall	752-6885
Discussion Section 1:	W 1:10-2:00, 55 Roessler CRN: 61417	
Discussion Section 2:	W 2:10-3:00, 55 Roessler CRN: 83089	
Discussion Section 3:	F 1:10-2:00, 55 Roessler CRN: 83090	
Office hours:	F 10:00 AM -12:00 PM in 2041 Kemper Hall	
Pre-exam office hours:	Friday, 10/15, 12:30-2:30 PM	
	Monday, 11/8, 12:00-3:00 PM	
	Wednesday, 12/9, 12:30-4:00 PM	

TAs:

Timothy Monk – office hours: F, 3:00-4:00 PM in 2161 Kemper (tamonk@ucdavis.edu)
Stanley Hsu – office hours: Th, 3:00-4:00 PM in 2161 Kemper (swhsu@ucdavis.edu)
Syed Bahadur – office hours: W, 3:00-4:00 PM in 2161 Kemper (srbahadur@ucdavis.edu)

Please do NOT use email to contact us unless it is necessary (i.e., don't use it in place of questions in class, the discussion session and office hours). All administrative questions, complaints, or grading issues should be brought to Prof. Spencer, not one of the TAs. Prof. Spencer's email address is: rrspencer@ucdavis.edu

Required Text: Artice M. Davis, *Linear Circuit Analysis*, Cengage (originally PWS Publishing Company), 1998

Prerequisite: Phy 9C, Math 22B (may be taken concurrently)

Website URL: http://www.ece.ucdavis.edu/~spencer/E17/

Homework: Assignments will be posted on the course website each week and will indicate when they are due (it will usually, but not always, be Friday afternoon). Homework should be put in the box in Room 2131 in Kemper Hall unless specified otherwise. Late homework will be accepted the day after it was due if there is a *good* reason (be prepared to supply documentation), it will not be accepted after that except in *extraordinary* cases. Late homework *must* be handed in to Prof. Spencer. Homework solutions will be available on the course website (when you click on the links to view solutions you will be required to login, the user name is eng17 and the password is kirchoff, both are case sensitive). You may collaborate on HW assignments, but each student must hand in his or her own assignment.

Homework problems will be graded on a four-level scale; 0 = little, if anything, done, 1 = sloppy and/or a number of mistakes, 2 = basically correct, but somewhat sloppy and/or minor mistakes, 3 = easy to follow and completely correct. **Format:** All homework should be done on standard 8 1/2"x11" paper, stapled together, *not* folded, and should have your name (last name first, *please*) and the assignment number. Be sure to put your name *as it appears on UC transcripts and class lists*!

Grading: There will be two 50-minute midterms, and a two-hour final exam. All exams will be closed book and closed notes and calculators will *not* be allowed. You will be provided with a formula sheet for each exam. A copy of the formula sheet will be available for you to use when studying. I will report any instances of attempted cheating to Student Judicial Affairs.

The final course grade will be based on the following weighting: Homework 15%, Midterms 50% (25% each), Final 35%. **Any disagreements about exam scores must be brought to the attention of Prof. Spencer within one week of the exam in question being handing back, otherwise, the score stands.** Homework grading will not be reconsidered (except for clerical errors in entering the scores).

Circuits I Class Schedule – Fall 2010

Date		**Day**	**Topic**	**Reading**[1] (Note: look at the errata for the book – it should help you)
Sept	24	F	Introduction, define: elements, branches, leads, terminals, circuit, topology, node, subcircuit, series and parallel circuits, voltage, current, notation, and ground	§1.1 & §1.2
	27	M	Charge & flux linkage; Passive sign convention; Unit step function; Power and energy; Independent & dependent sources; The resistor and equivalent resistance; Kirchoff's laws	§1.3 through §1.5, §2.1 & §2.2 HW1 covers up through here
	29	W	Series circuits & the voltage divider; Equivalent subcircuits & circuits; Parallel circuits & the current divider; Review basic axioms of circuit theory	§2.3, §2.4, & §2.6
Oct	1	F	Source transformation; Linearity & superposition; Thévenin and Norton equivalent circuits	§3.1 through §3.3
	4	M	Practical sources and matching; Source transportation (split-source transformations) & substitution; Examples	§3.4, §3.5 & §3.6 HW2 covers up through here

[1] All reading assignments refer to the required text and should be completed *before* the lecture they are listed next to (except for the first lecture of course).

	6	W	Nodal analysis	§4.1, §4.2 & review Appendix A up through (A-58)
	8	F	Mesh analysis	§4.3 & §4.4
	11	M	Analysis examples and analysis by inspection	§4.5 HW3 covers up through here
	13	W	Finish examples and review for midterm	
	15	**F**	**Midterm 1** covers material through Chapter 4 (HW3)	
	18	M	Dependent (controlled) sources. Active subcircuits; Introduction to op amps	§5.1, §5.2 (skip the material starting with Example 5.4 on page 178), §5.3, §5.4 (only through page 191)
	20	W	"Multilinear" circuits. Capacitors; The pulse function; Operator notation for derivatives and integrals; Impedance and admittance, One-sided waveforms and causality; Energy storage; Capacitors in parallel and series	§6.1 & §6.2 HW4 covers up through here
	22	F	Inductors; Energy storage; Inductors in parallel and series; general series and parallel impedances; DC steady-state	§6.3 & §6.4
	25	M	Finish DC steady-state; Initial conditions; Switched circuits; The impulse function	§6.5
	27	W	More on the impulse function; Time response of first-order circuits with first-order lowpass response	§6.6 (skip the *Generalized Differentiation of Discontinuous Waveforms* section, which begins on page 283 and ends on page 286) & §7.1 HW5 covers up through here
	29	F	First-order highpass response; General first-order response	§7.2, §7.3 (pay particular attention to Example 7.9!)

Nov	1	M	Equivalent circuit analysis for circuits with a single energy storage element; Compare methods	§7.7 (§7.6 is interesting and useful, but you are not required to read it)
	3	W	Complex numbers; Euler's formulas; Sinusoids, Complex Exponentials and Phasors	§8.1, §8.2, §8.4 (pay attention to footnote 8 on page 412) & §8.6 HW6 covers up through here
	5	F	Review for midterm	
	8	**M**	**Midterm 2** covers material through Chapter 8 (HW6)	
	10	W	Solution of higher-order circuits and differential equations;	§9.1 (you may skip the short section entitled *Cascade Simulation of the General Solution Operator* on page 427) HW7 covers up through here
	12	F	Properties of 2nd-order circuits and systems – damping	§9.2
	15	M	The phasor equivalent circuit; Complex impedance & admittance; KVL & KCL with phasors	§11.1
	17	W	AC circuit analysis with phasors; resonance	§11.2 (skip the material on Impedance Scaling and Frequency Scaling beginning right after Example 11.12 and ending with Example 11.15) HW8 covers up through here
	19	F	AC circuit analysis examples	
	22	M	Power in AC circuits (average, rms, apparent, complex); Power factor	§11.3 & §11.4 (skip the material beginning with *Conservation of Complex Power* on page 585 through Example 11.24. Start reading again with *Power Factor Correction* on page 588) HW9 covers up through here
	24	W	More AC circuit analysis examples with power; Power factor correction; Conjugate matching	

	26	**F**	**Thanksgiving Holiday**	
	29	M	Two-port networks; modeling nonlinear networks	Handout
Dec	1	W	Mutual inductance and transformers	§16.1 (Ignore Equation (16.1-14a) and stop reading after Example 16.1) HW10 covers up through here
	3	F	Review for final examination	
	10	**F**	**1:00-3:00 Final Examination** (comprehensive)	