CASE WESTERN RESERVE UNIVERSITY
Case School of Engineering
Department of Electrical Engineering and Computer Science

ENGR 210. Introduction to Circuits and Instruments (4)
Spring 2004 Course Information (Updated)

Summary Description:
Modeling and circuit analysis of analog and digital circuits. Fundamental concepts in circuit analysis: voltage and current sources, Kirchhoff's Laws, Thevenin and Norton equivalent circuits, inductors capacitors, and transformers. Modeling sensors and amplifiers and measuring DC device characteristics. Characterization and measurement of time dependent waveforms. Transient behavior of circuits. Frequency dependent behavior of devices and amplifiers, frequency measurements. AC power and power measurements. Noise in real electronic systems. Electronic devices as switches. Digital logic circuits. Introduction to computer interfaces. Analog/digital systems for measurement and control.
Prerequisite: MATH 122. Co-requisite: PHYS 122.

Required Textbook: The Analysis and Design of Linear Circuits, 4th Ed., R. Thomas and A. Rosa, Wiley, 2004,ISBN 0-471-27213-2.
Lecture Schedule: MWF from 9:30 - 10:20 am in Schmitt Lecture Hall.
Instructor: Prof. Frank Merat, Glennan 518, x4572 (flm)
Instructor Office Hours: see http://eecs.cwru.edu/courses/engr210/profhours.htm
Lab Instructors: Mark Zurcher (maz4), Craig Birkhimer (ceb), David Young (dly), Ben Hothem (bjh7), Shaun Endres(sxe19)
Lab Hours: see http://eecs.cwru.edu/courses/engr210/labhours.htm
Teaching Assistants: Bryan Inderhees (bpi), Run Wang (rxw54), Chad Simpson (cxs101), Todd Levy(tjl10)
TA Office Hours: see http://eecs.cwru.edu/courses/engr210/tahours.htm.
Handouts: handouts will be posted at http://eecs.cwru.edu/courses/engr210/ under “Class Info”.

Basis of Grades
*Homework (**25 %**)*: Homework assignments will be posted on Wednesday mornings and collected on the following Wednesday during lecture. Students may work together on homework assignments, but each student is required to turn in his/her own work.
*Quizzes (**25 %**)*: Quizzes will be given in lectures on Friday mornings, and are based on the homework collected on Wednesday. Quizzes are closed book, and students must work alone. Calculators are generally not required. If used, they must be cleared of all programs and/or data before the quiz.
*Laboratory (**25 %**)*: The laboratory for ENGR 210 is located in Glennan 308. Labs will be done in groups of two. *Students must attend regular lab sessions*, but labs may be completed during open lab hours. Lab reports, one per group, must be completed in a one-week period and turned in to the lab instructor during the regularly schedule lab period. The laboratory requires key card access and workstation accounts, which will be provided based on the class roster.
*Final Exam (**25 %**)*: The final exam will be given on May 4th, from 8:30-11:30 am. The exam is closed book, students must work alone, and calculators must be cleared of all programs and/or data before the exam.

Late Policy and Missed Assignments
Assignments are due in lecture/laboratory on the specified date. No late assignments are accepted, but the lowest 2 HW/Quiz/Lab scores will be ignored, one from each half of the semester. As per University policy, the Final Exam is absolutely required.

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Spring 2004 Agenda and Assignment Dates (Revised 3/29/04)

Notes:
1. Labs are posted on MON mornings and reports are collected the following week, at scheduled lab times.
2. HW is posted and collected on WED mornings (in lecture), and solutions are posted on WED afternoons.
3. Quizzes are given on FRI mornings (in lecture), and solutions are posted on FRI afternoons.
4. Reading is from The Analysis and Design of Linear Circuits, 4th Ed., Thomas and Rosa, Wiley, 2004.

Date	Class	Due	Agenda	Reading	Lab
1/12	1		Course Outline and Information	1.1	
1/14	2		Electrical units, engineering notation	1.1-1.3	*intro*
1/16	3		passive sign convention; Ohm's Law	1.3-2.1	
1/19			Martin Luther King Day		
1/21	4	HW1	switches; v and I sources"	2.2	**L1**
1/23	5	Q1	KCL; KVL; element constraints	2.2-2.3	Ohm's Law
1/26	6		series/parallel	2.3	**L2**
1/28	7	HW2	equivalent R; source transforms	2.4	Computer-based
1/30	8	Q2	voltage and current dividers	2.5	Instruments
2/2	9		fuses; circuit reduction	2.5-2.6	**L3**
2/4	10	HW3	node voltage techniques	3.1	LabVIEW and
2/6	11	Q3	Cramer's method; supernodes	3.1	DMMs
2/9	12		mesh current techniques	3.2	**L4**
2/11	13	HW4	linear circuits; proportionality	3.3	Function Generator
2/13	14	Q4	turning sources OFF; superposition	3.3	and Oscilloscope
2/16	15		Thevenin and Norton equivalent circuits	3.4	**L5**
2/18	16	HW5	maximum power transfer	3.5	KCL and
2/20	17	Q5	interface circuits	3.6	Superposition
2/23	18		dependent sources	4.1-4.2	**L6**
2/25	19	HW6	Thevenin and Norton of active circuits	4.2	Thevenin Equivalent
2/27	20	Q6	basic OP AMP amplifiers	4.4	Circuits
3/1	21		summing/subtracting amplifiers	4.5	**L7**
3/3	22	HW7	voltage follower; multi OP AMP circuits	4.5	Intro to Operational
3/5	23	Q7	comparators	4.7	Amplifier
3/8			Spring Break		
3/10			"		*none*
3/12			"		
3/15	24		Instrumentation systems; transducers	4.6	**L8**
3/17	25	HW8	unit impulse, step & ramp; exponentials	5.1-5.3	Comparator and
3/19	26		sinusoidal waveforms; rms & average power	5.4-5.6	Schmitt Trigger
3/22	27	Q8	No lecture (Quiz only)		**L9**
3/24	28	HW9	Capacitors and Inductors, i-v characteristics	6.1-6.2	Exponential
3/26	29	Q9	Integrators and differentiators	6.3	Waveforms
3/29	30		Series/parallel L/C, steady-state characteristics	6.4	L10
3/31	31	HW10	Forced sinusoidal response, phasors	7.1,7.2, 7.4,8.1	555 Timer
4/2	32	Q10	Euler identity; phasor manipulation	8.2	
4/5	33		Phasor current/voltage; impedance	8.2	L11
4/7	34	HW11	Circuit analysis with phasors	8.3-8.4	Passive RC
4/9	35	Q11	Frequency Response; Bode diagrams	12.1	Filters
4/12	36		Frequency response examples	12.2	L12
4/14	37	HW12	More frequency response examples	12.2	Active RC Filters
4/16	38	Q12	Bandpass and notch filters	12.3	
4/19	39		Step response; zero-input response	7.1,7.2	
4/21	40		State variables and differential equations	7.2	none
4/23	41		Time constants; initial/final value theorem	7.2	
4/26	42		Responses other than state variables	7.2	
4/27,28			Reading Days		
5/4			**Final**	8:30 - 11:30 am	

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Spring 2004 Schedule and Contact Information:

Lecture Schedule: MWF from 9:30 - 10:20 am in Rockefeller 301.

Recitations:
HW Recitation: Tuesday from 6:30 - 8:00 pm (Chad, White 411)
Quiz Recitation: Thursday from 6:30 - 8:00 pm (Bryan, White 411)
Mini-Recitations: Tuesday from 1:30-2:30 (Todd), Thursday from 3:00-4:00 (Ben)

Lab Schedule	Lab Assistants
M 0330-0530	Dave Young& Craig Birkheimer
M 0700-0900	Mark Zurcher & Craig Birkheimer
T 0245-0445	Mark Zurcher & Craig Birkheimer
T 0700-0900	Dave Young & Craig Birkheimer
W 0330-0530	Dave Young & Mark Zurcher
W 0700-0900	Mark Zurcher & Dave Young

Course Web Page:http://www.eecs.cwru.edu/courses/engr210/

Instructor: Prof. Frank L. Merat (responsible for lecture and overall course)
Office: Glennan 518
Voice: 216-368-4572
e-mail: flm@case.edu (Please use ENGR 210 in your subject)
Web: http://vorlon.cwru.edu/~flm/flm/home.html
Instructor Office Hours: see http://eecs.cwru.edu/courses/engr210/profhours.htm

Instructor: Prof. Warren L. Grill (responsible for labs)
Office: Wickenden 114
Voice: 216-368-8625
e-mail: wmg@case.edu
Web: http://www.cwru.edu/groups/ANCL/grill.html
Instructor Office Hours: see http://eecs.cwru.edu/courses/engr210/profhours.htm

Lab Instructors:

Mark Zurcher	maz4@case.edu	Shaun Endres	sxe19@case.edu
Craig Birkhimer	ceb@case.edu	Ben Hothem	bjh7@case.edu
David Young	dly@case.edu		

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