

ETE 2210 – Electrical Engineering for Non-Major

Dr. Oenardi Lawanto

4 credits – Spring 2009

Course Description

A study and application of DC and AC concepts which includes circuit fundamentals, theorems, laws, analysis, components, equipment and measuring devices. The laboratory will include circuit design, construction and analysis of DC/AC circuits, and the use of measuring instruments, power supplies and signal generators.

Course Objectives

By completing this course, the students should be able to:

1. Demonstrate an understanding and application of Ohm's Law
2. Demonstrate an understanding and application of resistance
3. Demonstrate an understanding and application of series, parallel, and compound circuits
4. Understand the principles of capacitance and inductance in modern electronic and electricity DC and AC circuits
5. Build and analyze electronic circuits on a proto board
6. Demonstrate the ability to use a DMM, power supply, and frequency generator
7. Demonstrate the ability to use an oscilloscope to measure voltage and frequency
8. Understand the application of modern analog circuits like operational amplifiers.

Textbook

Introductory Circuit Analysis, Rebert L. Boylestad, Prentice Hall, 2003 (11th edition)

Fees

The laboratory experiments for this course will require electronic supplies (one set per group). You have three options in purchasing parts:

1. You may purchase all of the parts on your own. The list of parts can be obtained from sources such as Radio Shack, past students or any other source you might know about.
2. You may purchase the proto board on your own and get the remaining parts from Dr. Lawanto. You will need to pay a parts fee of \$18.00 in the registrar's office; deposit into account number MITE (A02363-525500). Bring the receipt to Dr. Lawanto, and he will provide you with all the parts except the proto board.
3. You may purchase all the parts, including proto board, from Dr. Lawanto. Pay a parts fee of \$38.00 in the registrar's office; deposit into account number MITE (A02363-525500). Bring the receipt to Dr. Lawanto, and he will provide you with all of the parts.

Note: Do not confuse the parts fee with the \$20.00 course fee which is paid with registration. The course fee is used for maintenance and repair of equipment.

Instructor

Dr. Oenardi Lawanto

Office: IS 103A

Phone: 797-8699

Email: olawanto@engineering.usu.edu

Please use prefix "ETE 2210:" for your email subject

Office hours: W at 1:00 – 2:00 p.m.

R at 1:30 – 2:30 p.m. or by appointments

Teaching Assistants

Mark Glade

ETE 2210 Lab Section 901 Thursday 2:30-5:20pm

Lab Section 902 Wednesday 2:30-5:20pm

Homework Graders

Email: mark.glade@aggiemail.usu.edu

Trevor Skeen

ETE 2210 Lab Section 902 Wednesday 2:30-5:20pm

Email: trevor.s@aggiemail.usu.edu

If you need to discuss something with your TAs, please try to meet them during the lab. activities or make an appointment with them.

Class Time

Lecture: M W F 11:30 a.m. -12:20 p.m. – Engineering Lab. 248

Labs: 902 W – 2:30 – 5:20 p.m. – IS 119

901 R – 2:30 – 5:20 p.m. – IS 119

Homework

All assigned homeworks are due on Fridays. Please use engineering papers for your homework.

Grading Policy

Homework	10%
Examinations	40%
Laboratory (13 labs)	30%
Final Examination	20%

1. Homework will be assigned regularly and graded. Homework is due on Fridays.
2. Tentative dates for the hourly exams are: Feb. 9, Feb. 27, April 1, April 20, 2009
3. The comprehensive final examination is scheduled for
 - Date : Monday, April 27, 2009
 - Time :9:30-11:30 am
 - Place :Engineering Lab. 248
4. Cheating will not be tolerated and will result in a grade of "F" for that particular test.

Accommodation for Persons With Disabilities

Students with ADA-documented physical, sensory, emotional or medical impairments may be eligible for reasonable accommodations. Veterans may also be eligible for services. All accommodations are coordinated through the Disability Resource Center (DRC) in Room 101 of the University Inn, (435)797-2444 voice, (435)797-0740 TTY, or toll free at 1-800-259-2966. Please contact the DRC as early in the semester as possible. Alternate format materials (Braille, large print or digital) are available with advance notice.

Tentative Class Schedule

The schedule shown may be adjusted from time to time as necessary.

Date	Topic	Readings	Homework Assignments
#1 - Mon January 5	Course Overview	None	None
#2 - Wed January 7	Introduction: Units of Measurement, Systems of Units, Significant Figures, Powers of Ten, Various Notations, Conversion	Chapter 1.3 - 1.9	Set # 1: Page 28-30 #4, #9, #23g, #25a,b,f, #37
#3 - Fri January 9	Voltage and Current	Chapter 2.1 – 2-8	<u>Set #1 due</u> Set # 2 part a: Page 59-60 #2, #7, #11, #24, #31
#4 - Mon January 12	Resistance	Chapter 3.1 – 3.14	Set #2 part b: Page 97-99 #1, #7, #14, #19, #24, #40a, #40b, #45, #49, #52
#5 - Wed January 14	Ohm’s Law, Power, and Energy, part 1	Chapter 4.1 – 4.4	Set #2 part c: Page 127-128 #1, #13, #15, #20, #28, # 36
#6 – Fri January 16	Ohm’s Law, Power, and Energy, part 2	Chapter 4.5-4.7	<u>Set #2 due</u> Set #3 part a: Page 128-129 #38, #39, # 40, #45, #48, #54, 60
#7 – Wed January 21	Series dc Circuits, part 1	Chapter 5.1 – 5.3	Set #3 part b: Page 172-175 #1, #4, #5c, #6, #8, #10
#8 – Fri January 23	Series dc Circuits, part 2	Chapter 5.4 – 5.6	<u>Set #3 due</u> Set #4 part a: Page 176-178 #12, #18, #22
# 9 – Mon January 26	Series dc Circuits, part 3	Chapter 5.7 – 5.10	Set #4 part b: Page 179-183 #25, #29, #30, #35, #41, #45
#10 – Wed January 28	Parallel dc Circuit, part 1	Chapter 6.1 – 6.3	Set #4 part c: Page 232-236 #1a, e, f, #4, #8, #10, #18
#11 – Fri January 30	Parallel dc Circuit, part 2	Chapter 6.4 – 6.6	<u>Set #4 due</u> Set #5 part a: Page 237-240 #19, #22, #24, #26, #29, 32
#12 – Mon February 2	Parallel dc Circuit, part 3	Chapter 6.7 – 6.10	Set #5 part b: Page 240-242 #35, #40, #38, #43

#13 – Wed February 4	Methods of Analysis and Selected Topics (dc), part 1	Chapter 8.1 – 8.6	Set # 5 part c: Page 334-337 #1, #3, #5, #7a, #8b, #11, #13, #15
#14 – Fri February 6	Methods of Analysis and Selected Topics (dc), part 2	Chapter 8.7 – 8.9	<u>Set # 5 due</u> Set #6 part a: Page 337-341 #20, #24, #28, #35, #36
#15 – Mon February 9	Exam # 1	None	None
#16 – Wed February 11	Network Theorems, part 1	Chapter 9.1 – 9.2	Set #6 part b: Page 388-389 #1, #4
#17 – Fri February 13	Network Theorems, part 2	Chapter 9.3	<u>Set #6 due</u> Set #7 part a: Page 389-391 #7, #8, #9, #15, #16
#18 – Tue February 17	Network Theorems, part 3	Chapter 9.4 – 9.5	Set #7 part b: Page 392-393 #18, #22, #24, #28
#19 – Wed February 18	Capacitors, part 1	Chapter 10.1 – 10.6	Set #7 part c: Page 453-455 #1, #4, #8, #14, #21, #23, #27
#20 – Fri February 20	Capacitors, part 2	Chapter 10.7 – 10.11	<u>Set #7 due</u> Set #8 part a: Page 455-459 #32, #34, #36, #39, #42, #44, #50, #51, #54
#21 – Mon February 23	Inductors, part 1	Chapter 11.1 – 11.8	Set #8 part b: Page 504-508 #7, #12, #14, #15, # 22
#22 – Wed February 25	Inductors, part 2	Chapter 11.9 – 11.14	Set #8 part c: Page 508-511 #30, #35, #43, #44
#23 – Fri February 27	Exam # 2	None	<u>Set #8 due</u> None
#24 – Mon March 2	Sinusoidal Alternating Waveforms, part 1	Chapter 13.1 – 13.6	Set #9 part a: Page 581-583 #1, #2, #4, #5, #6, #9, #10, #11, #14, #17, #20, #29, #30
#25 – Wed March 4	No class	No class	None
#26 – Fri March 6	TBA	TBA	TBA
#27 – Mon March 16	Sinusoidal Alternating Waveforms, part 2	Chapter 13.7 – 13.10	Set #10 part a: Page 583-585 #37, #42, #44
#28 – Wed	The Basic Elements and	Chapter 14.1 – 14.3	Set #10 part b: Page 632-633

March 18	Phasors, part 1		#4, #6, #7, #13, #14, #15
#29 – Fri March 20	The Basic Elements and Phasors, part 2	Chapter 14.4 – 14.6	<u>Set #9 due</u> <u>Set #10 due</u> Set #11 part a: Page 633 #30, #31
#30 – Mon March 23	The Basic Elements and Phasors, part 3	Chapter 14.7 – 14.12	Set #11 part b: Page 634-635 #34, #39, #43a,b,c, #48, #50
#31 – Wed March 25	Series and Parallel ac Circuits, part 1	Chapter 15.1 – 15.4	Set #11 part b: Page 702-704 #2a,b,c, #4b, #9
#32 – Fri March 27	Series and Parallel ac Circuits, part 2	Chapter 15.5 – 15.7	<u>Set #11 due</u> Set #12 part a: Page 706-707 #21,#23, #24a,e, #25, #26
#33 – Mon March 30	Series and Parallel ac Circuits, part 3	Chapter 15.8 – 15.11	Set #12 part b: Page 708 #28, #29, #35, #37
#34 – Wed April 1	Exam # 3	None	None
#35 – Fri April 3	Resonance	Chapter 20.1, 20.2, 20.8, 20.12, 20.13	<u>Set #12 due</u> Set #13 part a: Page 911-913 #1, #2, #3, #13, #14, #16
#36 – Mon April 6	Operational Amplifier, part 1	handout	Set #13 part b: handout
#37 – Wed April 8	Operational Amplifier, part 2	handout	Set #13 part c: handout
#38 – Fri April 10	Special Topics, part 1	handout	<u>Set #13 due</u> TBA
#39 – Mon April 13	Special Topics, part 2	handout	TBA
#40 – Wed April 15	Special Topics, part 3	handout	TBA
#41 – Fri April 17	Special Topics, part 4	handout	TBA
#42 – Mon April 20	Exam #4	None	None

#43 – Wed April 22	Review	None	None
#44 – Fri April 24	Review and Course Evaluation	None	None

Tentative Labs

Lab #	Title	Lab. Day
1	Introduction to Laboratory and Ohm's Law	01/21 or 01/22
2	Series Circuits	01/28 or 01/29
3	Parallel Circuits	02/04 or 02/05
4	Series and Parallel Circuits	02/11 or 02/12
5	Thevenin's Theorem/Superposition	02/18 or 02/19
6	Capacitance	02/25 or 02/26
7	Inductance	03/04 or 03/05
8	RL and RLC Circuits	03/18 or 03/19
9	AC Measurements	03/25 or 03/26
10	RLC Components	04/01 or 04/02
11	Frequency Response of RC/RL Circuits	04/08 or 04/09
12	Series Resonance	04/15 or 04/16
13	Operational Amplifier	04/22 or 04/23

Parts for ETE 2210

Resistors

1 X 4.7
1 X 22
1 X 47
1 X 100
2 X 220
1 X 330
1 X 470
1 X 680
1 X 1 k
1 X 1.2 k
1 X 1.8 k
2 X 2.2 k
1 X 3.3 k
1 X 3.9 k
1 X 4.7 k
3 X 10 k
1 X 27 k
1 X 39 k
2 X 47 k
1 X 82 k
1 X 100 k
1 X 470 k
1 X 1 M

Capacitors

Electrolytic

1 X 100 uF
1 X 220 uF

Ceramic

1 X .1 uF
1 X .47 uF
1 X 1 uF

Inductors

2 X 10 mH

Other

2 X 741 Op Amps