ECE 2200
Electrical Engineering for Civil Engineers
Fall 2023 Class Syllabus

Instructor: Arn Stolp
    Office: MEB 2262
    Phone: U of U: 581-4205
           Cell: (801) 783-6589 text 1st, start text with "ECE 2210". Text is the best way to reach me.
    E-mail: arnstolp@ece.utah.edu (I rarely check my e-mail, so let me know by some other method if you send me email that I need to read.) Subject should start with "ECE 2210". I don't look at any messaging on Canvas.
    Office hours: My "office hours" are the problem sessions. Otherwise it's catch me if you can. I'm usually around until at least 2:00 p.m. T & Th, when I need to teach another class. If I'm not in my office, check the lab. To increase your chances, talk to me in class to say when you'd like to see me.

Web Site: http://www.ece.utah.edu/~ece2210/index2200.html

Required books and lab supplies:
    <u>Practical Electronics for Inventors</u>, 3rd or 4th Ed, by Paul Scherz
    Downloaded class material packs (available on website) & Ring binder
    Lab notebook (bound or spiral)
    Breadboard & Lab parts available for purchase at lab (~$16 on your U-card)

Prerequisites: MATH 2250 and PHYCS 2210, PHYCS 2220 is strongly recommended

Introduction:

In case you haven't noticed, you're surrounded by electrical and electronic devices. Electrical motion, measurement and control are powerful and cheap, so they're used everywhere and are part of every technical career, including yours. Maybe you can find a job where other people make all the decisions concerning wiring, power distribution, electric motors, communications systems, instrumentation, and control; but do you *really want* that? Do you really *want* to be the clueless one?

ECE 2210 will introduce you to some of the basics of electrical engineering. This may not seem important now, but I think you will find these concepts very useful in your future classes and jobs. Besides, they'll help you pass the FE exam, and that should be of immediate concern.

I teach concepts and relationships and the use of these to solve problems, not formulas and memorization. The hands-down easiest way get a good grade in this class is to learn these concepts and relationships and add them to the "web of knowledge" that you have (hopefully) been nurturing in your brain for years. It is the "web of knowledge" that helps you retain information and skills to use when you need them.

This class consists of:

Lectures: T & Th 9:10 -10:10 am in WEB L103

Lectures set the direction and tone of the class and cover more than the written material. You will be held accountable for everything discussed in the lectures, so your attendance is important.

Problem Sessions: T & Th 10:10 -10:30 am in WEB L103

We cover a lot of material in this class and there is rarely enough lecture time to work examples or to answer your questions in detail. I will not cover new material in the problem session, so you can get by without coming, but I think you'll find it worth your while.

Textbook:

The text contains a great deal of practical, useful information beyond the theoretical material we cover in this class. It should prove to be a good reference. The reading page numbers are for the 3rd edition (4th edition page may be a little different).

Supplementary Packets (in place of class handouts):

I've supplemented the textbook with weekly packs of class notes, homework assignments, and lab instructions that can be downloaded from the class web site: (http://www.ece.utah.edu/~ece2210/). You should have received a message with links. Most of this material is also available individually on the web site. If you want to print some of this material you can sign on to computers in the lab and use the printers there. Use the same user name and password you use (or can get) in the Engman computer lab (the one in WEB, level L2).

Homework, homework, and more homework: 14%

Expect a homework assignment for each lecture, to be turned in twice-a-week, often on non-class days. Homework will be your main study tool. As such, I'll give you all the answers so that you can check your work immediately. In fact, you'll have to self-correct your homework. If you can't get the answer, check the web site for corrections, study some more, come to the problem session, ask for help, or see the posted solutions in my office window. Sometimes I even post solutions *before* the homework is due. So, you might ask, "If we have the answers and have to check it ourselves, why is it handed in and 'graded'?".   Well, to answer a question with a question, "Would you even do it otherwise?"

Your homework should be neat and clear and show all your work. For most problems the grader will simply check to see that you've done it and that your paper shows the enough work to get the answer. Only a few problems will be checked in greater detail. You may collaborate with others to learn how to do the homework, but will need to hand in your own work. Copying or allowing another student to copy your work is considered cheating.

You will probably learn more from doing the homework than any other part of this class. If you thoroughly understand the homework, you will know what the class is about, and the exams should give you no trouble.

Turn in homework as a pdf file on canvas by 11:59 pm of the due date. Solutions will be posted in my office window. Most graded material will be returned on Canvas.

Midterm: (100 exam pts) 35%

One 50-minute midterm will cover material up to the time of the test. My exams are designed to see if you learned concepts and problem solving strategies and whether you can work with them, sometimes in new and different ways. Don't try to memorize formulas or specific problems. Exams also cover what you learn in the labs. All exams are closed book, closed notes, no phones, tablets or computers allowed. The class may be split into two or more rooms on exam days, listen in class for details. If you do poorly on an exam, come see me before the next exam, there may be an opportunity to improve your score.

Final: In your last lab (ask 1st class day), or Thurs., 9:10am 10/19/23 (Recommended) 35%

The 50 minute final will be comprehensive with greater emphasis on the most recent material. I highly recommend that you take the exam at the later date so that you will have enough time to study. If you want to take the your final in your last lab, you will need to tell me at the first class so that you can start labs the first week. If you say nothing the first day then you will have to take the later exam (by far the best choice).

Labs: MEB 2267 16%

Lab will be held every week, beginning the first week and including the last week of class. Many of the subjects covered in lab aren't covered anywhere else in class, so make sure you pay attention and read the lab instructions. You will have to keep a laboratory notebook as a requirement of the lab. Your lab TA will collect and grade these notebooks. Labs are **not optional.** For each lab that you miss or fail (< 60% score), your final grade will suffer a **half letter drop** (5% of possible points). Be sure to make-up any labs you miss or fail.

Grades:

			% of total	Grade
Homework:	14%		> 93	A
Labs:	16%		90-93	A-
Exams:	70%		87-90	B+
Total:	100%		83-87	B
			80-83	B-
Failed lab:	-5%		77-80	C+
			73-77	C
Cheating:	-100%		70-73	C-
			67-70	D+
			63-67	D
			60-63	D-
			< 60	E

If you want any deviations from the normal requirements (say credit for labs, you've done before) you will need to see me before the work would normally be due and get an agreement *in writing*. You'll need to turn in your copy of the agreement with your final, so I'll remember to grade you properly.

ECE 2200 Fall Semester, 2023

A. Stolp 8/18/23

Month	Week	Mon	Tue	Wed	Thur	Fri
Aug	1	21	22 First Class	23	24	25 Last day to add or drop 2200
	2	28	29	30	31	1
Sept	3	4 Labor Day	5	6	7	8
	4	11	12	13	14	15 Last day to withdraw 2200
	5	18	19 Exam 1	20	21	22
	6	25	26	27	28	29 Last day to reverse CR/NC 2200
Oct	7	2	3	4	5 Last Lecture of 2200	6
		9 Fall break	10	11	12	13
	8	16	17	18	19 Exam 2 (Final)	20
	9	23	24	25	26	27
Nov (wed)	10	30	31	1	2	3
	11	6	7	8	9	10
	12	13	16	15	16	17
	13	20	21	22	23 Thanksgiving	24
	14	27	28	29	30	1
Dec	15	4	5 ME Design Day in Union bldg (maybe)	6	7 Last Day of Normal Classes	8 Reading Day
	16	11 Finals	12	13	14	15

ECE 2200 Fall Semester 2023

Week	Month	Mon	Tue	Wed	Thur	Fri
1	Aug	21	22 L1 Introduction, Basic electrical units & symbols, Kirchhoff's laws	23	24 L2 Resistance, Ohm's law, Power, Resistors in parallel & series	25
2		28	29 L3 Voltage and current dividers, Sources, Nodes, Grounds, Branches, Meters	30	31 L4 Superposition, Practical voltage and current sources	1
3	Sept	4 Labor Day	5 L5 Thevenin & Norton Equivalent Circuits, Max power transfer	6	7 L6 Thevenin & Norton Equivalent Circuits	8
4		11	12 L7 Networks, Nodal analysis	13	14 L8 Introduction to AC & Signals, Capacitors	15
5		18	19 Exam 1	20	21 L9 Capacitors, Inductors	22
6		25	26 L10 Inductors, Resonance, RC first order transients	27	28 L11 First order transients, Recall complex numbers	29
7	Oct	2	3 L12 Complex numbers, Steady-state Sinusoids, Phasors, & Impedance	4	5 L13 Phasors, Impedance, & AC circuits Last Lecture of ECE 2200	6
		9	10 Fall Break	11	12	13
8		16	17 L14 AC circuit examples	18	19 Exam 2	20
9		23	24 L16 Second order transients, Laplace Impedance, Transfer functions	25	26 L17 Second order transients, Time-domain solutions	27
10	Nov	30	31 L18 Second order transients, Initial and final condtions	1	2 L19 Second order transient examples, Systems	3
11		6	7 L20 Diodes basics, Diodes in DC circuits	8	9 L21 Diodes in AC circuits, Rectification	10
12		13	14 Exam 3	15	16 L23 Transistors, Operational Amplifiers	17
13		20	21 L24 Operational Amplifiers	22	23 Thanksgiving	24
14		27	28 L25 Op Amps, RMS and AC Power	29	30 L26 AC Power	1
15		4	5 L27 AC Power, examples, ME Design day	6	7 L28 AC Power, Transformers, 3 phase, Y, Delta	8 Read Day
16		11	12	13	14 Zoom Review	15 Final 8:00 am

Week	Month	Mon	Tue	Wed	Thur	Fri	Sat
1	Aug	21	22	23	24	25	26 HwDC1 KCL KVL
2		28	29 HwDC2 Resistors, Ohm's Law	30	31	1	2 HwDC3 Ohm's Law, Power
3	Sept	4 Labor Day	5 HwDC4 Superposition	6	7	8	9 HwDC5 Thevenin & Norton 1
4		11	12 HwDC6 Thevenin & Norton 2	13	14	15	16 HwDC7 Nodal Analysis
5		18	19 Exam 1	20 HwAC Basic AC	21	22	23
6		25	26 HwCap Caps	27	28	29	30 HwInd Inductors
7	Oct	2	3	4	5	6	7
		9 Fall Break	10	11	12	13	14
8		16	17	18	19 Exam 2	20	21
9		23	24	25	26	27	28
10	Nov	30	31	1	2	3	4
11		6	7	8	9	10	11
12		13	14 Exam 3	15	16	17	18
13		20	21	22	23 Thanksgiving	24	25
14		27	28	29	30	1	2
15	Dec	4	5	6	7	8 Read Day	9
16		11	12	13	14 Zoom Review	15 Final 8:00	16

ECE 2210 Fall Semester, 2023 Likely Homework Due Dates (Canvas will overide)

ECE 2200

A. Stolp

Tentative

08/16/23

Fall 2023 COURSE SCHEDULE

Week	Date		lect	Topics	Textbook
1	T	08/22	1	Introduction, Basic electrical units & symbols, Kirchhoff's laws	Ch1, 2.1-3, 2.17
	Th	08/24	2	Resistance, Ohm's law, Power, Resistors in parallel & series	2.5-7, 2.11-12, 3.5
2	T	08/29	3	Voltage and current dividers, Sources, Nodes, Grounds, Branches, Meters	2.10, 2.12-16
	Th	08/31	4	Superposition, Practical voltage and current sources	2.18, 3.2
3	M	09/04		Labor Day	
	T	09/05	5	Thevenin & Norton Equivalent Circuits, Max power transfer	2.19
	Th	09/07	6	Thevenin & Norton Equivalent Circuits	notes
4	T	09/12	7	Networks, Nodal analysis	2.17, notes
	Th	09/14	8	Introduction to AC & Signals, Capacitors	2.29, 2.23
5	T	09/19		Exam 1	
	Th	09/21	9	Capacitors, Inductors	2.23, 3.6, 2.24
6	T	09/26	10	Inductors, Resonance, RC first order transients	2.24, 3.7, 2.30
	Th	09/28	11	First order transients, Recall complex numbers	2.34
7	T	10/03	12	Complex numbers, Steady-state Sinusoids, Phasors, & Impedance	2.25-26
	Th	10/05	13	Phasors, Impedance, & AC circuits	2.27
				End ECE 2200 except for Exam 2 (You may visit the lectures below)	
	S	10/07		Fall Break	
	Su	10/15			
8	T	10/17	14	AC circuit examples	2.29-30
	Lab Lect		15	Filters & Bode plots	2.31-33, notes
	Th	10/19		Exam 2	
9	T	10/24	16	Second order transients, Laplace Impedance, Transfer functions	2.34, notes
	Th	10/26	17	Second order transients, Time-domain solutions	notes
10	T	10/31	18	Second order transients, Initial and final condtions	notes
	Th	11/02	19	Second order transient examples, Systems	notes
11	T	11/07	20	Diodes basics, Diodes in DC circuits	4.2
	Th	11/09	21	Diodes in AC circuits, Rectification	4.2, notes
	Lab Lect		22	Diodes, Transistors & Switching circuits	4.3, notes
12	T	11/14		Exam 3	
	Th	11/16	23	Transistors, Operational Amplifiers	Ch 8
13	T	11/21	24	Operational Amplifiers	Ch 8
	Th	11/23		Thanksgiving	
14	T	11/28	25	Op Amps, RMS and AC Power	2.21-22
	Th	11/30	26	AC Power	2.21-22
	T	11/28	25	Op Amps, RMS and AC Power	2.21-22
	Th	11/30	26	AC Power	2.21-22
15	T	12/05	27	AC Power, examples, ME Design day	2.28, 3.8
	Th	12/07	28	AC Power, Transformers, 3 phase, Y, Delta	Appendix A
	F	12/08		Read Day	

MERRILL ENGINEERING BUILDING (BLDG. 064)

SECOND FLOOR PLAN

north

Checkout Window

Stockroom to buy parts

Arn's Office (MEB 2262)
(Homework solutions will be posted here)

Lab

Door with card access

Lockers for homework
and lab notebooks
(if not handed in on canvas)

ECE office

Homework, labs and exams are
returned to a file cabinet in MEB
2101
(paper returns only)

Room numbers visible on plan:
2480B, 2488, 2490, 2536, 2532, 2528, 2524, 2520, 2516, 2298, 2296, 2294, 2292, 2290
2480A, 2480, 2478, 2477, 2004P, 2489, 2491T, 2505B, 2513, 2005G, 2285, 2288, 2286, 2284, 2282
2474, 2475, 2560, 2505A, 2509, 2505, 2005E, 2005B, 2005K
2473, 2562A, 2560A, 2005H, 2005D, 2005A, 2002L
2460, 2005, 2002K
2458, 2456, 2565, 2555, 2551, 2543, 2541, 2005F WOMEN, 2005C MEN, 2002J, 2278, 2280
2454, 2452, 2565A, 2355C, 2355B, 2355A, 275, 2272, 2270, 2274
2440, 2365, 2355, 2267, 2268, 2266, 2266C, 2266B
2430, 2262, 2264, 2260
2003, 2258, 2256, 2254
2420, 2415, 2360, 2350, 2340, 2325 CLASSROOM capacity: 50, 2261, 2305, 2259, 2258, 2002H
2410, 2407, 2240, 2238, 2236, 2234, 2232, 2230, 2255, 2002, 2250, 2224, 2222, 2220, 2220-B
2405, 2405A, 2405B, 2151B, 2151C, 2215A, 2215, 2239, 2237, 2235, 2233, 2231, 202F, 2216, 2259
2004R, 2001R, 2165, 2155A, 2155, 2151A, 2151, dn, 2141, 2131, 2105, 2103, 2101, 2002C
200C, 2129, 2109, 2001D, 2127, 2125, 2123, 2121, 2110, 2110A, 2102
2196, 2196C, 2196D, 2172, 2135, 2180A, 2180, 2162, 2196B, 2180C, 2180B, 2138, 2136, 2134, 2132, 2130, 2126, 2124, 2122, 2120, 2110D
2196A, 2110C