

Course Syllabus
ELEG 3213 – Electronics I, Spring Semester, 2007
MWF 8:30 – 9:20 BELL 291

Instructor:

Dr. Leonard Schaper

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Co-requisite: ELEG 3211L

Prerequisite: ELEG 2903 and PHYS 2073 and MATH 2574 and **ELEG 2113**

Textbook: Microelectronic Circuits, **5th Edition**, by Sedra and Smith, Oxford University Press, 2004.

The material will be covered in the text as follows:

Chapter 1: Introduction to Electronics – All Sections	2 wks. 1/17 – 1/29
Chapter 2: Operational Amplifiers – All Sections	2 wks. 1/31 – 2/12
Chapter 3: Diodes – All Sections except 3.8	3 wks. 2/14 – 3/5
Chapter 4: Field Effect Transistors – All except 4.11	4 wks. 3/7 – 4/9
Chapter 5: Bipolar Junction Transistors – 5.1 – 5.7, 5.11	3 wks. 4/11 – 5/2

Above dates are approximate! We may adjust as necessary.

Grading: Grades will be determined by your performance on weekly quizzes, the final exam, preparedness, and PSpice assignments. There will be no formal homework assigned or graded.

Quizzes will be given each week, at the beginning of class on Monday. They will be closed book and closed notes, and will last about 15 minutes. Any necessary formulas will be given.

The final exam will be open book and open notes. The exam period is defined by the University (2 hours.)

This course requires active learning. **I expect students to read and attempt to understand the week's material before the first class of the week. Come to class prepared to ask questions.** I will review the material, but will not be duplicating the material in the book in lectures. Instead, class time will concentrate on problem solving approaches and applications not found in the book. Thus, though class attendance is not mandatory, it is strongly recommended. You are of course responsible for obtaining all handouts or learning about announcements given during the regular class meetings if you miss class.

In order to make sure you are keeping up with, and putting in the effort necessary to master the subject matter, I will expect each of you to keep a file folder with

your name on it. **On Mondays, bring that folder to class.** It should contain the notes you have taken from reading the week's material, the exercises and problems you have worked in order to master the material, and the notes you have taken during the week's classes. I will call several names at random, and you will turn your folders in. I will evaluate your work effort, and this evaluation will go into your "preparedness" grade. I expect you to work all of the exercises for the book sections we cover, and a few problems from the appropriate sections at the back of the chapter each week. **You should be spending at least 6 hours a week outside of class in order to master the material.**

There will be three PSpice assignments. PSpice assignments will be weighted a total of 15 percent. PSpice assignments are a *requirement* of the course. You must turn in all PSpice assignments to receive a grade for the course (even if an assignment is late and you receive no points for it). It is essential for your success in electrical engineering that you be "fluent" in using PSpice, even though it is not taught as part of the course.

The weighting of all aspects of your grade will be as follows:

Weekly Quizzes	50%
Final Exam	25%
PSpice	15%
Preparedness	10%

I am a hard marker. You will have points off for anything that is not perfect. Do not be discouraged. The final grades will be curved. I may post projected grades at appropriate times and will certainly let you know if you are in trouble, usually by a note on your weekly quiz.

SPECIAL NOTES: If you are forced to miss a weekly quiz due to an emergency, you should inform me **prior** to missing the quiz. Leave me voice mail on my extension (5-8408) and leave the time at which you call, or even better, send e-mail. If you miss a quiz with a valid excuse, I will decide whether a makeup quiz (which may be oral) will be offered, or your grade will be based on your performance on the remainder of your work. Any person found cheating on a quiz or exam will receive a grade of "F" for the course.

Office Hours: I will post office hours after discussing in class. There is no point in me having office hours when many students can't come in.

Detailed Course Structure

Week	Starts	Sections	Suggested Problems	Assignment
1	1/17	1.1 – 1.5	1.1 – 1.21 for review 1.29, 31, 37, 40, 46, 50, 59, 64	
2	1/24	1.6 – 1.8	1.67, 72, 75, 82, 84, 88	
3	1/31	2.1 – 2.4	2.8, 14, 22, 37, 45, 51, 53	
4	2/7	2.5 – 2.7, 2.8.1, 2.9	2.62, 76, 83, 97, 126	
5	2/14	3.1 – 3.3	3.1, 2, 4, 7, 16, 23, 26, 36, 46, 61	
6	2/21	3.4 – 3.6	3.65, 66, 77, 87, 90, 93, 99, 104	
7	2/28	3.7 – 3.9	3.107, 111, 115, 118	SPICE 1
8	3/7	4.1 – 4.2	4.3, 7, 11, 14, 17, 19, 22, 28	
9	3/14	4.3 – 4.5	4.36, 37, 41, 44, 51, 60, 61	
10	3/28	4.6 – 4.7	4.69, 75, 77, 79, 81, 86	
11	4/4	4.8 – 4.10, 4.12	4.91, 95, 101, 105, 111, 113	SPICE 2
12	4/11	5.1 – 5.2	5.1, 8, 12, 16, 20, 26, 40, 46, 52	
13	4/18	5.3 – 5.5	5.60, 65, 69, 74, 79, 84, 90, 95	
14	4/25	5.6, 5.7, 5.11	5.104, 110, 114, 120, 128, 130, 136	SPICE 3
15	5/2	Review		

Words of Advice for ELEG 3213 Students

ELEG 3213 and the subsequent ELEG 3223 are distinctly different courses from the ones that you have had to date. Some of you will find the differences to your liking while others will find them extremely frustrating. These differences and some possible ways to turn them into a successful experience are given below.

1. Many of the circuits are too complex for straightforward analysis techniques – i.e., Kirchhoff's laws, etc.
2. There are sometimes design problems that have no unique answer.
3. You must be able to translate the lecture material into practice in the accompanying laboratories. It is important to participate fully in the lab. Be sure to work the prelab calculations beforehand so you know what to expect.
4. You will work with components with wide variations in values: resistor tolerances of 10%, capacitor tolerances of 20%, and transistor gain variations of 50-100%!
5. You will have to verify experimental results with hand analysis and computer simulation.

The above aspects demand a different approach to the material for you as a student. Try to master the following techniques as you progress through ELEG 3213 and 3223.

1. Learn to make simplifying assumptions – e.g., 100:1 assumption (if a resistor is in parallel with another that is more than 100 times larger, the current through the larger resistor can be ignored).
2. You must be able to justify your assumption(s) at the end of your calculations. An assumption is normally used to simplify a problem to get an answer. You should try to use the answer obtained to show that the assumption was valid.
3. Learn to set up and model your problem with the most appropriate and simplest approach or model before beginning calculations. Time spent here will more than pay for itself later. To paraphrase Einstein, "The right model is the simplest one that will do the job, but no simpler."
4. Always ask if your analytical results (or experimental results) make sense. Try to get a "feel" for how the circuit works. For example, what influence would increasing a resistance value have on the performance of an amplifier?
5. Check the units of all calculations. Many errors can be avoided by "working the units" as well as the numbers to make sure you have used the right formula.
6. Learn to analyze the frequency extremes of circuits by letting capacitors or inductors approach short or open circuits as appropriate.
7. Recognize the importance of impedance of circuits. If a low impedance output drives a high impedance input, usually the current drawn by the input can be neglected. But driving a low impedance with a high impedance is a disaster!
8. Don't expect precise, unique answers, but DON'T substitute sloppiness for good and valid assumptions.