EE320 Electronics-1

Instructor: Al Davis
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Time and place: MWF, 11:20-12:20am, AB 2911

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Textbook:
Required:
"Electronics" by Hambley

Optional:
"Microelectronic Circuits", 5th edition, by Sedra and Smith.
It is really too advanced, but if you are serious about it, you will eventually
want the extra detail.

Web site:
http://www.kettering.edu/~adavis/class/ee320-electronics-1

Office hours:
Official office hours are most of the day Thursday. I have an open door
policy. If the door is open I am probably available. If I am with someone
else, please let me know of your presence. Don't just silently wait outside
the door! I am usually also available Monday, Wednesday, Friday 1:30-2:30.

Catalog description:
The basic building blocks used in electronic engineering are studied. Topics
include: operational amplifiers; diodes; bipolar and MOS devices; basic
transistor configurations; bipolar and MOSFET digital logic circuits.
Prerequisite: EE-210 (Circuits-1)

Course outline:
1. Operational Amplifiers (6 classes)
2. Diodes and Nonlinear Circuit Applications (6 classes)
3. Basic amplifier concepts. (3 classes)
4. Bipolar Transistors (6 classes)
5. Bipolar Transistor Digital Logic Circuits (3 classes)
6. MOSFETs (4 classes)
7. MOSFET Digital Logic Circuits (2 classes)

Software and equipment:

Most of the homework will require you to use a circuit simulator to verify
your work. I will show how to use Gnucap. I will hand out a disk containing
this software, and some other utilities that might be useful. We also have
"Accusim", "Saber" and "Eldo" on our Sun system, and a limited version of
PSPICE on the PC's. You may use any of these if you want to, but I do not
guarantee any results.

I will hand out a self-booting CD containing gnucap, ng-spice (another
simulator), gschem (schematic capture), gwave (graphic waveform viewer),
pcb (printed circuit layout), and some other tools. This CD is free software,
that you may redistribute.

Lots of information about gnucap is available at:
http://www.kettering.edu/~adavis/gnucap

A MS-Windows version of gnucap, without graphics, is available for
download from:
http://www.kettering.edu/~adavis/gnucap/devel/gnucap-0.34.exe

For the lab, you will need to buy the "ECE Breadboard Kit" for $15. The
breadboard kit contains a protoboard, a wire cutter/stripper, and alligator
clips. Students may purchase a kit from us in one of two ways:

1. Give the department a check made out to "Kettering University" in
exchange for a kit. The kits and the checks will be kept in the main ECE
office area. We will not accept cash. Amy Owens will be the primary
custodian of the checks and the kits. Genette should be available if Amy
isn't.

2. Pay for the kit either by cash or check in the Student Accounts office or in
the Cashier's office. The student must bring a receipt to the ECE office to get
a kit.

In addition to what is supplied in the kit, I recommend that you have some
other tools such as needle nose pliers, a small screw driver, and diagonal
cutters. A set of clip leads, with alligator clips, is also worh having.

Grades:

Labs are reported separately as EE321, so they don't count here.

Grades are based on a weighted sum of quizzes, homework, projects, and a comprehensive final, as follows:

8 quizzes, 5% each = 40%
4 projects, 5% each = 20%
final exam = 25%
homework exercises = 15%

Tests and quizzes:

Quizzes, about 15 minutes long, will be given every Monday. Since there is no quiz on the first Monday, and there is no class on Labor Day, that leaves 8 days for quizzes. There will be no make-ups. Each quiz counts 5% of your grade, for a total of 40%.

There will also be unannounced quizzes. They may be given at any time, and should be considered to be a way to raise your grade. They count only by replacing the score on another quiz.

I will count only the best 8 quizzes. If you miss class, and actually take less than 8 quizzes, the final will substitute for the missing quizzes.

The department "assessment exam" counts at least 25% of your grade. This is a multiple choice test with no partial credit and no curve. I will also count it as a substitute for any quiz score lower than the final.

There will be no full-hour tests.

Homework:

There are two kinds of homework in this course: exercises and design projects.

Homework exercises are simple examples to practice and explore the basic concepts of the course. These exercises will be assigned almost every class, and will be due the second class following. You should attempt to do the exercises as soon as possible after they are assigned, when the lecture is still fresh. I will answer questions on it in the following class. Then I may collect it, or part of it, the second following class. It is expected and encouraged that you will work together. Please acknowledge who you work with. For grading, it will be spot-checked. It is easy for you to check your results with simulation, so I expect correct answers. These exercises count 15% of your grade.

For the design projects, I will give you a specification, and you will design a circuit to meet the specification. You will need to make a report, containing the completed design, calculations, and simulation results.

Each project will have two opportunities for extra credit. First, one point (20%) may be added if you actually build the circuit, verify that it works as expected, and provide the appropriate documentation. The second extra credit, one point (20%) may be added for certain additional work, such as a more rigorous design or added performance. This option is intended to be difficult. A third extra point may be added if you do both, that is actually build and test the extra credit circuit. The extra credit makes it possible to get a grade of higher than 100%.

Projects will be graded on a 5 point scale, with one point each for presentation, functionality, design basics, design completeness, and verification. You get the point if the part is there, and of expected quality. You might get a half-point if it is there but something is wrong or incomplete. Extra credit is available only if the basic requirements are met. Each project counts 5% of your grade, for a total of 20%. With extra credit, it could count more, possibly adding 12 points to your final course grade.