ECE 311 Winter 2008

Instructor: Prof. J. Miller  214 ELB, Phone 593-5245 EMAIL: jwvm@umich.edu

E.C.E 311, Electronic Circuits I: Diodes, junction transistors, FETs, terminal characteristics, design of rectifiers and power supplies, design of amplifiers, switching circuits, gain-bandwidth limitations, circuit models

Textbook : Adel S. Sedra and Kenneth C. Smith, Microelectronic Circuits (any edition), HRW.

Topics with textbook sections (for the 4th edition) noted:
1. Real and ideal diode characteristics, circuits and analysis: All of Chap. 3
2. Bipolar transistor terminal characteristics, modeling, and biasing: Chap. 4 sections 4.1-4.6, 4.9-4.10
3. Design modeling and analysis of BJT amplifier circuits: Chap. 4 sections 4.7, 4.8, and 4.11
4. Differential amplifiers: Chap. 6 sections 6.1 and 6.2
5. Operational amplifier and representative applications: All of Chap. 2
6. Power amplifiers: Chap. 9 sections 9.1-9.6
7. Frequency response; approximate methods of calculation: Chap. 7 Sections 7.3 and 7.4

Laboratory

Students are expected to have read and understood the laboratory assignment and run computer simulations prior to performing the experiments. The laboratory component of the course must be passed if the student is to pass the course. It is suggested that students purchase a breadboard for the design projects. Learning how to test and debug circuits is an especially important part of this course, especially for the design projects.

Grading

There will be two tests and weekly quizzes, which will count as one test. The tests and quizzes will be based on the course outcomes described below. The lab also counts as one test and the final design project counts as two tests. There is no final exam. Grading is as follows:

<table>
<thead>
<tr>
<th>90 and above: A</th>
<th>80-89: B</th>
<th>70-79: C</th>
<th>60-69: D</th>
<th>Less than 60: E</th>
</tr>
</thead>
</table>

In order to receive an A in the course, the test average generally must be 90 or greater. In order to pass the course, a test average of 60 or greater is generally required.

It will be necessary to pass a course competency quiz (CCQ or ABET quiz) that will be given at the end of the term. A score of 90% or higher is necessary to pass the course. Failure on the CCQ will result in failing the course regardless of other work or test results. Course outcomes covered on the CCQ (along with tests and quizzes) are:

1. Basic knowledge of the properties and characteristics of nonlinear semiconductor devices: diode, BJT, and MOSFET. Ability to perform time domain transient analysis.
2. Ability to analyze DC nonlinear electronic circuits using basic circuit theory and analysis techniques.
3. Ability to perform small-signal analysis of analog circuits.
4. Ability to perform large-signal analysis on digital or power amplifier circuits.
5. Basic knowledge of ideal operational amplifiers and ability to analyze basic op-amp circuits.

The final project report, another requirement for passing the course, must be well written and conform to good design and technical writing standards. This project, along with the laboratory assignments, will be used to demonstrate competency in the following course outcomes:

1. Ability to use CAD tools such as SPICE (PSPICE) to analyze and design electronic circuits.
2. Ability to use electronic instruments to measure and test properties of electronic circuits.

Note that additional ECE 311 material including PSPICE may be found at: [http://www.engin.umd.umich.edu/~jwvm/ece311/](http://www.engin.umd.umich.edu/~jwvm/ece311/)

Please be sure that you have entered your email address in the umich database (directory.umich.edu) using your kerberos password. Note that this does not have to be a university email account and it is not a new email address!