08/26/05

EE 40 – Introduction to Microelectronic Circuits

Fall 2005, **Prof. A. R. Neureuther**
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UC Berkeley **Office Hours** **M1, W 3, F10**
Course Web Site **http://www-inst.eecs.berkeley.edu/~ee40/**

Course Information Sheet

Discussion and Laboratory sections begin 8/29/05

Overview: The course begins with models for circuits, their analysis using node and mesh techniques based on Kirchhoff's laws, and equivalent circuits. Capacitors and inductors and the transisent analysis of signals associated with them are then considered. This includes sources of delay and power consumption in digital circuits. In the sixth week complex numbers (phasors) are introduced to both efficiently represent sinusoidal signals and analyze the frequency response of circuits. The design of circuits using very high-gain operational-amplifiers is then considered. The operation of semiconductor diode and MOSFET devices are overviewed and simple circuit models for them are used to analyze their usefulness in basic applications. Basic concepts from logic circuits including simple synthesis, timing diagrams, glitching, and circuits for latches and clocks are described. Near the end of the course the more challenging mathematics of 2nd order circuit response and total (transient plus forded solutions) are briefly treated. The last topic is a survey of microfabrication and nano technology.

Textbook: *Electrical Engineering Principles and Applications*, Allen R. Hambley, 3rd Edition, 2004 Prentice Hall.

Prerequisites: Math 1B and Physics 7B or equivalent

Course Format: Three hours lecture, three hours laboratory, one hour of discussion [4 Units].

Lectures: The topics of the course will be fully covered in the Lectures with **Handouts provided**.

Discussion Sections: Examples will be the main focus of the discussion sections. You may attend any and all of the discussion sections, but regular attendance at one discussion section will assure that you have seen examples of all the problem types you can expect on the homework assignments and exams.

Laboratory: The weekly laboratory illustrates the concepts with actual devices. There are nine structured experiments and a three week project on a topic of your choice. The project involves real-time interfacing a simple circuit design with computerized measurement, comparison and feedback.

Homework: Assignments will be posted and distributed in the class on Monday. They are due 8 days later on **Tuesday at 5 PM in 240 Cory**. Grading is based on independent work and is used to give you feedback on your degree of mastery. **Homework is returned to the discussion section of your choice.**

Examinations: All exams are closed book with formulas provided. Quizes in class Sep. 28, and Nov 2. Midterms in class Oct 5th and Nov 9th The final is 8-11AM, Monday December 19th, room TBA.

Grading: Out of 100 weighting is Laboratory 18, Homework 10, Midterms 18 each, Final 36.

EE40 Equivalence: We are exploring new ways to enable students who have had nearly all of the material in EE40 to move on to other more advanced courses such as EE 105 or to move laterally to other topics that interest them such as biology, computer science, etc. See Web Site for details.

Discussion and Lab Consolidation: The goal is to pack down to 4 Discussion Sections and 9 or even 8 Labs so that we operate more cost-effectively at 2/3 capacity or higher. The decision as to which Discussion Sections and Labs to cancel will be based on a survey in class on August 29th and discussions with the TA's at the Discussion Sections and Labs the first week of class. **See Web Site.**

On-Line Information: Course information is accessible through the link from UC Berkeley Schedule of Classes. The class web site is best for weekly information at http://inst.eecs.berkeley.edu/~ee40/.

Look in archives.html for previous offerings and exams. Daily updates will be made by the Discussion TA’s through the EE 40 news group.