ECE 120B Spring 2016

Integrated Circuit Design and Fabrication
Electrical and Computer Engineering Department
University of California, Santa Barbara

This course is a continuation of ECE 120A Integrated Circuit Design and Fabrication. We will focus on the sound understanding of solid state devices for integrated circuits as well as semiconductor processing techniques. Specifically, we will study p-n junctions and heterojunctions, MOS, bipolar transistors and HBTs, and JFETs/HFETs. We will also discuss CMOS and BiCMOS technologies, which are the basic building blocks of VLSI integrated circuits. There is a laboratory associated with this course which will give you hands on experience in integrated circuit design, processing, and characterization. In the laboratory, you will design a simple circuit, fabricate it, and test it.

Topics to be covered

- MOS Transistors
- p-n junctions and heterojunctions
- Bipolar Transistors and HBT's
- JFET's and HFET's
- VLSI technologies
- Advanced processing techniques

Prerequisite: ECE 132, ECE 137A, and ECE 124B/120A or equivalent or consent of the instructor

Instructor: Ilan Ben-Yaacov, Room 2213, ESB, ext. 5295, ilan@engineering.ucsb.edu

Time: Tuesday and Thursday 9:30-10:45 a.m.

Place: PHELPS 1508

Text: Device Electronics for Integrated Circuits, by Richard S. Muller and Theodore I. Kamins. Published by John Wiley & Sons. 3rd edition, 2002. TK7871.85 .M825 2002

Handouts and class notes will complement the text.

Course Format: There will be homework assignments, a midterm, a presentation, and laboratory work. Laboratory work will consist of designing, fabricating, and testing of something interesting, such as a simple MOS circuit. You will design a process sequence using L-Edit software by Tanner EDA, simulate the device characteristics and circuit performance, and compare it with your experimental results. Homework, midterm, and laboratory project/presentation will each contribute 15%, 30%, and 55%, respectively, to the final grade. The laboratory will include a final report and a presentation to the class.

Office Hours: Instructor office hours are Tues/Thurs 10:50-11:50am or by appointment in ESB 2213.

Teaching Assistants: Alexander Hunter (adhunter@umail.ucsb.edu), office/lab hours TBA
Alexander So (alexanderso@umail.ucsb.edu), office/lab hours TBA

Class Web Page: http://www.ece.ucsb.edu/courses/ECE120/120B_S16Ilan/

Lab Supervisor: Bob Hill, Engineering II Room 1141, ext. 4142, bob@ece.ucsb.edu