ECE 124C   Spring 2006

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

This course is a continuation of ECE 124B 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 or equivalent or consent of the instructor

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

Time: Monday and Wednesday 5:30-6:45 p.m.

Place: BLDG 387, room 101

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, presentation, and laboratory will each contribute 15%, 30%, 15%, and 40% to the final grade. The laboratory will consist of a final report and a presentation to the class.

Office Hours: Instructor office hours are MF 11am-noon in ESB 2213.

Teaching Assistant: Navin Parthasarathy (navin@ece.ucsb.edu), office hours TBA

Class Web Page: http://my.ece.ucsb.edu/ECE124C_S2006

Lab Supervisor: Martin Vandenbroek, Room 4110, Engineering I, ext. 4142, mav@ece.ucsb.edu