UNIVERSITY OF CALIFORNIA
College of Engineering
Department of Electrical Engineering and Computer Sciences

EE 130: INTEGRATED CIRCUIT DEVICES

http://www-inst.eecs.berkeley.edu/~ee130

Spring 2003 Prof. King

Course Information Sheet

Staff: Professor: Tsu-Jae King (tking@eecs.berkeley.edu, 643-9251)
Teaching Assistants: Marie Eyoum (meyoum@eecs.berkeley.edu)
Alvaro Padilla (apadilla@eecs.berkeley.edu)

Lectures (203 & 205 McLaughlin)**:** Tuesdays & Thursdays, 3:30 PM to 5:00 PM
(These will be webcast at http://webcast.berkeley.edu/courses/ and will also be available on videotape.)

Discussion Sections:
Section 101 (203 McLaughlin): Wednesdays, 4-5 PM; Marie Eyoum
-- also available on videotape
Section 102 (213 Wheeler): Thursdays, 10-11 AM; Alvaro Padilla

**** DISCUSSIONS SECTIONS WILL BEGIN ON WEDNESDAY, JANUARY 29th ****

Office Hours (also available by appointment)**:**
T.-J. King (567 Cory): Thursdays 12-1 PM and Fridays 4-5 PM
M. Eyoum (179M Cory): Mondays 5-6 PM
A. Padilla (179M Cory): Wednesdays 3-4 PM

Objective:
To teach the fundamentals of basic semiconductor devices: the pn-junction diode, the bipolar junction transistor, the metal-oxide-semiconductor capacitor, and the field-effect transistor. Upon completing this course, the student will understand their principles of operation, and how their electrical characteristics depend on their physical parameters and operating conditions.

Prerequisites:
- EECS 40: Simple pn-junction and MOSFET theory; MOSFET circuit applications (CMOS logic gates); basic microfabrication processes.
- It is assumed that students are familiar with the Bohr model (concept of electron energy levels) for the hydrogen atom.

Relation to Other Courses:
EE130 is a prerequisite for EE231 (Solid State Devices). It is also helpful (but not required) for IC analysis and design courses such as EE140 & EE141, as well as for the microfabrication technology course EE143.

Textbook: *Semiconductor Device Fundamentals*, by Robert F. Pierret

Course Reader: The EE130 course reader contains a complete set of old homework assignments, quizzes and exams (along with their solutions), as well as required reading material on MOS devices. It can be purchased at Copy Central (2483 Hearst Avenue).

References (on reserve in the Engineering Library)**:**
1. *Solid State Electronic Devices* by B. G. Streetman & S. Banerjee (Prentice Hall, 2000)
2. *Fundamentals of Modern VLSI Devices* by Y. Taur & T. H. Ning (Cambridge University Press, 1998)

Student Participation:
Students are encouraged to ask relevant questions in class, and to regularly attend a discussion section. The TA's will review important concepts covered in the lectures and work through sample problems during the discussion sections.

Homework:
Weekly assignments will be distributed on Tuesdays, and will be due one week afterward (at the beginning of class). Late homework will not be accepted.

Students are encouraged to discuss homework problems with other students in the class, the TA's, and/or Prof. King. However, the work which you submit for grading must be your own.

Quizzes:
Six quizzes (25 minutes each) will be given periodically in class throughout the semester. These are intended to gauge the student's understanding of the basic concepts covered in the course, and hence will not require extensive numerical calculations (*i.e.* calculators should not be needed). All quizzes will be closed book. The lowest quiz score will be dropped for each student (*i.e.* only the top 5 quiz scores will be used in determining the course grade).

Design Project:
Students will gain experience in bipolar junction transistor design through a term project. Teams of two will be permitted; each team must work independently (*i.e.* sharing of work across teams is not allowed). Details will be provided later in the semester.

Final Exam:
The final exam will be open book and notes. Students will need to bring a calculator.
The final exam will be given on **Friday 5/23 from 12:30-3:30 PM**. No early final exam will be offered.

Grading:
The numerical score on which the course grade will be based is derived as follows:

Homework: 10%	Project: 20%
Quizzes: 6% each	Final Exam: 40%

Letter grades will be assigned based approximately on the following scale:

98-100: A+	88-98: A	85-88: A-
83-85: B+	73-83: B	70-73: B-
68-70: C+	58-68: C	55-58: C-
45-55: D	<45: F	