

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

EE 130 / EE 230A: INTEGRATED CIRCUIT DEVICES
<http://www-inst.eecs.berkeley.edu/~ee130/fa13/>

Fall 2013

Prof. Liu

Course Information Sheet

Staff: Instructor: Tsu-Jae King Liu (tking@eecs.berkeley.edu)
Teaching Assistant: Peng Zheng (pzheng@eecs.berkeley.edu)

Lectures (241 Cory): Tuesdays and Thursdays 2- 3:30 PM

Discussion Section (beginning on Wednesday 1/23):

Section 101 (247 Cory): Mondays 10-11 AM

Section 102 (247 Cory): Wednesdays 12-1 PM

Office Hours:

T.-J. K. Liu: Mondays 4-5 PM in 212 Cory (except 9/30 and 10/7 in 225 Cory)

P. Zheng: Tuesdays 9-10 AM and Wednesdays 4-5 PM in 288 Cory

This term we will be using Piazza, a free online discussion forum, to allow students to get help efficiently from classmates as well as the teaching staff. You are encouraged to post your questions on Piazza:
<https://piazza.com/berkeley/fall2013/ee130230a/home>

Objectives:

At the end of this course, the successful student will have a fundamental understanding of the working principles of semiconductor devices (pn-junction diode, metal-oxide-semiconductor capacitor, field-effect transistor, bipolar junction transistor) used in modern integrated circuits. One of the student outcomes of this course will be an ability to design a transistor to meet performance requirements within realistic constraints.

Prerequisites:

- EECS 40: Basic properties of semiconductors and basic understanding of transistor operation.
- It is assumed that students are familiar with the Bohr model (*i.e.* the concept of electron energy levels) for the hydrogen atom.

Relation to Other Courses:

EE 130/230A is a prerequisite for EE 230B (Solid State Devices). It is also helpful (but not required) for IC analysis and design courses such as EE 140/240A & EE 141/241A, and for the microfabrication course EE 143.

Textbook for EE 130: *Semiconductor Device Fundamentals*, by Robert F. Pierret

Reference for EE 230A: *Modern Semiconductor Devices for Integrated Circuits*, by Chenming Hu
(<http://www.eecs.berkeley.edu/~hu/Book-Chapters-and-Lecture-Slides-download.html>)

Homework:

Weekly assignments will be posted online on Thursdays, and will be due one week afterward (at the beginning of class). **Late homework will not be accepted.** The lowest homework score will be dropped for each student (*i.e.* only the top 12 homework scores will be used in determining the course grade). Students are encouraged to discuss homework problems with other students in the class, the TA, and/or the instructor. 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, with a limited number of pages of notes allowed. 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 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 closed book, with 7 pages of notes allowed. Students will need to bring a calculator. The final exam will be given on **Tuesday 12/17 from 8:00 AM to 11:00 AM**. 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+	89-98: A	87-89: A-
85-87: B+	76-85: B	74-76: B-
72-74: C+	63-72: C	61-63: C-
59-61: D+	50-59: D	48-50: D-
	<50: F	

Course Accommodations:

Students may request accommodation of religious creed, disabilities, and other special circumstances. Please arrange to meet with Prof. Liu to discuss your request so that she can plan accordingly in advance.

Classroom Etiquette:

- Arrive in class on time
- Bring your own copy of the lecture notes (posted online at least one day in advance).
- Turn off cell phones, *etc.*
- Avoid distracting conversations - relevant questions are encouraged