

Intro. to microelectronic circuits (EECS 40) Summer 2003 Course Policies and Syllabus

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1. The Course

- This course is an introduction to microelectronic circuits. Notice the root words: micro and electronics. Hence, this course will cover topics in circuit theory, some device physics and device fabrication. For a more detailed outline refer to the syllabus at the end of this document. Since you need a firm grasp of basics, 80% of the course will be devoted to circuit theory and the remaining 20% will be devoted to device physics, fabrication and some other IC (integrated circuits) stuff.
- The official prerequisite for this course is Physics 7B. However, I will be teaching the material from ground up, so Physics 7B is not required. The only enrollment restriction that I will have is space in the classroom.
- Since the summer session is only 8 weeks long, **THE COURSE MOVES AT A VERY FAST PACE**. Please **DO NOT SLACK OFF!** If you need help, ask immediately.
- As for course materials: there are no textbooks. We have a custom reader that you need to buy from Copy Central, on 2483 Hearst Avenue (cross street is Euclid) in Berkeley . Do not go to any other Copy Central (for example, the one on Bancroft, you cannot find the reader there). The reader will be available on Friday, June 20th, 2003. The hours of operation for Copy Central are 7:30 AM - 10:00 PM Mon - Thurs, 7:30 AM - 7:00 AM on Friday and 10:00 AM - 5:00 PM over the weekends. The reader costs \$19.02.

2. The Lab

- There is a lab component to this course. It must be taken for a pass/not pass basis and must be taken concurrently. Passing the lab

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involves turning in a prelab at the beginning of lab section, completing a lab report and turning it in at the end of lab section and a final project. The project is building an obstacle-avoidance digital robot. You may work in groups of up to 2 people in lab. If there are an odd number of students in a section, a group of 3 will be formed. **YOUR LAB PARTNER MUST BE IN THE SAME SECTION AS YOU.** No exceptions.

- The material for the labs is online at the lab homepage: <http://inst.eecs.berkeley.edu/~ee40/Labs/>. You need Adobe Acrobat Reader to download the files.
- **I MAY ASK YOU A SIMPLE LAB QUESTION (10 points, maximum) ON THE EXAM.** So, don't just sleep through lab.

3. Instructors, Office Hours and Links

- Instructor: Bharathwaj Muthuswamy (call me Bharath)
Office hours will be held in 469 Cory
 Office: 301 Cory Hall, Desk #4
 Phone: (510) 643 2382
 Office Hours:

Tu: 9:00 - 11:00 and 3:00 - 5:00
 W: 9:00 - 11:00 and 3:00 - 5:00
 Th: 9:00 - 11:00 and 3:00 - 5:00
 F : 11:00 - 12:00

You can also email me for appointments.

Homepage: <http://robotics.eecs.berkeley.edu/~mbharat>

The best way to reach me is email: mbharat@cory.eecs.berkeley.edu

- Your TA names and their email addresses are given in the table below. Please do not contact the readers directly. If you have grading issues with the homework, please bring it to my office hours first.

TAs	Readers
Nir Matalon nmatalon@uclink.berkeley.edu	Kun Gao
Jesse Trutna jint@soda.csua.berkeley.edu	Amy Wu
Jonathan Tsao jjtsao@uclink4.berkeley.edu	

TA office hours:

Nir Matalon: Tu 12 - 2, Th 2 - 3

Jesse Trutna: M, 2 - 5

Jonathan: Tu 10 - 12, Th 10 - 11

Location: 140 Cory

- Course website: <http://inst.eecs.berkeley.edu/~ee40>

- Lab website: <http://inst.eecs.berkeley.edu/~ee40/Labs/>
- Lab: 140 Cory Hall.
- Newsgroup: ucb.class.ee40. The news server is agate.berkeley.edu. Please check the newsgroup link under the course website to setup access to the newsgroup.

4. Lecture

- Lecture will run from 12:10 - 2:00 pm. Location: 2060 Valley Life Sciences Building (VLSB). If you want to know where VLSB is, try: <http://www.berkeley.edu/map>
- There will be a ten minute break every lecture from 1:00 - 1:10 pm.
- It is in your best interest to read the material in the reader before coming to lecture.
- **NO QUESTION IS STUPID.** Please ask questions in lecture. Also, respect your fellow classmates as well as their questions.
- If time permits, I will try to have lectures which talk about cutting edge stuff in electrical engineering. I will try to invite some of the professors from Berkeley who are doing cutting edge electronics research. I will not quiz you on this material.
- I will do my best to make the course interesting and fun. However, I need feedback. We have set up an anonymous feedback email address for this purpose: ee40-feedback@cory.eecs.berkeley.edu. If you send an email to this address, your email will be forwarded to me and the TAs. However, your email address will be stripped. All we see in the from field is the feedback address above.

5. Homework¹

- There will be one homework set per week, which will be posted on the web page by Wednesday at 12PM and is due on the subsequent Wednesday. **THE HOMEWORK MUST BE TURNED IN BEFORE LECTURE STARTS PROMPTLY AT 12:10 PM.** Print your names and lab time on your homework. The lab time (e.g. M 9-12A) is used to return the homework to you. Late homeworks will not be accepted. No exceptions (don't even ask). The solutions to the homework will be posted on the website. **YOU ARE WELCOME TO WORK IN GROUPS OF UP TO THREE PEOPLE AND HAND IN ONE HOMEWORK PER GROUP.** If you work with another student, you must put that student's name on your homework. Proper attribution for your work is essential. If we find identical homeworks with no indication of cooperation, we will assume that one of the homeworks was copied without permission, see "My Policy on Cheating" below. If you have errors in homework grading, please contact me first.

¹Homework policy adopted from EECS 20: <http://ptolemy.eecs.berkeley.edu/eecs20/>

6. Midterms and Final

- Midterm Dates: July 16th and August 06th
Midterm location: In class, this way all of you should be able to make it. Closed book and notes, cheat sheet allowed (see below). The midterm will be 2 hours long. There will be a review session for the midterm that will be announced sometime before the midterm.
Cheat sheet: Yes (of course)! One 8.5" x 11" sheet, front and back, any font type and size.
- Final Date: August 15th
Final location: I will try to make it in class. Closed book and notes, cheat sheet allowed (see below). **HOWEVER, THE FINAL WILL BE 3 HOURS LONG.** There will be a review session for the final that will be announced later in the summer.
Cheat sheet: Yes! Two 8.5" x 11" sheets, front and back, any font type and size.
- **MAKEUP MIDTERM AND FINAL WILL BE GIVEN ONLY IN EXTENUATING CIRCUMSTANCES. I MAY GIVE YOU AN ORAL MIDTERM OR FINAL.**
- If you have a disability and need special accommodations for the exams, it can be arranged. Please contact me one week before the scheduled exam date.

7. Grading

- Homework(s): 20% Midterm I: 17.5% Midterm II: 17.5% Final: 45%
- I will try not to curve the class. Don't panic! The homeworks are the only component of your grade that you may find difficult, so it is highly recommended that you work on the problems in groups. The midterms and the final should be of "medium" difficulty. My definition of "medium": If you understand the concepts from lecture, you should be able to get a B+ on the midterm and the final. Hence, if you have good homework scores, you should be able to get a B+ in the class. A little more work will get you into the A- range. For getting an A, you need to understand the concepts very well. A+ means: "Hail to the king, baby"! Also, notice that I have two midterms. This is to your advantage. If you screw up in one, you can always make it up with another.
- However, if the entire class does poorly on the midterms or final, I will blame it on myself. I will add points as I see fit and I will also post my curve on the web. I will try to avoid this as much as possible because **I DO NOT BELIEVE IN GIVING HARD EXAMS.**
- The breakdown for letter grades is shown below:

A+: 96 - 100

A : 89 - 95
A-: 83 - 88
B+: 77 - 82
B : 70 - 76
B-: 66 - 69
C+: 62 - 65
C : 56 - 61
C-: 50 - 55
F: < 50

- Incomplete grades will be granted only for dire medical or personal emergencies, and only if your work in the class is satisfactory.

8. My Policy on Cheating (**READ THIS CAREFULLY!!!!**)

- If I catch you cheating:
 - I will give you an “F” in the course.
 - I will try my best to throw you out of the department.
 - I will try my best to throw you out of the University.
- What is cheating and why is the penalty so severe? According to American Heritage College Dictionary, 2000 Edition: cheat, v. 1) To act dishonestly; practice fraud.
An example of cheating would be if I had defined “cheat” above without citing the proper reference. I am taking credit for work which I did not do. Obviously, this is not fair. So, other obvious forms of cheating are copying from your neighbour during an exam, copying homework and fudging lab data randomly. Not so obvious forms of cheating include allowing someone to copy your homework or your project code. However, if you explain to someone some ideas behind your homework solution or project, that is acceptable. Students usually cheat because they are scared of “getting a bad grade” or they have fallen behind so much in the class. If you have any problem, just talk to the instructors. We are more than willing to help you. It is our job, as instructors and more importantly as human beings.

Week/Labs	Lect.	Date	Topic
1/Intro. and Oscilloscope.	1	06/23	Introduction
	2	06/25	Circuit Analysis I - Series and Parallel Circuits, Current and Voltage divider, Kirchoff's laws
	3	06/27	Circuit Analysis II - Nodal and Mesh Analysis
2/RC circuits and Make-up	4	06/30	Capacitance and Inductance concepts
	5	07/02	Circuit Analysis III - Thevenin and Norton theorems, op-amp model
	6	07/04	NO CLASS
3/Op-amps and CalBOT intro.	7	07/07	Operational Amplifiers Circuits
	8	07/09	Circuit Analysis IV - Source Transforms, intro. to fabrication
	9	07/11	12 - 1: Guest lecture or MIDTERM REVIEW
4/Digital logic and Make-up	10	07/14	No lecture
	11	07/16	MIDTERM I (covers lectures 1-8)
	12	07/18	Digital logic
5/Diodes and CalBOT lab 1	13	07/21	Nonlinear devices I - diodes
	14	07/23	Nonlinear devices II - FET transistors intro.
	15	07/25	Device physics and fabrication
6/Mosfet and CalBOT lab 2	16	07/28	Non-linear devices III - Constant current source, PMOS, CMOS intro.
	17	07/30	Nonlinear devices III - CMOS circuit and layout/fabrication
	18	08/01	Guest lecture and CMOS NAND/NOR logic
7/CalBOT lab 3 and make-ups	19	08/04	CMOS propagation delay and fabrication II
	20	08/06	MIDTERM II (covers lectures 10, 12 - 18)
	21	08/08	BJT transistors
8/ Finish project and return CalBOT	22	08/11	Circuit examples
	23	08/13	Course conclusion/review/survey
	24	08/15	FINAL (cumulative)