Welcome to EE40

LAB 0: WELCOME TO EE40

ELECTRICAL ENGINEERING 40

INTRODUCTION TO MICROELECTRONIC CIRCUITS

University Of California, Berkeley

Department of Electrical Engineering and Computer Science

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DISCLAIMER:

Dear Class,

The contents of the following class may be frustratingly difficult at times but since we know you're awesome, we know that you, in the interest of self-preservation, will attempt and complete all the labs. We know many of you are the CS side of EECS and are predisposed to hating this class but we hope that the contents of these labs will at least make you nominally acknowledge that the material is at a minimum interesting. The labs are not meant to be mortally debilitating to your soul and we will try to make them as painless and/or amusing as possible.

Regards,

Your Teaching Staff

Basic Stuff

Labs will normally consist of two components: a pre-lab, and lab. In the pre-lab, we will usually work with the circuit simulator Multisim and cover the basic theory that will be presented in lab. During your time in the laboratory, we will actually build the circuits and explore the practical and non-idealized implementation of the circuit material presented. Finally, after you have had time to work with the basics of the circuits in lab, we will discuss the relevance of each lab to your final project.

These labs will also sometimes ask you to refer to your textbook written by your immodest instructor who walks on water so we highly recommend you purchase the textbook for this class.

Last thing, we know how much everyone likes putting units on their measurements. In these labs, when you are prompted for a numerical answer, make sure to put the correct units or we will automatically assume that the answer is in Terawatt-meters per Faraday.

Pre-Lab

The pre-lab sections of each lab are designed to prepare you adequately for the lab component. In these pre-lab sections, it is important for you to understand the concepts presented and, if asked, simulate a functional circuit before coming to the lab. If you do not complete the pre-lab, there is a good chance that you will **NOT** be able to complete the lab in the allotted three hour lab section.

The labs are **designed** to be completed during the three hours that consist of your lab section and if you are adequately prepared this should not be a problem. Be aware the there is absolutely no guarantee that you will have more than three hours to finish the lab because the lab is booked from 8AM to 8PM Monday through Friday. In fact, if you need more than three hours to complete the lab, you probably did not adequately complete the pre-lab or read the document.

For every pre-lab, you are responsible for **answering all of the questions** presented, in addition to **reading through the entire lab document**. It is your responsibility to ask your lab partner/friend/local circuit guru, or attend office hours if you do not understand something in the lab.

The pre-lab should be completed individually so that both partners in the tag team understand the basis and reasoning behind the lab. All labs with the exception of the solder lab will be completed in partners. There will be NO groups of 3 or more; this rule will be strictly enforced.

Lab Component

All lab sections will be held in room 140 Cory Hall. Each lab section is three hours long in which you will complete the laboratory component of the lab. For each lab, you will be required to demonstrate the working implementation of the circuit presented to your lab GSI for check off. If you do not get these lab check offs, you will not get full credit for the lab component.

The labs are written and have been tested to be completed in three hours, provided you adequately prepared yourself with the pre-lab. If you ever try and attend another lab section to finish your circuit, be aware the TA will not be obligated to help you and that some sections are not part of EE40. In addition, you cannot ask the TA during your make up section to check you off.

The lab must be completed in pairs because there are not enough workstations for each student to complete the lab individually.

Also there is ABSOLUTELY NO FOOD OR DRINK allowed in the labs AT ANY TIME. Failure to comply with this sacred rule will subject you to the wrath of Pete Caraghar or Ming Wong, the godfathers of 140 Cory.

Take Home Instruments

Once we kick off the semester and the dust settles, we will be offering to check out to each pair of students a myDAQ, a breadboard, and kit of circuit components to take home and use. The myDAQ is a data acquisition device which also comes with on board instrumentation capabilities.

If you are interested, you may use these myDAQs to perform pre-lab, and lab assignments at home before you come to lab. This will ensure that you have a viable means of completing the pre-labs and labs, and getting it checked off in lab. Some of the labs you will encounter are incredibly long but if you are prepared you should be able to complete them in the allocated time in the lab.

The kit that you will be receiving after lab 2 will contain all of the parts you will be using throughout the semester except for resistors and capacitors. The kits are one per tag team and will be deployed at the beginning of lab 3. Do NOT lose, break, fry, eat, swallow, or explode these parts. You will only be provided with what is necessary and one or two extras. If you need more parts your TA will have some spares but if you become the master of disaster we reserve the right to begin docking points from your overall lab score.

If you fear that you will not be able to finish your labs in the allocated lab sections, we strongly encourage you to do your labs at home and just bring your circuits in to lab to get checked off. You are not obligated to take home the myDAQ it is just an option for those of you who want to work on circuits outside of the lab.

If you are issued a myDAQ to take home and use, you will be responsible for returning it at the end of the semester. Failure to return this item will result in disciplinary actions subject to the discretion of the professor and department chair.

With that being said, it is ABSOLUTELY CRITICAL that you find a lab partner who you are willing to snuggle up with for the entire semester. These labs are designed to be completed in groups of two so it is imperative that you do not let your other partner jump ship halfway into the semester.

Final Project

Throughout the laboratory set, you will be building modules that will culminate into your final project. The final project for EE40 will compose of a printed circuit board electroencephalographic detector (EEG).

An EEG is an electrical detector that that detects the μV fluctuations on your scalp. Each week we will be learning about different components and modules that compose of an EEG and gradually learning how it applies to the final project. Once we have learned about and completed all the modules for our EEG, in EE40, we will design a printed circuit board and have it fabricated. Please do NOT use yourself as a test subject for your EEG at any time during this process.

Lab Submissions

For each lab we will provide you with one of these lab documents that will guide you through the lab. At the top right corner of each lab document there will be a box with fields for you and your partner's names and student ID numbers. For each lab you will be working with one other lab partner and your tag team will submit one copy of your work per lab.

Typically the lab for week N will be due at the beginning of lab N+1 unless otherwise specified. Also there will be no new labs held during midterm weeks.

When you submit your lab documents, make sure to attach any other work, graphs, or circuit diagrams that the lab asks for. It is hard to give partial credit for a lab report that refers to a non-existent circuit diagram. Also please do not use invisible ink or write illegibly… they're practically the same thing…