EE 42: Introduction to Digital Electronics
EE 43: Introductory Electronics Laboratory
EE 100: Electronic Techniques for Engineering

INSTRUCTOR
Tony Dear tonydear@berkeley.edu

TEACHING ASSISTANTS
Jerry Chang tingchiachang@berkeley.edu
William Chow william_chow@berkeley.edu
Dennis Wai dwai213@berkeley.edu
John Wang johnjwang@berkeley.edu

LAB ASSISTANTS
Zoey Huang huangfang8899@berkeley.edu
Boris Lo bt.lo@berkeley.edu
Robert Tang-Kong robert.t-k@berkeley.edu
Gregory Trigub 4734trigub@berkeley.edu

READERS
Pritha Hait pritha.hait@berkeley.edu
Pius Lau lauph@berkeley.edu
Davis Li davisli@berkeley.edu

LECTURE:	MWF 14:10-16:00 in 2040 VLSB	Tony
DISCUSSIONS:	Tues. 09:10-11:00 in 285 Cory	Jerry
	Tues. 10:10-12:00 in 3113 Etcheverry	John
	Tues. 12:10-14:00 in 310 Hearst Mining	William
	Tues. 14:10-16:00 in 289 Cory	Dennis
LABS (125 Cory):	MW 11:10-14:00	John, Boris, Gregory
	TuF 11:00-14:00	Jerry, Gregory
	WF 17:10-20:00	Dennis, Robert, Zoey
	ThF 08:10-11:00	William, Zoey, Boris

Course Text
Allan R. Hambley, *Electrical Engineering: Principles and Applications*, 5th edition, Prentice Hall, 2010.
While the text is not strictly required in that it is possible to get by in the course without it, I **highly encourage** you to get your own copy. All necessary material is covered in lecture, but the textbook has a number of examples and practice problems. It also serves as a reference for the topics covered in lieu of regular lecture notes. Older versions are permissible; it is your responsibility to match relevant chapters and sections to that of the 5th edition.

Online Resources
We will be using a combination of Piazza and Bspace to administer the course online. It is mandatory that you have access to both. Piazza will serve as the primary means of class discussion outside of class, as well as the venue for class announcements. We will use Bspace for keeping track of grades, the course schedule, and section enrollment. Resources such as homework and labs will also be posted on Bspace.

Course Prerequisites
The official prerequisite for the course is Math 1B. I assume familiarity with systems of linear equations, single-variable calculus, and first-order linear differential equations. Mathematical knowledge of complex arithmetic and Fourier analysis is helpful but not necessary.

A basic physics course covering E&M and circuits is highly desirable. While I do not assume such knowledge, the physics material will be reviewed very quickly in the first lecture in the interests of covering core material. It is your responsibility to come to office hours and see me immediately if you are struggling from day 1.

Course Description and Objectives
This class is a combination of three different courses. EE 42 is a 3-unit lecture course for L&S CS majors. EE 43 is an optional, 1-unit, P/NP lab course designed to complement EE 42. EE 100 is the 4-unit course for engineers; it includes both the lecture and lab component.

The purpose of EE 42 and EE 100 is to prepare you to analyze, use, and design elementary circuits in the analog and digital domains. For engineers, this is important as you will almost certainly have to use electronics or circuit schematics in your field. For computer scientists, this course will teach you the physical foundations on which computers are built. It is my hope that all of you will walk out of this course with an appreciation for the tight interdependence of electrical engineering with other technical fields.

EE 42 and the lecture portion of EE 100 cover a lot of material, with the following course objectives:

- Use physical laws and principles to analyze circuit behavior and characteristics.
- Design simple analog circuits, e.g. filters or amplifiers, using good engineering principles.
- Describe the transient behavior of a circuit using ODE analysis.
- Describe the frequency behavior of a circuit using Fourier analysis.
- Use linear analysis techniques to model nonlinear elements, such as diodes and transistors.
- Make the connection between the analog and digital domains using transistors.
- Solve binary logic problems and design simple digital circuits for computing problems.

EE 43 and the lab portion of EE 100 revolve around the following course objectives:

- Apply concepts learned in lecture to reinforce understanding and implement real-world applications.
  - Become familiar with basic electrical components such as resistors and capacitors.
  - Design and build simple analog circuits, including amplifiers, oscillators, and filters.
- Become proficient at using electronic lab equipment and applying electronic techniques.
  - Solder on printed circuit boards (PCBs).
  - Use lab equipment, such as the oscilloscope and digital multimeter, and analyze their outputs.
  - Integrate digital and analog sensors with the circuits built above.

For further details on what exactly the course will cover, refer to the Course Schedule at the end of the syllabus.

Discussion Sections

Discussion sections are held weekly. Attendance is not enforced; furthermore, you may attend whichever section you want. You are strongly encouraged to attend section, as it is an opportunity to review previously learned material in a different form, as well as a chance to get practice with sample problems and get homework help. Paper assignments will also be returned in section.

Lab Sections

Each lab section is six hours per week, split into two days of three hours each. In general, we will be doing one lab a week, meaning that you will have six hours to do a lab meant to be finished in three hours. If you finish the week's lab in the first session, you will not have to come in for the second, unless otherwise stated. Each lab consists of a prelab assignment to be done *before* the lab session itself. This and the actual in-lab portion count toward the grade, all graded by your lab GSI.

The last two or three weeks of the course may be devoted to a large-scale final project in lieu of the normal labs. Whether this will be done or not is still under discussion, as it will depend highly on our ability to spare the cycles during this fast-paced summer class. If this is done, it will be more open-ended than the other labs, and it will include a significant design component. As for grading, the project will be worth however many labs it replaces.

Homework Assignments

There will be a total of seven homework assignments over the course, one for each week except the last. There will be approximately one week between the release and due date of each homework. *Late homework is **not** accepted.* Instead, the lowest homework grade will automatically be dropped. Solution sets are posted after each homework is due.

Homework problems will typically cover topics and material introduced in lecture and discussion during the week before it is due. They will include some combination of paper-and-pencil problems and problems requiring the use of a computer program such as LTSpice or MultiSim. You may treat the former type as study material for the exams.

Homework submission and grading. All homeworks are to be submitted in the homework dropbox outside 125 Cory before the deadline. The readers will typically get all homeworks graded within a week of the due date. Homeworks will be graded based on correctness, methodology, and presentation; you may find the grading to be harsher than that of the exams. This will hopefully encourage you to take homework more seriously, despite being worth less than the exams, so that you can learn the material better from your mistakes. *In addition, failure to **staple** the homework together, filling out incomplete or incorrect information, and extremely messy writing may lead to the loss of up to 10% of homework credit.*

Collaboration is allowed and encouraged, but homeworks must be written up *individually.* If work was done with classmates, all names must be acknowledged on the top of the homework assignment. Failure to do so constitutes plagiarism and dishonest use of academic material, and the offending student will be subject to the academic dishonesty policy, explained below.

If you feel that a homework was unfairly graded and would like a regrade request, you may submit a written proposal explaining your complaint, along with the homework, back into the homework dropbox. A different reader will then entertain the request. Your new grade will then be the average of your old and new score. *Note that your grade may go down.*

Exams

There will be four exams: two quizzes, one midterm, and one final. All are to take place during the normal lecture time. Because there is not enough time over the summer to have too many exams, the quizzes are meant to be soft assessments of your progress in the class. They will be short and take up no more than half an hour of the lecture. Both the midterm and final are two hours long. All exams are closed-book; the quizzes are closed-note, while the midterm and final will allow you to bring in one and two cheat sheets, respectively. Calculators are **not** allowed on any of the exams.

All exam dates have been scheduled and are listed in the schedule below. If you find that you will have a conflict with any one of them, you must notify the instructor with the reason by the second week of the course. Any future makeup requests will only be entertained for emergencies and unforeseen circumstances, for which you must notify the instructor within two days of the exam with appropriate documentation.

Exam regrade requests should be submitted only after reviewing the exam solutions and rubric. If you believe that the exam was unfairly graded, submit a written proposal explaining your complaint to any of the TAs or instructor. *All problems will be regraded, and your score may go down.* Your exam score will be **replaced** by the new evaluation, if it is different. Furthermore, you may only appeal an exam grade once; it will not be changed after the first regrade request.

Grading

The grading breakdown for the three classes is as follows:

Component	**EE 42**	**EE 100**	**EE 43**
Participation	10%	5%	0%
Homeworks	20%	15%	0%
Labs	0%	15%	100%
Quizzes	10%	10%	0%
Midterm	25%	25%	0%
Final	35%	30%	0%

Participation will be evaluated in a variety of ways, such as Piazza contributions and attendance in lecture, discussions, and office hours. Because this is a big class, we need your help in getting to know all of you. To encourage lecture attendance and participation, there will be occasional "pop quizzes" that will be collected and recorded for this portion of the grade.

As for the actual letter grade at the end of the course, I will be following the EECS Grading Guidelines for Undergraduate Courses, which means that the course average will roughly be around a B- to a B. Because EE 42 and 100 have different course components and grading scales, they will also be curved separately at the end of the course.

DSP Students

If you are a DSP student, I have already received the appropriate documentation. Special arrangements will be made for the quizzes, midterm, and final exam.

Instructors' Commitment

Everyone on the teaching staff is fully devoted to the course to the best of his or her ability. Their primary goal is to aid all students in the learning of the course material. You can expect the staff to be courteous, well-prepared, punctual, organized, and reasonable for all class-related activities. Furthermore, all staff will grade and evaluate work as uniformly and consistently as possible.

Academic Integrity

I will adhere strictly to the EECS Department Policy on Academic Dishonesty: "Copying all or part of another person's work, or using reference material not specifically allowed, are forms of cheating and will not be tolerated." For further information on the actions taken if this occurs, consult the full policy on the website.

In short, I expect everyone to complete his or her own work and acknowledge collaborators when appropriate. You are here to learn, and the course staff puts in a lot of effort to help you out. In return, you are expected to respect the integrity of the course by not misrepresenting your work. If you are at a point where you feel that you have to start copying other students' work, just remember that the course staff are all here for you. Ask for help if needed!

Course Schedule

The course schedule, which specifies lecture coverage, labs, readings, exams, and homework due dates, is provided on Bspace, as well as attached below. It is highly fluid and likely subject to change as the course goes on. An update will be made each time this happens (as with this syllabus), and you will be notified of the specific changes. While homework due dates, exams, and labs are unlikely to shift, lecture material coverage and readings are, depending on how much we get through for each lecture.