ES154: ELECTRONIC DEVICES and CIRCUITS

INFORMATION SHEET

http://deas.harvard.edu/courses/es154

INSTRUCTOR:	Gu-Yeon Wei, Assistant Professor of Electical Engineering
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Handouts are always available in Maxwell Dworkin 343

(PDF of handouts, notes, etc. are also available on the course web site)

Lectures: Tues and Thurs, 10:00 AM to 11:30AM
Cruft 318

Text: Course Notes (available on course web site and in class)
Microelectronic Circuits, Fourth Edition, Sedra/Smith (www.sedrasmith.org)

Prerequisites: Basic understanding of electronic circuits (ES 50), differential equations and Fourier series (AM 21b), electricity and magnetism (Phy 15b or 11b)

Assignments: Weekly homeworks and occassional lab write-ups will be due on Thursdays ***in class*** (solutions will be provided in class on the due date). No late homeworks accepted unless approved by instructor at least one lecture day prior to due date.

Laboratory: There will be four laboratory assignments throughout the semester. Lab assignments will be performed in Maxwell Dworkin B### during assigned lab hours TBD.

Homeworks and assignments will make extensive use of HSPICE (an analog circuit simulator) available on Linux machines in Maxwell Dworkin B123. You should have access to the room with your ID card once you've enrolled in the class. Please limit your computer usage to *course related* work. You will also have access to these machines from most on-campus computers.

Mini-project: There will be a small design project near the end of the semester. A write-up of the project will be due at the end of reading period.

Exams: This course will have one in-class midterm and one 3-hour final exam.

Grading:

Midterm	20%	Homework and Labs	30%
Final	30%	Mini-project	20%

Other: Each student will be required to sign up for *at least* one grading session where he/she will grade homework assignments from the entire class. Solutions with grading guidelines will be provided. *Pizza and sodas will also be provided!*

Reference Text Available (soon) in McKay Library:

- *Electric Circuits*, Nilsson, Addison Wesley, 1991.
- *Electric Circuit Analysis*, Johnson et al, Prentice Hall, 1997.
- *The Art of Electronics*, Horowitz and Hill, Cambridge, 1989.
- *Analysis and Design of Analog Integrated Circuits*, Gray et al, Wiley, 2001.
- *The Design of CMOS Radio-Frequency Integrated Circuits*, Lee, Cambridge, 1998.
- *Device Electronics for Integrated Circuits*, Muller and Kamins, Wiley, 1986.
- *Design with Operational Amplifiers and Analog Integrated Circuits*, Franco, McGraw Hill, 2002.
- *Design of Analog CMOS Integrated Circuits*, Razavi, McGraw Hill, 2001.

Other relevant information and links to interesting course-related web sites will be published in the course web site http://deas.harvard.edu/courses/es154.

TENTATIVE COURSE CALENDAR

Week		Tuesday	Thursday
1	17-Sep	Course Intro and Organization	Review of Basic Circuit Analysis
		Reading S&S: Ch 1, App B	
2	24-Sep	More Circuit Analysis and Laplace Transforms	
		Reading S&S: App E and F	
			HW1 due
3	1-Oct	Ideal Operational Amplifiers and OpAMP Circuits	
		Reading S&S: Ch 2; App C, D, and F	
4	15-Oct	OpAMP Non-Idealities	Intro to Semiconductors
		Reading S&S: Ch 2; App A	
		Lab1: Fun with Operational Amplifiers	
			HW2 and Lab1 writeup due
5	22-Oct	PN Junctions	Diode Characteristics and Applications
		Reading S&S: Ch 3	
		Lab2: Introduction to HSPICE and MATLAB	
			HW3 and Lab2 writeup due
6	29-Oct	Bipolar Junction Transistor (BJT) Devices and BJT Circuits	
		Reading S&S: Ch 4	
		Lab3: Useful circuits you can build with diodes	
			HW4 and Lab3 writeup due
7	5-Nov	MOSFET Devices and Circuits	
		Reading S&S: Ch 5	
		Lab4: BJT Thermometers	
			HW5 and Lab4 writeup due
8	12-Nov	In-Class Midterm Exam (up to BJTs)	Analog MOS Circuits
		Reading S&S: Ch 6.1-6, 6.9-10	
			HW6 due
9	19-Nov	Frequency Response Analysis	
		Reading S&S: Ch 7	
			HW 7 due
10	26-Nov	Feedback	Thanksgiving Recess
		Reading S&S: Ch 8	
11	3-Dec	More Feedback	Analysis of Circuits with Feedback
		Reading S&S: Ch 8	
			HW 8 due
12	10-Dec	Advanced CMOS Amplifiers	
		Reading S&S: Ch 10.7	
13	17-Dec	Introduction to Digital CMOS Circuits	Winter Recess
		Reading S&S: 13.1-4	
14	24-Dec	Winter Recess	Winter Recess
15	31-Dec	Winter Recess	Reading Period
16	7-Jan	Reading Period (Possible Makeup Lectures and Exam Review)	
			Mini-Project Due
17	14-Jan	Exam Period (Exam Time TBA)	
18	22-Jan	Exam Period	