EE 140/240A **ANALOG INTEGRATED CIRCUITS** **SPRING 2014**

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DETAILED COURSE SYLLABUS *(TENTATIVE)*

The following comprises a **tentative** syllabus describing the material to be covered in this course. Material to be covered for each dated lecture is indicated along with the corresponding sections of the required and recommended textbooks, where GM = Gray & Meyer's "Analysis and Design of Analog Integrated Circuits" (i.e., the required text), and R = Razavi's "Design of Analog CMOS Integrated Circuits" (i.e., the recommended text). How much of this material we can actually cover is a function of the degree of preparation of the average student in the class, which can vary depending upon which versions of EE 105 were taken.

Date		Material to be Covered	HWs	Labs
Jan.	22	Administrative Information, Introduction/Overview: Op Amps		No Lab
	24	Dev. Operation & Models: BJT & MOS; G&M: §1.1-1.6, R: Chpt. 2		
	27	Dev. Operation & Models, Inspection Analysis; G&M: §1.1-1.6, R: Chpt. 2		
	29	1-Tx Amps: Bipolar Inspection Analysis; G&M: §3.1-3.3, R: §3.1-3.4, §6.1-6.4		No Lab
	31	1-Tx Amps: MOS Inspection Analysis; G&M: §3.4, R: §3.5-3.6,	HW#1 Due	
Feb.	3	Multi-Tx Amps: Gain & Impedance Inspection Analysis; G&M: §3.4, R: §3.5-3.6		
	5*	1-Tx Amps: Freq. Response Inspection Analysis; G&M: §7.1-7.2, R: §6.5		No Lab
	7	Multi-Tx Amps: Freq. Response Inspection Analysis II; G&M: §7.3, R: §6.5	HW#2 Due	
	10	Active Loads: 1-Tx and Multi-Tx Loads; G&M: §4.3		Lab #1: 1-Tx MOS Amp.
	12*	Current Sources; G&M: §4.2, R: §5.1-5.2, R: §5.1-5.2		
	14	Supply and Temperature Independent Biasing; G&M: §4.4.2-4.4.3, R: Chap. 11	HW#3 Due	
	17	***Academic and Administrative Holiday***		Lab #1 (cont.)
	19	High Swing Current Sources; G&M: §4.2.5.2, R: §5.1-5.2		
	21	Current Source Matching; G&M: §A.4.1	HW#4 Due	
	24	Op Amps: Diff. Pairs, ECP, Half Circuits; G&M: §6.1, §3.5, R: §4.1-4.4		Lab #2-1 Diff. Pair Anal. & Des.
	26	Op Amps: SCP, Diff. Pair w/ Active Load; G&M: §3.5.6, §4.3.5, §A.4.2, R: §4.4, §5.3, §9.1-9.2		
	28	Op Amps: Active Loads, Input Offset Voltage; G&M: §3.5.6, §4.3.5, §A.4.2, R: §4.4, §5.3, §9.1-9.2	HW#5 Due	
March	3	Op Amps: Finite Gain-BW Product, Freq. Response in FB; G&M: §9.2		Lab #2-2 2nd Gain Stage Des.
	5	Op Amps: Freq. Response II, High Gain Designs; G&M: §6.3-6.7, R: §9.3-9.4		
	7	Op Amps: High Gain Designs, Compensation (a 1st pass); G&M: §6.3-6.7, R: §9.3-9.4	HW#6 Due	
	10	Op Amps: Swing, Slew Rate (a 1st pass); G&M: §9.4.1-9.4.2, §9.6.1-9.6.2, R: §9.7-9.8		Lab #2-3 Complete Op-Amp Anal.
	12	Op Amps: Output Stages; G&M: §5.1-5.5		
	14	Compensation: Stability of FB Circuits, Narrowbanding; G&M : §9.4, R: §10.1-10.3	HW#7 Due	
	17	Compensation: Narrowbanding, Pole-Splitting Pole/Zero Plots ; G&M: §9.4-9.5, R: §10.4		Lab #3 CMOS Op-Amp Design Project
	19	Compensation: Pole-Splitting Pole/Zero Plots ; G&M: §9.4-9.5, R: §10.4		
	21	***Midterm Exam***	HW#8 Due	
	24	***Spring Break – No Class***		Work on the Design Project
	26	***Spring Break – No Class***		
	28	***Spring Break – No Class***		
	31	Compensation: For CMOS Op Amps; G&M : §9.4-9. 5, R: §10.1-10.3		Work on the Design Project
April	2	Compensation: For CMOS Op Amps, Choosing C_c; G&M : §9.4-9. 5, R: §10.1-10.3		
	4	Compensation: CMOS Op Amp RHP Zero; G&M : §9.4-9. 5, R: §10.4		
	7	Compensation: CMOS Op Amp RHP Zero; G&M : §9.4-9. 5, R: §10.5-10.6		Work on the Design Project
	9	Slew Rate; G&M : §9.6		
	11	Settling Time & PSRR: Handout, R: §9.9	HW#9 Due	
	14	Feedback I: Pros & Cons, Types of FB Ckts; Handout, G&M : §8.1-8.2, §8.4, R: §8.1-8.2		

	16	Feedback I: Inspection Analysis of FB Ckts; Handout, G&M : §8.1-8.2, §8.4, R: §8.1-8.2		Work on the Design Project
	18	Feedback I: Inspection Analysis of FB Ckts., Influence on I/O Impedance; Handout, G&M : §8.1-8.2, §8.4, R: §8.1-8.2	HW#10 Due	
	21	Feedback II: Feedback Loading I; G&M : §8.5-8.6, R: §8.1-8.3		Work on the Design Project
	23	Feedback II: Feedback Loading II; G&M : §8.5-8.6, R: §8.1-8.3		
	25	Feedback III: Examples ; G&M : Chpt. 8, R: §8.1-8.3	HW#11 Due	
	28	Feedback III: Examples ; G&M : Chpt. 8, R: §8.1-8.3		Work on the Design Project
	30	Feedback III: Examples ; G&M : Chpt. 8, R: §8.1-8.3		
May	2	Course Wrap-Up	HW#12 Due	
	5	***Reading/Review/Recitation***		
	7	***Reading/Review/Recitation***	Project Due	
	9	***Reading/Review/Recitation***		
	12	***Reading/Review/Recitation***		
	13	***Final Exam: Tuesday, May 13, 8:00-11:00 a.m. (Exam Group 5)***		

* Dates with an asterisk next to them represent those days that I will not be in town. On these dates I will make appropriate arrangements for the lecture. These will likely entail make-up lectures, possibly in the evenings.

Homeworks are due at 8am on Fridays.

This term we will be using Piazza for class discussion. The system is highly catered to getting you help fast and efficiently from classmates, the TA, and myself. Rather than emailing questions to the teaching staff, I encourage you to post your questions on Piazza. Find our class page at: https://piazza.com/berkeley/spring2014/ee140/home