STANFORD UNIVERSITY
Department of Electrical Engineering

EE214B: Advanced Analog Integrated Circuit Design

http://coursework.stanford.edu/homepage/W16/W16-EE-214B-01.html

TIME:	Class: MWF 10:30-11:20 AM, Gates B01 Review Session: Friday, 2:30-3:20 PM, Gates B03
INSTRUCTOR: Email: Office hours:	Boris Murmann murmann@stanford.edu See course website.
TAs Email: Office hours:	Danny Bankman and Delphine Chang ee214b-tas@mailman.stanford.edu See course website.
ADMIN: Email: Phone: Office:	Ann Guerra guerra@par.stanford.edu (650) 725-3725 Allen-207

GRADING:		
	Homework	20% (lowest score will be dropped)
	Midterm Exam	30%
	Project	20%
	Final Exam	30%

COURSE READER:	B. Murmann, *EE214B – Advanced Analog Integrated Circuit Design* Hardcopies available at Stanford Bookstore, Softcopies available online
REQUIRED TEXT:	Tony Chan Carusone, David A. Johns and Kenneth W. Martin, *Analog Integrated Circuit Design*, 2nd Edition, Wiley. 2011.
REFERENCE TEXTS:	Gray, Hurst, Lewis and Meyer, *Analysis and Design of Analog Integrated Circuits*, 5th Edition, Wiley, 2008 B. Razavi, *Design of Integrated Circuits for Optical Communications*, 2nd Edition, McGraw-Hill, 2012
GROUP DISCUSSIONS:	Please sign up for the EE214B Piazza online forum at: http://piazza.com/stanford/winter2016/ee214b
COURSE DESCRIPTION:	Analysis and design of analog integrated circuits in advanced MOS and bipolar technologies. Device operation and compact modeling in support of circuit simulations needed for design. Emphasis on quantitative evaluations of performance using hand calculations and circuit simulations; intuitive approaches to design. Analytical and approximate treatments of noise and distortion; analysis and design of feedback circuits. Design of archetypal analog blocks for networking and communications such as broadband gain stages and transimpedance amplifiers. Prerequisite: EE114/EE214A or equivalent.

Course Calendar (Tentative)

Date	Lecture	Assignments
Mon 01/04	Introduction	
Wed 01/06	Bipolar Junction Transistors	HW1 out
Fri 01/08	Bipolar Junction Transistors	
Mon 01/11	Bipolar Junction Transistors	
Wed 01/13	Elementary BJT Circuits	HW1 due, HW2 out
Fri 01/15	Elementary BJT Circuits	
Mon 01/18	**NO CLASS (Martin Luther King Day)**	
Wed 01/20	MOSFET Modeling	HW2 due, HW3 out
Fri 01/22	MOSFET Modeling	
Mon 01/25	g_m/I_D Based Design	
Wed 01/27	g_m/I_D Based Design	HW3 due, HW4 out
Fri 01/29	Electronic Noise	
Fri 01/29	**Pre-taping: Electronic Noise, 3:30-4:20 PM, Gates B01**	
Mon 02/01	**NO CLASS**	
Wed 02/03	Electronic Noise	HW4 due, HW5 out
Fri 02/05	**MIDTERM REVIEW**	
Mon 02/08	Electronic Noise	
Mon 02/08	**MIDTERM (6:00-7:30 PM, Hewlett 200)**	
Wed 02/10	Introduction to Feedback	
Fri 02/12	Feedback TIA Design	HW5 due, HW6 out
Mon 02/15	**NO CLASS (Presidents' Day)**	
Wed 02/17	Feedback TIA Design	
Fri 02/19	Feedback TIA Design	Project out
Mon 02/22	Root Locus	HW6 due
Wed 02/24	Frequency Compensation	
Fri 02/26	Frequency Compensation	
Mon 02/29	Fully Differential Amplifiers	Project I due
Wed 03/02	OTA Design Examples	
Fri 03/04	OTA Design Examples	
Mon 03/07	OTA Design Examples	
Wed 03/09	Wideband Amplifiers Using Local Feedback	Project II due
Fri 03/11	Mismatch	
TBD	**PROJECT PRESENTATIONS**	
Thu 03/17	**FINAL EXAM (8:30-10:00 AM, Gates B01)**	

FAQ

Homework

What is the late submission policy?

All assignments are due on the specified date and time, sharp. It is very difficult for us to get your work to the graders when you submit your work late. Please be on time! If you turn in your work after the deadline, your score will degrade by 0.5 dB per hour.

I am an SCPD student. When/how should I submit my homework?

Local and remote SCPD students may email their assignments to SCPD (scpd-distribution@lists.stanford.edu). Be sure to submit your work on time and use SCPD's routing form as a cover sheet. Do not email your homework to the teaching staff.

CAD

Which program will we use for circuit simulation?

The primary simulator for this course is HSpice. You can access this tool via your instructional computer account. Please refer to the "CAD Basics" handout on the course web site for further information.

Can I use a different circuit simulator?

You may use other Spice variants at your "own risk."

I am a remote student, how can I access and run HSpice?

You can log into your instructional account via SSH and VNC (see "CAD Basics" handout). For general info, please refer to:
https://itservices.stanford.edu/service/sharedcomputing/loggingin

I am a remote student, how can I gain access to Stanford's electronic libraries (such as IEEE Xplore)?

You can setup proxy access using your SUNet ID. See:
http://library.stanford.edu/using/connect-campus.
You can also use EZproxy to log into access restricted sites, for example:
http://ezproxy.stanford.edu/login?url=http://ieeexplore.ieee.org

General Questions

I cannot attend your scheduled office hours. Are you available at other times?

Feel free to email the instructor to set up a meeting on an as-needed basis.

I am an SCPD student, and I must get a grade of B or higher, otherwise I have to pay. Can you guarantee that I won't have to pay?

No, of course not. You earn your grade; we don't arbitrarily assign it. To minimize the likelihood of having to pay, stay current on the homework and, especially, allot plenty of time to do a good job on the design project. Many SCPD students find themselves in trouble time-wise, because of customer visits, unexpected tape-out problems, etc., at their place of employment. Our advice is to expect the unexpected, and budget enough extra time for EE214B.

I need to take the midterm/final exam at other than the scheduled time. May I?

Such arrangements are made on a case-by-case basis, and we cannot guarantee flexibility in this matter. The most common acceptable reason is a *demonstrable* scheduling conflict with another course (which would imply that you are taking two courses that are scheduled at the same time). As an example, "Being able to catch a cheaper flight for a vacation" is not a suitable reason. Please alert us as soon as possible.