

Syllabus

Spring 2010

**EE60542      Analog Integrated Circuit Design**

**Instructor:** Alan Seabaugh

**Time**            TH 9:30-10:45

**Class:**            Coleman Morse Center 234

**Website:**        Concourse

**Prerequisite:**   Graduate standing or by permission

**Textbook:**        Design of Analog CMOS Integrated Circuits, Behzad Razavi  
2001 McGraw-Hill, ISBN 0-07-238032-2

**Description:**    This course teaches the design and analysis of transistor integrated circuits including amplifiers, current mirrors, frequency response, noise, feedback, stability, bandgap references, etc., with application to operational and power amplifiers, oscillators, and communication. Students will learn how to use SPICE (simulation program with integrated circuit emphasis) for circuit design.

**Homework:**      Homework will be due on Tuesdays at the beginning of class. Late homework will be accepted only under extraordinary circumstances. Open discussion of homework with other students is accepted, but students must turn in their own work. Copying from solution manuals will be penalized up to the forfeiture of the full semester homework grade. Copying is easy to detect, as there are errors in the solution manual. Assigned readings are to be completed prior to class on the date listed. With the exception of the first reading assignment, a reading discipline of 4 pages per day will enable completion of the readings.

**Class Participation:** In class questions will be used to gauge mastery of readings and circuit concepts. To be exempt from questions in a given class, send an email message with PASS in the subject line prior to class. Each student can use up to two passes in the semester.

**Grading:**         Homework (15%), class participation (10%), exams (2 x 25%), final (25%).

**Office hours:**    Mondays, 5 – 6 pm or by appointment, Fitzpatrick 230A

**SPICE:**            AIM-SPICE will be used for circuit simulation; download at  
[www.aimspice.com](http://www.aimspice.com).

## EE60542 Schedule

Class	Date	Plan	Chapter	HW due	Reading due
1	12-Jan	Introduction to Analog Design	1		pp. 1-8
2	14-Jan	MOS device physics and models	2		9-38
3	19-Jan	Single stage amplifiers	3	HW1	
4	21-Jan	Common source	3		47-75
5	26-Jan	Common drain and common gate	3	HW2	
6	28-Jan	Cascode stage - CLASS TO BE RESCHEDULED	3		76-93
7	2-Feb	Differential amplifiers	4	HW3	
8	4-Feb	Common mode rejection	4		100-129
9	9-Feb	Passive and active current mirrors	5	HW4	
10	11-Feb	Cascode current mirrors	5		135-158
11	16-Feb	Frequency response of amplifiers	6	HW5	
12	18-Feb	Miller effect, poles and zeros	6		166-195
13	23-Feb	Noise	7	HW6	
14	25-Feb	Representation of noise in circuits	7		
15	2-Mar	Exam 1	1-6		
16	4-Mar	Special topics			201-233
	9-Mar	MIDSEMESTER BREAK			
	11-Mar	MIDSEMESTER BREAK			
17	16-Mar	Feedback	8	HW7	
18	18-Mar	Feedback topologies	8		246-269
19	23-Mar	Case studies	8	HW8	
20	25-Mar	Loading in feedback circuits	8		270-285
21	30-Mar	Operational amplifiers	9	HW9	
22	1-Apr	Two stage op amps	9		291-316
23	6-Apr	Stability and frequency compensation	10	HW10	
24	8-Apr	Phase margin	10		345-373
25	13-Apr	Bandgap references	11	HW11	
26	15-Apr	Temperature independent references	11		377-400
27	20-Apr	Special topics		HW12	
28	22-Apr	Exam 2	7-11		
29	27-Apr	Wrap-up and review			
	TBD	FINAL EXAM	1-11		