



Course Syllabus: Monolithic Amplifier Circuits - EE 202

Division	Computer, Electrical and Mathematical Sciences & Engineering
Course Number	EE 202
Course Title	Monolithic Amplifier Circuits
Academic Semester	Spring
Academic Year	2017/2018
Semester Start Date	01/28/2018
Semester End Date	05/24/2018
Class Schedule (Days & Time)	10:30 AM - 12:00 PM Mon Wed

Instructor(s)				
Name	Email	Phone	Office Location	Office Hours
Talal Al Attar	talal.attar@kaust.edu.sa	+966128080415		TBD

Teaching Assistant(s)	
Name	Email
TBD	TBD

Course Information	
Comprehensive Course Description	<p>This course covers the design, construction, and debugging of monolithic amplifier circuits. The main contents are: the basic principles of operation, terminal characteristics, and equivalent circuit models for transistors and op-amps. Design and analysis of multistage analog amplifiers, differential amplifiers, and current mirrors. Frequency response of cascaded amplifiers and gain-bandwidth considerations. Feedback, stability and Noise analysis.</p> <p>Design and Simulation exercises are significant components of the course.</p>
Course Description from Program Guide	<p>This course covers principles of designing and optimizing analog and mixed-signal circuits in CMOS technologies, including an overview of device physics of the MOS transistor, small and large signal models, Analysis and design of CMOS multi-transistor amplifiers, feedback theory and application to feedback amplifiers, Stability considerations, pole- zero cancellation, root locus techniques in feedback amplifiers, and noise analysis.</p>
Goals and Objectives	<p>After completing this course, the student should have a firm grasp on:</p> <ul style="list-style-type: none"> •The concepts, the models, the use and the analysis of <ol style="list-style-type: none"> 1. MOS transistors in different circuits and applications 2. Single stage and two stage op-amps in different circuits and applications •Amplifier stability, feedback, frequency response and compensation
Required Knowledge	<p>Familiarity with Transistors: models, small signal analysis and circuit simulation.</p>

Reference Texts	Analysis and Design of Analog Integrated Circuits, 5th Edition, Grey et al Microelectronic Circuits, Sedra/Smith, 7th edition Design of Analog CMOS Integrated Circuits, Razavi
Method of evaluation	5.00% - Written report 10.00% - Quiz(zes) 5.00% - Presentation 10.00% - Homework /Assignments 25.00% - Final exam 15.00% - Exam 2 15.00% - Exam 1 15.00% - Course Project(s)
Nature of the assignments	Homework assignments are due on Wednesday in the class. The Solutions will be provided by the end of the day homeworks are due. If you need more time for your homework, you have to inform the Instructor or the TA in advance. Quizzes: There will be at least one Quiz every week starting the 2nd week and will be based on a 0-10 point scale. The worst few quizzes will be dropped (If any). If you are keeping up with the problem sets, they should be relatively easy. Exams: There will be two midterm exams and one final exam You are free to use your text book, course notes and any provided figures and handouts.
Course Policies	All homework assignments, quizzes, and exams are required. Students who do not show up for a Quiz or an exam should expect a grade of zero on that exam. If you dispute your grade on any homework, quiz, or exam, you may request a re-grade (from the TA for the homeworks and quizzes or from the instructor for the exams) only within 48 hours of receiving the graded exam. Incomplete (I) grade for the course will only be given under extraordinary circumstances such as sickness, and these extraordinary circumstances must be verifiable. The assignment of an (I) requires first an approval of the dean and then a written agreement between the instructor and student specifying the time and manner in which the student will complete the course requirements.
Additional Information	Engineers are required to practice “continuous” or “life-long” learning. This course will cover a lot of material which will require the students to do a lot of self-study, reading of the textbooks and handouts, learning how to use equipment and software, etc...Although the instructor and the TAs are committed to help the students in this course, the students are also expected to take initiatives and to get used to this notion of self-study that will be anyway (i) expected from them in their future careers and (ii) imperative to their success and survival in the real engineering and academic worlds. Please don't hesitate to ask if you have any question or concern about the course.

Tentative Course Schedule

(Time, topic/emphasis & resources)

Week	Lectures	Topic
1	Mon 01/29/2018 Wed 01/31/2018	Introduction to MOSFET
2	Mon 02/05/2018 Wed 02/07/2018	Small signal Model
3	Mon 02/12/2018 Wed 02/14/2018	Gain Stages
4	Mon 02/19/2018 Wed 02/21/2018	MOSFET Amplifiers
5	Mon 02/26/2018 Wed 02/28/2018	Differential Amp.
6	Mon 03/05/2018 Wed 03/07/2018	Differential Amp. (2)
7	Mon 03/12/2018 Wed 03/14/2018	Differential Amp. (3)
8	Mon 03/19/2018 Wed 03/21/2018	Multistage Amp.
9	Mon 03/26/2018 Wed 03/28/2018	Multistage Amp. (2)
10	Mon 04/02/2018 Wed 04/04/2018	Multistage Amp. (3)
11	Mon 04/09/2018 Wed 04/11/2018	Frequency Response
12	Mon 04/16/2018 Wed 04/18/2018	Frequency Response (2)
13	Mon 04/23/2018 Wed 04/25/2018	Frequency Response (3)
14	Mon 04/30/2018 Wed 05/02/2018	Feedback
15	Mon 05/07/2018 Wed 05/09/2018	Feedback (2)
16	Mon 05/14/2018 Wed 05/16/2018	Noise in MOSFET
17	Mon 05/21/2018 Wed 05/23/2018	Final Review
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Note

The instructor reserves the right to make changes to this syllabus as necessary.