Course Syllabus: Analog Electronics - EE 102

Division	Computer, Electrical and Mathematical Sciences & Engineering
Course Number	EE 102
Course Title	Analog Electronics
Academic Semester	Spring
Academic Year	2018/2019
Semester Start Date	01/27/2019
Semester End Date	05/23/2019
Class Schedule (Days & Time)	09:00 AM - 10:30 AM | Sun Tue

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	This Course consists of two parts: Part 1: Introduces the fundamentals of the lumped circuit abstraction. Topics covered include: resistive elements and networks, independent and dependent sources, switches and MOS transistors, digital abstraction, amplifiers, energy storage elements, dynamics of first and second order networks, design in the time and frequency domains, and applications of analog and digital circuits. Part 2: Covers the design, construction, and debugging of analog electronic circuits. The main contents are: the basic principles of operation, terminal characteristics, and equivalent circuit models for diodes, transistors, and op-amps. Introduction to multistage analog amplifiers, differential amplifiers, current mirrors, and gain stages including frequency response of cascaded amplifiers and gain-bandwidth considerations. Design and lab exercises are significant components of the course.
Course Description from Program Guide	This course covers the design, construction, and debugging of analog electronic circuits. The main contents are: the basic principles of operation, terminal characteristics, and equivalent circuit models for diodes, transistors, and op-amps. Design and analysis of multistage analog amplifiers. Study of differential amplifiers, current mirrors, and gain stages. Frequency response of cascaded amplifiers and gain-bandwidth considerations. Concepts of feedback, stability and frequency compensation. Includes weekly laboratory.
Goals and Objectives	After completing this course, the student should have a firm grasp on: Part 1: •The use of Kirchhoff's laws and Ohm's law •The use of circuit analysis techniques (Node-Voltage & Mesh- Current methods) •The concepts and types of amplifiers •The electric behavior of Inductors & Capacitors (Time & Frequency domains) •The concepts of Sinusoidal steady-state analysis and the calculations of Power types •The difference between Analog and Digital design and applications •The concepts, the use and the analysis of MOS transistors in different circuits and applications Part 2: •The concepts, the models, the use and the analysis of MOS transistors in different circuits and applications •The concepts, the models, the use and the analysis of BJT transistors in different circuits and applications •The concepts, the models, the use and the analysis of single stage and two stage op-amps in different circuits and applications
Required Knowledge	Familiarity with basic circuit knowledge

Reference Texts	Electric Circuits, 10th edition Nilsson & Riedel Microelectronic Circuits, 7th edition Sedra & Smith
Method of evaluation	**10.00**% - Quiz(zes) **15.00**% - Others - Please specify **10.00**% - Homework /Assignments **25.00**% - Final exam **20.00**% - Exam 2 **20.00**% - Exam 1
Nature of the assignments	Homework: Homework assignments are due on Thursday 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 form 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	Sun 01/27/2019 Tue 01/29/2019	Introduction
2	Sun 02/03/2019 Tue 02/05/2019	KVL & KCL
3	Sun 02/10/2019 Tue 02/12/2019	Circuits in Time Domain
4	Sun 02/17/2019 Tue 02/19/2019	Circuits in Frequency Domain
5	Sun 02/24/2019 Tue 02/26/2019	RC Circuits
6	Sun 03/03/2019 Tue 03/05/2019	RL Circuits
7	Sun 03/10/2019 Tue 03/12/2019	RLC Circuits (1)
8	Sun 03/17/2019 Tue 03/19/2019	RLC Circuits (2)
9	Sun 03/24/2019 Tue 03/26/2019	Spring Break
10	Sun 03/31/2019 Tue 04/02/2019	Diodes (1)
11	Sun 04/07/2019 Tue 04/09/2019	Diodes (2)
12	Sun 04/14/2019 Tue 04/16/2019	Op-Amps
13	Sun 04/21/2019 Tue 04/23/2019	Op-Amps (2)
14	Sun 04/28/2019 Tue 04/30/2019	Introduction to Transistors
15	Sun 05/05/2019 Tue 05/07/2019	NMOS & PMOS
16	Sun 05/12/2019 Tue 05/14/2019	Single Stage Amplifier
17	Sun 05/19/2019 Tue 05/21/2019	Final Exam Week

Note

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

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