



Course Syllabus: Solid-State Device Laboratory - EE 203

Division	Computer, Electrical and Mathematical Sciences & Engineering
Course Number	EE 203
Course Title	Solid-State Device Laboratory
Academic Semester	Fall
Academic Year	2018/2019
Semester Start Date	08/26/2018
Semester End Date	12/11/2018
Class Schedule (Days & Time)	02:30 PM - 04:00 PM Mon Wed

Instructor(s)				
Name	Email	Phone	Office Location	Office Hours
Muhammad Mustafa Hussain	MuhammadMustafa.Hussain@Kaust.edu.sa	+966128084450	3274, 3, Ibn Sina (bldg. 3)	M/W: 12:05 - 12:50 pm

Teaching Assistant(s)	
Name	Email
TBD	TBD

Course Information	
Comprehensive Course Description	<p>This class is designed in compliance with the state-of-the-art semiconductor industry's advanced device fabrication training. Therefore, this course is extremely demanding. My aspiration will be to make you enthusiast about device fabrication and to provide you the introductory guidelines how you will be doing it. But your enthusiastic participation will be the key which will include class and lab participation, interaction, out-of-class-hour study and self-study of many, many course materials – all of which cannot be covered in the class room.</p> <p>You will be reviewing all the lectures before coming to the class room instruction days (designated) and we will be using the classroom time as a follow-up discussion to have better clarity on online lectures. This is flip-mode instruction. Additionally, we will be forming dynamic study groups who will be addressing to questions raised by other groups and the instruction will chip in to solidify the ideas, concepts and enriching the discussion. We expect the whole experience will be highly rewarding and refreshing.</p>
Course Description from Program Guide	Semiconductor material and device fabrication and evaluation: diodes, bipolar and field-effect transistors, passive components. Semiconductor processing techniques: oxidation, diffusion, deposition, etching, photolithography. Lecture and laboratory. Projects to design and simulate device fabrication sequence.
Goals and Objectives	Students will receive training on microfabrication techniques.
Required Knowledge	Undergraduate level fundamental knowledge on advanced physics, chemistry and various calculus, polynomial functions. Understanding on material science is a plus. Hands on lab experience in physics and chemistry is a must.
Reference Texts	<p>Text Book: Introduction to Microelectronic Fabrication: Volume 5 of Modular Series on Solid State Devices (2nd Edition) 2nd Edition</p> <p>Reference Book: Silicon VLSI Technology: Fundamentals, Practice, and Modeling James D. Plummer Prentice Hall 2000 1 978-0130850379</p>

Method of evaluation	60.00% - Written report 25.00% - Midterm exam 15.00% - Active participation
Nature of the assignments	Active participation will include interactive discussion in the classroom. Preparedness, insightful response, thought provoking discussion, creative ideas. Midterm exam will be open book in the class room. There will 3 reports: 1. Report 1: On MOSCAP fabrication and characterization = 20% 2. Report 2: On Flip-Mode Learning: evaluation and areas of improvements = 10% 3. Report 3: On MOSFET fabrication and characterization = 30%
Course Policies	ATTENDANCE POLICY (optional but if you have an attendance policy it should be publicized): Strongly encouraged to attend the discussion classes. Mandatory lab hours. Late work submission is not accepted unless there is natural disaster, personal injury, family distressed situation, university closer. Every submission is individual except group project. HONOR CODE In accordance with the University policy and professional standards, the highest levels of academic integrity are expected in this class. The code of student conduct is strictly enforced. Academic dishonesty will result in reductions in grades and/or expulsions from this class and/or the University.
Additional Information	N/A

Tentative Course Schedule

(Time, topic/emphasis & resources)

Week	Lectures	Topic
1	Mon 08/27/2018 Wed 08/29/2018	Introduction and CMOS integration
2	Mon 09/03/2018 Wed 09/05/2018	Lab hours: Safety training and mask design.
3	Mon 09/10/2018 Wed 09/12/2018	Lab hours: Oxidation, etching, deposition, etching.
4	Mon 09/17/2018 Wed 09/19/2018	17 Sep, 2018 Discussion class: silicon. 19 Sep, 2018 Lab hours: MOSCAP etching.
5	Mon 09/24/2018 Wed 09/26/2018	Discussion classes: Oxidation and Lithography.
6	Mon 10/01/2018 Wed 10/03/2018	Lab hours: MOSCAP characterization.
7	Mon 10/08/2018 Wed 10/10/2018	Discussion classes: Etching and thin film deposition.
8	Mon 10/15/2018 Wed 10/17/2018	15 October, 2018 Discussion class: Ion implantation, annealing and CMP. 17 October, 2018: Reports 1 and 2 preparation.
9	Mon 10/22/2018 Wed 10/24/2018	22 October, 2018 Discussion class: Review of theories. 24 October, 2018 Exam on theories (open book) Report 1 and 2 submission (28 October 2018, KSA time 5:00 PM by PDF and email only. File naming will be your KAUST ID only).
10	Mon 10/29/2018 Wed 10/31/2018	Lab hours: MOSFET.
11	Mon 11/05/2018 Wed 11/07/2018	Lab hours: MOSFET.
12	Mon 11/12/2018 Wed 11/14/2018	Lab hours: MOSFET.
13	Mon 11/19/2018 Wed 11/21/2018	Lab hours: MOSFET.
14	Mon 11/26/2018 Wed 11/28/2018	Lab hours: MOSFET.
15	Mon 12/03/2018 Wed 12/05/2018	Report 3 Submission. (08 December 2018, KSA time 5:00 PM by PDF and email only. File naming will be your KAUST ID only).
16	Mon 12/10/2018	Exam week (no final exam for EE 203).

Note

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