



## Course Syllabus: Solid State - EE 103

<b>Division</b>	Computer, Electrical and Mathematical Sciences & Engineering
<b>Course Number</b>	EE 103
<b>Course Title</b>	Solid State
<b>Academic Semester</b>	Fall
<b>Academic Year</b>	2019/2020
<b>Semester Start Date</b>	08/25/2019
<b>Semester End Date</b>	12/10/2019
<b>Class Schedule</b> (Days & Time)	02:30 PM - 04:00 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

<b>Comprehensive Course Description</b>	This course covers the physics of microelectronic semiconductor devices for Silicon integrated circuit applications. The main contents are: semiconductor fundamentals, p-n junction, metal-oxide semiconductor structure, metal semiconductor junction, and MOS field-effect transistor. The course emphasizes physical understanding of device operation through energy band diagrams and MOSFET device design. Issues in modern device scaling are also outlined.
<b>Course Description from Program Guide</b>	This course covers the physics of microelectronic semiconductor devices for Silicon integrated circuit applications. The main contents are: semiconductor fundamentals, p-n junction, metal-oxide semiconductor structure, metal semiconductor junction, MOS field-effect transistor, and bipolar junction transistor. The course emphasizes physical understanding of device operation through energy band diagrams and MOSFET device design. Issues in modern device scaling are also outlined. Includes weekly laboratory.
<b>Goals and Objectives</b>	After completing this course, the student should have a firm grasp on: <ul style="list-style-type: none"> <li>•The physical understanding of device operation of diodes</li> <li>•The physical understanding of device operation of MOS transistors</li> </ul>
<b>Required Knowledge</b>	Familiarity with the basic properties of solids
<b>Reference Texts</b>	<i>Semiconductor Device Fundamentals</i> , Robert F. Pierret
<b>Method of evaluation</b>	25.00% - Exam 1 25.00% - Exam 2 10.00% - Homework /Assignments 10.00% - Quiz(zes) 30.00% - Final exam

<p><b>Nature of the assignments</b></p>	<p><u>Homework:</u>  Homework assignments are due on Wed in the class.  The Solutions will be provided by the end of the day the homework is due.  NO LATE homework will be accepted.  If you need more time for your homework, you have to inform the Instructor or the TA in advance.</p> <p><u>Quizzes:</u>  There will be at least one Quiz every week (During the class) 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.</p> <p><u>Exams:</u>  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</p>
<p><b>Course Policies</b></p>	<p>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.</p> <p>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.</p> <p>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.</p>
<p><b>Additional Information</b></p>	<p>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.</p> <p>Please don't hesitate to ask if you have any question or concern about the course.</p>

## Tentative Course Schedule

*(Time, topic/emphasis & resources)*

<b>Week</b>	<b>Lectures</b>	<b>Topic</b>
1	Mon 08/26/2019 Wed 08/28/2019	General Introduction
2	Mon 09/02/2019 Wed 09/04/2019	General Material Properties
3	Mon 09/09/2019 Wed 09/11/2019	General Material Properties
4	Mon 09/16/2019 Wed 09/18/2019	Carrier Modeling
5	Mon 09/23/2019 Wed 09/25/2019	Saudi National Day
6	Mon 09/30/2019 Wed 10/02/2019	Carrier Action
7	Mon 10/07/2019 Wed 10/09/2019	Carrier Action
8	Mon 10/14/2019 Wed 10/16/2019	pn Junction Diodes
9	Mon 10/21/2019 Wed 10/23/2019	Diodes
10	Mon 10/28/2019 Wed 10/30/2019	Diodes
11	Mon 11/04/2019 Wed 11/06/2019	Diodes
12	Mon 11/11/2019 Wed 11/13/2019	Diodes
13	Mon 11/18/2019 Wed 11/20/2019	MOSFET
14	Mon 11/25/2019 Wed 11/27/2019	MOSFET
15	Mon 12/02/2019 Wed 12/04/2019	MOSFET
16	Mon 12/09/2019	Exams

### Note

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