King Saud University   **EE311- Basics of Semiconductor Devices**
College of Engineering
Electrical Engineering Department

Text Book: Microelectronic Circuits- 4th edition, 1998
Authors: Sedra / Smith

The following chapters and sections will be covered:

Chapter three

Section	Page number
Introduction	
3.1	123-131
3.2	131-137
3.3	137-155
3.4	155-163
3.5	163-168 and 170

Chapter four

Introduction	
4.1	222-223
4.2	223-232
4.3	232-233
4.4	234-238
4.5	238-241
4.6	241-253
4.7	253-259
4.8	259-261, 262-264 and 322-323
4.9	272-276
4.12	295-303

Chapter five

Introduction	
5.1	354-361 and 364-365
5.2	366-374
5.3	376-380
5.4	380-388
5.5	389-397
5.11	447

Grading

First midterm	20
Second midterm	20
Homeworks	10
Quizzes	10
Final	40

Course Objectives

This is a required course for electrical engineering and computer engineering majors. The objective of this course is to introduce students to the basic physics and operation of semiconductor devices as well as some simple applications. Students will gain good background for more advanced courses

	Course outcome	abet (a-k)
1	Students will demonstrate an understanding of basic semiconductor theory, including the concepts of resistivity, conductivity, intrinsic semiconductor, doping, majority and minority carriers, energy band diagram, drift and diffusion	a, e
2	Students will demonstrate an understanding of pn junction operation, biasing, and current.	a, e
3	Students will demonstrate an understanding of nonlinear devices through ideal diode behavior	a
4	Students will demonstrate an understanding of the use of on-off behavior of the diode on some applications such as rectifiers and logic gates.	a, c,e
	Students will demonstrate an understanding of the internal semiconductor characteristics of diodes and BJT/MOSFET transistors	a,e
5	Draw the I-V characteristics of a PN junction diode, BJT and MOSFET.	a
6	Indicate different regions of operation of a diode and operating modes of BJTs and MOSFETs.	a
7	Students can apply electric network theory to semiconductor circuits: diodes, transistors, amplifiers and diode logic gates.	a, e, k
8	Students will be able to distinguish bias from signal	a, e, k
9	Students will be able to analyze and design basic diode and transistor circuits for large and small signal operation.	a,c,e,k
10	Student will demonstrate a basic understanding of the application of the transistor (BJT & MOSFET) as an amplifier or switch.	a,c,e,k