4.8.2020

2018 1 MAY 22 Tuesday

Week 21

142:223 ECE 462 PRINCIPLES OF SEMICONDUCTOR DEVICES

TAUGHT BY

- prof. anshu sarje

COURSE TOPICS

6 fundamentals of semiconductors

- band structure
- electron-hole statistics
- intrinsic and extrinsic semiconductors
- band diagrams
- carrier transport mechanisms
- generation-recombination
- optical absorption and emission
- basics of circuit models
- parameter extraction

JUNE JULY AUGUST

JUN 2018

S	M	T	W	T	F	S
*	*	*	*	*	1	2
3	4	5	6	7	8	9
10	11	12	13	14	15	16
17	18	19	20	21	22	23
24	25	26	27	28	29	30

8. PN junctions

- physics of P-N junction
- diode electrical characteristics
- charge storage & transient behaviour
- circuit model
- junction break down
- zener diode
- schottky diodes
- photo diode
- solar cell
- tunnel diode
- LED
- laser diode

3. bipolar junction transistors

- transistor physics

- circuit models for BJT
- frequency response and switching of BJTs
- non-ideal effects
- hetero-junction bipolar transistors
- power BJTs

4. metal oxide semiconductor capacitor
   - MOS capacitor
   - structure and regions of operation
   - electrical characteristics
   - interface states
   - flat-band condition
   - small-signal capacitances

5. metal oxide semiconductor field effect transistor
   - regions of operation

- body effect
- threshold voltage
- popular MOSFET SPICE models
- Scaling laws
- Short geometry effects
- integrated circuit technology.

6. advanced integrated circuit technology

- principles and technology of advanced devices for future IC technology.
- devices like
  - UTBSOI
  - finFETs
  - HEMTs
  - tunnel FETs

} will be introduced.

TEXT BOOKS

1. fundamentals of modern VLSI device; taur.
2. Semiconductor devices: physics & technology; sze. (2012)

3. solid state electronic devices ; streetman.
4. semiconductor device fundamentals ; pierret. (1996)
5. semiconductor devices, an introduction ; singh.
6. current literature from journal & conference proceedings.

Sunday 27