

MTSE-4070 ELECTRONIC MATERIALS

Spring 2011 Syllabus

Tuesdays 2:00-5:00 p.m. – Discovery Park, Room: D 207B,
Instructor: Professor El Bouanani Phone: 369-8109; E-mail: bouanani@unt.edu,
Office hours: open door policy or appointment via e-mail

Text Book:

Principles of Electronic Materials and Devices, 3rd Edition by S.O.Kasap, ISBN: 0-07-295791-3

Other useful references:

- Electronic Properties of Materials, by Rolf E. Hummel (3ed Edition, Springer, New York, 2000)
- Physics of Semiconductor Devices, by S.M. Sze (2nd Edition, Wiley, New York, 1981)
- Introduction to Solid State Physics, by C. Kittel (7th Edition, Wiley, New York, 1996)
- Microchip manufacturing, by S. Wolf, ISBN: 0-9616721-8-8

PLAN OF STUDY

Elementary Concepts and Electrical Conduction

Modern Theory of Solids: Band theory of solids, Density of states, Boltzmann and Fermi-Dirac statistics, Electron effective mass and Fermi Energy,

Semiconductors: Intrinsic and Extrinsic semiconductors, degenerate semiconductors, conductivity, recombination and minority carrier injection, Schottky Junctions and Ohmic Contacts.

Semiconductor Devices: Basics of a pn junction, Metal-Oxide-Semiconductor Field Effect Transistor (MOSFET), Thermoelectrics, Piezoelectrics, Light Emitting Diodes (LEDs), Solar Cells.

IC fabrication: Integrated-circuit types, Overview of semiconductor manufacturing, silicon wafer production, thin films depositions, diffusion and ion implantation, oxidation, plasma processing, lithography, interconnects,...

MIDTERM EXAMS: **03/1/2011** LOCATION: DP; D207B 2:00-5:00 PM
 04/5/2011 LOCATION: DP; D207B 2:00-5:00 PM

FINAL EXAM (Comprehensive): **05/10/2011** LOCATION: DP; D207B 2:00-5:00 PM

GRADES: 30% Homework; 30% Midterm Exams; 40% Comprehensive Final

This is a preliminary course outline. The instructor may change material, course content, and course pace or item sequence at any time.