

ENG323 Electronic Materials

Level: 3

Credit Units: 5 Credit Units

Language: ENGLISH

Presentation Pattern: EVERY JAN

Synopsis:

This course introduces the fundamentals of semiconductors, dielectric and magnetic materials. Topics include the basic properties of semiconductor, carrier generation, transport and recombination, polarization in material, dielectric phenomena, properties of capacitors, piezoelectric effects, mechanism of magnetization, and the types of magnetic materials and their properties. You will also learn about the processes used in the selection of materials for capacitors and magnetic sensors and their applications.

Topics:

- Crystal structure, Fermi-Dirac statistics, Intrinsic semiconductors.
- Extrinsic semiconductors, Recombination, carrier transport & minority carrier injection.
- Optical absorption, Material Polarization
- Dielectric phenomena & capacitors
- Piezoelectric effect, Basic concepts in magnetism
- Magnetic materials & applications

Textbooks:

Kasap, S.O: Principles of Electronic materials and Devices (eTextbook) 4th edition McGraw-Hill, 2006
ISBN-13: 9781259165900-AA

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Learning Outcome:

- Discuss the fundamentals of electronic / magnetic materials, for example, crystal structure, Fermi-level statistics, piezoelectric effect and etc.
- Illustrate the optical absorption phenomenon in semiconductors and the concept of material polarization.
- Appraise the characteristics of the dielectric phenomena and capacitor design methods.
- Use qualitative and quantitative methods to study the characteristics of semiconductors.
- Calculate the band gap, electron mobility, density, dielectric constant and various other parameters of electronic materials.
- Assess the impact of temperature, doping concentration and other parameters on the characteristics of electronic materials.

Assessment Strategies:

Continuous Assessment Component	Weightage (%)
CLASS TEST	15
CLASS TEST	15
Sub-Total	30

Examinable Component	Weightage (%)
Written Exam	70
Sub-Total	70

Weightage Total **100**