

Syllabus of Physics II

1. Optics and Ultrasonic:

Interference: Criteria for good interference, Interference by division of amplitude, Wedge film, Newton's Ring, its application, Interference by division of wave front, Fresnel's biprism and determination of fringe width,

Diffraction: Fresnel's and Fraunhofer's diffraction, Diffraction grating

Ultrasonic waves, Production of ultrasonic waves, Properties, Determination of wavelength of ultrasonic waves, Applications of ultrasonic waves

2. Magnetic Materials :

Diamagnetic materials, Paramagnetic materials, Ferromagnetic materials, Magnetostriction, Antiferromagnetism, Ferrimagnetism, Ferrites, Hysteresis loss, Soft and hard magnetic materials

3. Semiconductor electronics:

P-N diode, Biasing of a diode, Voltage-Ampere characteristic, half wave, full wave (center tapped, bridge), Zener diode, zener regulated power supply, Solar Cell, PNP and NPN transistors(elementary idea), BJT (Bipolar junction transistor), LED, Photodiode, Hall effect, Hall voltage and Hall coefficient, Hall mobility

Basic feedback theory; +ve and -ve feedback

Logic gates: OR, NOT, AND, NOR and NAND; universal gates; XOR and XNOR gate; Truth tables

4. Dielectrics:

Crystal structure; Crystalline and noncrystalline materials; Classification of crystal; Bonding in solids; Dielectric constant, Dielectric Polarization, Dielectric Susceptibility, Relation between P and E, Types of Polarization, Clausius-Mosotti equation, Piezoelectricity, Ferroelectricity, Pyroelectricity

5. Superconductivity:

Properties of Superconductors, Type I and Type II Superconductors, BCS theory

Texts/References:

Michael Sayer & Abhai Mansingh, "Measurement, Instrumentation and experiment design in physics and engineering", Prentice Hall of India Pvt. Ltd., New Delhi – 110 001, 2003.

A. P. Malvino, "Electronic Principles", Tata McGraw-Hill, 1979.

H. V. Malmstadt, "Electronics for Scientists", New York : W. A. Benjamin, 1962.

J. W. Goodman, An Introduction of Fourier Optics, McGraw Hill, N.Y., 1968.

M G. B. Fowles, Introduction to Modern Optics, Holt Reinhart and Winston, 1975.