

Theory**Unit 1**

Basic Definitions; Types of waves, Electromagnetic radiation, Wave & Particle Theory; Black body radiation – definitions; Propagation of waves; Non destructive testing; Numerical based on above.

Unit 2

Energy levels in solids and band theory; Types of materials based on their conductivity; bond theory; Junction diode & junction transistors; Superconductivity and its types, properties, theories etc.

Lasers and its properties: Spontaneous and stimulated emission of radiation; Absorption, Radiation population inversion, pumping and active system, Optical Feedback, Threshold condition, Laser Modes, Classes of Lasers, Mode Locking.; Einstein coefficients; Types of LASERS: Ruby laser, Gas laser; conductor laser, CO₂ laser; Uses of laser.

Unit 3

Fiber-Optic: Introduction; Principle, Structure and classification, Numerical aperture; Fibre optics communication system; Multi mode and single mode fibre; Scalar wave equation and the modes of a fibre; Pulse dispersion, Multimode fibres with optimum profiles; First and second generation fibre optic communication systems; Advantages of optical fibre communication; Applications and uses.

Practical

1. Introduction
2. Study of Basic Instrumentations
3. Study of Surface area to volume ratio (Nanotechnology)
4. Error Analysis – I
5. Error Analysis – II
6. Study of Electricity and Magnetism
7. Study of LED and LASER Diode Characteristics
8. Study of Photo Diode Characteristics