

OPTOELECTRONICS AND FIBRE OPTICS

Code : EI 503A

Contacts : 3L

Credits : 3

Module I

Optoelectronics : Characteristics of optical emission, electro-luminescence. LED: Power and efficiency calculation, Structure of LED and its characteristics, Heterojunction LED [4]

Laser: semiconductor based lasers - double heterojunction broad area laser, stripe geometry DH laser. [2]

Module II

Photo diode: PIN photodiode, hetero junction diode, Avalanche Photo diode, Phototransistor. [3]

LDR, photovoltaic cells, photo emissive cells - types, materials, construction, response, opto-couplers – characteristics, noise figures, applications in analogue and digital devices. [6]

Module III

Fiber optics: Optical fibre – materials, construction, step index and graded index fibres, ray propagation, attenuation. Modes in optical fibres, intermodal dispersion. [3]

Singlemode fibre- working principle, attenuation, dispersion and bandwidth. Multimode fibre- attenuation, dispersion. propagation of EM waves, fibre coupling. [5]

Module IV

Fibre-optic sensors: classification. Intensity modulated sensors, phase modulated sensors, spectrally modulated sensors. [3]

Fibre optic sensors for Industrial applications: temperature, displacement, pressure and liquid-level sensors. [4]

Books:

1. P. Bhattacharjee, Semiconductor Optoelectronic Devices, PHI
2. W. Hawkes, Optoelectronics- An Introduction, PHI
3. C. K. Sarkar, Optoelectronics and Fiberoptics communication, New Age International
4. John M. Senior, Optical Fibre Communications, PHI
5. Culshaw B. and Dakin J(Ed) - Optical Fibre Sensors, Vol.1.2 Artech House, 1989.
6. Chin-Lin-Chon -Elements of Optoelectronic & Fibre Option, MGH