

**OPTO ELECTRONICS.**

Introductory remarks on radio metric units, photometric units and different types of light sources assumed.

**UNIT – I : Optical process in semi conductors.**

Electron – hole pair formation and recombination – radio active and non-radio active recombination – Absorption in semi conductors – indirect transition, exciton absorption, Donor – Acceptor and impurity band absorption – Franz-Keldysh and Stark effects – absorption in Quantum well structures – radiation in semi conductors – Stokes shift – Deep level transitions – Auger recombination – Luminescence from Quantum wells – Time resolved photo luminescence.

**UNIT – II : Semi Conductor Junctions.**

The ideal hetero junction – current – voltage characteristics – applications – choice of LED materials – injection – recombination and conversion efficiencies – LED structure – hetero junction LED, Edge emitting LED, device performance – I – V Characteristics – Spectral response, frequency response.

**UNIT – III : Photo detectors.**

Photo conductors – junction photo diodes – PIN and APD – high speed measurements – Photo transistor – modulated barrier photo diodes – Schottky barrier photo diode – MSM photodiodes – detectors for long wave length, the operation – micro cavity photo diodes.

**UNIT – IV : Modulation and Switching devices.**

Direct modulation of SDL, direct modulation of LED's external modulation – Pockel cells – phase modulation – Wave guide modulators – Quantum well modulators – acousto-optic and magneto-optic modulators – basic ideal of non-linear optics – optical second harmonic generation, frequency conversion – optical switching and logical devices – self electro optic devices – bipolar controller modulator – memory devices.

**UNIT – V : Optical Communication.**

Optical fibre – Characteristics and fundamental parameters – propagation modes – low loss fibres – transmission distance with optical fibres – examples of optical transmission techniques – Instrumentation and control with optical fibres.

**Recommended Books:**

Semi Conductor – Opto electronic devices – P.Battacharaya (PHI).  
Opto – Electronics – Texas instruments (McGraw Hill).  
Opto – Electronics – Wilson and Hawker.  
Opto – Electronics – Yaspir Sing.  
Optical fibre communications – Suematsu and Toa (Hohn Wiley).  
Fibre Optic Communication – R.L.Keiser.