

**MAJOR BASED ELECTIVE III  
OPTO ELECTRONICS AND FIBER OPTIC COMMUNICATION**

**Unit I Interaction of Light with Matter**

Introduction – Absorption – optical absorption in metals, dielectrics and semiconductors – Reflection – trap – excitons - color centers – Generation of colour centers – Luminescence – Photoluminescence.

**Unit II Opto electronic Materials of Devices LED Materials**

Construction of LED - Advantages of LEDs in electronic display - LCD – Characteristics of LCD materials – Action of LCD display device – Photodetectors

Detector performance parameters – Photo conductive materials – Photo diode – LDR, Phototransistors.

**Unit III Lasers**

Introduction – Stimulated emission – Einstein's coefficients – Absorption and amplification of radiation – Optical feed back – Threshold condition for lasing – Properties of lasers – Radiant power, Coherence, Coherence length - Laser spot size – Beam divergence. - CO<sub>2</sub> laser, semiconductor laser – Applications.

**UNIT IV Fiber optic Communication**

Introduction – Principles of light transmission in a fiber - Numerical aperture - Fiber index profiles – Modes of propagation – Losses in fibers – Light sources – Laser diode – Light detector – Avalanche photo diode – Fiber optic communication link (-Block diagram) Advantages of fiber optics communication.

**Unit V Optical Data Storage**

Surface Storage Phase change recording – Magneto optical data storage - Hi- tech evolved in system development – Automatic focussing – Automatic track following capacity of CD – advantages of CD – holographic storage – Construction of a hologram – Reconstruction of a hologram.

**Books for study**

1. Palanisamy P.K.Semiconductor Physics and Opto electronics, Ed II Scitech Publications. (2003).
2. Palanisamy P.K. Material Science Ed II Scitech (2003).
3. Tripathi K.N, Mathur P.C, Ainishi Kapoor, Vinod K. Sharma, Opto electronics – BS Publications (2004).