

**SEMESTER IV – PAPER X  
FIBER OPTICS AND NETWORK COMMUNICATIONS**

**UNIT I: STEP INDEX AND – GRADED – INDEX**

Fiber Structure – Fiber Materials – Fiber Fabrication Mechanical Properties of Fibers. Attenuation-Single Distortion in Optical waveguides-Mode Coupling

**UNIT II: OPTICAL SOURCES**

Laser Diodes-Photodetectors: Physical Principles of Photodiodes- Photodetector Noise – Detector Response Time – Transmitter design-Elements of transmitters-Optical Receiver Operation: Fundamental Receiver Operation-Digital Receiver Performance Calculation

**UNIT III: DIGITAL TRANSMISSION SYSTEMS:**

Point-to-Point Links-Line Coding Coherent Optical Fiber Communications: Definition and Classification of Coherent Systems-Requirements on Semiconductor Lasers-Modulation Techniques.

**UNIT IV: ADVANCED SYSTEMS AND TECHNIQUES**

Fiber optic Networks-LAN-WAN-Wavelength Division Multiplexing (WDM)-Local Area Networks-Optical Amplifiers – Photonic Switching

**UNIT V: SATELLITE COMMUNICATIONS**

Ground Station-Antenna angle of elevation Transmission path-height of geostation orbits Problems-satellite works-Frequency allocation and polarization-Various blocks of equipment aboard the satellite-Transmit and receiver contour-Block diagram of network control station (NCS) interconnecting telephone traffic between remote stations-SS/TDMA concepts.

**BOOKS FOR STUDY AND REFERENCE**

- 1) Optical fiber Communications, Gerd Keiser McGraw-Hill International Editions (1991) Ch-2, 2.5 to 2.9, Ch-3, 3.1, 3.2, 3.4, Ch-4, 4.3, Ch-6, 6.1 to 6.3, Ch-7, 7.1, 7.2, Ch-8, 8.1, 8.2, Ch-10, 10.1 to 10.3, Ch11, 11.1 to 11.4
- 2) Understanding Fiber Optics, Jeff Hecht, Sams Publishing, BPB, 1997.
- 3) Optical Fiber Communications Principles and Practice, John M. Senior, Prentice Hall of India Pvt. Ltd. New Delhi, 1996
- 4) Fiber Optics Technology and Applications, Stewart D. Personick, Khanna Publishers, Delhi (1986)
- 5) Communication Systems and Techniques, M. Schwartz, W.R.Bennet, S.Stein, McGraw Hill Book Company, New Delhi.
- 6) Communication systems, S.P.Lathi, Wiley Easter private Ltd., New Delhi.
- 7) Principles of Communication systems, H.Taub & P.L.Schilling, McGraw Hill Book Company, New Delhi.