## ECMC1T2: Fiber Optic Components, Measurements and Networks

**Unit- I Fiber-Optic Light Sources**

Brief description on the principle of optical sources, Internal Quantum efficiency of LED,Modulation capability,Power-Bandwidth product, Laser diodes, Laser diode modes, Threshold conditions, Resonant frequencies, Laser diode structures, Single mode lasers, modulation of laser diodes.

**Unit- II Fiber-Optic Light Detectors**

Brief description on the principle of optical detectors, photodetector noise, Noise sources, signal-to-Noise ratio, Detector response time, Depletion layer photocurrent, Response time, Avalanche multiplication noise.

**Unit- III Optical Fiber Connection**

Joint loss, Multi mode fiber joints, Singe mode fiber joints, Fiber splices, Fusion splices, Mechanical splices, Multiple splices, Fiber connectors, Cylindrical ferrule connectors, Biconical ferrule connectors. Double eccentric connectors, Duplex fiber connectors, Expanded beam connectors

**Unit- IV Optical Couplers and Optical Amplifiers**

Fiber couplers Three port couplers, Four port couplers, Star couplers, WDM couplers. Optical amplifiers, Semiconductor laser amplifiers, Fiber amplifiers, Rare earth doped fiber amplifiers, Raman fiber amplifiers, Brillouin fiber amplifiers.

**Unit- V Integrated Optics**

Integrated optical devices, Beam splitters, Directional couplers, switches, Modulators, Periodic structures for filters and injection lasers, Opto-electronic integration, Optical bistability and digital optics, Optical computation.

**Unit- VI Optical Sensors and Measurements**

Optical sensors intrinsic & extrinsic, Intensity, phase and polarization based sensors, principles of pressure, temperature, displacement and velocity measurements.

**Unit – VII Components of fiber optic Networks**

Overview of fiber optic networks, Transreceiver, semiconductors optical amplifiers, couplers/splicers, wavelength division multiplexers and de-multiplexers, filters, isolators and optical switches. Fiber Optic Networks:

**Unit – VIII Fiber Optic Networks**

Basic networks, SONET/SDIT, Broad cast and select WDM Networks, wavelength routed networks, optical CDMA.

**Text Books:**


1. G. Keiser, Optical Fiber Communications, Mc-Graw-Hill.
2. J.M.Senior, Optical Fiber Communications Principles and Practice, PHI.
3. A. Ghatak & K. Thyagarajan "Optical Electronics".
4. Fiber Optic Communication Technology – Djafar K. Mynbaev and Lowell L. Scheiner, (Pearson Education Asia)
5. WDM Optical Networks – C. Siva Ram Murthy and Mohan Guru Swamy, PHI.
6. Fiber Optics Communications – Harold Kolimbiris (Pearson Education Asia)


**Reference Books:**


1. Jacobs, I. (2001) "Optical Fiber communication Technology and System Overview", in Handbook of Optics, M. Bass (ed.), et al., p. 2.2, McGraw-Hill.
2. DeCusatis, C., Maass, E., Clement, D. and Lasky, R. (eds) (1998) Handbook of Fiber Optic Data Communication, Academic Press, NY; see also Optical Engineering, special issue on optical data communication (December 1998).
3. Goff, D.R. (1999) Fiber Optic Reference Guide, 2nd edition, Focal Press: Boston, Mass.