

PET7J008 OPTICAL COMMUNICATION AND NETWORKING

3-0-0

MODULE-I

(9 Hours)

Introduction: Introduction, Ray theory transmission, Total internal reflection-Acceptance angle, Numerical aperture; Skew rays; Electromagnetic mode theory of optical propagation: EM waves, modes in Planar guide, phase and group velocity; cylindrical fibers, SM fibers.

MODULE-II

(9 Hours)

Transmission characteristics of optical fibers: Attenuation – Material absorption losses in silica glass fibers, Linear and Non linear Scattering losses, Fiber Bend losses; Mid band and far band infrared transmission; Intra and inter Modal Dispersion – Over all Fiber Dispersion; Polarization: non linear Phenomena; Optical fiber connectors, Fiber alignment and Joint Losses; Fiber Splices, Fiber connectors, Expanded Beam Connectors : Fiber Couplers.

MODULE-III

(9 Hours)

Sources and detectors: Optical sources: Light Emitting Diodes, LED structures, surface and edge emitters, mono and hetero structures: internal; quantum efficiency; injection laser diode structures; comparison of LED and ILD Optical Detectors: PIN Photo detectors, Avalanche photo diodes, construction, characteristics and properties; Comparison of performance; Photo detector noise :Noise sources, Signal to Noise ratio, Detector response time.

MODULE-IV

(9 Hours)

Fiber optic receiver and measurements: Fundamental receiver operation, Pre amplifiers, Error sources: Receiver Configuration Probability of Error Quantum limit; Fiber Attenuation measurements, Dispersion measurements, Fiber Refractive index profile measurements, Fiber cut-off Wave length Measurements, Fiber Numerical Aperture Measurements, Fiber diameter measurements.

ADDITIONAL MODULE (Terminal Examination-Internal)

(9 Hours)

Optical networks: Basic Networks, SONET / SDH, Broadcast and select WDM Networks; Wavelength Routed Networks; Nonlinear effects on Network performance, Performance of WDM + EDFA system, Solutions; Optical CDMA; Ultra High Capacity Networks.

Text Books

1. Optical Fiber Communication, John M. Senior, Pearson Education, Second Edition, 2007.
2. Optical Fiber Communication, Gerd Keiser, McGraw Hill, Third Edition, 2000.
3. Optical Network, Rajib Ramaswamy & Kumar Sivarajan, M.K. Publication, 2nd edition.

Reference Books

1. Optical Communication System, J. Gower, Prentice Hall of India, 2001.
2. Optical Networks, Rajiv Rama swami, Elsevier, Second Edition, 2004.
3. Fiber-optic communication systems, Govind P. Agrawal, John Wiley & sons, third edition, 2004.
3. Fiber Optics and Optoelectronics, R.P. Khare, Oxford University Press, 2007.
4. Optical Communication Network, Viswanath Mukherjee, McGraw Hill Publication, 2000