Subject Name: EC2402 Optical Communication and Networking

Staff Name :,S.Jayalilly,AssistantProfessor

Year : Final Year –ECE ‘B’ Section

**Syllabus:UNIT I 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.

**UNIT II TRANSMISSION CHARACTERISTICS OF OPTICAL FIBERS**

Attenuation – Material absorption losses in silica glass fibers – Linear and Non linearScattering losses - Fiber Bend losses – Midband and farbandinfra red transmission –Intra and inter Modal Dispersion – Over all Fiber Dispersion – Polarization- non linearPhenomena. Optical fiber connectors**,** Fiber alignment and Joint Losses – Fiber Splices– Fiber connectors – Expanded Beam Connectors – Fiber Couplers.

**UNIT III SOURCES AND DETECTORS**

Optical sources: Light Emitting Diodes - LED structures - surface and edge emitters,mono and hetero structures - internal - quantum efficiency, injection laser diodestructures - comparison of LED and ILD

Optical Detectors: PIN Photo detectors, Avalanche photo diodes, construction,characteristics and properties, Comparison of performance, Photo detector noise –Noisesources , Signal to Noise ratio , Detector response time.

**UNIT IV 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 indexprofile measurements – Fiber cut- off Wave length Measurements – Fiber NumericalAperture Measurements – Fiber diameter measurements.

**UNIT V OPTICAL NETWORKS**

Basic Networks – SONET / SDH – Broadcast – and –select WDM Networks –Wavelength Routed Networks – Non linear effects on Network performance –Performance of WDM + EDFA system – Solitons – Optical CDMA – Ultra High CapacityNetworks.

**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

**REFERENCES**

1. J.Gower, “Optical Communication System”, Prentice Hall of India, 2001

2. Rajiv Ramaswami, “Optical Networks “ , Second Edition, Elsevier , 2004.

3. Govind P. Agrawal, “ Fiber-optic communication systems”, third edition, John Wiley

& sons, 2004.

4. R.P. Khare, “Fiber Optics and Optoelectronics”, Oxford University Press, 2007.