FIBER OPTIC COMMUNICATION

Unit I: INTRODUCTION

Optical fibers: Structures and wave guiding fundamentals-basic optical laws and definitions –optical fiber modes and configurations- mode theory for circular waveguides –graded index fiber structure-fiber materials and fabrication methods-mechanical properties-fiber cables-attenuation-signal distortion in optical waveguides-pulse broadening-mode coupling.

Unit II: OPTICAL SOURCES AND DETECTORS

Optical sources-light emitting diodes - laser diodes-modes of threshold condition – light source linearity model and reflection noise – modulation and temperature effect - reliability consideration Photo detectors - Principles of photo – diodes – photodetectors - noise-response time - avalanche multiplication noise – temperature effects on avalanche gain.

Unit III: RECEIVERS AND MEASUREMENTS

Fundamental receiver operation –digital receivers-performance calculations-pre amplifier design – analog receivers Attenenuation measurements-fiber fault location-dispersion measurements-refractive index profile measurements-measurement of optical source characteristics-eye pattern.

Unit IV: ADVANCED SYSTEMS AND TECHNIQUES

Wavelength division multiplexing-Optical fiber bus -ring topology –star architecture-fail safe fiber optic nodes-optical amplifiers-types-gain-noise figure –application-optical bandwidth –photonic switching-integrated optical switch.

Unit V: APPLICATIONS AND FUTURE DEVELOPMENTS

Public network operation – trunk network – junction network – local access network - submerged systems - synchronous network - military, civil, consumer and industrial applications.

TEXT BOOKS:

1. Gerd Keiser- Optical fiber Communication-McGraw Hill- 1984
2. John M. Senior-Optical Fiber Communication-Principle.

REFERENCE BOOKS:

1. Fiber Optics in Telecommunication-N. Sharma-TMH
2. H. Zanger and C.Zanger-Fiber Optic communications and other Applications-Maxwell International Edition.