



# Fundamentals of Optical Fiber Communication

Principles, Components, and Applications

Ashok T. Kanade

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# Fundamentals of Optical Fiber Communication: Principles, Components, and Applications

**Ashok T. Kanade**

Department of Electronic-Science, P.V.P.  
College of ASC, Pravaranagar, India



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## **UNIT 1: Overview of Optics and Optical Fiber Communication**

History of fiber optic systems, block diagram, Fiber material, fiber cables and fiber fabrication, fiber joints, fiber connectors, splicer, Propagation of light in optical fiber, acceptance angle, numerical aperture, Types and specification of optical fiber, Advantages of optical fiber communication, applications

## **UNIT 2: Transmission Characteristics of Optical Fiber**

Attenuation, absorption, linear and nonlinear scattering losses, bending losses, modal dispersion, waveguide dispersion and pulse broadening, Dispersion shifted and dispersion flattened fibers, Measurement of optical parameters, attenuation and dispersion

## **UNIT 3: Optical Sources and Detectors**

Sources: Coherent and non-coherent sources, quantum efficiency, modulation capability of optical sources, working principle and characteristics of - LEDs, Laser diodes, Modulation in laser diodes, Detectors: PIN and APD, Noise analysis in optical detectors

## **UNIT 4: Optical Networks**

Architecture of optical transport networks (OTNs), network topologies, Introduction to Synchronous optical networking (SONET) and synchronous digital hierarchy (SDH).