

SUBJECT NAME: Optical Fiber Technology

SUBJECT NO: PH40230 LTP: 3-0-0; CRD- 3 Total No. of Lectures: 42

Basic Fiber Optics: Brief history, Maxwell's equation,
Modes: Concept of modes, TE & TM modes in slab waveguides, Modes in fiber, WKB
Approximation

Fabrication of optical fibers, Light guidance mechanism in optical fiber, Numerical
Aperture (NA), V-parameter

Fiber Characteristics: Loss mechanism, Evanescent field, Modal Dispersion, Ray
Equation, Material Dispersion, Step Index and Graded Index Fibers, Single mode fiber,
Cut off, Birefringence

Application of Optical Fiber: Fiber optics communication, Optical coupler, Coupled
mode theory, Fiber Bragg Grating (FBG) theory and application, Fiber Amplifier

Advanced topics in fiber optics: Nonlinear optics in optical fibers, Specialty Fibers
(Photonic Crystal Fibers), Applications of the specialty fibers, Kerr-effect and Self
phase modulation (SPM), Modulation Instability (MI), Optical Soliton

Refs. and texts:

1. Introduction to Fiber Optics: Ajoy Ghatak and K. Thyagarajan
2. Optical Electronics: Ajoy Ghatak and K. Thyagarajan
3. Optical Waveguide Theory: A.W. Snyder, J. Love
4. Nonlinear Fiber Optics: Govind. P. Agrawal