

Course Type	Course Code	Name of Course	L	T	P	Credit
DE	ECD415	Optical Communication	3	0	0	9
Course Objective						
The objective of the course is to develop an understanding of the basic optical fiber communication concepts. A thorough grounding in optical communications is necessary to communication engineers to address future needs of high data rate communications.						
Learning Outcomes						
Upon successful completion of this course, students will:						
- Understand basic principles of light propagation and modal analysis of optical fiber. - Understand the basic operating principles of light sources, detectors.						

Unit No.	Topics to be Covered	Lecture Hours	Learning Outcome
1	Introduction of Optical fiber Communication: Block diagram of optical fiber communication system, Advantages of optical fiber communication, Different optical windows and different generations. Ray theory transmission- acceptance angle, NA and skew rays.	08	Acquire an understanding of basic fundamentals behind optical communication.
2	Modal analysis: Mode in planar waveguide, Maxwell's equation, solution in an Inhomogeneous medium, TE modes of Symmetric step-index planar waveguide, Evanescent field and mode theory for circular guide modal equation, modes in optical fiber, linearly polarized modes, single and multimode fiber characteristics.	10	Develop an understanding about the modal analysis and mode theory of optical waveguide.
3	Attenuation and Dispersion: Material absorption, linear and non-linear scattering losses, fiber bend losses., Intra and Intermodal dispersion, material dispersion and waveguide dispersion, Dispersion modified fibers.	08	Develop the concepts of analyzing the optical waveguides and fibers using attenuation and dispersion concepts.
4	Optical sources and Detectors: LED structures and its characteristics, Basic concept lasers, semiconductor injection laser, Detection principles semiconductor photodiodes p-n, p-i-n, APD.	08	Understand the basic operating principles of light sources and detectors.
5	Optical modulation and demodulation techniques, Optical transmission Link design, Power budget and rise time budget. WDM techniques, Fiber optic connector, Couplers, multiplexers	08	Understand the design of optical link and develop concepts of power penalty.

Textbook:

- Optical Fibre Communication: John M.S Senior PHI, 2nd Ed.

Reference Books:

- An Introduction to Fiber Optics: Ajoy Ghatak, K. Thyagarajan Cambridge University Press
- Optical Fibre Communication: G.E. Keiser Mc Graw-Hill, 3rd Ed.
- Optoelectronics: Wilson & Hawkes PHI, 2nd Ed.