

Course Type	Course Code	Name of Course	L	T	P	Credit
DP	NECC521	Optical Communication Lab	0	0	3	1.5

Course Objective

- The objective of the course is to provide a thorough grounding in advance optical communications to address future needs of high data rate communications.

Learning Outcomes

Upon successful completion of this course, students will:

- Understand the mechanism of light propagation through fiber and modal analyses.
- Understand the operating principle of light sources and detectors.
- Understand coherent detection, Noise, and Comparison of direct and coherent detection.
- Design optical link, power penalty, etc.

Unit No.	Topics	Practical Hours	Learning Outcome
1	Transcendental equations for the TE, TM modes in a symmetric step index planar waveguide and cylindrical core optical fiber.	06	To understand the Transcendental equations for the TE and TM modes in a symmetric step index planar waveguide and cylindrical core optical fiber.
2	Determination of the normalized index b, against the normalized freq. V, for different values of symmetric coefficient 'a' and the first three values of 'v'.	03	In this experiment understand the normalized index b, against the normalized freq. V, for different values of symmetric coefficient 'a' and the first three values of 'v' and plot the normalized index b.
3	Measurement of Intermodal/Intramodal Dispersion in optical fibers.	03	To acquire knowledge on the dispersion in the optical fiber
4	P-I Characteristics of Laser Diode and LED	06	To understand the laser diode and LED characteristics and measurement of slope efficiency.
5	Characteristics of Photodiode.	03	To understand the Photodiode characteristics and measurement of responsivity.
6	Setting up of an analog and digital link using optical fiber, and testing of voice transmission.	03	To get knowledge on setting up connection through optical link
7	Design of amplitude and frequency modulation and demodulation circuit using optical fiber link.	03	To get the exposure in amplitude and frequency modulations and demodulations using Optical Fiber link.
8	Characterization of various passive optical components.	03	To understanding the properties of passive components and its applications.
9	Design and analysis of WDM mux and Demux.	06	Students will learn about WDM mux and Demux and its characteristics.
10	Design of coherent detection system for 5G/6G optical communication application.	06	Understanding fundamentals of coherent detection in optical communication. focusing on its principles and characterization within the context of 5G/6G technologies
Total		42	

Text Books:

- Ajoy K. Ghatak, K. Thyagarajan, "An Introduction to Fiber Optics, Cambridge University Press, 1998
- J. M. Senior, "Optical Fiber Communication-principles and practice" Prentice Hall of India, 2014
- G.P. Agrawal, "Fiber Optic Communication Systems", John Wiley and Sons Inc. Publication 3rd edition

Reference Books:

- Xizheng Ke, Jiali Wu, "Coherent Optical Wireless Communication Principle and Application" Springer, 2022
- Govind P Agrawal, "Lightwave Technology: component and devices, John Wiley", 2004