Course Type	Course Code	Name of Course	L	T	P	Credit
DC	NECC506	Optoelectronic & Photonic Devices	3	1	0	4

Course Objective

The objective of the course is to provide fundamentals of different semiconductor optoelectronic devices employed in light wave systems and networks. The course will help students meet the demand of growing semiconductor optoelectronic industry and prepares them to advanced study and research in the semiconductor optics and optoelectronics devices.

Learning Outcomes

At the end of the course, the student must be able to

- Understand the basic principles of optoelectronics.
- Learn about the construction and working principle of high speed optoelectronics and photonics devices such as high speed laser diode MZI, MZM, EAM, and SOA for design of high speed communication system, microwave photonic system.

Module No.	Topics to be Covered	Lecture Hours	Learning Outcome
1	Introduction: Distinction between electronic, optoelectronic and photonic devices; Electrical and optical bandwidth.	9L+3T	Acquire an understanding of the basics of optoelectronics
2	Semiconductor Detectors – Structure and noise analysis of PIN and APD detectors, Solar cells. Semiconductor Sources- LEDs, LDs (Double heterojunction, DFB, Quantum wire & dot).	9L+3T	Develop an understanding about principles of operation and performance of optical detectors and sources
3	Modulators – Electro-optic and magneto-optic. Semiconductor amplifiers.	9L+3T	Understand the working of semiconductor optical amplifiers and modulators
4	Photonic Devices: Fiber Amplifiers and Fiber Lasers**.** Optical Filters, Fiber Bragg grating (FBG) and its application as dispersion compensator and Add-Drop Multiplexer.	9L+3T	Obtain the knowledge of various fiber based devices and components like fiber amplifiers, lasers and fiber Bragg gratings
5	MZI and its applications. Optical Switches.	6L+2T	Understand the applications of MZI for modulation and switching
	Total	**42L+14T**	

Textbook:

1. Fundamentals of Photonics, B. E. A. Saleh and M. C. Teich, Wiley-India, 2007.

Reference Books:

1. Optoelectronics and Photonics, S. O. Kasap, Pearson, 2012.
2. Semiconductor Optoelectronic Devices, P. Bhattacharya, Pearson, 2017