

# PEEE5301 **OPTOELECTRONICS DEVICES & INSTRUMENTATION** (3-0-0)

## **Module –I**

Wave Optics: 12 Hrs

Wave properties of light: Propagation, polarization, interference, diffraction, transmission of light through slab and cylindrical waveguides.

Optical Fiber:

Construction of step and graded index fibers, single mode and multimode fibers, loss and dispersion characteristics;

## **Module –II**

12 Hrs

Fiber optic components: couplers, splicer, polarizer.

Sources and Detectors :

Sources: LED, Lasers-fundamentals, conditions for oscillations, construction and principle of operation of gas and semiconductor, pulsed and continuous type lasers;

Detectors: photodiodes- PN, PIN and APD.

## **Module –III**

Optoelectronic Instrumentation 12 lectures

Modulation techniques: intensity, polarization, interference, electro-optic, electromagnetic; Sensing techniques for displacement, pressure, acceleration, flow, current and voltage measurement, Fiber optic gyroscope, Distributed fiber optic sensors- OTDR and OFDR principles.

## **Text Books:**

1. A. Ghatak and K. Tyagrajan: Introduction to Fiber Optics: Cambridge University Press, New Delhi, 2004. (Chapter 2, Sections 7.2-7.3, Chapter 3, Sections 4.3,8.2, 17.2, 17.8, Section 11.3, 11.6, Chapter 12, Chapter 18)
2. J. Wilson and J.F.B. Hawkes: Optoelectronics: An Introduction (2/e), PHI, New Delhi, 2001. (Chapter 1, Sections 3.1-3.2; 8.1-8.2, Sections 8.3-8.4, 8.5, Sections 4.6, 5.1-5.6, 5.10.2, 7.2, Sections 3.4, 3.7, 3.8, Chapter 10)

## **Reference Books:**

1. J.P. Bentley- Principles of Measurement Systems (3/e), Pearson Education, New Delhi, 2007.
2. N. Bala Saraswathi and I. Ravi Kumar- Principles of Optical Communications and Optoelectronics (2/e), Laxmi Publications, New Delhi, 2007.
3. M.K. Ghosh, S.Sen and S. Mukhopadhyay (ed.)- Measurement and Instrumentation: Trends and Applications, Ane Books, New Delhi, 2008.
4. R.P.Khare: Fibre Optics & Optoelectronics, Oxford University Press, New Delhi, 2010.