

# PHY7208: PHOTONICS & OPTOELECTRONICS

**1. Course Name:** Photonics & Optoelectronics

**2. Course Code:** PHY7208

**3. Credit Units:** 3

**4. Course Description:**

This course discusses the modulation of light and gives different optical devices.

**5. Course Objectives:**

At the end of the course, the students should be able to:

- Give different types of display devices.
- Discuss operation of fibre optical waveguides.
- Measure fibre characteristics.
- Use fibre optical communication systems.

**6. Course Outline:**

Content	Hours
Modulation of light; Elliptical polarization, birefringence; Optical activity, electro-, magnetic and acousto-optic effects and devices.	6
Nonlinear crystals; Scanning and switching; Display devices- CRT, LED, plasma, flat-screen and LCD displays.	7
Photo detectors- thermal and quantum: PMT, photoconductive; Photodiode- p-n, p-i-n, avalanche; Photodiode amplifiers; CCD devices.	7
Fibre optical waveguides- planar dielectric, optical fibre; Dispersion and losses in optical fibre; Fibre modes; Fibre jointing and connectors.	6
Measurement of fibre characteristics; Fibre materials and fabrication.	7
Optical communication systems- analogue and digital modulation, free space communication; Fibre optical communication systems: fibre-to-	8

the-home, FTTH, Ethernet, LAN, metro and long haul; Optical fibre amplifiers; Non-communication applications of fibres.	
Integrated optics- channel or strip waveguides, distributed-feedback lasers, couplers, modulators and switches; Planar optical devices; Surface emitting lasers	6
<b>Total</b>	<b>45</b>

### 7. Mode of Delivery:

This course will consist of lecture sessions and there will also be data analysis using theories learnt

### 8. References:

1. Jordan, E. C. and K. G. Balman. Electromagnetic waves and Radiating systems (2nd Edition(1968). Prentice Hall.
2. Agrawal G. P. Nonlinear Fiber Optics. Elsevier/Academic Press, 2007
3. Hecht, Jeff. Understanding Fiber Optics. Upper Saddle River, N.J. : Prentice Hall, 1999.