

EC6016 OPTO ELECTRONIC DEVICES

DETAILED SYLLABUS

OBJECTIVES:

- To understand the basics of solid-state physics.
- To understand the basics of display devices.
- To understand the optical detection devices.
- To understand the design of optoelectronic integrated circuits.

UNIT I ELEMENTS OF LIGHT AND SOLID-STATE PHYSICS

Wave nature of light, Polarization, Interference, Diffraction, Light Source, review of Quantum Mechanical concept, Review of Solid-State Physics, Review of Semiconductor Physics and Semiconductor Junction Device.

UNIT II DISPLAY DEVICES AND LASERS

Introduction, Photo Luminescence, Cathode Luminescence, Electro Luminescence, Injection Luminescence, Injection Luminescence, LED, Plasma Display, Liquid Crystal Displays, Numeric Displays, Laser Emission, Absorption, Radiation, Population Inversion, Optical Feedback, Threshold condition, Laser Modes, Classes of Lasers, Mode Locking, laser applications.

UNIT III OPTICAL DETECTION DEVICES

Photo detector, Thermal detector, Photo Devices, Photo Conductors, Photo diodes, Detector Performance.

UNIT IV OPTOELECTRONIC MODULATOR

Introduction, Analog and Digital Modulation, Electro-optic modulators, Magneto Optic Devices, Acoustoptic devices, Optical, Switching and Logic Devices.

UNIT V OPTOELECTRONIC INTEGRATED CIRCUITS

Introduction, hybrid and Monolithic Integration, Application of Opto Electronic Integrated Circuits, Integrated transmitters and Receivers, Guided wave devices.

TEXTBOOKS:

1. Pallab Bhattacharya "Semiconductor Opto Electronic Devices", Prentice Hall of India Pvt., Ltd., New Delhi, 2006.
2. Jasprit Singh, "Opto Electronics – As Introduction to Materials and Devices", Mc Graw-Hill International Edition, 1998

REFERENCES:

1. S C Gupta, Opto Electronic Devices and Systems, Prentice Hal of India, 2005.
2. J. Wilson and J.Haukes, "Opto Electronics – An Introduction", Prentice Hall, 1995