

Optional Certificate Course for Electronics Students 2012-13 Syllabus (Odd Semester)

OPTO-ELECTRONICS AND APPLICATIONS

UNIT 1: Optical Process in Semiconductors (8 hrs)

Introduction , Revision of basic reflection ,refraction, transmission and absorption of light radiations, Photometric units ,Basic parameters of optical radiation, Luminescence of Semiconductors ,Electron hole formation, Radiative and non radiative semiconductor Hetero junctions

UNIT 2: Opto- electronic devices (12hrs)

Light emitting Diodes, LED materials, LED structures, VI characteristics, spectral and frequency response, Semiconductor Lasers, Operating principles, Types, Comparisons, Photo detectors, Junction photo diodes- PIN and APD, Phototransistors, construction and working, photo resistors, charged coupled devices, Solar cells, Principles of operations, materials, cascaded solar cells, Applications

UNIT 3: Opto- couplers (10)

Basic types of opto-couplers , Diode photo-coupled pairs, Transistor photo-coupled pairs, Thyristor, photo-coupled pairs, Resistor photo-coupled pairs, opto-electronic integrated circuits, Application of opto-couplers, Application of opto-couplers in Digital and Pulse devices

UNIT 4: Optical transmitter circuits (15hrs)

Introduction, analog and digital modulations, modulation formats, modulation circuits, LED, Laser, optical receivers, heterodyne receiver, automatic gain control, equalizers, multiplexing, Application, public network applications, Military applications, civil and consumer application, industrial application, computer application, fiber optics and communication circuits, Future developments- Integrated optical devices

Recommended books : P. Bhattacharya, Semiconductor Opto-electronics devices, PHI

Reference books:

J.Wilson, J.F.B Hawkes , An introduction to Opto-Electronics, PHI,2000
Keiser, Optical fiber communication, TMH, 4th edition, 2008

Assessment methods for Certificate Program:

Internal assessment- Assignment / presentation and attendance
Mid SEM exam – written type 50 marks.
End SEM Exam- written type 100 marks.