

# NPTEL Video Lecture Topic List - Created by LinuXpert Systems, Chennai

NPTEL Video Course - Physics - NOC:Semiconductor Optoelectronics

Subject Co-ordinator - Prof. M. R. Shenoy

Co-ordinating Institute - IIT - Delhi

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

- Lecture 1 - Context, Scope and Contents of the Course
- Lecture 2 - Energy Bands in Solids
- Lecture 3 - E-k Diagram - The Band Structure
- Lecture 4 - The Density of States
- Lecture 5 - The Density of States  $\rho(k)$ ,  $\rho(E)$
- Lecture 6 - Density of States in a Quantum Well Structure
- Lecture 7 - Occupation Probability and Carrier Concentration
- Lecture 8 - Carrier Concentration and Fermi Level
- Lecture 9 - Quasi Fermi Levels
- Lecture 10 - Semiconductor Materials
- Lecture 11 - Semiconductor Heterostructures-Lattice-Matched Layers
- Lecture 12 - Strained-Layer Epitaxy and Quantum Well Structures
- Lecture 13 - Bandgap Engineering
- Lecture 14 - Heterostructure p-n junctions
- Lecture 15 - Schottky Junctions and Ohmic Contacts
- Lecture 16 - Fabrication of Heterostructure Devices
- Lecture 17 - Interaction of Photons with Electrons and Holes in a Semiconductor
- Lecture 18 - Optical Joint Density of States, and Probabilities of Emission and Absorption
- Lecture 19 - Rates of Emission and Absorption
- Lecture 20 - Amplification by Stimulated Emission
- Lecture 21 - The Semiconductor (Laser) Amplifier
- Lecture 22 - Absorption Spectrum of Semiconductors
- Lecture 23 - Gain and Absorption Spectrum of Quantum Well Structures
- Lecture 24 - Electro-absorption Modulator-I Principle of Operation
- Lecture 25 - Electro-absorption Modulator-II Device Configuration
- Lecture 26 - Injection Electroluminescence
- Lecture 27 - Light emitting diode-I Device structure and parameters
- Lecture 28 - Light emitting diode-II Device Characteristics
- Lecture 29 - Light emitting diode-III Output Characteristics

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- Lecture 30 - Light emitting diode-IV Modulation Bandwidth
- Lecture 31 - Light emitting diode-V Material and Applications
- Lecture 32 - Laser Basics
- Lecture 33 - Semiconductor Laser-I Device Structure
- Lecture 34 - Semiconductor Laser-II Output Characteristics
- Lecture 35 - Semiconductor Laser-III Single Frequency Lasers
- Lecture 36 - Vertical cavity Surface Emitting Laser (VCSEL)
- Lecture 37 - Quantum Well Laser
- Lecture 38 - Practical Laser Diodes and Handling
- Lecture 39 - General Characteristics of Photodetectors
- Lecture 40 - Responsivity and Impulse Response
- Lecture 41 - Photoconductors
- Lecture 42 - Semiconductor Photo-Diodes-I
- Lecture 43 - Semiconductor Photo-Diodes-II
- Lecture 44 - Other Photodetectors
- Lecture 45 - Photonic Integrated Circuits