

PANIPAT INSTITUTE OF ENGINEERING & TECHNOLOGY

Department of Applied Sciences and Humanities

Subject Name: - SEMICONDUCTOR PHYSICS

Year/Semester: 1st

Subject Code: BS-115A

LESSON PLAN

| Lecture No. | Topic | Tentative Date | CO | Methodology |
|--------------------|--|-----------------------|-----------|---|
| L 1 | Introduction – Scheme and syllabus, CO ,books etc. | 02.11.21 | | Explanation through PPT |
| L 2 | Crystalline and Amorphous solids, Unit cell ,lattice translation vector, space lattice, basis, crystal structure | 08.11.21 | | Lecture using Digital interactive and writing board |
| L 3 | symmetry operations, Primitive cell, Fundamental types of Bravais lattices: in two-dimensional | 09.11.21 | | Lecture using Digital interactive and writing board |
| L4 | three dimensional Bravais lattices; Characteristics of Unit cells | 10.11.21 | | Demonstration using 3D Projector and writing board |
| L 5 | Simple Cubic (SC), Body Centred Cubic (BCC), | 11.11.21 | | Demonstration using 3D Projector and writing board |
| L 6 | Face Centred Cubic (FCC) | 15.11.21 | | Demonstration using 3D Projector |
| L 7 | Gap-Grain and grain boundary | 16.11.21 | | PPT and use of internet for showing examples |

| | | | | | |
|-------------|--|----------|---|---|---|
| L8 | crystal structures: Sodium Chloride, Cesium Chloride, Diamond, | 17.11.21 | 1 | Flip Learning | |
| L 9 | Hexagonal Close Packed (HCP) structure | 18.11.21 | | Demonstration using 3D Projector and writing board | |
| L10 | Miller Indices –Definition and calculations | 22/12/21 | | Explanation through Writing board | |
| L 11 | Miller Indices –Sketching | 23.11.21 | | Explanation through Writing board | |
| L 12 | Gap-X ray diffraction | 24.11.21 | | | |
| L 12 | Bonding in Solids | 25.11.21 | | Flip Learning | |
| L 13 | Point defects in crystals: Schottky and Frenkel defects. | 29.11.21 | | Lecture using Digital interactive and writing board | |
| L 14 | Revision of main points using questions from final exam | 30.11.21 | | Flip learning | |
| | Unit – II Quantum Theory | | | | |
| L 15 | CO ,Need and origin of Quantum concept | 01.12.21 | | 1,2,3 | NPTEL Lecture and Lectures |
| L 16 | Planks Radiation Law | 02.12.21 | | | Lecture using Digital interactive and writing board |
| L 17 | Quantum theory: Basic concepts | 06.12.21 | | | Lecture using Digital interactive and writing board |

| | | | | |
|------|---|----------|--|---|
| L 18 | Wave-particle duality, Photoelectric Effect | 07.12.21 | | NPTEL Lecture and Lectures |
| L19 | Compton effect, concept of wave function | 08.12.21 | | Lecture using Digital interactive and writing board |
| L 20 | Phase velocity and group velocity | 09.12.21 | | Lecture using Digital interactive and writing board |
| L 21 | Uncertainty Principle | 13.12.21 | | video and Lecture using Digital interactive and writing board |
| L 22 | Applications of uncertainty Principle | 14.12.21 | | Lecture using Digital interactive and writing board |
| L 23 | Schrodinger's wave equation: time-dependent | 15.12.21 | | Lecture using Digital interactive and writing board |
| L 24 | Time –independent wave equation; Physical Significance of wave function Ψ | 16.12.21 | | Lecture using Digital interactive and writing board |
| L25 | Surprise Objective Test | 22.12.21 | | unit 1 and 2 |
| L 26 | Sessional Paper Discussion and Assignment | 23.12.21 | | |
| | UNIT III | | | |
| L 27 | Free Electron Theory: Classical free electron theory: electrical conductivity in metals, thermal conductivity in metals, | 27.12.21 | | Lecture using Digital interactive and writing board |

| | | | | |
|------|--|----------|--|---|
| L 28 | Wiedemann-Franz law | 28.12.21 | | Lecture using Digital interactive and writing board |
| L 29 | Lecture of Assignment - 1 | 29.12.21 | | Lecture using Digital interactive and writing board |
| L 30 | success and drawbacks of free electron theory | 30.12.21 | | Lecture using Digital interactive and writing board |
| L 31 | Quantum free electron theory: wave function, eigen values | 03.01.22 | | Lecture using Digital interactive and writing board |
| L 32 | Density of states | 04.01.22 | | Lecture using Digital interactive and writing board |
| L 33 | Fermi-Dirac distribution function | 05.01.22 | | Lecture using Digital interactive and writing board |
| L 34 | Fermi energy and its importance, Thermionic Emission (qualitative). | 06.01.22 | | Lecture using Digital interactive and writing board |
| L 35 | Band theory of Solids: Bloch theorem, Kronig-Penney Model (qualitative) | 10.01.22 | | Lecture using Digital interactive and writing board |
| L 36 | CONT..... , Kronig-Penney Model | 11.01.22 | | Lecture using Digital interactive and writing board |
| L 37 | E versus k diagram | 12.01.22 | | Lecture using Digital interactive and writing board |
| L 38 | K P MODEL | 13.01.22 | | Lecture using Digital interactive and writing board |
| L 39 | Brillouin Zones | 17.01.22 | | Lecture using Digital interactive and writing board |

| | | | | |
|------|--|----------|-----|---|
| L 40 | Concept of effective mass of electron | 18.01.22 | | Lecture using Digital interactive and writing board |
| L 41 | Energy levels and energy bands | 19.01.22 | | Lecture using Digital interactive and writing board |
| L 42 | Distinction between metals, insulators and semiconductors | 20.01.22 | | Flip Learning |
| L 43 | Lecture on Semiconductors | 27.01.22 | | Flip Learning |
| L44 | Hall effect and its Applications | 31.01.22 | | Lecture using Digital interactive and writing board |
| | Unit –IV | | | |
| L 45 | Semiconductors: Conduction in Semiconductors | 01.02.22 | 1,4 | 3 D Projector |
| L 46 | , Intrinsic Semiconductors: Conductivity of charge carriers, | 02.02.22 | | Flip Learning |
| L 47 | Carrier concentration in intrinsic semiconductors | 03.02.22 | | Lecture using Digital interactive and writing board |
| L 48 | Lecture - Applications of semiconductor | 07.02.22 | | Flip Learning |
| L 49 | Extrinsic Semiconductors: n-type semiconductors, p-type semiconductors | 08.02.22 | | Lecture using Digital interactive and writing board |

| | | | | |
|--------------------------------|---|----------|--|---|
| L 50 | charge carrier concentration in extrinsic semiconductors | 09.02.22 | | Lecture using Digital interactive and writing board |
| Content beyond Syllabus | | | | |
| L 51 | Introduction to lasers | 10.02.22 | | video and Lectures |
| L 52 | Semiconductor Devices: The p-n junction, Current-voltage characteristics of p-n junction | 14.02.22 | | Lecture and Lab work |
| L 53 | Beyond Syllabus.....Semiconductor Application as solar cell | 15.02.22 | | Expert Lecture |
| L 54 | The Transistor: Bipolar Junction Transistor (BJT) | 16.02.22 | | Lecture using Digital interactive and writing board,video |
| L 55 | Field Effect Transistor (FET) | 20.02.22 | | Lecture using Digital interactive and writing board,video |
| L 56 | Metal-Semiconductor Junction (Ohmic and Schottky); Semiconductor Laser. | 21.02.22 | | Lecture using Digital interactive and writing board,video |
| L 57 | Revision of Imp. Topics | 22.02.22 | | Lecture and discussions |
| L 58 | Revision of Imp. Topics | 23.02.22 | | Lecture and discussions |
| L 59 | Revision of Imp. Topics | 24.02.22 | | Lecture and discussions |