

**PANIPAT INSTITUTE OF ENGINEERING & TECHNOLOGY**

**Department of Applied Sciences and Humanities**

**Subject Name: - SEMICONDUCTOR PHYSICS**

**Year/Semester: 1<sup>st</sup>/2<sup>nd</sup>**

**Subject Code: BS-115A**

**LESSON PLAN**

Lecture No.	Topic	Tentative Date	CO	Methodology
L 1	<b>Introduction</b> – Scheme and syllabus, CO ,books etc.	28.03.22	1	Explanation through PPT
L 2	Crystalline and Amorphous solids, Unit cell ,lattice translation vector, space lattice, basis, crystal structure	29.03.22		Lecture using Digital interactive and writing board
L3	Symmetry operations, Primitive cell, Fundamental types of Bravais lattices: in two-dimensional	30.03.22		Lecture using Digital interactive and writing board
L4	Three dimensional Bravais lattices; Characteristics of Unit cells	4.04.22		Demonstration using 3D Projector and writing board
L 5	Simple Cubic (SC), Body Centred Cubic (BCC),Face Centred Cubic (FCC)	5.04.22		Demonstration using 3D Projector and writing board
L6	Crystal structures: Sodium Chloride, Cesium Chloride, Diamond,Gap-Grain and grain boundary	6.04.22		Demonstration using 3D Projector and writing board
L7	Hexagonal Close Packed (HCP) structure	11.04.22		Demonstration using 3D Projector and writing board

<b>L8</b>	Miller Indices –Definition and calculations	12.04.22		Explanation through Writing board
<b>L9</b>	Miller Indices –Sketching	13.04.22		Lecture using Digital interactive and writing board
<b>L10</b>	Gap-X ray diffraction, Bonding in Solid	18.04.22		Explanation through Writing board
<b>L11</b>	Point defects in crystals: Schottky and Frenkel defects.	19.04.22		Explanation through Writing board
<b>L12</b>	Revision of main points using questions from final exam	20.04.22		
	<b>Unit – II Quantum Theory</b>			
L13	CO ,Need and origin of Quantum concept	25.04.22	1,2	Lecture using Digital interactive and writing board
<b>L14</b>	Planks Radiation Law	26.04.22		Lecture using Digital interactive and writing board
L15	Quantum theory: Basic concepts	27.04.22		Lecture using Digital interactive and writing board
L16	Wave-particle duality, Photoelectric Effect	02.05.22		Lecture using Digital interactive and writing board
L17	Compton effect, concept of wave function	03.05.22		Lecture using Digital interactive and writing board
L18	Phase velocity and group velocity	10.05.22		Lecture using Digital interactive and writing board

L19	Uncertainty Principle, Applications of uncertainty Principle	11.05.22		NPTEL Lecture and Lectures
L20	Schrodinger's wave equation: time-dependent	13.05.22		Lecture using Digital interactive and writing board
L21	Time –independent wave equation; Physical Significance of wave function $\Psi$	15.05.22		Lecture using Digital interactive and writing board
	<b>UNIT III</b>			
L22	<b>Free Electron Theory:</b> Classical free electron theory: electrical conductivity in metals, thermal conductivity in metals,	17.05.22	3	Lecture using Digital interactive and writing board
L23	Wiedemann-Franz law, Success and drawbacks of free electron theory	23.05.22		Lecture using Digital interactive and writing board
L24	Quantum free electron theory: wave function, eigen values	24.05.22		Lecture using Digital interactive and writing board
L25	Density of states	25.05.22		Lecture using Digital interactive and writing board
L26	Fermi-Dirac distribution function	30.05.22		Lecture using Digital interactive and writing board
L27	Fermi energy and its importance, Thermionic Emission (qualitative).	31.05.22		Lecture using Digital interactive and writing board
L28	<b>Band theory of Solids:</b> Bloch theorem, Kronig-Penney Model (qualitative)	01.06.22		Lecture using Digital interactive and writing board

L29	E versus k diagram, Brillouin Zones	09.06.22		Lecture using Digital interactive and writing board
L30	Concept of effective mass of electron	10.06.22		Lecture using Digital interactive and writing board
L31	Energy levels and energy bands, Distinction between metals, insulators and semiconductors	13.06.22		Lecture using Digital interactive and writing board
L32	Hall effect and its Applications	14.06.22		Lecture using Digital interactive and writing board
	<b>Unit –IV</b>			
L33	<b>Semiconductors:</b> Conduction in Semiconductors Intrinsic Semiconductors: Conductivity of charge carrier	15.06.22	1,4	3 D Projector
L34	Carrier concentration in intrinsic semiconductors	17.06.22		Lecture using Digital interactive and writing board
L35	Extrinsic Semiconductors: n-type semiconductors, p-type semiconductors	20.06.22		Lecture using Digital interactive and writing board
<b>L36</b>	Charge carrier concentration in extrinsic semiconductors	21.06.22		Lecture using Digital interactive and writing board
L37	<b>Semiconductor Devices:</b> The p-n junction, Current-voltage characteristics of p-n junction	22.06.22		Lecture and Lab work
L38	<b>Beyond Syllabus.....Semiconductor Applications</b>	27.06.22		Expert Lecture
L39	The Transistor: Bipolar Junction Transistor (BJT)Field Effect Transistor (FET)	28.06.22		Lecture using Digital interactive and writing board,video

L40	Metal-Semiconductor Junction (Ohmic and Schottky); Semiconductor Laser.	29.06.22	Lecture using Digital interactive and writing board,video
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