

Lesson Plan

Name of Institute	: Ambala College of Engineering and Applied Research
Name of the Faculty member	: Mr. Ajay Singh
Discipline	: Applied Sciences and Humanities
Semester	: 2nd
Subject	: Semiconductor Physics (B24-BSC-101) Semiconductor Physics Lab (B24-BSC-111)
Lesson Plan Duration	: 15 weeks (from Jan 2026 to June, 2026)
Work Load	: L-3, T-1, P-2

Week	Theory		Practical	
	Lecture day	Topic (including assignment/ test)	Practical day	Topic
1 st	1	Crystalline and Amorphous solids, Crystal Structure: lattice translation vector	1 st	To study the V-I characteristics of Semiconductor diode
	2	symmetry operations, space lattice, basis; Unit cell and Primitive cell		
	3	Fundamental types of lattices: two-dimensional and three dimensional Bravais lattices		
2 nd	4	Characteristics of Unit cells: Simple Cubic (SC), Body Centred Cubic (BCC)	2 nd	To find the Ionisation potential of Ar/Hg using thyratron tube
	5	Face Centred Cubic (FCC)		
	6	Hexagonal Close Packed (HCP) structure		
3 rd	7	Simple crystal structures: Sodium Chloride, Cesium Chloride, Diamond, Cubic Zinc Sulfide	3 rd	To find frequency of Ultrasonic waves by piezoelectric methods
	8	Miller Indices		
	9	Bonding in Solids		
4 th	10	Point defects in crystals: Schottky	4 th	Viva Voce
	11	Point defects in crystals: Frenkel defects.		
	12	Revision and Doubts		
5 th	13	Need and origin of Quantum mechanics, simple concepts	5 th	To find flashing/Quenching potential of Ar and to find capacitance of unknown potential
	14	Wave-particle duality		
	15	Phase velocity and group velocity		
6 th	16	Uncertainty Principle and Applications	6 th	To find Planck's constant by using Photocell
	17	Schrodinger's wave equation: time-dependent and time –independent		
	18	Physical Significance of wave function		
7 th	19	Classical free electron theory: electrical conductivity in metals	7 th	To find e/m for electrons by Helical method
	20	thermal conductivity in metals,		
	21	Wiedemann-Franz law		
8 th	22	Success and drawbacks of free electron theory	8 th	Viva Voce
	23	Quantum free electron theory		
	24	wave function, eigen values		
9 th	25	Fermi-Dirac distribution function	9 th	To find the value of Hall coefficient of
	26	Density of states		

	27	Fermi energy and its importance		semiconductor
10 th	28	Bloch Theorem,	10 th	To study variation of magnetic field using Stewart and Gee's apparatus
	29	K-P models, E- K diagrams		
	30	Brillouin zones		
11 th	31	Concept of effective mass of electron	11 th	To find thermionic Richardson's equation
	32	Energy levels and energy bands, Distinction between metals, insulators, and semiconductors		
	33	Hall effect & its Applications		
12 th	34	Semiconductor Basics, its types, Conduction in Semiconductors	12 th	Viva Voce
	35	Intrinsic Semiconductors: Conductivity of charge carriers		
	36	Carrier concentration in intrinsic semiconductors		
13 th	37	Extrinsic Semiconductors: n-type semiconductors, p-type semiconductors	13 th	To find the temperature coefficient of resistance by using Pt resistance thermometer by PO box
	38	charge carrier concentration in extrinsic semiconductors		
	39	The p-n junction diode, Current-voltage characteristics of p-n junction		
14 th	40	Half wave and full wave rectifier	14 th	Internal Viva
	41	The Transistor: NPN and PNP transistor		
	42	Basic configuration in common emitter		
15 th	43	Basic configuration in common base and common collector	15 th	Doubts/Revision
	44	Metal-Semiconductor Junction (Ohmic)		
	45	Metal-Semiconductor Junction (Schottky)		

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