

Lesson Plan

Name of the Faculty:	Dr. U. P. SINGH
Discipline:	B.Tech. (CSE, IT, EE, ME)
Semester:	1 st or 2 nd
Subject:	Semiconductor Physics (B24-BSC-101)
Work Load (Lecture/Practical) per week (In hours):	Lecture-3 Tutorial-1

S. No.	Lecture	Topics
1.	L1.	Crystalline and Amorphous solids, Crystal structure: lattice translation vector, Space lattice, basis; Unit cell and Primitive cell
2.	L2.	Characteristics of Unit cells: SC, BCC, FCC structure
3.	L3.	Symmetry operations, Fundamental types of lattices: Two and three dimensional Bravais lattices
4.	L4.	HCP structure
5.	L5.	Simple crystal structure: NaCl, CsCl structure
6.	L6.	Diamond, ZnS structure
7.	L7.	Miller Indices
8.	L8.	Miller Indices
9.	L9.	Bonding in Solids
10.	L10.	Point defects in crystals: Schottky defect and Frenkel defect
11.		Revision
12.		Home Assignment 1
13.	L11.	Need and origin of Quantum concept
14.	L12.	Wave-particle duality, Phase velocity
15.	L13.	group velocity
16.	L14.	Uncertainty Principle and applications
17.	L15.	Schrodinger's time-independent & time-dependent wave equation, Physical significance of wave function
18.	.	Revision
19.		Home Assignment 2
20.	L16	Classical free electron theory, Electrical conductivity in metals
21.	L17.	Thermal conductivity in metals, Wiedmann- Franz law, Success and drawbacks of free electron theory

22.	L18.	Quantum free electron theory: wave function, eigen values
23.	L19.	Density of states
24.	L20.	Fermi – Dirac distribution function
25.	L21.	Fermi energy and its importance
26.		Revision
27.	L22.	Bloch theorem, Kronig-Penney model (qualitative)
28.	L23.	Kronig-Penney model (qualitative), E versus K diagram, Brillouin Zones
29.	L24.	Concept of effective mass of electron
30.	L25.	Energy levels and energy bands
31.	L26.	Distinction between metals, insulators and semiconductors
32.	L27.	Hall effect and its applications
33.		Revision
34		Home Assignment 3
35.	L28.	Conduction in Semiconductor, Intrinsic Semiconductors: Conductivity of charge carriers
36.	L29.	Carrier concentration in intrinsic semiconductors
37.	L30.	Extrinsic Semiconductors: n-type semiconductors, p-type semiconductors
38.	L31.	Charge carrier concentration in extrinsic semiconductors
39.		Revision
40.	L32.	The pn junction, current voltage characteristics of pn junction
41.	L33.	Half Wave and full wave rectifier
42.	L34.	The transistor: NPN and PNP transistor
43.	L35.	Basic configuration in common emitter, common base and common collector
44.	L36.	Metal-Semiconductor junction: Ohmic and Schottky
45.		Revision
46.		Home Assignment 4