

## LESSON PLAN

**Name of Faculty :** Manoj Kumar Jha (Theory/ Practical)

**Discipline :** B. Tech I<sup>st</sup> Year

**Semester :** 2<sup>nd</sup>

**Subject :** Physics II /HAS-101C

**Lesson Plan Duration :** 15 weeks (from January,2018 to April,2018)

**Work load(Lecture/ Practical) per week (in hours):** Lectures-04,Practicals-02

Week	Theory		Practical	
	Lecture Day	Topic (including assignment/test)	Practical Day ( 2 lectures each day)	Topic
1 <sup>st</sup>	1	<b>Section-Unit-1 Crystal structure:</b> Introduction, Classification, Unit cell	1 <sup>st</sup>	To find the high resistance by substitution method
	2	Translation vector, Bravais lattice.		
	3	Co-ordination number, Lattice points/Unit cell,		
	4	Calculation of lattice constant, Lattice planes.		
2 <sup>nd</sup>	5	Miller indices, Spacing between lattice planes.	2 <sup>nd</sup>	To study the characteristics of a Photo-Voltaic (solar cell) and to find the fill factor.
	6	Bonding in solids.		
	7	X-rays diffraction method, Laue method		
	8	Powder method /Assignment- I		
3 <sup>rd</sup>	9	Defect in solids, Point defects.	3 <sup>rd</sup>	To find the ionization potential of mercury vapour filled in thyratron valve.
	10	Schottky defects		
	11	Frenkel defects.		
	12	Simple Crystal structure of NaCl and diamond		
4 <sup>th</sup>	13	<b>Quantum Physics:</b> Difficulties with classical physics.	4 <sup>th</sup>	To plot graph showing

	14	Introduction of quantum mechanics-simple concepts.		the variation of magnetic field with distance along the axis of a circular coil carrying current and to estimate from it the radius of the coil.
	15	Black body radiations.		
	16	Discovery of planks constants, planks radiation law.		
5 <sup>th</sup>	17	Group velocity and phase velocity and their relationship.	5 <sup>th</sup>	To plot forward & reverse bias characteristics of PN JUNCTION DIODE.
	18	de-Broglie hypothesis and matter wave.		
	19	Schrödinger wave equation-Time dependent.		
	20	Schrödinger wave equation-time independent		
6 <sup>th</sup>	21	Application of Schrödinger Wave equation-particle in a box.	6 <sup>th</sup>	To determine the energy band gap of a semiconductor (Germanium) using four probe method.
	22	Elementary idea of quantum statistics- Bose Einstein and Fermi-Dirac statistics.		
	23	<b>Unit-2 Nanomaterials and applications:</b> Introduction of nanoscience		
	24	Synthesis of nano particles		
7 <sup>th</sup>	25	Techniques-ball milling	7 <sup>th</sup>	To find the value of Planck's constant by using the photoelectric cell.
	26	Sputtering		
	27	Plasma synthesis		
	28	Properties of nano particles-mechanical		
8 <sup>th</sup>	29	Optical properties	8 <sup>th</sup>	To study the Hall effect in semiconductors and determine- a) Hall coefficient and hall voltage b) No of charge carriers / unit volume c) Mobility and Hall angle
	30	Magnetic properties		
	31	Electronic properties		
	32	Introduction to carbon nanotubes./Test-I		
9 <sup>th</sup>	33	<b>Free Electron Theory:</b> Element of classical free electron	9 <sup>th</sup>	To obtain hysteresis

		theory and its limitations.		
	34	Drude's theory of conduction of electrons.		
	35	Quantum theory of free electron, Density of states.		
	36	Fermi level, Fermi-Dirac distribution function		
				loop (B – H curve) for a given ferromagnetic material on a CRO and to find the loss of energy due to hysteresis.
10 <sup>th</sup>	37	Thermionic emission-Richardson's equation./Assignment-II	10 <sup>th</sup>	To find the value of e/m for electrons by helical method.
	38	<b>Unit-3 Band Theory of Solids:</b> Concept of band theory, classification of solids and its properties.		
	39	Kronig-Penny model, E-K diagram.		
	40	Concept of effective mass and holes.		
11 <sup>th</sup>	41	Thermionic emission-Richardson's equation.	11 <sup>th</sup>	Physics lab –II/Test-1 (Theory part)
	42	Fermi energy in intrinsic semiconductor and its variation with temperature.		
	43	Fermi energy in extrinsic semiconductor-p type and n type.		
	44	Hall effect and its applications.		
12 <sup>th</sup>	45	<b>Photoconductivity and Photo voltaic's:</b> Photoconductivity in insulating crystals and its variation with illumination.	12 <sup>th</sup>	Physics lab-II/Test-2(Experimental performance)
	46	Effect of traps, Effect of impurity on photoconductivity		
	47	Application of photo conductivity.		
	48	Photovoltaic Cell process in semiconductor.		
13 <sup>th</sup>	49	Solar Cell and characteristics./Assignment-III	13 <sup>th</sup>	Physics lab-II/Test-3 (Theory part)

	50	<b>Unit-4 Magnetic Properties of Solids:</b> Atomic magnetic moments, Orbital diamagnetism.		
	51	Classification of magnetic substances- dia, para and ferro./ Test-II		
	52	Classical theory of diamagnetism,		
14 <sup>th</sup>	53	Classical theory of Paramagnetism, Langvin's theory.	14 <sup>th</sup>	Physics lab-II/Test-4 (Experimental Performance)
	54	Modifications by Weiss in Langevin's theory		
	55	Ferromagnetism-Molecular field and domain.		
	56	<b>Superconductivity</b> -Introduction (Experimental survey)		
15 <sup>th</sup>	57	Meissner Effect	15 <sup>th</sup>	Physics lab-II / Project work
	58	London equations		
	59	Hard and soft superconductor		
	60	Elements of BCS theory and applications of superconductors/Assignment-IV		