

P.I.G. GOVT. COLLEGE FOR WOMEN, JIND
LESSON-PLAN (Session 2023-24) EVEN SEMESTER

Name of Teacher: Dr. Manoj Kumar
 Designation: Assistant Professor
 Subject: Physics (Solid State and Nano Physics)
 Class: B. Sc. (NM & CS) VI sem

Subject/Paper: Sr. No.	Months	Topics to be covered	Remarks if any,
1	Feb.	Definition, Length scale, Importance of Nano-scale and technology, History of Nantechonology, Benefits and challenges in molecular manufacturing. Molecular assembler concept, Understanding advanced capabilities. Vision and objective of Nano-technology, Nanotechnology in different field, Automobile, Electronics, Nano-biotechnology, Materials, Medicine.	
2	March	Crystalline and glassy forms, liquid crystals, crystal structure, periodicity, lattice and basis. crystal translational vectors and axes. Unit cell and Primitive Cell, Winger Seitz primitive Cell, symmetry operations for a two dimensional crystal, Bravais lattices in two and three dimensions. Crystal planes and Miller indices, Interplaner spacing, Crystal structures of Zinc Sulphide, Sodium Chloride and Diamond.	
3	April.	X-ray diffraction, Bragg's Law and experimental X-ray diffraction methods. K-space and reciprocal lattice and its physical significance, reciprocal lattice vectors, reciprocal lattice to a simple cubic lattice, b.c.c. and f.c.c. Historical introduction, Survey of superconductivity, Super conducting systems, High Tc Super conductors, Isotopic Effect, Critical Magnetic Field, Meissner Effect, London Theory and Pippards' equation, Classification of Superconductors (type I and Type II), BCS Theory of Superconductivity,	1st assignment would be taken in April.
4	May	Flux quantization, Josephson Effect (AC and DC), Practical Applications of superconductivity and their limitations, power application of superconductors.	Test would be taken in May.

Manoj

P.I.G. GOVT. COLLEGE FOR WOMEN, JIND
LESSON-PLAN (Session 2023-24) EVEN SEMESTER

Name of Teacher: Ms. Aashi Mittal

Designation: Assistant Professor

Subject: PHYSICS

Class: B.Sc. (2nd Sem)

Subject/Paper: Electricity, Magnetism and EM theory

Sr. No.	Months	Topics to be covered
1	February	<p>Electric Field: Conservative nature of Electrostatic Field, Electrostatic Potential, Potential as line integral of field, potential difference Derivation of electric field \vec{E} from potential as gradient. Derivation of Laplace and Poisson equations. Electric flux, Gauss's Law and applications of Gauss's law. Mechanical force of charged surface, Energy per unit volume.</p> <p>Magnetic Field: Biot-Savart law and its simple applications straight wire and circular loop, Current Loop as a Magnetic Dipole and its Dipole Moment, Ampere's Circuital Law and its applications to (1) Solenoid and (2) Toroid, properties of \vec{B}: curl and divergence</p>
2	March	<p>Magnetic Properties of Matter: Force on a dipole in an external field, Electric currents in Atoms, Electron spin and Magnetic moment, types of magnetic materials, Magnetization vector (M), Magnetic intensity (H), Magnetic Susceptibility and permeability, Relation between B, H and M. Electronic theory of dia and paramagnetism, Domain theory of ferromagnetism (Langevin's theory), Cycle of Magnetization-H-M curve and hysteresis loop: Energy dissipation, Importance of Hysteresis Curve</p> <p>Alternating Current Circuits: A resonance circuit, Phasor, Complex Reactance and Impedance, Analysis for RL, RC and RLC Circuits, Series LCR Circuit: (1) Resonance, (2) Power Dissipation (3) Quality Factor and (4) Band Width, Parallel LCR Circuit</p>
3	April	<p>DC current Circuits: Electric currents and current density, Electrical conductivity and Ohm's law (Review), Kirchhoff's laws for D.C. networks</p> <p>Vector Background: Gradient of a scalar and its physical significance, Line, Surface and Volume Integrals of a vector and their physical significance, Flux of a vector field, Divergence and curl of a vector and their physical significance, Gauss's divergence theorem, Stoke's theorem, Differential form of Gauss's law</p>

Aashi

		Time varying electromagnetic fields: Electromagnetic induction, 11 Faraday's laws of induction and Lenz's Law, Self-inductance, Mutual inductance, Energy stored in a Magnetic field
4	May	Time varying electromagnetic fields: Derivation of Maxwell's equations, Displacement current, Maxwell's equations in differential and Integral form and their physical significance. Electromagnetic Waves: Electromagnetic waves, Transverse nature of electromagnetic wave, energy transported by electromagnetic waves, Poynting vector, Poynting's theorem

*Vacation as per university calendar

- Assignment and unit test will be taken as per schedule.

fast

P.I.G. GOVT. COLLEGE FOR WOMEN, JIND
LESSON-PLAN (SESSION 2023-24) EVEN SEMESTER

Name of Teacher: Ankita

Designation: Ext. Lecturer

Subject: Physics

Class: B.Sc , N.M llnd C,S llnd

Subject/Paper: Sr. No.	Months	Topics to be covered	Remarks if any,
1	Feb.	<p>Unit1: Statistical Physics I</p> <p>Microscopic and Macroscopic systems, events-mutually exclusive, dependent and independent. Probability, statistical probability, A- priori Probability and relation between them, probability theorems, some probability considerations, combinations possessing maximum probability, combination possessing minimum probability, Tossing of 2,3 and any number of Coins, Permutations and combinations, distributions of N (for N= 2,3,4) distinguishable and indistinguishable particles in two boxes of equal size.</p>	
2	March	<p>Unit1: statistical physics I</p> <p>Micro and Macro states, Thermodynamical probability, Constraints and Accessible states, Statistical fluctuations, general distribution of distinguishable particles in compartments of different sizes, Condition of equilibrium between two systems in thermal contact-- parameter, Entropy and Probability (Boltzman's relation).</p>	

		<p>Unit -2: Statistical Physics II</p> <p>Postulates of statistical physics, Phase space, Division of Phase space into cells Three kinds of statistics, basic approach in three statistics. M. B. statistics applied to an ideal gas in equilibrium- energy distribution law (including evaluation of σ and β), speed distribution law & velocity distribution law. Expression for average speed, r.m.s. speed, average velocity, r. m. s. velocity, most probable energy & mean energy for Maxwellian distribution.</p>	
3	April	<p>Unit-3: Quantum Statistics Need for Quantum Statistics:</p> <p>Bose-Einstein energy distribution law, Application of B.E. statistics to Planck's radiation law B.E. gas, Degeneracy and B.E. Condensation, Fermi-Dirac energy distribution law, F.D. gas and Degeneracy, Fermi energy and Fermi temperature, Fermi Dirac energy distribution law, Fermi Dirac gas and degeneracy, Fermi energy and Fermi temperature, Fermi Dirac energy distribution law for electron gas in metals, Zero point energy, Zero point pressure and average speed (at 0 K) of electron gas, Specific heat anomaly of metals and its solution. M.B. distribution as a limiting case of B.E. and F.D. distributions, Comparison of three statistics.</p>	
4	May	<p>Unit-4: Theory of Specific Heat of Solids Dulong and Petit law</p> <p>Derivation of Dulong and Petit law from classical physics. Specific heat at</p>	

		<p>low temperature, Einstein theory of specific heat, Criticism of Einstein theory</p> <p>Debye model of specific heat of solids, success and shortcomings of Debye theory, comparison of Einstein and Debye theories.</p> <p>Revision For all syllabus</p> <p>Note- assignment and 1 unit test will be taken as per schedule</p>	
--	--	------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------	--

Ankita
22/3/2024

Lesson Plan: BSC -II (NM CS)

Dr. Ramesh Kumar

Waves and Optics

Assistant Professor of Physics

GCW JIND

Month : Feb 2024 **Unit-1: Polarization**

Polarization: Polarisation by reflection, refraction and scattering, Malus Law, Phenomenon of double refraction, Huygen's wave theory of double refraction (Normal and oblique incidence), Analysis of polarized Light. Nicol prism, Quarter wave plate and half wave plate, production and detection of (i) Plane polarized light (ii) Circularly polarized light and (iii) Elliptically polarized light. Optical activity, Fresnel's theory of optical rotation, Specific rotation, Polarimeters (half shade and Biquartz).

Month : March 2024 **Unit-II: Fourier analysis**

Fourier theorem and Fourier series, evaluation of Fourier coefficient, importance and limitations of Fourier theorem, even and odd functions, Fourier series of functions $f(x)$ between (i) 0 to 2π , (ii) $-\pi$ to π , (iii) 0 to π , (iv) $-L$ to L , complex form of Fourier series, Application of Fourier theorem for analysis of complex waves: solution of triangular and rectangular waves, half and full wave rectifier outputs, Parseval identity for Fourier Series, Fourier integrals.

Month : Apr 2024 **Unit III: Fourier transforms**

Fourier transforms and its properties, Application of Fourier transform (i) for evaluation of integrals, (ii) for solution of ordinary differential equations, (iii) to the following functions:

1. $f(x) = e^{-x^2/2} \quad |x| < a$

2. $f(x) = 0 \quad |x| > a$

Geometrical Optics I

Matrix methods in paraxial optics, effects of translation and refraction, derivation of thin lens and thick lens formulae, unit plane, nodal planes, system of thin lenses.

Month : May 2024 **Unit-IV: Geometrical Optics II**

Chromatic, spherical, coma, astigmatism and distortion aberrations and their remedies. Fiber Optics
Optical fiber, Critical angle of propagation, Mode of Propagation, Acceptance angle, Fractional refractive index change, Numerical aperture, Types of optics fiber, Normalized frequency, Pulse dispersion, Attenuation, Applications, Fiber optic Communication, Advantages.



P.I.G. GOVT. COLLEGE FOR WOMEN, JIND
LESSON-PLAN (Session 2023-24) EVEN SEMESTER

Name of Teacher: Dr. Manju Sharma

Designation: Assistant Professor

Subject: PHYSICS

Class: B.Sc. Final (6th Sem)

Subject/Paper : ATOMIC AND MOLECULAR PHYSICS

Sr. No.	Months	Topics to be covered	Remarks if any,
1	February -March	Introduction of early observations, emission and absorption spectra, atomic spectra, wave number, spectrum of Hydrogen atom in Balmer series, Bohr atomic model (Bohr's postulates), spectra of Hydrogen atom, explanation of spectral series in H-atom, un-quantized states and continuous spectra, spectral series in absorption spectra, effect of nuclear motion on line spectra (correction of finite nuclear mass), variation in Rydberg constant due to finite mass, shortcomings of Bohr's theory, Wilson Sommerfeld quantization rule, de-Broglie interpretation of Bohr quantization law, Bohr's corresponding principle, Sommerfeld's extension of Bohr's model, Sommerfeld relativistic correction, Short comings of Bohr-Sommerfeld theory, Vector atom model; space quantization, electron spin, coupling of orbital and spin angular momentum, spectroscopic terms and their notation, quantum numbers associated with vector atom model, transition probability and selection rules.	Videos of the related topics will be shown on smart board. Class Test/Quiz shall be conducted after the completion of the unit.
2	March-April	Orbital magnetic dipole moment (Bohr magneton), behavior of magnetic dipole in external magnetic field; Larmor's precession and theorem; Penetrating and Non-penetrating orbits, Penetrating orbits on the classical model; Quantum defect, spin orbit interaction energy of the single valance electron, spin orbit interaction for penetrating and non penetrating orbits, quantum mechanical relativity correction, Hydrogen fine spectra, Main features of Alkali Spectra and their theoretical interpretation, term series and limits, Rydberg-Ritz combination principle, Absorption spectra of Alkali atoms. observed doublet fine structure in the spectra of alkali metals and its Interpretation, Intensity rules for doublets, comparison of Alkali spectra and H- spectrum.	
3	April-May	Essential features of spectra of Alkaline-earth elements, Vector model for two valance electron atom: application of spectra. Coupling Schemes; LS or Russell – Saunders Coupling	

		<p>Scheme and JJ coupling scheme, Interaction energy in L-S coupling (sp, pd configuration), Lande interval rule, Pauli principle and periodic classification of the elements. Interaction energy in JJ Coupling (sp, pd configuration), equivalent and non-equivalent electrons, Two valance electron system-spectral terms of non-equivalent and equivalent electrons, comparison of spectral terms in L-S And J-J coupling. Hyperfine structure of spectral lines and its origin; isotope effect, nuclear spin.</p>	
4	May	<p>Zeeman Effect (normal and Anomalous), Experimental set-up for studying Zeeman effect, Explanation of normal Zeeman effect(classical and quantum mechanical), Explanation of anomalous Zeeman effect (Lande g-factor), Zeeman pattern of D1 and D2 lines of Na-atom, Paschen-Back effect of a single valance electron system. Weak field Stark effect of H- atom. Molecular Physics: General Considerations, Electronic States of Diatomic Molecules, Rotational Spectra (Far IR and Microwave Region), Vibrational Spectra (IR Region), Rotator Model of Diatomic Molecule, Raman Effect, Electronic Spectra.</p>	

*Vacation as per university calendar

- Assignment and unit test will be taken as per schedule.

10/10/20

P.I.G. GOVT. COLLEGE FOR WOMEN, JIND
LESSON-PLAN (SESSION 2023-24) EVEN SEMESTER

Name of Teacher: Priyanka
Designation: Ext. Lecturer
Subject: Physics
Class: MDC-2

Subject/Paper: Sr. No.	Months	Topics to be covered	Remarks if any,
1	Feb.	<p style="text-align: center;">UNIT-I</p> <p>Light and Optics- Nature and properties of light, its speed frequency and wavelength; Refraction of light- types of reflection and their importance in daily life, Laws of reflection. Refraction of light- Laws refraction, refractive index, refraction of light through prism (dispersion of light), formulation Rainbow, twinkling of stars, advance Sunrise and delayed Sunset; scattering of light and blue color of the sky; appearance depth, total internal reflection.</p>	
2	March	<p style="text-align: center;">UNIT-II</p> <p>Image formation through reflection- image formation by plane mirrors, multiple image formed by two flat mirrors and optical illusions; Images formed by parabolic mirrors and spherical mirrors- Convex and Concave mirrors, ray diagrams, mirror equation and magnification; application of plane and curve mirror in daily life. Image formed through reflection- images by convex and concave lenses ray diagrams and lens equation.</p> <p style="text-align: center;">UNIT-III</p> <p>Electricity- electric charges, types of charges, unit of charge, frictional electricity, electricity by conduction and electric current, units of electric current, measurements of current, conductors and insulators; resistance, resistivity and ohm's law, electric potential and potential difference, emf.</p>	

3	April	<p style="text-align: center;">UNIT-III</p> <p>Electric circuit- register, capacitor, battery, ammeter and Voltmeter; Series and parallel combination of resistors, electrical wiring in houses and electrical safety (fuse, hot wire, neutral, ground and short circuit), electric power and electric power transmission current and its practical applications.</p> <p>Magnetic effect of electric current- Magnetic field and field lines, bar magnet magnetic field and direction of field due to a current through straight conductor.</p> <p style="text-align: center;">UNIT-IV</p> <p>Structure of an atom- Rutherford's model of an atom Bohr's model of an atom and composition of atom-electron, proton and neutron</p>	
4	May	<p style="text-align: center;">UNIT-IV</p> <p>Orbits or shells (energy levels in an atom), distribution of electrons in different shells of the atom, atomic number and atomic mass of an atom. valency of an atom, excitation and ionization of atom, meaning of atomic transitions; Discovery of X-rays, Generation of X-rays, composition of nucleus, meaning of nuclear transitions.</p> <p>Revision For all syllabus Note- assignment and Mid-term exam will be taken as per schedule</p>	

P.I.G. GOVT. COLLEGE FOR WOMEN, JIND
LESSON-PLAN (SESSION 2023-24) EVEN SEMESTER

Name of Teacher: Priyanka

Designation: Ext. Lecturer

Subject: Physics

Class: SEC Physics

Subject/Paper: Sr. No.	Months	Topics to be covered	Remarks if any,
1	Feb.	<p style="text-align: center;">UNIT-I</p> <p>Introduction to Electricity and Circuits: Basics of Electricity, Electric charges (positive and negative). Basic components of a circuit: battery, wires, bulb, switch. Conductors and insulators</p> <p>Basic Electricity Principles: Voltage, Current, Resistance, and Power. Ohm's law. Series, parallel, and series parallel combinations. AC Electricity and DC Electricity.</p>	
2	March	<p style="text-align: center;">UNIT-II</p> <p>Understanding Electrical Circuits: AC and DC Voltage Sources, Current and voltage drop across the DC circuit elements. Kirchhoff's laws. Instruments to measure current, voltage, power in DC and AC circuits.</p> <p>Familiarization with multimeter, voltmeter and ammeter. Insulation. Preparation of extension board. Joints in electrical conductors. Techniques of soldering.</p>	

3	April	<p style="text-align: center;">UNIT-III</p> <p>Electrical Protection: Relays. Fuses and disconnect switches. Circuit breakers. Overload devices. Ground-fault protection. Grounding and isolating. Surge protection.</p> <p>Smart Switches, Wi-fi enabled switches, Smart Bulbs, Ways to make smart home. Estimation of electric load, average electricity bill calculation.</p> <p style="text-align: center;">UNIT-IV</p> <p>Electric Appliances: Fan, Bulb, LEDs, Working of Water Cooler. Working of Air Conditioner, Comparison of Invertor & Non Invertor Air Conditioners</p>	
4	May	<p style="text-align: center;">UNIT-IV</p> <p>Working of DC & AC Moto, Working of Water Pump, Invertor, Offgrid & ongrid Solar Systems for home. Ways to save electricity</p> <p>Revision For all syllabus Note- assignment and Mid-term exam will be taken as per schedule</p>	

