Lesson Plan

Name: **Mukesh Chander (Ext. Lecturer Physics)**

Class and Section: **B.Sc.-1st (2nd Sem.)** Subject: **Physics**

Feb 2024	and optics-Nature and properties of light, its speed, frequency and wavelength; tion of light-types of reflection and their importance in daily life, laws of reflection, ble reflection by mirrors and their applications. ction of light- laws of refraction, refractive index, refraction of light through (dispersion of light), formation Rainbow, twinkling of stars, advance Sunrise elayed Sunset; Scattering of light and blue colour of the sky; apparent depth, nternal reflection and its important applications
March 2024	formation through reflection-images formed by plane mirrors, multiple images formed flat mirrors and optical illusions; images formed by parabolic mirrors and spherical s- Concave and convex mirrors, ray diagrams, mirror equation and magnification; tions of plane and curved mirrors in daily life. formation through refraction- images by convex and concave lenses, ray diagrams and uation. Optical instruments- Camera, eye, telescope and microscope
Apr 2024	Electricity- electric charge, types of charges, unit of charge, frictional electricity, electricity by conduction and electric current, units of electric current, measurement of current, conductors and insulators; resistance, resistivity and Ohm's law, electric potential and potential difference, emf; Electric circuit- resistor, capacitor, battery, ammeter and voltmeter; Series and parallel combinations of resistors, electrical wiring in houses and electrical safety (fuse, hot wire, neutral, ground and short circuit), electric power and electric power transmission; Heating effect of current and its practical applications. 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 and through a circular loop; solenoid, electmagnet
May 2024	Structure of an atom- Rutherford's model of an atom, Bohr's model of an atom and composition of the atom-electron, proton and neutron, 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, core shell and outer shell, valency of an atom, excitation and ionization of the atom, meaning of atomic transitions; Discovery of X-rays, Generation of X-rays, their characteristics, applications and harmful effects; Composition of nucleus, meaning of nuclear transitions and properties of α-, β- and γ-rays

Mukesh chander

Extension Lecturer in Physics

Lesson Plan

Name: **Mukesh Chander (Ext. Lecturer Physics)**

Class and Section: **B.Sc.-1st (2nd Sem.)** Subject: **Physics**

Feb 2024	**Vector Background and Electric Field**: 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. Conservative nature of Electrostatic Field, Electrostatic Potential, Potential as line integral of field, potential difference Derivation of electric field E from potential as gradient. Derivation of Laplace and Poisson equations. Electric flux, Gauss's Law, Differential form of Gauss's law and applications of Gauss's law. Mechanical force of charged surface, Energy per unit volume.
March 2024	**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 B: curl and divergence, **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'stheory),Cycle of Magnetization -B-H curve and hysteresis loop: Energy dissipation, Hysteresis loss and importance of Hysteresis Curve
Apr 2024	**Time varying electromagnetic fields:** Electromagnetic induction, Faraday's laws of induction and Lenz's Law, Self-inductance, Mutual inductance, Energy stored in a Magnetic field, Derivation of Maxwell's equations, Displacement current, Maxwell's equations in differential and integral form and their physical significance.**lectromagnetic Waves:** Electromagnetic waves,Transverse nature of electromagnetic wave, energy transported by electromagnetic waves, Poynting vector, Poynting's theorem. Propagation of Plane electromagnetic waves in free space & Dielectrics
May 2024	**DC current Circuits:** Electric current and current density, Electrical conductivity and Ohm's law (Review), Kirchhoff's laws for D.C. networks, Network theorems: Thevenin's theorem, Norton theorem, Superposition theorem. **Alternating Current Circuits:** A resonance circuit, Phasor, Complex Reactance and Impedance, Analysis for RL, RC and LC Circuits, Series LCR Circuit: (1) Resonance, (2) Power Dissipation (3) Quality Factor and (4) Band Width, Parallel LCR Circuit.

Mukesh chander (Extension Lecturer in Physics)

Class and Section: **B.Sc.-2nd (4th Sem.)** Subject: **Physics**

Jan 2024	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 2pi, (ii) –pi to pi, (iii) 0 to pi, (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 wave rectifier, full wave rectifier outputs, Parseval identity for Fourier Series, Fourier integrals. 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- x2/2 1 |X|<a 2 .f(x) = 0 |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.
Feb 2024	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, 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-- β parameter, Entropy and Probability (Boltzman's relation).
March 2024	Statistical Physics II 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. Quantum Statistics Need for Quantum Statistics: 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.
Apr 2024	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. Theory of Specific Heat of Solids Dulong and Petit law. Derivation of Dulong and Petit law from classical physics. Specific heat at low temperature, Einstein theory of specific heat, Criticism of Einstein theory, Debye model of specific heat of solids, success and shortcomings of Debye theory, comparison of Einstein and Debye theories.

Lesson Plan

Name of the Assistant/ Associate Professor:**Mukesh Chander (Ext. Lecturer Physics)**

Class and Section: **B.Sc.-3rd (6th Sem.)**

Subject: **Physics**

Jan 2024	Crystal Structure -introduction, crystal structure, periodicity, Crystalline and glassy forms, liquid crystal, translation vector and axes, unit cell, primitive cell, Wienger sietz primitive cell, symmetry operation for a two dimensional crystal, Bravis lattice for two and three dimension, crystal plane and miller indices, inter planar spacing and numerical X-ray and Braggs Diffraction, K –spacing and reciprocal lattice and its physical significance reciprocal lattice vectors, reciprocal lattice to a simple cubic lattice, b.c.c and f.c.c.
Feb 2024	survey of superconductivity, high and tc superconductor, isotopic effect, critical magnetic field, miessner effect, London and peppered equation, classification of superconductor, BCS Theory and flux quantization, Josephon effect , application and limitation of superconductivity, introduction to Nano Physics, definition, length scale ,importance of Nano scale and technology, history, benefits and challenge in molecular manufacturing, molecular, assembler concept, vision and objective of nano technology, application of nanotechonology in different fields
March 2024	emission and absorption spectra, Bhors Atomic Model, spectra of hydrogen atom, complete explanation of spectra, Rudberg constant mass shortcoming of Bohrs model Wilson Summerfield quantization rule, Bhors corresponding model, shortcoming of this model, vector atom model, various quantum no. associated with vector model and selection rule orbital ,magnetic dipole moment, larmor precession and theorm, penetrating and non penetrating model, quantum defect and spin orbit interaction energy, hydrogen fine spectra main feature of alkali spectra and theoretical interpretation, absorption spectra of alkali atom intensity rule for doublets, comparison of alkali and hydrogen spectra
Apr 2024	vector atom model for two valence electron LS Coupling and jj coupling hyperfine structure of spectral line and its origin ,nuclear spin, atoms in external field Zeeman effect, types and lande –g factor, Paschen –Back effect of a single valence electron system, rotation spectra, vibration spectra and rotator model of diatomic model

Mukesh chander

Extension Lecturer in Physics