

Govt. College for Women Lakhan Majra, Rohtak
Lesson Plan (Odd Semester 2021-22)

Name of Assistant Professor: Dr. Sunil Dhankhar

Class: - B.Sc. Ist Semester

Subject: Physics

Paper II – PHY-101: Mechanics

Sr. No.	Date/Week/Month	Syllabus
1.	October 2021	Mechanics of single and system of particles, conservation of laws of linear momentum, angular momentum and mechanical energy, Centre of mass and equation of motion.
2.	November 2021	Constrained motion, degrees of freedom, Generalised coordinates, displacement, velocity, acceleration, momentum, force and potential. Hamilton's variational principle, Lagrange's equation of motion from Hamilton's Principle. Linear Harmonic oscillator
3.	December 2021	Simple pendulum, Atwood's machine, Rotation of Rigid body, moment of inertia, torque, angular momentum, kinetic energy of rotation. Theorems of perpendicular and parallel axes with proof.
4.	January 2022	Moment of inertia of solid sphere, hollow sphere, spherical shell, solid cylinder, hollow cylinder and solid bar of rectangular cross-section. Acceleration of a body rolling down on an inclined plane.

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Lesson Plan (Odd Semester 2021-22)

Name of Assistant Professor: Dr. Sunil Dhankhar

Class: - B.Sc. Ist Semester

Subject: Physics

Paper II – PHY-102: Electricity and Magnetism

Sr. No.	Date/Week/Month	Syllabus
1.	October 2021	Mathematical Background: Scalars and Vectors, Dot and Cross product, Triple vector product, Scalar and Vector fields. Differentiation of a vector, Gradient of a scalar and its physical significance. Integration of a vector (line, surface and volume integral and their physical significance), Gauss's divergence theorem and Stock's theorem.
2.	November 2021	Electrostatic Field: Derivation of field E from potential as gradient, Derivation of Laplace and Poisson equations. Electrostatic flux, Gauss's Law and its application to spherical shell, uniformly charged infinite plane and uniformity charged straight wire. Mechanical force of charged surface, Energy per unit volume
3.	December 2021	Magneostatistics: Magnetic Induction, magnetic flux, Solenoidal nature of Vector field of induction. Properties of B (i) $\nabla \cdot B = 0$ (ii) $\nabla \times B = \mu_0 J$, Electronic theory of dia and para magnetism (Langevin's theory). Domain theory of ferromagnetism. Cycle of Magnetization. Hysteresis (Energy dissipation, Hysteresis loss and importance of Hysteresis curve).
4.	January 2022	Maxwell Equation and their derivations, Displacement Current, Vector and scalar potentials, Boundary conditions at interface between two different media, Propagation of electromagnetic wave (Basic idea, no derivation). Poynting vector and Poynting theorem.

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Lesson Plan (Odd Semester 2021-22)

Name of Assistant Professor: Dr. Sunil Dhankhar

Class: - B.Sc. 3rd Semester

Subject: Physics

Paper I – PHY-301: Computer Programming, Thermodynamics

Sr. No.	Date/Week/Month	Syllabus
1.	October 2021	Computer Programming: Computer organization, Binary representation, Algorithm development, flow charts and their interpretation. Fortran Preliminaries; Integer and floating point arithmetic expression, built in functions. Executable and non-executable statements.
2.	November 2021	Input and output statements, Formats. IF, DO and GO TO statements, Dimension arrays statement function. Function subprogram. Thermodynamics-I: Second law of thermodynamics, Carnot theorem, Absolute scale of temperature, Absolute Zero, Air pollution due to internal combustion Engine. Joule's free expansion.
3.	December 2021	Joule Thomson (Porous plug) experiment, Joule - Thomson effect. Entropy, Show that $dQ/T = 0$, T-S diagram, Nernst heat law, Liquefaction of gases. Thermodynamics-II: Derivation of Clausius - Claperyron latent heat equation, Phase diagram and triple point of a substance.
4.	January 2022	Development of Maxwell thermo dynamical relations, Application of Maxwell relations in the derivation of relations between entropy, specific heats and thermodynamic variables. Thermodynamic functions: Internal energy (U), Helmholtz function (F), Enthalpy (H), Gibbs function (G) and the relations between them.

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Lesson Plan (Odd Semester 2021-22)

Name of Assistant Professor: Dr. Sunil Dhankhar

Class: - B.Sc. 3rd Semester

Subject: Physics

Paper I – PHY-302: Optics - I

Sr. No.	Date/Week/Month	Syllabus
1.	October 2021	Fourier Analysis and Fourier Transforms: Speed of transverse waves on a uniform string. Speed of longitudinal waves in a fluid, superposition of waves (physical idea), Fourier Analysis of complex waves and its application for the solution of triangular and rectangular waves.
2.	November 2021	Half and full wave rectifier out puts. Fourier transforms and its properties Fourier transforms and its properties, Application of fourier transform to following function. (I) $f(x) = e^{-x^2/2}$ (II) $f(x) = 1[x] < a, 0[x] > a$, Geometrical Optics: Matrix methods in paraxial optics, effects of translation and refraction.
3.	December 2021	Derivation of thin lens and thick lens formulae, unit plane, nodal planes, system of thin lenses, Chromatic, spherical coma, astigmatism and distortion aberrations and their remedies. Physical Optics.
4.	January 2022	Interference: Interference by Division of Wavefront: Fresnel's Bi-prism and its applications to determination of wave length of sodium light and thickness of a mica sheet, Lloyd's mirror, phase change on reflection.

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Lesson Plan (Odd Semester 2021-22)

Name of Assistant Professor: Dr. Sunil Dhankhar

Class: - B.Sc. 5th Semester

Subject: Physics

Paper I – PHY-501: Solid State Physics

Sr. No.	Date/Week/Month	Syllabus
1.	October 2021	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.
2.	November 2021	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.	December 2021	X-ray diffraction, Bragg's law. Experimental X-ray diffraction methods, K-space. Reciprocal lattice and its physical significance, Reciprocal lattice vectors, Reciprocal lattice to a simple cubic lattice, b.c.c and f.c.c.
4.	January 2022	Specific heat: Specific heat of solids. Einstein's theory of specific heat, Debye model of specific heat of solids. Revision

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Lesson Plan (Odd Semester 2021-22)

Name of Assistant Professor: Dr. Sunil Dhankhar

Class: - B.Sc. 5th Semester

Subject: Physics

Paper I – PHY-502: Quantum Mechanics

Sr. No.	Date/Week/Month	Syllabus
1.	October 2021	Failure of (Classical) E.M. Theory. Quantum theory of radiation (old quantum theory), Photon, photoelectric effect and Einstein's photoelectric equation, Compton effect (theory and result), Inadequacy of old quantum theory, de-Broglie hypothesis. Davisson and Germer experiment.
2.	November 2021	G.P. Thomson experiment. Phase velocity group velocity, Heisenberg's uncertainty principle, Time-energy and angular momentum position uncertainty principle from de-Broglie wave, (wave-particle duality). Gamma Ray Microscope, Electron diffraction from a slit.
3.	December 2021	Derivation of time dependent Schrodinger wave equation, Eigen values, Eigen functions, wave functions and its significance. Normalization of wave function, concept of observable and operator. Solution of Schrodinger equation for harmonic oscillator ground states and excited states.
4.	January 2022	Application of Schrodinger equation in the solution of the following one-dimensional problems : Free particle in one dimensional box (solution of schrodinger wave equation, Eigen function, Eigen values, quantization of energy and momentum, nodes and antinodes, zero point energy). i) One-dimensional potential barrier $E > V_0$ (Reflection and Transmission coefficient). ii) One-dimensional potential barrier, $E > V_0$ (Reflection Coefficient, penetration of leakage coefficient, penetration depth).