**Govt. College Barota ,Gohana, Sonepat**

**Lesson Plan (Odd Semester 2024-25)**

**Name of Assistant Professor: Dr. Mukesh Sheoran**

**Class: - B.Sc. 1st Semester**

**Subject: Physics**

**Paper Code– 24PHY401DS01: Mechanics & Theory of Relativity (Theory)**

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| **Sr. No.** | **Date/Week/Month** | **Syllabus** |
| 1. | July 2024 | Mechanics of single and system of particles, Numericals related to these topics |
| 2. | August 2024 | conservation of laws of linear momentum,angular momentum and mechanical energy, Centre of mass and equation of motion, WorkEnergyTheorem,Conservative & Non Conservative forces, Potential Energy , Energy diagram, Stable &Unstable Equilibrium , Elastic P.E. Force as gradient of P.E , Work done by conservative forces ,Law of conservation of energy |
| 3. | September 2024 | Degree of freedom Generalised coordinates,Transformation Equations, Generalised displacement, velocity, acceleration, momentum, force and  potential. Components of Velocity & Acceleration in Cylinderical & Spherical coordinate Systems , Hamilton’s variational principle , Lagrange’s equation of motion from  Hamilton’s Principle. Linear Harmonic oscillator, simple pendulum, Atwood’s machine. |
| 4 | Oct. 2024 | Rotation of Rigid body, moment of inertia, torque, angular momentum, kinetic energy of  rotation. Theorems of perpendicular and parallel axes with proof.  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, K.E of Rotation, Motion involving both Translation and rotation |
| 5 | Nov. 2024 | Non –inertial frames & fictitious forces ,Uniformly Rotating Frame , Law of Physics in rotating coordinate systems ,Centrifugal force ,Coriolis force & its applications ,Michelson-Morley Experiment & its outcome. Postulates of Special Theory of Relativity. L-T Transformations , simultaneity & order of events , Lorentz Contraction, Time dilation, Relativistic transformation of velocity frequency & wave no.Relativistics addition of velocities, Variation of mass with velocities, Massless Particle, Mass energy equivalence, Relativistics Doppler effect, Relativistics kinematics , Transformation of energy & momentum ,Energy momentum Four Vector. |

**Govt. College Barota ,Gohana, Sonepat**

**Lesson Plan (Odd Semester 2024-25)**

**Name of Assistant Professor: Dr. Mukesh Sheoran**

**Class: - B.Sc. 3rd Semester**

**Subject: Physics**

**Paper I – PHY-301: Computer Programming &Thermodynamics**

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| **Sr. No.** | **Date/Week/Month** | **Syllabus** |
| 1. | July 2024 | Computer Programming : Computer organisation, Binary representation |
| 2. | Aug. 2024 | Computer Programming : Algorithm development, flow charts and their interpretation , Fortran Preliminaries; Integer and floating point arithmetic expression, built in functions executable and non-executable statements, input and output  statements, Formats, I.F. DO and GO TO statements, Dimension arrays statement function and function subprogram. |
| 3. | Sept.2024 | Thermodynamics-I : Second law of thermodynamics, Carnot theorem, Absolute scale of temperature, Absolute Zero, Entropy, show that dQ/T=O, T-S diagram Nernst heat law, Joule’s free expansion, Joule Thomson (Porous plug)  experiment. Joule - Thomson effect. Liquefication of gases. Air pollution due to internal combustion Engine. |
| 4 | Oct.2024 | Derivation of Clausius - Claperyron latent heat equation.  Phase diagram and triple point of a substance. Development of Maxwell thermodynamical relations. Application of Maxwell relations in the derivation of relations between entropy, specific heats and thermodynamic variables. |
| 5 | Nov. 2024 | Thermodynamic functions : Internal energy (U), Helmholtz function (F), Enthalpy  (H), Gibbs function (G) and the relations between them. |

**Govt. College Barota ,Gohana, Sonepat**

**Lesson Plan (Odd Semester 2024-25)**

**Name of Assistant Professor: Dr. Mukesh Sheoran**

**Class: - B.Sc. 3rd Semester**

**Subject: Physics**

**Paper II– PHY-302: Optics-I**

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| **Sr. No.** | **Date/Week/Month** | **Syllabus** |
| 1. | July 2024 | . Speed of transverse waves on a  uniform string. Speed of longitudinal waves in a fluid, superposition of waves |
| 2. | Aug. 2024 | (physical idea), Fourier Analysis of complex waves and its application for the  solution of triangular and rectangular waves, half and full wave rectifier out puts.  Fourier transforms and its properties. Application of fourier transform to following  function.  (I) f(x) = e-x2/2  (II) f(x) = I [x] <a  =0 [x] >a |
| 3. | Sept. 2024 | Geometrical Optics : 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, Chromatic, spherical coma, astigmatism and  distortion aberrations and their remedies. |
| 4 | Oct. 2024 | Interference : Interference by Division of Wavefront : Fresnel’s Biprism and its  applications to determination of wave length of sodium light , Related numericals |
| 5 | Nov.2024 | Thickness of a  mica sheet, Lioyd’s mirror, phase change on reflection.  Doubt solving classes |

**Govt. College Barota ,Gohana, Sonepat**

**Lesson Plan (Odd Semester 2024-25)**

**Name of Assistant Professor: Dr. Mukesh Sheoran**

**Class: - B.Sc.5th Semester**

**Subject: Physics**

**Paper I – PHY-501: Solid State Physics**

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| **Sr. No.** | **Date/Week/Month** | **Syllabus** |
| 1. | July 2024 | Crystalline and gallssy forms, liquid crystals. Crystal structure, periodicity, lattice and basis, |
| 2. | Aug.2024 | crystal translational vectors and axes. Unit cell and primitive cell, Winger Seitz primitive Cell,  symmetry operations for a two dimensional crystal, Bravais tattices in two and three dimensions. |
| 3. | Sept. 2024 | crystal planes and Miller indices, Interplanner spacing, Crystal structures of Zinc sulphide,  Sodium Chloride and diamond, X-ray diffraction, Bragg's Law and experimental x-ray diffraction methods, K-space. |
| 4 | Oct.2024 | Reciprocal lattice and its physical significance, reciprocal lattice vectors, reciprocal lattice to a  simple cubic lattice, b.c.c and f.c.c. Numericals Problems |
| 5 | Nov. 2024 | Specific heat : Specific heat of solids, Einstein's theory of specific heat, Debye model of specific  heat of solids. |

**Govt. College Barota ,Gohana, Sonepat**

**Lesson Plan (Odd Semester 2024-25)**

**Name of Assistant Professor: Dr. Mukesh Sheoran**

**Class: - B.Sc.5th Semester**

**Subject: Physics**

**Paper II – PHY-502 Quantum Physics**

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| **Sr. No.** | **Date/Week/Month** | **Syllabus** |
| 1. | July 2024 | Failure of (Classical) E.M. Theory. quantum theory of radiation (old quantum theory) ,Photons |
| 2. | Aug. 2024 | Photoelectric effect and Einsteins photoelectric equation compton effect (theory and result).Inadequancy of old quantum theory, de-Broglie hypothesis. Davisson & Germer experiment.  G.P. Thomson experiment. Phase velocity group velocity, Heisenberg's uncertainty principle.Time-energy and angular momentum, Position uncertainity |
| 3. | Sept.2024 | Uncertainty principle from de-Broglie wave, (wave-partice duality). Gamma Ray Microoscope, Electron diffraction from a slit, Derivation of time dependent Schrodinger wave equation |
| 4 | Oct.2024 | Eigen values, eigen functions, wave  functions and its significance. Normalization of wave function, concept of observable and  operator. Solution of Schrodinger equation for harmomic oscillator ground states and excited states |
| 5 | Nov.2024 | 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).   1. One-dimensional potential barrier E>V0 (Reflection and Transmission coefficient.   (ii) One-dimensional potential barrier, E>V0 (Reflection Coefficient, penetration of leakage coefficient, penetration depth). |