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

**Lesson Plan (Odd Semester 2023-24)**

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

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

**Subject: Physics**

**Paper I – PHY-101: Mechanics**

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| **Sr. No.** | **Date/Week/Month** | **Syllabus** |
| 1. | July 2023 | Mechanics of single and system of particles, Numericals related to these topics |
| 2. | August 2023 | conservation of laws of linear momentum,  angular momentum and mechanical energy, Centre of mass and equation of motion,  constrained motion, degrees of freedom. Assignment no. 1 given to students |
| 3. | September 2023 | 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, simple pendulum, Atwood’s machine. |
| 4 | October 2023 | Rotation of Rigid body, noment of inertia, torque, angular momentum, kinetic energy of  rotation. Theorems of perpendicular and parallel axes with proof. |
| 5 | November 2023 | 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 |

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

**Lesson Plan (Odd Semester 2023-24)**

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

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

**Subject: Physics**

**Paper I – PHY-102: Electricity & Magnetism**

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| **Sr. No.** | **Date/Week/Month** | **Syllabus** |
| 1. | July 2023 | Scalars and Vectors, dot and cross product, Triple vector  Product & related numericals |
| 2. | August 2023 | 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 Stocks theorem. |
| 3. | September 2023 | Derivation of field E from potential as gradient, derivation of  Laplace and Poisson equations. Elecotric 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. |
| 4 | October 2023 | Magnetic Induction, magetic flux, solenoidal nature of Vector field  of induction. Properties of B (i) .B = 0 (ii) xB= J. Electronic theory of dia and  para magnetism (Langevin’s theory). Domain theory of ferromagnetism. Cycle of  Magnetisation - Hysteresis (Energy dissipation, Hysteresis loss and importance of  Hysteresis curve). |
| 5 | November 2023 | 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 |

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

**Lesson Plan (Odd Semester 2023-24)**

**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 2023 | Computer Programming : Computer organisation, Binary representation,  Algorithm development, flow charts and their interpretation. |
| 2. | August 2023 | Computer Programming : Computer organisation, Binary representation,  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, Dimesion arrays statement  function and function subprogram. |
| 3. | September 2023 | 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 | October 2023 | 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 | November 2023 | 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 2023-24)**

**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 2023 | . Speed of transverse waves on a  uniform string. Speed of longitudinal waves in a fluid, superposition of waves |
| 2. | August 2023 | (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. | September 2023 | 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 | October 2023 | Interference : Interference by Division of Wavefront : Fresnel’s Biprism and its  applications to determination of wave length of sodium light , Related numericals |
| 5 | November 2023 | Thickness of a  mica sheet, Lioyd’s mirror, phase change on reflection.  Doubt solving classes |

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

**Lesson Plan (Odd Semester 2023-24)**

**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 2023 | Crystalline and gallssy forms, liquid crystals. Crystal structure, periodicity, lattice and basis, |
| 2. | August 2023 | 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. | September 2023 | 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 | October 2023 | 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 | November 2023 | 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 2023-24)**

**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 2023 | Failure of (Classical) E.M. Theory. quantum theory of radiation (old quantum theory) ,Photons |
| 2. | August 2023 | Photoelectric effect and Einsteins photoelectric equation compton effect (theory and result).  Inadequancy of old quantum theory, de-Broglie hypothesis. Davisson and Germer experiment.  G.P. Thomson experiment. Phase velocity group velocity, Heisenberg's uncertainty principle.  Time-energy and angular momentum, positioUncertaprinciplfrom de-Broglie  wave, (wave-partice duality). Gamma Ray Maciroscope, Electron diffraction from a slit. |
| 3. | September 2023 | Uncertainty principle from de-Broglie  wave, (wave-partice duality). Gamma Ray Maciroscope, Electron diffraction from a slit, Derivation of time dependent Schrodinger wave equation |
| 4 | October 2023 | 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 | November 2023 | 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 barrie E>V0 (Reflection and Transmission coefficient.  ii) One-dimensional potential barrier, E>V0 (Reflection Coefficient, penetration of leakage  coefficient, penetration depth). |