**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 andpotential. Hamilton’s variational principle , Lagrange’s equation of motion fromHamilton’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 ofrotation. Theorems of perpendicular and parallel axes with proof. |
| 5 | November 2023 | Moment of inertia ofsolid sphere, hollow sphere, spherical shell, solid cylinder, hollow cylinder and solid barof 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 vectorProduct & related numericals |
| 2. | August 2023 |  Scalar and Vector fields, Differentiation of a vector, Gradient of a scalar and itsphysical significance, Integration of a vector (line, surface and volume integral and theirphysical significance), Gauss’s divergence theorem and Stocks theorem. |
| 3. | September 2023 | Derivation of field E from potential as gradient, derivation ofLaplace and Poisson equations. Elecotric flux, Gauss’s Law and its application tospherical 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 fieldof induction. Properties of B (i) .B = 0 (ii) xB= J. Electronic theory of dia andpara magnetism (Langevin’s theory). Domain theory of ferromagnetism. Cycle ofMagnetisation - Hysteresis (Energy dissipation, Hysteresis loss and importance ofHysteresis curve). |
| 5 | November 2023 | Maxwell equation and their derivations, DisplacementCurrent. Vector and scalar potentials, boundary conditions at interface between twodifferent 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 infunctions executable and non-executable statements, input and outputstatements, Formats, I.F. DO and GO TO statements, Dimesion arrays statementfunction and function subprogram. |
| 3. | September 2023 | Thermodynamics-I : Second law of thermodynamics, Carnot theorem, Absolutescale of temperature, Absolute Zero, Entropy, show that dQ/T=O, T-S diagramNernst heat law, Joule’s free expansion, Joule Thomson (Porous plug)experiment. Joule - Thomson effect. Liquefication of gases. Air pollution due tointernal combustion Engine. |
| 4 | October 2023 | Derivation of Clausius - Claperyron latent heat equation.Phase diagram and triple point of a substance. Development of Maxwellthermodynamical relations. Application of Maxwell relations in the derivation ofrelations 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 auniform 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 thesolution of triangular and rectangular waves, half and full wave rectifier out puts.Fourier transforms and its properties. Application of fourier transform to followingfunction.(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 andrefraction, derivation of thin lens and thick lens formulae, unit plane, nodalplanes, system of thin lenses, Chromatic, spherical coma, astigmatism anddistortion aberrations and their remedies. |
| 4 | October 2023 | Interference : Interference by Division of Wavefront : Fresnel’s Biprism and itsapplications to determination of wave length of sodium light , Related numericals |
| 5 | November 2023 | Thickness of amica 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 asimple 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 specificheat 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-Brogliewave, (wave-partice duality). Gamma Ray Maciroscope, Electron diffraction from a slit. |
| 3. | September 2023 | Uncertainty principle from de-Brogliewave, (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, wavefunctions and its significance. Normalization of wave function, concept of observable andoperator. 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 leakagecoefficient, penetration depth). |