**Govt College for Women Gurawara, Rewari**

**Lesson Plan (Course Handout)**

Name of the Assistant Professor: **Dr. Jyoti**

Class and Section: **B.Sc. 1st Semester Pass course**

Subject: **Mechanics PHY 101 Session: 2023-24**

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| **Slot** | **Topic** |
| Week-1 | Unit I: Mechanics of single and system of particles, conservation of laws of linear momentum |
| Week-2 | angular momentum and mechanical energy, Centre of mass and equation of motion |
| Week-3 | Constrained motion, degrees of freedom |
| Week-4 | Tutorial, Assignment, Class Test  |
|  Week-5 | Generalised coordinates, displacement, velocity, acceleration, momentum, force and potential.  |
| Week-6 | Hamilton’s variational principle , Lagrange’s equation of motion fromHamilton’s Principle.  |
| Week-7 | Linear Harmonic oscillator, simple pendulum, Atwood’s machine |
| Tutorial-Assignment, Class Test |
| Week-8 | Rotation of Rigid body, moment of inertia, torque, angular momentum, kinetic energy of rotation.  |
| Week-9 | Theorems of perpendicular and parallel axes with proof. Moment of inertia ofsolid sphere. |
| Week-10 | Moment of Inertia of hollow sphere, spherical shell, solid cylinder. |
| Week-11 | hollow cylinder and solid bar of rectangular cross-section.  |
| Week-13 | Acceleration of a body rolling down on an inclined plane. |
|  Week-14 | Tutorial-Assignment of unit iii and class test |

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**Lesson Plan (Course Handout)**

Name of the Assistant Professor: **Dr. Jyoti**

Class and Section: **B.Sc. 1st Semester Pass course**

Subject: **Electricity & Magnetism, PHY 102 Session: 2023-24**

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| **Slot** | **Topic** |
| Week-1 | Unit I: scalars and vectors, dot and cross product, triple vector product, scalar and vector fields, differentiation of a vector. |
| Week-2 | Gradient of a scalar and its significance, line, surface, volume integral, the divergence of a vector and its significance, curl of a vector and its physical significance, gauss – divergence theorem, stokes theorem. |
| Week-3 | Divergence of a vector and its significance, curl of a vector and its physical significance |
| Week-4 | Gauss – divergence theorem, stokes theorem. |
|  Week-5 | Derivation of the electric field from potential as gradient, electric flux, and gauss law and its application to the spherical shell, uniformly charged infinite plane, and uniformity charged |
| Week-6 | Derivation of Laplace and Poisson equation, the mechanical force of charged surface, energy per unit volume. |
| Tutorial -Assignment of unit 1 and class test |
| Week-7 | Unit II: magnetic flux and induction, solenoidal nature of vector field |
| Week-8 | Line integral, divergence, and curl of magnetic field |
| Week-9 | Electronic theory of diamagnetic and paramagnetic, domain theory of ferromagnetic (Langevin’s theory), cycle of magnetization- hysteresis loop |
| Tutorial- Assignment of unit ii and class test |
| Week-10 | Unit III: Maxwell’s equations and derivation |
| Week-11 | Displacement current, scalar, and vector potential |
| Week-13 | The boundary condition at the interface between two different media, practical labs. |
|  Week-14 | Propagation of electromagnetic waves, Poynting vector, and Poynting theorem |
| Tutorial-Assignment of unit iii and class test |

**Govt College for Women Gurawara, Rewari**

**Lesson Plan (Course Handout)**

Name of the Assistant Professor: **Dr. Kavita Yadav**

Class and Section: **B.Sc. 3rd Semester Pass course**

Subject: **Computer Programming & Thermodynamics, PHY 301 Session: 2023-24**

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| **Weeks** |  **Physics Topics** |
| 1. | Thermodynamics-I : Second law of thermodynamics, Carnot theorem |
| 2. | Absolute scale of temperature, Absolute Zero, Entropy |
| 3. | Show that dQ/T=O, T-S diagram Nernst heat law, Group discussion on Entropy |
| 4. | Joule’s free expansion, Joule Thomson (Porous plug) experiment. Joule - Thomson effect. |
| 5. | Liquefaction of gases.  |
| 6. | Air pollution due to internal combustion engine.**Class test 1** |
| 7. | Thermodynamics-II : Derivation of Clausius - Claperyron latent heat equation.  |
| 8. | Phase diagram and triple point of a substance. Group discussion on Phase Diagram |
| 9. | Development of Maxwell thermodynamical relations. Application of Maxwell relations in the derivation of relations between entropy, specific heats and thermodynamic variables.  |
| 10. | Thermodynamic functions : Internal energy (U), Helmholtz function (F), Enthalpy (H), Gibbs function (G) and the relations between them.**Assignment on Thermodynamical relations** |
| 11. | Computer Programming : Computer organization, Binary representation, Algorithm development, flow charts and their interpretation. **Class Test 2** |
| 12. | Fortran Preliminaries; Integer and floating point arithmetic expression, built in functions executable and non-executable statements |
| 13. | Input and output statements, Formats, I.F. DO and GO TO statements, Dimesion arrays statement function and function subprogram. |
| 14. | Revision  |
| 15. | Revision  |

**Govt College for Women Gurawara, Rewari**

**Lesson Plan (Course Handout)**

Name of the Assistant Professor: **Dr. Jyoti**

Class and Section: **B.Sc. 3rd Semester Pass course**

Subject: **Optics-I, PHY 302 Session: 2023-24**

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| **Slot** | **Topic** |
| Week-1 | **Unit-I** Fourier analysis and Fourier Transform: Speed of transverse and longitudinal waves |
| Week-2 | Fourier analysis of complex waves and its applications |
| Week-3 | Application for Triangular and rectifiers |
| Week-4 | Fourier Transform and its properties |
|  Week-5 | Applications of Fourier Transform |
| Assignment of unit 1 and class test |
|  Week-6 | **Unit II:** Matrix method in paraxial optics |
| Week-7 | Effects of translation and refraction |
| Week-8 | Derivation of thin lens and thick lens |
| Week-9 | Unit plane, nodal planes, system of thin lenses |
| Week-10 | Chromatic, astigmatism and distortion abresstions |
| Assignment of unit ii and class test |
| Week-11 | **Unit III**: Interference by division of wavefront: Fresnel Biprism |
| Week-12 | Application of biprism |
| Week-13 | Thickness of thin mica sheets |
| Week-14 | Lloyd’s mirror, the phase change of reflection |
| Assignment of unit iii and class test |

**Govt College for Women Gurawara, Rewari**

**Lesson Plan (Course Handout)**

Name of the Assistant Professor: **Dr. Kavita Yadav**

Class and Section: **B.Sc. 5th Semester Pass course**

Subject: **Solid State Physics, PHY 501 Session: 2023-24**

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| **Weeks** |  **Physics Topics** |
| 1. | Crystalline and glassy forms, liquid crystals.  |
| 2. | Crystal structure, periodicity, lattice and basis, crystal translational vectors and axes. Group Discussion on Crystal Structures |
| 3. | Unit cell and primitive cell, Winger Seitz primitive Cell, symmetry operations for a two dimensional crystal,  |
| 4. | Bravais lattices in two and three dimensions Numerical Practices**Class Test 1** |
| 5. | Crystal planes and Miller indices, Inter-planer spacing |
| 6. | Crystal structures of Zinc Sulphide, Sodium Chloride and diamond,  |
| 7. | X-ray diffraction, Bragg's Law Numerical Practice |
| 8. | Experimental x-ray diffraction methods, K-space**Class Test 2** |
| 9. | Reciprocal lattice and its physical significance,  |
| 10. | Reciprocal lattice vectors, reciprocal lattice to a simple cubic lattice, b.c.c and f.c.c. Group Discussion on Reciprocal Lattice |
| 11. | Specific heat : Specific heat of solids |
| 12. | Einstein's theory of specific heat,  |
| 13. | Debye model of specific heat of solids.**Assignment**  |
| 14. | Revision  |
| 15. | Revision  |

**Govt College for Women Gurawara, Rewari**

**Lesson Plan (Course Handout)**

Name of the Assistant Professor: **Dr. Kavita Yadav**

Class and Section: **B.Sc. 5th Semester Pass course**

Subject: **Quantum Mechanics, PHY 502 Session: 2023-24**

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| **Weeks** |  **Physics Topics** |
| 1. | Failure of (Classical) E.M. theory, quantum theory of radiation (old quantum theory)   |
| 2. | Photon, photoelectric effect and Einstein’s photoelectric equation Group Discussion  |
| 3. | Compton effect (theory and result), Inadequancy of old quantum theory |
| 4. | De-Broglie hypothesis, Davisson and Germer experimentNumerical Practices**Class Test 1** |
| 5. | G.P. Thomson experiment. Phase velocity group velocity, Heisenberg's uncertainty principle. |
| 6. | Time-energy and angular momentum, position uncertainty, uncertainty principle from de-Broglie wave (wave-particle duality) |
| 7. | Gamma Ray Microscope, Electron diffraction from a slit, Numerical Practice |
| 8. | Derivation of time dependent Schrodinger wave equation, eigen values, eigen functions, wavefunctions and its significance. **Class Test 2** |
| 9. | Normalization of wave function, concept of observable and operator  |
| 10. | Solution of Schrodinger equation for harmonic oscillator ground states and excited statesGroup Discussion on Schrodinger equation |
| 11. | Application of Schrodinger equation in the solution of the 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). One-dimensional potential barrie E>V0 (Reflection and Transmission coefficient) |
| 12. | Application of Schrodinger equation in the solution of one-dimensional potential barrier, E>V0 (Reflection Coefficient, penetration of leakage coefficient, penetration depth).**Assignment** |
| 13. | Revision |
| 14. | Revision  |
| 15. | Revision  |