**Govt College for Women Gurawara, Rewari**

**Lesson Plan**

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

Class and Section: **B.Sc. 2nd Semester**

Subject: **Properties of Matter, Kinetic theory and Relativity, PHY 201** **Session: 2023-24**

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| **Slot** | **Topics** |
| Week-1 | Elasticity, Hooke’s law, Elastic constants and their relations, Poisson’s ratio, energy of strained body  Group discussion on elastic constants |
| Week-2. | Torsion of cylinder and twisting couple, Bending of beam (bending moment and its magnitude) cantilevers, Centrally loaded beam.  Home assignment: Experiment to analyze the effect of radius and length on twisting couple |
| Week-3. | Assumptions of Kinetic Theory of gases, Law of equipartition of energy and its applications for specific heats of gases.  Group discussion on the assumption of kinetic theory of gases |
| Week-4. | Derivation of Maxwell distribution of speeds and velocities, |
| Week-5. | Experimental verification of Maxwell’s Law of speed distribution : most probable speed, average and r.m.s. speed  **Class test 1** |
| Week-6. | Mean free path. Transport of energy and momentum, diffusion of gases. Brownian motion (qualitative),  Numerical Practice |
| Week-7. | Real gases, Van der Waal’s equation. |
| Week-8. | Theory of Relativity : Reference systems, inertial frames,  Group discussion on inertial frames |
| Week-9. | Gallilean invariance and Conservation laws, Newtonian relativity principle, |
| Week-10. | Michelson - Morley experiment: Search for ether  **Assignment on Mischelson experiment** |
| Week-11. | Lorentz transformations length contraction, |
| Week-12 | Time dilation, Velocity addition theorem |
| Week-13. | Variation of mass with velocity and mass energy equivalence. |
| Week-14. | time dilation, velocity addition theorem  **Class Test II** |
| Week-15. | Revision |

**Govt College for Women Gurawara, Rewari**

**Lesson Plan**

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

Class and Section: **B.Sc. 2nd Semester**

Subject:**Electromagnetic Induction and Electronic Devices, PHY 202** **Session: 2023-24**

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| **Slots** | **TOPICS** |
| Week-1 | **Electromagnetic Induction** : Growth and decay of current in a circuit with (a) Capacitance and resistance |
| (b) resistance and inductance (c) Capacitance and inductance |
| (d) Capacitance resistance and inductance |
| Week-2 | AC circuit analysis using complex variables with (a) capacitance and resistance, (b) resistance and inductance |
| AC circuit analysis using complex variables with (c) capacitance and inductance (d) capacitance |
| **Tutorial – I ( Numerical Problems)** |
| Week-3 | Resistance Series and parallel resonant circuit. Quality factor (Sharpness of resonance) |
| Week-4 | **Semiconductor Diodes** : Energy bands in solids. Intrinsic and extrinsic semiconductor, Hall effect |
| **Class Test** |
| Week-5 | P-N junction diode and their V-I characteristics. Zener and avalanche breakdown. Resistance of a diode, |
| Light Emitting diodes (LED). Photo conduction in semiconductors, photodiode, Solar Cell. |
| Week-6 | **Diode Rectifiers** : P-N junction half wave and full wave rectifier |
| Types of filter circuits (L and - with theory). Zener diode as voltage regulator, simple regulated power supply. |
| **Tutorial – III ( Numerical Problems)** |
| Week-7 | **Transistors** : Junction Transistors, Bipolar transistors, working of NPN and PNP transistors |
| Transistor connections (C-B, C-E, C-C mode), constants of transistor |
| Week-8 | Transistor characteristic curves (excluding h parameter analysis), advantage of C-B configuration. C.R. O. (Principle, construction and working in detail). |
| Week-9 | **Transistor Amplifers** : Transistor biasing, methods of Transistor biasing and stabilization. D.C. load line. |
| Week-10 | Common-base and common-emitter transistor biasing. Common-base, common- emitter amplifiers. Classification of amplifiers. Resistance-capacitance (R-C) coupled amplifier (two stage; concept of band width, no derivation). Feed-back in amplifiers, advantage of negative feedback Emitter follower. |
| Week-11 | Resistance-capacitance (R-C) coupled amplifier (two stage; concept of band width, no derivation). Feed-back in amplifiers, advantage of negative feedback Emitter follower. |
| **Class Test** |
| Week-12 | Oscillators : Oscillators, Principle of Oscillation, Classification of Oscillator. Condition for self sustained oscillation : Barkhousen Criterion for oscillations. Tuned collector common emitter oscillator. Hartley oscillator. Colpitt’s oscillator. |
| Week-13 | Tuned collector common emitter oscillator. Hartley oscillator. Colpitt’s oscillator. |
| Week-14 | **Tutorial – V(Problems)** |
| Conclusion and Course Summarization |

**Govt College for Women Gurawara, Rewari**

**Lesson Plan**

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

Class and Section: **B.Sc. 4th Semester**

Subject: **Statistical Mechanics, PHY 401** **Session: 2023-24**

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| **Weeks** | **Physics Topics** |
| 1. | Probability, some probability considerations, combinations possessing maximum  probability,  **Group discussion** on Probability |
| 2. | Combinations possessing minimum probability, distribution of  molecules in two boxes, case with weightage (general).  **Numerical Practice** |
| 3. | Phase space, microstates and macrostates, statistical fluctuations constraints and accessible states. |
| 4. | Thermodynamical probability and Numerical Practice  **Class test 1** |
| 5. | Postulates of Statistical Physics. Division of Phase space into cells, Condition of  equilibrium between two system in thermal contact.  **Assignment** |
| 6. | b-Parameter. Entropy and Probability, Boltzman’s distribution law.  **Group discussion** on entropy and probability |
| 7. | Evaluation of A and B constants. Bose-Einstein statistics, |
| 8. | Application of B.E. Statistics to Plancks’s radiation law, B.E. gas.  **Numerical Practice** |
| 9. | Fermi-Dirac statistics, M.B. Law as limiting case of B.E. |
| 10. | Degeneracy and B.E., Condensation.  **Doubt class** |
| 11. | F.D. Gas, electron gas in metals. Zero point energy.  **Class Test 2** |
| 12. | Specific heat of metals and its solution. |
| 13. | Revision of Unit I |
| 14. | Revision of Unit II |
| 15. | Revision of Unit III |

**Govt College for Women Gurawara, Rewari**

**Lesson Plan**

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

Class and Section: **B.Sc. 4th Semester Pass course**

Subject: **(Optics -II) PHY 402 Session: 2023-24**

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| **Lecture No** | **Topics** |
| Week-1 | Interference by Division of Amplitude : Color of thin films, Wedge shaped film |
| Week-2 | Newton’s rings |
| Interferometers: Michelson’s Interferometer and its applications in standardization of a meter scale, determination of wave length |
| **Tutorial-I (Numerical Problems)** |
| Week-3 | Fresnel’s Diffraction: Frenal’s Half period Zones |
| Zone Plate, diffraction at a straight edge |
| Week-4 | Rectangular slit and circular aperture |
| Fraunhoffer Diffraction: One slit diffraction |
| Week-5 | Two slit diffraction, N slit diffraction |
| Week-6 | Plane diffraction grating spectrum |
| Week-7 | **Tutorial (Numerical Problems)** |
| Dispersive power of a grating, limit of resolution |
| Week-8 | Rayleigh’s criterion, Resolving power of telescope and grating |
| Week-9 | Polarization: Polarization and double refraction, Polarization by reflection, polarization by scattering |
| Week-10 | Malus’s law, phenomenon of double refraction |
| Week-11 | Hugen’s wave theory of double refraction, analysis of Polrized light: Nicol Prism, quarter wave plate and half wave plate |
| **Tutorial (Numerical Problems)** |
| Week-12 | Production and detection of Plane polarized light, circularly porized light elliptically polarized light |
| Week-13 | Optical activity, Fresnel’s theory of rotation |
| Week-14 | Specific rotation |
| Polarimeters |
| Week-15 | **Tutorial (Numerical Problems)** |
| **Conclusion and course Summarization** |

**Govt College for Women Gurawara, Rewari**

**Lesson Plan**

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

Class and Section: **B.Sc. 6th Semester**

Subject**: Atomic Molecular and Laser Physics, PHY 601** **Session: 2023-24**

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| **Weeks** | **Topics** |
| 1. | Vector atom model, quantum numbers associated with vector atom model, penetrating and non-penetrating orbits  Group discussion on Vector atom model |
| 2. | Spectral lines in different series of alkali spectra, spin orbit interaction and doublet term separation).  Discussion on Alkali Spectra using video on smart board |
| 3. | LS or Russel-Saunder Coupling, jj coupling, expressions for interaction energies for LS and jj coupling required  Numerical Practice |
| 4. | Zeeman effect (normal and Anomalous) Zeeman pattern of D1 and D2 lines of Na-atom  Group Discussion on Zeeman effect |
| 5. | Paschen Back effect of a single valence electron system, Weak field Stark effect of Hydrogen atom  **Class Test 1** |
| 6. | Discrete set of electronic energies of molecules, quantization of Vibrational and rotational energies  Numerical Practice |
| 7. | Raman effect: classical and quantum concepts, Stokes and anti-Stokes lines  Group discussion on Raman effect |
| 8. | Main features of a laser : Directionality, high intensity, high degree of coherence, spatial and temporal coherence  **Class Test 2** |
| 9. | Einstein's coefficients and possibility of amplification, Momentum transfer, life time of a level |
| 10. | Kinetics of optical absorption, Threshold condition for laser emission, Laser pumping, |
| 11. | He-Ne laser and RUBY laser (Principle, Construction and Working). Applications of laser in the field of medicine and industry.  **Assignment on He-Ne laser and its applications** |
| 12. | Revision of vector atom model |
| 13. | Revision of LS and jj coupling |
| 14. | Revision of Zeeman effect and Raman Effect |
| 15. | Revision of Lasers |

**Govt College for Women Gurawara, Rewari**

**Lesson Plan**

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

Class and Section: **B.Sc. 6th Semester**

Subject**: Nuclear Physics, PHY 602** **Session: 2023-24**

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| **Weeks** | **Physics Topics** |
| 1. | Nuclear mass and binding energy, nuclear stability, Nuclear size, spin, parity, statistics magnetic dipole moment, quadrupole moment (shape concept) |
| 2. | Determination of mass by Bain-Bridge, Bain-Bride and Jordan mass spectrograph,  Group Discussion |
| 3. | Determination of charge by Mosley law, Determination of size of nuclei by Rutherford Back Scattering.  Doubt Class |
| 4. | Interaction of heavy charged particles (Alpha particles), alpha disintegration and its theory, Energy loss of heavy charged particle (idea of Bethe formula, no derivation), |
| 5. | Energetic of alpha-decay, Range and straggling of alpha particles. Geiger-Nuttal law  Numerical Practice |
| 6. | Introduction of light charged particle (Beta-particle), Origin of continuous beta-spectrum (neutrino hypothesis) types of beta decay and energetics of beta decay,  **Class Test 1** |
| 7. | Energy loss of beta particles (ionization), Range of electrons, absorption of beta-particles, Interaction of Gamma Ray, Nature of gamma rays  Doubt Class |
| 8. | Energetic of gamma rays, passage of Gamma radiations through matter (photoelectric, Compton and pair production effect) electron position annihilation. Absorption of Gamma rays (Mass attenuation coefficient) and its application. |
| 9. | Nuclear reactions, Elastic scattering, Inelastic scatting, Nuclear disintegration, photonuclear reaction, Radiative capture, Direct reaction, heavy ion reactions and spallation Reactions, conservation laws. Q-value and reaction threshold.  **Class Test II** |
| 10. | Nuclear Reactors General aspects of Reactor design. Nuclear fission and fusion reactors (Principles, construction, working and use).  **Assignment on Nuclear Reactors** |
| 11. | Linear accelerator, Tendem accelerator, Cyclotron and Betatron accelerators.  Ionization chamber, |
| 12. | proportional counter, G.M. counter detailed study, scintillation counter and semiconductor detector |
| 13. | Revision of Unit I |
| 14. | Revision of Unit II |
| 15. | Revision of Unit III |