**Lesson Plan Physics**

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| **Dr Kavita Yadav (Assistant Professor)**  **Lesson plan of properties of matter, kinetic theory and relativity**  **B.Sc – Non-Medical, 2nd semester, (2021-2022)** | |
| **WEEKS** | **Physics Topics** |
| 1. | Elasticity, Hooke’s law, Elastic constants and their relations, Poisson’s ratio, energy of strained body  Group discussion on elastic constants |
| 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 |
| 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 |
| 4. | Derivation of Maxwell distribution of speeds and velocities, |
| 5. | Experimental verification of Maxwell’s Law of speed distribution : most probable speed, average and r.m.s. speed  **Class test 1** |
| 6. | Mean free path. Transport of energy and momentum, diffusion of gases. Brownian motion (qualitative),  Numerical Practice |
| 7. | Real gases, Van der Waal’s equation. |
| 8. | Theory of Relativity : Reference systems, inertial frames,  Group discussion on inertial frames |
| 9. | Gallilean invariance and Conservation laws, Newtonian relativity principle, |
| 10. | Michelson - Morley experiment : Search for ether  **Assignment on Mischelson experiment** |
| 11. | Lorentz transformations length contraction, time dilation, velocity addition theorem  **Class Test II** |
| 12. | Variation of mass with velocity and mass energy equivalence. |
| 13. | Revision of Unit Properties of Matter (Elasticity) |
| 14. | Revision of Unit Kinetic Theory of Gases |
| 15. | Revision of Theory of Relativity |

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| **Dr Kavita Yadav (Assistant Professor)**  **Lesson plan of Optics – II**  **B.Sc – Non-Medical, 4th semester, (2021-2022)** | |
| **Weeks** | **Physics Topics** |
| 1. | Introduction and discussion on Interference by Division of Amplitude :Colour of thin films  Group discussion on Interference |
| 2. | Wedge shaped film, Newton’s rings.  Experimental demonstration of Newton’s rings |
| 3. | Interferometers: Michelson’s interferometer and its application to (1) Standardization of a meter (II) determination of wave length.  Group discussion on Michelson’s interferometer |
| 4. | Fresnel’s Diffraction : Fresnel’s half period zones  **Class test 1** |
| 5. | Zone plate, diffraction at a straight edge, rectangular slit and circular aperture  Numerical Practice |
| 6. | Fraunhofer diffraction : One slit diffraction, Two slit diffraction  Group discussion on Fraunhofer diffraction |
| 7. | N-slit diffraction, Plane transmission granting spectrum, Dispersive power of a grating |
| 8. | Limit of resolution, Rayleigh’s criterion, resolving power of telescope and a grating.  Group discussion on resolving power of telescope |
| 9. | Polarization :Polarisation and Double Refraction : Polarisation by reflection, Polarisation by scattering |
| 10. | Malus law, Phenomenon of double refraction, Huytgen’s wave theory of double refraction (Normal and oblique incidence),  Double refraction demonstration by video using smart board |
| 11. | Analysis of Palorised light : Nicol prism, Quarter wave plate and half wave plate, production and detection of (i) Plane polarized light (ii) Circularly polarized light and (iii)Elliptically polarized light  **Class Test 2** |
| 12. | Optical activity, Fresnel’s theory of rotation, Specific rotation, Polarimeters (half shade and Biquartz).  **Assignment on Polarimeter** |
| 13. | Revision of Unit Interference |
| 14. | Revision of Fresnel’s and Fraunhofer Diffraction |
| 15. | Revision of Polarization |

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| **Dr Kavita Yadav (Assistant Professor)**  **Lesson plan of atomic molecular and laser physics**  **B.Sc – Non-Medical, 6th semester, (2021-2022)** | |
| **Weeks** | **Physics 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 Strak 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, Stoke's and anti Stoke's 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 |