Bachelor of Science in Textile Engineering
0533 22 PHY 1125: Physics - I
Academic Session: 2024-2025

2 Hours/week, 2 Credits | Examination Duration: 3 Hours

1. **Fluid Mechanics and Viscosity:** Fluid, Rate of flow, Different fluid motions, Equation of continuity, Bernoulli's equation, Speed of efflux: Torricelli's theorem, Venturimeter, Viscosity, Newton's law of viscous flow, coefficient of viscosity, Reynold Number, Poiseuille's equation and corrections, Capillary flow method.

2. **Surface tension:** Molecular forces of cohesion & adhesion, Molecular range: sphere of influence, Surface tension, Free energy, Excess pressure across a curved film or membrane, Capillarity, Contact angle, Capillary rise method.

3. **Elasticity:** Hooke's law, Breaking stress, Stress-strain diagram, Different types of elasticity, Heat effect on elasticity, Poisson's ratio, Shearing stress and shearing strain, Relations among the elastic constants, Work done in a strain, Work of rupture, Deformation by bending, Bending moment.

4. **Dynamics of circular motion:** Moment of Inertia, Radius of Gyration, Theorem of perpendicular axes and parallel axes, Moment of inertia for different geometrical shapes and Flywheel.

5. **Interference:** Huygen's principle, Interference, Young's double slit experiment, Fresnel's Biprism, Newton's ring, Thin film interference.

6. **Diffraction:** Diffraction, Fresnel & Fraunhofer diffraction, Diffraction grating and its use, Zone Plate, Resolving power of a grating, Dispersive power of a grating, Bragg's law, X-ray diffraction, Debye-scherrer equation.

7. **Polarization:** Polarization, Polarization by reflection, Brewster's law; Double refraction, Nicol prism, Malus law, Specific rotation, Laurent's half shade polarimeter.

8. **Laser Physics:** Spontaneous and stimulated emission, properties of laser beam, laser types, pumping schemes, Application of laser in textiles.

Books Recommended:

- Fundamentals of Physics – David Halliday, Jearl Walker, and Robert Resnick
- University Physics with Modern Physics – Hugh D. Young, Roger A. Freedman
- Elements of Properties of Matter – D. S. Mathur
- Optics – Ajoy Ghatak