LESSON PLAN SESSION 2025-2026 (PHYSICS)

Mechanics (Sem. 1ST)

S.No	WEEK	TOPIC
1	01.08.2025-02.08.2025	**Introduction**
2	04.08.2025-09.08.2025	**Unit II (Elasticity)** Deforming force, Elastic limit, stress, strain and their types, Hooke's law, Modulus of rigidity,
3	11.08.2025-16.08.2025	Poisson's ratio and its limiting value, Elastic Constants and their relations. Determination of elastic constants for material of wire by Searle's method.
4	18.08.2025-23.08.2025	Relation between shear angle and angle of twist, elastic energy stored/volume in an elastic body, Elongation produced in heavy rod due to its own weight and elastic potential energy stored in it, Tension in rotating rod,
5	25.08.2025-30.08.2025	Torque required for twisting cylinder, Hollow shaft is stiffer than solid one. Bending of beam, bending moment and its magnitude, Flexural rigidity,
6	01.09.2025-06.09.2025	Bending of cantilever (loaded by a weight W at its free end), and weight of cantilever uniformly distributed over its entire length. Dispersion of a centrally loaded beam supported at its ends, Geometrical moment of inertia for beam of rectangular cross-section and circular cross-section/**Doubt Session**
7	08.09.2025-13.09.2025	**Unit II** Moment of Inertia of Disc, Angular Disc, Solid cylinder, Solid sphere, Hollow sphere, Rectangular plate, Square plate, Solid cone, Triangular plate,
8	15.09.2025-20.09.2025	Torque, Rotational Kinetic Energy, Angular momentum, Law of conservation of angular momentum, Rolling motion, condition for pure rolling,
9	22.09.2025-27.09.2025	Acceleration of body rolling down an inclined plane, Fly wheel, Moment of Inertia of an irregular body
10	29.09.2025-04.10.2025	**Unit III** (**Special Theory of Relativity)** Michelson"s Morley experiment and its outcomes, Postulates of special theory of relativity, Lorentz Transformations, , Lorentz contraction, Time dilation,
11	06.10.2025-11.10.2025	Relativistic transformation of velocity, relativistic addition of velocities, variation of mass-energy equivalence, relativistic
12	13.10.2025-18.10.2025	Doppler effect, relativistic kinematics, transformation of energy and momentum, transformation of force, Problems of relativistic dynamics
	19.10.2025-26.10.2025	**DIWALI BREAK**
13	27.10.2025-31.10.2025	Unit IV (**Gravitation and central force motion)** **:** Law of gravitation, Potential and field due to spherical shell and solid sphere. Motion of a particle under central force field,
14	03.11.2025-08.11.2025	Two body problem and its reduction to one body problem and its solution, compound pendulum or physical pendulum in form of elliptical lamina and expression of time period, determination of g by means of bar pendulum,,.
15	10.11.2025-15.11.2025	Normal coordinates and normal modes, Normal modes of vibration for given spring mass system,
16	17.11.2025-22.11.2025	Possible angular frequencies of oscillation of two identical simple pendulums of length (l) and small bob of mass m0 joined together with spring of spring constant (k).
17	24.11.2025-29.11.2025	**Revision**
	02.12.2025 onwards	**Exam**
	25.12.2025-31.12.2025	**Winter Break**

Course Learning Outcomes (CLO)

Subject-Physics,

Semester-1st

Name of the Course-Mechanics

After completing this course, the learner will be able to:

1. Understand the dynamics of system of particles, conservation of energy and momentum application of both translational and rotational dynamics motions simultaneously in analysing rolling with slipping.
2. Differentiate between elastic and plastic body. Elastic constants, determination and their physical significance. Torque and its significance.
3. Familiar about the special theory of relativity and its applications. Michelson's Morley experiments and its finding.
4. Analyse the two body Central Force problem and its applications
5. Learn to present observations, results, analysis and different concepts related to experiments of Mechanics.

LESSON PLAN SESSION 2025-2026 (PHYSICS)

Thermo dynamics & Statistical Physics (Sem. 3rd)

S.No	WEEK	TOPIC
1	01.08.2025-02.08.2025	**Introduction**
2	04.08.2025-09.08.2025	Unit I- **THERMODYNAMICS-I** Zeroth law of thermodynamics; Concept of heat, work and its sign (work done- by the system on the system) & its path dependence, First law of thermodynamics- its significance and limitations, internal energy as a state function, different types of process-isochoric process, isobaric process, adiabatic process, isothermal process, cyclic process, Reversible and irreversible process,
3	11.08.2025-16.08.2025	Second law of thermodynamics and its significance, Carnot theorem; Absolute scale of temperature, Absolute Zero and magnitude of each division on work scale and perfect gas scale,
4	18.08.2025-23.08.2025	Joule‟s free expansion, Joule Thomson effect, Joule-Thomson (Porous plug) experiment, conclusions and explanation, analytical treatment of Joule Thomson effect,
5	25.08.2025-30.08.2025	Entropy, calculations of entropy of reversible and irreversible process, T-S diagram, entropy of a perfect gas, Nernst heat law (third law of thermodynamics);
6	01.09.2025-06.09.2025	Liquefaction of gases, (oxygen, air, hydrogen and helium) solidification of helium below 4K, Cooling by adiabatic demagnetization
7	08.09.2025-13.09.2025	Unit II- **THERMODYNAMICS-II** Derivation of Clausius-Clapeyron and Clausius latent heat equations and their significance, specific heat of saturated vapours, phase diagram and triple point of a substance,
8	15.09.2025-20.09.2025	Thermo dynamical functions: Internal energy (U), Helmholtz function (F), Enthalpy (H), Gibbs function (G) and the relations between them, derivation of Maxwell thermodynamical relations from thermodynamical functions,
9	22.09.2025-27.09.2025	Application of Maxwell relations: relations between two specific heats of gas, Derivation of Clausius- Clapeyron and Clausius equation
10	29.09.2025-04.10.2025	Variation of intrinsic energy with volume for (i) perfect gas (ii) Vander wall gas (iii) solids and liquids, derivation of Stefan‟s law, adiabatic compression and expansion of gas & deduction of theory of Joule Thomson effect.
11	06.10.2025-11.10.2025	**Revision**
12	13.10.2025-18.10.2025	Unit III- **Statistical Physics-I** Distribution of N (for N= 2, 3, 4) distinguishable and indistinguishable particles in two boxes of equal size, microstates and macro states, thermo dynamical probability, constraints and accessible states,
	19.10.2025-26.10.2025	**DIWALI BREAK**
13	27.10.2025-31.10.2025	statistical fluctuations, general distribution of distinguishable particles in compartments of different sizes, β-parameter, entropy and probability;
14	03.11.2025-08.11.2025	Maxwell-Boltzmann statistics applied to an ideal gas in equilibrium-energy distribution law, Maxwell‟s distribution of speed & velocity (derivation required), most probable speed, average and r.m.s. speed, mean energy for Maxwellian distribution.
15	10.11.2025-15.11.2025	**Unit IV- Statistical Physics-II** Dulong and Petit Law, derivation of Dulong and Petit law from classical physics; Need of Quantum statistics- classical versus quantum statistics,
16	17.11.2025-22.11.2025	Bose-Einstein energy distribution Law, Application of B. E. Statistics to Planck‟s radiation law, degeneracy and B. E. condensation;
17	24.11.2025-29.11.2025	Fermi-Dirac energy distribution Law, F.D. gas and degeneracy, Fermi energy and Fermi temperature; F. D. energy distribution Law for electron gas in metals, zero point energy, average speed (at 0 K) of electron gas
	02.12.2025 onwards	**Exam**
	25.12.2025-31.12.2025	**Winter Break**

Course Learning Outcomes(CLO):

After completing this course, the learner will be able to:

1. Understand and describe the basic concepts and laws of thermodynamics.

2. Apply the laws of thermo dynamics to develop Maxwell‟s thermodynamic relations be able to understand their physical interpretations.

3. Appreciate cellular nature of phase space and have better knowledge of classical statistics which would result in greater insight into solutions of various complex problems.

4. Have better understanding of quantum statistics and are in a position to extend the treatment to the analysis of complex problems.

5. Learn to present observations, results, analysis and different concepts of experiments related to Thermodynamics & Statistical Physics.

LESSON PLAN SESSION 2025-2026 SUBJECT-Solid State Physics Sem.5th		
S.No	**WEEK**	**TOPIC**
1	01.08.2025-02.08.2025	**Introduction.**
2	04.08.2025-09.08.2025	**Unit-I** Crystalline and glassy forms, liquid crystals Crystal structure, periodicity, lattice and basis,
3	11.08.2025-16.08.2025	Crystal translational vectors and axes. Unit cell and primitive cell, Winger Seitz primitive Cell,
4	18.08.2025-23.08.2025	symmetry operations for a two dimensional crystal
5	25.08.2025-30.08.2025	Bravais lattices in two & Three dimension
6	01.09.2025-06.09.2025	Revision/Class Test
7	08.09.2025-13.09.2025	**Unit-II** Crystal planes and Miller indices-ray diffraction, Bragg's Law and experimental x-ray diffraction methods, K-space.
8	15.09.2025-20.09.2025	Interplanner spacing
9	22.09.2025-27.09.2025	Crystal structures of Zinc sulphide, Sodium Chloride, Crystal structures of diamond
10	29.09.2025-04.10.2025	Revision/Class Test
11	06.10.2025-11.10.2025	**Unit-III** Reciprocal lattice and its physical significance, reciprocal lattice vectors,
12	13.10.2025-18.10.2025	Reciprocal lattice to a simple cubic lattice,
17	19.10.2025-26.10.2025	Diwali Break
	27.10.2025-31.10.2025	reciprocal lattice to a b.c.c and f.c.c.lattice
	03.11.2025-08.11.2025	Specific heat : Specific heat of solids
	10.11.2025-15.11.2025	Einstein's theory of specific heat,
18	17.11.2025-22.11.2025	Debye model of specific heat of solids
19	24.11.2025-29.11.2025	Revision/Class Test
20	02.12.2025 onwards	Examinations
21	25.12.2025-31.12.2025	Winter Vacation

Course Learning Outcomes (CLO)

Subject-Physics

SEMESTER V

Solid State Physics

- Understand crystal structures: Explore crystalline forms, periodicity, unit cells, symmetry operations, and Bravais lattices.
- Analyse crystal properties and diffraction: Study crystal planes, Miller indices, X-ray diffraction principles, and K-space.
- Comprehend reciprocal lattice and specific heat: Learn about reciprocal lattices, specific heat theories, and models for solids.

Note: By achieving these outcomes, students will learn crystal structures, diffraction, crystal planes, reciprocal lattices, and specific heat theories in solids.