**CURRICULUM PLAN 2024-25**

Odd Semester: I, III, V

**Dr. Savita Sharma**

Department of Physics

**DSC Paper: Heat & Thermodynamics**

**B.Sc. Physical Sciences – II year, III Sem**

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| Content | Allocation of Lectures | Month-wise Schedule followed | Tutorial/assignment/  presentation etc |
| **Heat & Thermodynamics** | | |  |
| **Unit – I - Laws of Thermodynamics:**  Fundamental basics of Thermodynamic system and variables, Zeroth Law of  Thermodynamics and temperature, First law and internal energy, various thermodynamical  processes, Applications of First Law: general relation between CP and CV, work done during  various processes, Compressibility and Expansion Coefficient, reversible and irreversible  processes, Second law: Kelvin-Planck and Clausius statements, Carnot engine, Carnot cycle  and theorem, basic concept of Entropy, Entropy changes in reversible and irreversible  processes, Clausius inequality, Entropy-temperature diagrams. | 10 | 2-Aug to 28-Aug | Syllabus Overview  Reference books  Derivations and Numericals |
| **Unit – II - Thermodynamic Potentials and Maxwell’s Relations:**  Basic concept of Thermodynamic Potentials, Internal Energy, Enthalpy, Helmholtz Free  Energy, Gibb’s Free Energy, derivation of Maxwell’s Thermodynamic Relations and their  applications in Clausius Clapeyron Equation, value of CP – Cv, TdS Equations, Energy  equations for ideal gases, evaluation of CP /Cv | 5 | 30-Aug to 11-Sept | Derivations and  Numericals  Discussion of  Important questions |
| **Unit – III - Kinetic Theory of Gases and Molecular Collisions:**  Maxwell-Boltzmann Law of Distribution of Velocities in an ideal gas and its experimental  verification, Mean, Root Mean Square and Most Probable Speeds, Mean Free Path (Zeroth  order), Transport Phenomena in ideal gases: Viscosity, Thermal Conductivity and Diffusion  (for vertical case) | 6 | 12-Sept to 6-Oct | Derivations and  Numericals  Discussion of  Important questions  Home Register Checking |
| **Unit – IV - Theory of Radiation:**  Blackbody radiation, Spectral distribution, Derivation of Planck’s law, Deduction of Wien’s  law, Rayleigh-Jeans Law, Stefan Boltzmann Law and Wien’s displacement law from  Planck’s law | 5 | 7-Oct to 31-October | Derivations and  Numericals |
| **Unit – V - Statistical Mechanics:**  Macrostate and Microstate, phase space, Entropy and thermodynamic probability, Maxwell-  Boltzmann law, qualitative description of Quantum statistics – Bose Einstein and Fermi  Dirac, comparison of three statistics | 04 | 01-November to 27-November | Derivations and  Numericals |