Name of Teacher: Aashi Mittal
Designation: Assistant Professor
Subject: Physics
Class: B.Sc.(Physical Sciences) Ist Sem

Months	Topics to be covered
August	**Fundamentals of Dynamics**: Rigid body, Moment of Inertia, Radius of Gyration, Theorems of perpendicular and parallel axis (with proof). Moment of Inertia of ring. Disc, Angular Disc, Solid cylinder, Solid sphere, Hollow sphere, Rectangular plate, Square plate, Torque, Rotational Kinetic Energy, Angular momentum, Law of conservation of angular momentum, Rolling motion, condition for pure rolling, acceleration of body rolling down an inclined plane, Fly wheel, Moment of Inertia of an irregular body.
September	**Elasticity**: Deforming force, Elastic limit, stress, strain and their types, Hooks law, Module of elasticity 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, Poisson's ratio and its limiting value, Relation between Young modulus, Bulk modulus and Poisson ratio. Derive the Relation between Young's modulus, Bulk modulus and Modulus of rigidity. Torque required for twisting cylinder, Bending of beam, bending moment and its magnitude, Bending of cantilever (loaded by a weight W at its free end).
October	**Special Theory of Relativity**: Michelson's Morley experiments and its outcome, Postulate of special theory of relativity, Lorentz Transformation, Simultaneity and order of events, Lorentz contraction, Time dilation, Relativistic transformation of velocity, relativistic addition of velocities, variation of mass-energy equivalence. MID TERM EXAM
November	**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 filed, Two body problem and its reduction to one body problem and its solution, determination of g by means of bar pendulum, Normal coordinates and normal modes, Normal modes of vibration for given spring Assignment ,Revision and doubt class

P.I.G. GOVT. COLLEGE FOR WOMEN, JIND
LESSON-PLAN (Session 2025-26) ODD SEMESTER

Name of Teacher: Aashi Mittal
Designation: Assistant Professor
Subject: Physics
Class: Minor Physics- Ist Sem

Months	Topics to be covered
August	**Fundamentals of Dynamics:** Rigid body, Moment of Inertia, Radius of Gyration, Theorems of perpendicular and parallel axis (with proof). Moment of Inertia of ring. Disc, Solid Sphere.
September	**Elasticity:** Deforming force, Elastic limit, stress, strain and their types, Hooks law, Module of elasticity Relation between shear angle and angle of twist, Poisson's ratio and its limiting value
October	**Special Theory of Relativity:** Galilean Transformation, Michelson's Morley experiments and its outcome, Postulate of special theory of relativity, Lorentz Transformation, Lorentz contraction, Time dilation MID TERM EXAM
November	**Gravitation and central force motion:** Law of gravitation, Motion of a Particle under Central Force Field. Kepler's Laws for planetary motion (Statements Only). Assignment, Revision and Doubt Class

P.I.G. GOVT. COLLEGE FOR WOMEN, JIND
LESSON-PLAN (Session 2025-26) ODD SEMESTER

Name of Teacher: Aashi Mittal
Designation: Assistant Professor
Subject: Physics
Class: B.Sc.(Major in Physics) Ist Sem

Months	Topics to be covered
August	**Vector Algebra:** Properties of vectors. Scalar product and vector product, Scalar triple product and their interpretation in terms of area and volume respectively. Scalar and Vector fields. **Vector Calculus:** Vector Differentiation: Directional derivatives and normal derivative. Gradient of a scalar field and its geometrical interpretation. Divergence and curl of a vector field. Del and Laplacian operators.
September	**Matrices:** Normal Matrices, Orthogonal Matrices, Hermitian Matrices, Unitary Matrices, Symmetric and Anti-symmetric Matrices, Conjugate of a Matrix, Anti-hermitian Matrices, Trace of Matrix, Eigen values and eigen vectors of Matrices, Diagonalization of Matrices. **Theory of Errors:** Systematic and Random errors, Propagation of errors, Normal law of errors, Standard and Probable error, error on slope and intercept of fitted line.
October	**Differential Equations:** First order differential equations of degree one and those reducible to this form, Method of separation of variables, Homogeneous Differential Equations, Linear Differential Equations, Exact and Inexact equations, Integrating Factor, Applications to physics problems, Linear Differential Equations of Second Order with constant Coefficients. Vibrating mass on a spring. Current in RC & LC Circuit. MID TERM EXAM
November	**Fourier series and Integrals:** Introduction, Evaluation of coefficients of Fourier series, cosine series, sine series, Dirichlet's theorem, Graphic; representation of Even and odd functions, Extension of interval, complex form of Fourier series, Properties of Fourier series: Convergence, Integration, Differentiation, Parseval's theorem, Physical applications of Fourier series analysis, square wave, Half wave rectifier, Full wave rectifier, A sawtooth wave, A triangular wave, Fourier Integrals, Starting with the Fourier series, deduction of expressions for the Fourier Transform and its inverse. Revision and doubt class

| Name of Assistant Prof. | : Dr. Manju Sharma | Class: B.Sc (5th Semester) |
| Subject | : Classical Mechanics | Paper +Code: B23-PHY-303 |

Month-2025	Units/Topics Covered
August-2025	**Unit-1 (Introductory Ideas of Classical Mechanics)** Newton's Laws of Motion, Space-time reference system; Mechanics single particle-Conservation Laws of linear momentum, Angular moment and mechanical energy, Mechanics of a system of particles- Concept external and internal forces, concept of centre of mass and centre of mass frame of reference, Conservation laws of linear momentum, Angular momentum and mechanical energy, relation between angular momentum and angular momentum about the Centre of Mass.
September-2025	**Unit-2 (Lagrangian Dynamics)** Basics concepts about coordinate system, Degrees of freedom; Constraints Their classification, properties and examples; Generalized coordinates, Transformation equations, Generalized Displacement, Velocity, Acceleration, Momentum, Force and Potential; Principle of Virtual Work & D'Alembert's Principle, Lagrange's equations of motion from D'Alembert's Principle; Concept of symmetry-Homogeneity and isotropy. Problems using Lagrange's equation of motion: spring mass system, Atwood's machine, simple pendulum.
October-2025	**Unit-3 (Hamiltonian Dynamics)** Generalized Momentum, Cyclic or ignorable coordinates, Integrals of motion, Conservation Theorem, Hamilton's Function and Hamilton's equations of motion, Properties of Hamiltonian and Hamilton's equations of motion; Hamilton's equation in different coordinate system. Formation of Hamiltonian and Hamilton's equation of motion-for-Linear Harmonic oscillator, Atwood's machine, simple pendulum. **Mid-Term Exam** will be taken as per university norms.
November-2025	**Unit-4 (Motion Under Central Force)** Definition and properties of the central force, two body central force problem-reduction to equivalent one body problem (Lagrangian and Lagrange equations of motion), differential equation for an orbit, general features of the orbit, stability of the orbit under central force and conditions for closure Inverse square law-Kepler's law of planetary motion and these derivation.

Manju.

Name of Assistant Prof.　　: Dr. Manju Sharma　　Class: B.Sc (5th Semester)
Subject　　　　　　　　　 : Modern Physics　　　　Paper Code: B23-PHY-501

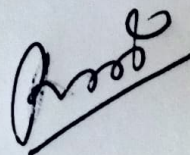| Month-2025	Units/Topics Covered
August-2025	**Unit-3 (Atomic and Molecular Physics)** Bohr model, Sommerfeld theory (qualitative), Larmor's theorem (qualitative), Vector Atom Model, electron spin, space quantization, spin-orbit Interaction energy, LS and JJ coupling, Zeeman effect, Lande's g-factor.
September-2025	**Unit-4 (Nuclear and Particle Physics)** Composition of nucleus, stability of nucleus, nuclear properties, nuclear size, spin, parity, magnetic moment, quadrupole moment, binding energy of nucleus, Semi- empirical Mass formula, classification of fundamental particles, Quark and Lepton, Hadrons, Baryons, Mesons, different types of nuclear interactions.
October-2025	**Unit-1 (Introductory Quantum Mechanics)** Need of Quantum Mechanics, Planck's quantum hypothesis and Black body Radiation (Qualitative only), photoelectric effect, Compton effect, de-Broglie hypothesis, de-Broglie wave, wave packet, phase and group velocities, Time-dependent and time-independent Schrodinger equations, Properties of wave function, particle confined in a one-dimensional infinite box: energy eigen functions and eigenvalues. Heisenberg's Uncertainty Principle (Qualitative Idea) **Mid-Term Exam** will be taken as per university norms.
November-2025	**Unit-2 (Solid State Physics)** Crystalline state, crystal lattice, basis, lattice translation vectors, primitive and non-primitive unit cells, Bravais lattices in two and three dimensions, Miller Indices, crystallographic planes, interplanar spacing, simple crystal structures: NaCl, diffraction of waves by crystals, Bragg's law, Idea of Reciprocal Lattice.

Manju

Lesson Plan

Dr. Ramesh Kumar
Asst. Prof (Physics)

Course: Thermodymics and Statistical Physics
3rd Sem BSc (PS) 2025

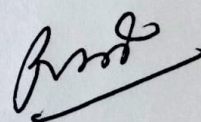| Month	Content
August	Laws of Thermodynamics: Thermodynamic Description of system: Zeroth Law of thermodynamics. First law of thermodynamics and internal energy, conversion of heat into work, Various Thermodynamical Processes, Applications of First Law: Work Done during Isothermal and *Adiabatic Processes, Compressibility and Expansion Coefficient, Reversible and irreversible processes, Second law of thermodynamics, Entropy, Carnot's cycle & Carnot's theorem. Entropy changes in reversible and irreversible processes, Entropy-temperature diagrams, Third law of thermodynamics, Unattainability of absolute zero.
September	Thermodynamic Potentials: Enthalpy, Gibbs, Helmholtz and Internal Energy functions, Maxwell's relations and applications Joule-Thompson Effect, Clausius- Clapeyron Equation, Expression for (CpCV), Cp/CV, TdS equations.
October	Basics idea of probability. Priori probability, Statistical probability, permutation and combination, distinguishable and indistinguishable particles Distribution of N (for N 2, 3, 4) distinguishable and indistinguishable particles in two boxes of equal size, microstates and macrostates, thermodynamical probability, constraints and accessible states, statistical fluctuations, entropy and probability: Concept of phase space, division of phase space into cells, postulates of statistical mechanics; Classical and quantum statistics, basic approach to these statistics, 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.
November	Need of Quantum statistics- classical versus quantum statistics, Bose-Einstein energy distribution Law, Application of B. E. Statistics to Planck's radiation law, Fermi-Dirac energy distribution Law, 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

Lesson Plan

Dr. Ramesh Kumar
Asst. Prof (Physics)

Course: *Thermodymics*
3rd Sem BSc (Pysics Minor) 2025

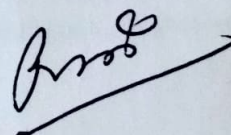| Month	Topics
August	Thermodynamic Description of system: Zeroth Law of thermodynamics and temperature. First law and internal energy, conversion of heat into work, Various Thermodynamical Processes, Applications of First Law: Work Done during Isothermal and Adiabatic Processes, Compressibility and Expansion Coefficient, Reversible and irreversible processes. Second law, Entropy, Carnot's cycle & theorem, Entropy changes in reversible and irreversible processes, Entropy-temperature diagrams, Third law of thermodynamics, Unattainability of absolute zero.
September	Enthalpy, Gibbs, Helmholtz and Internal Energy functions, Maxwell's relations and applications Joule-Thompson Effect, Clausius Clapeyron Equation, Expression for (C_P-C_V), C_P/C_V, TdS equations.
October	Assumption of Kinetic theory of gases, pressure of an ideal gas (with 11 derivation), Kinetic interpretation of Temperature, Ideal Gas equation, Degree of freedom, Law of equipartition of energy and its application for specific heat of gases, Real gases, Vander wall's equation, Brownian motion(Qualitative).
November	Maxwell's distribution of speed and velocities (derivation required). Experimental verification of Maxwell's law of speed distribution: most probable speed, average and r.m.s. speed, Mean free path, Transport of energy and momentum, Diffusion of gases.

Lesson Plan

Dr.Ramesh Kumar, *Course: Exploring the journey of Indian Space Satellites*

Asst. Prof (Physics)   *3rd Sem VAC 2025*

August	Concept of Satellite, ideas and theories, Concept of Orbits, The transfer orbit, hurdles in launching a satellite, space scarcity in space. Indian pace program, Objectives of the Indian Space Program, Organizational set-up.
September	Communication Satellite: Orbit and Description: A brief History of Satellite Communication, Satellite Frequency bands, Satellite Systems, Applications, Orbital Period and Velocity, Effects of Orbital inclination, Azimuth and Elevation, Coverage and Slant range, Eclipse, Orbital perturbations Placement of a Satellite in a Geo-Stationary Orbit
October	Space Centres and institutes, Genesis of Indian's space program, Indian 8 Satellites, Indian Communications satellites and their applications. Classification of Satellites based on Orbit Height. Indian remote sensing satellites, Indian National Satellites
November	Launch vehicle technology, Milestones in India's Space Programme.

P.I.G GOVT. COLLEGE FOR WOMEN , JIND

MDC - PHYSICS FUNDAMENTAL (1)

Lesson plan- 2025-26

Extension lecturer - Ankita

Class- B.Sc. 1st year (MDC Physics)

August 2025

Physics-nature, scope & excitement, major discoveries in physics, major contribution by Indian Physicists.

System of measuring Units-Need for measurement, measuring process, concept of mass,length, time; Fundamental and derive units, system of units, concept of error, types of error (only definition), Vernier calliper and Screw Gauge.

September 2025

Scalar and Vector quantities description of motion against a straight line- distance and displacement, uniform motion and non-uniform motion, average and instantaneous speed, average and instantaneous velocity, acceleration; graphical analysis of straight line motion- distance- time graph,
velocity- time graph.

October 2025

Concept of force, Newton's 1st law of motion, inertia and mass; Newton's 2nd law of motion, momentum and force; 3rd law of motion, daily life applications of Newton's laws of motion.

Universal law of gravitation and its importance, acceleration due to gravity and free fall of a body; mass and weight of an object on earth and moon.

NOVEMBER 2025

Work, energy, types of energy-Kinetic energy and Potential energy, P.E. of an object at a height. law of conservation of energy and its applications. Conservation of linear and angular momentum, collision (elastic and inelastic) and conservation laws in collisions- importance in daily life.

Note- assignment and Mid-term exam will be taken as per schedule.

Ankita

P.I.G GOVT COLLEGE FOR WOMEN, JIND

Lesson plan: 2025-26

Extension lecturer : Ankita

Subject: MDC 3 Physics

Class: B.sc 1ˢᵗ year

August 2025

Basics of semiconductor and semiconductor devices-Atomic structure and energy levels, energy bands (basic idea), definition of conductor, semiconductor and insulators (on the basis of energy gap), Intrinsic semiconductors, extrinsic semiconductors-p-type and n-type semiconductor), P-N junction diode-depletion layer, forward biasing and reverse biasing, V-I characteristics; Working of half wave and full wave rectifiers.

September 2025

Basics of Laser systems - introduction to LASER, important properties of laser light, Principle of laser- Light amplification, population inversion and pumping; Working of laser- schematic diagram for functioning of laser, applications of Lasers in different fields of science and technology.

October 2025

Introduction to nuclear physics I: Atomic nucleus and the nucleons, atomic number, mass number, isotopes, isobars and isotones; nuclear binding energy, Qualitative idea of liquid drop model. Qualitative idea of radioactivity and different type of radioactive decay- α, β, and γ- decay. Nuclear reactions and their types.

November 2025

Introduction to nuclear physics II: Carbon dating, Nuclear fission reaction and its application as a source of energy (nuclear reactor) and hazardous aspect of nuclear fission; Nuclear fusion reaction and source of stellar energy.

August 2025 :

Introduction to Electricity and Circuits: Basics of Electricity, Electric charges (positive and negative). Basic components of a circuit: battery, wires, bulb, switch, Conductors and insulators Basic Electricity Principles: Voltage, Current, Resistance, and Power, Ohm's law, Series, parallel, and series-parallel combinations, AC Electricity and DC Electricity.

September 2025

Understanding Electrical Circuits: AC and DC Voltage Sources, Current and voltage drop across the DC circuit elements, Kirchhoff's laws, Instruments to measure current, voltage, power in DC and AC circuits, Familiarization with multimeter, voltmeter and ammeter, Insulation, Preparation of extension board, Joints in electrical conductors, Techniques of soldering, Electrical Protection: Relays, Fuses and disconnect switches, Circuit breakers, Overload devices, Ground-fault protection, Grounding and isolating, Surge protection.

October 2025

Smart Switches, Wi-fi enabled switches, Smart Bulbs, Ways to make smart home. Estimation of electric load, average electricity bill calculation, Electric Appliances: Fan, Bulb, LEDs, Working of Water Cooler, Working of Air Conditioner

NOVEMBER 2025

Comparison of Invertor & Non Invertor Air Conditioners ,Working of DC & AC Moto, Working of Water Pump, Invertor, Off-grid & on-grid Solar Systems for home, Ways to save electricity.

Note- assignment and Mid-term exam will be taken as per schedule

P.I.G GOVT. COLLEGE FOR WOMEN, JIND

EXTENSION LECTURER – Ankita

SUBJECT – B.SC 1ST YEAR SEC 3 PHYSICS

Basic Instrumentation Skills

August 2025

Basic of Measurements: Instruments accuracy, precision, sensitivity, resolution range etc. Errors in measurements and loading effects, Voltmeter, Ammeter. Multimeter: Principles of measurement of dc voltage and dc current, ac voltage, ac current and resistance. Specifications of a multimeter and their significance.

September 2025

Electrical Instruments: Different types of conductors and cables, Voltage drop and losses across cables and conductors. Insulation. Solid and stranded cable. Resistance, Inductor, Capacitor, Transformer, Basics of wiring-Star and delta connection. Components in Series or in shunt. Response of inductors and capacitors with DC or AC sources

October 2025

Electronic Instruments: PN junction diode, Zenor Diode, LEDs, Solar Cell, Photocell, Soldering of electrical circuits having discrete components (R, L, C, diode) and ICs on PCB. Transistors, Rectifiers. Filter Circuits (Qualitative ideas only)

November 2025

Solar Energy: Solar Energy-Key features, its importance, Merits & demerits of solar energy, Applications of solar energy, Conversion of Solar energy into Electricity - Photovoltaic Effect, photovoltaic cell and its working principle, Different types of Solar cells, Series and parallel connections, Photovoltaic applications: Battery chargers, Load Calculation & Cost Calculation for installing Solar Panels, Domestic electricity, Solar Subsidy Schemes 6 Practicum 1. Use of Multimeter for measu

Ankita