(Lesson Plan)

MCM DAV College for Women, Sector – 36A, Chandigarh
Monthly Teaching Plans (Odd Semester)
Session – (2023-2024)

Name of the Teacher: Dr. Swati Khatta

Department: Department of Physics
Class: B.Sc. I   **Subject: Mechanics-I**   **Section(s): N.M & Vocational**

S.No.	Date (Monthly)		Topics to be Covered	Academic Activity Undertaken*
	From	To		
1.	22/07/2023	31/08/2023	Cartesian and spherical polar coordinate, Two dimensional coordinate systems, Area, volume, displacement, velocity and acceleration of these systems and solid angle.	(i) Lecture method (ii) Group discussion (iii) Notes (iv) Numerical Problems (v) Class test
2.	01/09/2023	30/09/2023	Centre of mass, linear momentum and angular momentum. Torque, potential energy and kinetic energy of a system of particles. Relationship of conservation laws of linear momentum, angular momentum and energy, and symmetries of space and time.	(i) Lecture method (ii) Group discussion (iii) Notes (iv) Numerical Problems (v) Class test
3.	01/10/2023	31/10/2023	Various forces in nature, relative strengths and spatial dependence, Motion under force obeying inverse square law, equivalent one body problem. Motion under central forces, equation of motion under central force, equation of orbit and turning points, Kepler's Laws.	(i) Lecture method (ii) Group discussion (iii) Notes (iv) Numerical Problems (v) Class test
4.	01/11/2023	30/11/2023	Elastic collision in Lab. and C.M. systems, Relationships of velocities, angles, and kinetic energies in these two systems, cross section of elastic scattering, Rutherford scattering.	(i) Lecture method (ii) Group discussion (iii) Notes (iv) Numerical Problems (v) Class test

Name of the Teacher: **Dr. Swati Khatta**

Department: **Department of Physics**

Class: B.Sc. I   **Subject: Mechanics-II**   **Section(s): N.M & Vocational**

S.No.	Date (Monthly) From	Date (Monthly) To	Topics to be Covered	Academic Activity Undertaken*
1.	09/01/2024	31/01/2024	Rigid Body motion; Rotational motion, principal moments and Axes, Euler's equations, precession and elementary gyroscope.	(i) Lecture method (ii) Group discussion (iii) Notes (iv) Numerical Problems (v) Class test
2.	01/02/2024	29/02/2024	Galilean transformations and Invariance, Transformation equations for inertial frames inclined to each other. Non-Inertial frames. Fictitious forces in a rotating frames of reference, Centrifugal and Coriolis forces due to rotation of earth, Foucault's pendulum.	(i) Lecture method (ii) Group discussion (iii) Notes (iv) Numerical Problems (v) Class test
3.	01/03/2024	31/03/2024	Concept of stationery universal frame of reference and ether, Michelson-Morley experiment and its results, Postulates of special theory of relativity, Lorentz transformations. Kinematical consequences of Lorentz transformations – length contraction and time dilation, Twin paradox, Transformation of velocities, Simultaneity of relativity.	(i) Lecture method (ii) Group discussion (iii) Notes (iv) Numerical Problems (v) Class test
4.	01/04/2024	03/05/2024	Velocity of light in moving fluid, Relativistic Doppler effect. Variation of mass with velocity, mass-energy equivalence, rest mass in an inelastic collision, relativistic momentum & energy, their transformation, concepts of Minkowski space, four vector formulation.	(i) Lecture method (ii) Group discussion (iii) Notes (iv) Numerical Problems (v) Class test

Name of the Teacher: **Dr. Pallavi Gupta** and **Anu Rathi**

Department: **Department of Physics**

Class: B.Sc. I   **Subject: Vibrations, Waves and E.M. Theory-I**   **Section: N.M & Vocational**

S.No.	Date (Monthly)		Topics to be Covered	Academic Activity Undertaken*
	From	**To**		
1.	24/7/2023	30/8/2023	Simple harmonic motion, energy of a SHM, Compound Pendulum, Torsional Pendulum, Electrical Oscillations, Transverse Vibrations of a mass on a string, composition of two perpendicular SHM of same period and of period in ratio 1: 2.	(i) Lecture method (ii) Group discussion (iii) Notes (iv) Numerical Problems (v) Class test
2.	01/09/2023	31/09/2023	Decay of free vibrations due to damping, differential equation of motion, types of damping, determination of damping co-efficient; Logarithmic decrement, relaxation time and Q- Factor. Electromagnetic damping (Electrical oscillator).	(i) Lecture method (ii) Group discussion (iii) Notes (iv) Numerical Problems (v) Class test
3.	01/10/23	31/10/23	Differential equation for forced mechanical and electrical oscillators, Transient and steady state behavior.Displacement and velocity variation with driving force frequency, variation of phase with frequency, resonance.	(i) Lecture method (ii) Group discussion (iii) Notes (iv) Numerical Problems (v) Class test
4.	01/11/23	30/11/23	Q-value and band width. Q-value as an amplification factor. Stiffness, coupled oscillators, Normal co-ordinates and normal modes of vibration, Inductance coupling of electrical oscillators.	(i) Lecture method (ii) Group discussion (iii) Notes (iv) Numerical Problems (v) Class test

Name of the Teacher: **Anu Rathi**

Department: **Department of Physics**

Class: B.Sc.I   **Subject: Vibrations, Waves and E.M. Theory-II**   **Section: N.M & Vocational**

S.No.	Date (Monthly) From	Date (Monthly) To	Topics to be Covered	Academic Activity Undertaken*
1	09/01/2024	31/01/2024	Waves in physical media, Wave equation and its solution, Types of waves, particle velocity, acceleration and energy in progressive waves. Longitudinal waves on a rod.	(i) Lecture method (ii) Group discussion (iii) Notes (iv) Numerical Problems (v) Class test
2	01/02/2024	29/02/2024	Transverse waves on a string, characteristic impedance of a string, Waves in absorbing media. Reflection and Transmission of transverse waves on a string at discontinuity, Reflection and transmission of energy. Reflection and transmission of longitudinal waves at a boundary. Standing wave ratio, Impedance matching, Energy of vibrating string. Wave and group velocity.	(i) Lecture method (ii) Group discussion (iii) Notes (iv) Numerical Problems (v) Class test
3	01/03/2024	31/03/2024	Physical interpretation of Maxwell's equations, E.M. waves and wave equation in a medium having finite permeability, permittivity and conductivity. Energy flow due to EM wave - Poynting vector, Impedance of a dielectric to EM waves. EM waves in a conducting medium and skin depth. Impedance and Refractive index of a dielectric and a conductor.	(i) Lecture method (ii) Group discussion (iii) Notes (iv) Numerical Problems (v) Class test
4.	01/04/2024	03/05/2024	Reflection and transmission of EM waves at a boundary of two dielectric media for normal and oblique incidence. Reflection of EM waves from the surface of a conductor at normal incidence.	(i) Lecture method (ii) Group discussion (iii) Notes (iv) Numerical Problems (v) Class test

Name of the Teacher: **Dr. R. Ridhi**

Department: **Department of Physics**

Class: B.Sc. I   **Subject: Electricity and Magnetism-I**   **Section: N.M & Vocational**

S.No.	Date (Monthly)		Topics to be Covered	Academic Activity Undertaken*
	From	To		
1.	24/07/2023	30/8/2023	Basic ideas of Vector Calculus, Gradient, Divergence, curl in Cartesian coordinates and their useful relations, physical significance and applications, Conservative field, Greens's theorem in a plane, divergence theorem. Stoke's theorem.	(i) Lecture method (ii) Group discussion (iii) Notes (iv) Numerical Problems (v) Class tests and doubt sessions
2.	01/09/2023	31/09/2023	Coulomb's Law for point charges and continuous distribution of charges, Electric field due to dipole, line charge, charged ring, circular disc and sheet of charge. Gauss's Law and its differential form. Work and potential difference, Potential difference as line integral of field, Electric potential due to dipole and quadrupole and its applications in Electrostatic field, Electric field as gradient of scalar potential, curl E = 0.	(i) Lecture method (ii) Group discussion (iii) Notes (iv) Numerical Problems (v) Class Tests and doubt sessions
3.	01/10/23	31/10/23	Calculation of E due to a point charge and dipole from potential. Poisson and Laplace's equation, Concept of Electrical images. Calculation of electric potential and field due to a point charge placed near an infinitely conducting sheet, Polarisation of matter, atomic and molecular dipoles, induced dipole moment and atomic polarizability.	(i) Lecture method (ii) Group discussion (iii) Notes (iv) Numerical Problems v) Class tests and doubt sessions
4.	01/11/23	30/11/23	Electric susceptibility and polarization vector. Relation K= 1 + χ, Gauss's law for dielectrics. Displacement vector, Div. D = 0, Energy stored in dielectric medium.	(v) Lecture method (vi) Group discussion (vii) Notes (viii) Numerical Problems vi) Class tests and doubt sessions

Name of the Teacher: Dr. R. Ridhi

Department: Department of Physics

Class: B.Sc. I   Subject: Electricity and Magnetism-II   Section: N.M & Vocational

S.No.	Date (Monthly)		Topics to be Covered	Academic Activity Undertaken*
	From	**To**		
1	09/01/2024	31/01/2024	Current and current density, equation of continuity. Microscopic form of Ohm's Law ($J = \sigma E$) and conductivity, Failure of Ohm's Law, Invariance of charge. E in different frames of reference, Field of a point charge moving with constant velocity,	(i) Lecture method (ii) Group discussion (iii) Notes (iv) Numerical Problems (v) Class tests and doubt sessions
2	01/02/2024	29/02/2024	Force between parallel currents, Behaviour of various substances in magnetic field, Definition of M and H and their relation to free and bound currents, Permeability and susceptibility and their interrelationship, B-H curve and energy loss in hysteresis.	(i) Lecture method (ii) Group discussion (iii) Notes (iv) Numerical Problems (v) Class tests and doubt sessions
3	01/03/2024	31/03/2024	Langevin theory of diamagnetism, Lorentz's force, Definition of B, Biot Savart's Law and its application to long straight wire, circular current loop and solenoid. Ampere's Circuital law and its application. Divergence and curl of B.	(i) Lecture method (ii) Group discussion (iii) Notes (iv) Numerical Problems (v) Class tests and doubt sessions
4.	01/04/2024	03/05/2024	Hall effect, expression and co-efficient, Vector potential. Definition and derivation. Current density-definition, its use in calculation of change in magnetic field at a current sheet, Energy stored in magnetic field, Faraday's Law of EM induction, Displacement current, Mutual inductance& reciprocity theorem Self-inductance for Solenoid.	(i) Lecture method (ii) Group discussion (iii) Notes (iv) Numerical Problems (v) Class tests and doubt sessions