

Teaching Plan

Name of the Faculty : Dr. Vandana Arora

Name of the Course : General Elective

Semester : II Sec (if any) :

Title of the Paper :Mechanics

Month	Topics Covered	References
January	<p>Vectors: Vector algebra. Scalar and vector products. Derivatives of a vector with respect to a parameter. Laws of Motion: Frames of reference. Newton's Laws of motion Gravitation: Newton's Law of Gravitation. Motion of a particle in a central force field (motion is in a plane, angular momentum is conserved, areal velocity is constant). Kepler's Laws (statement only).Satellite in circular orbit and applications</p>	<p>□ Mechanics, D.S. Mathur, S.Chand and Company Limited, 2000</p> <p>University Physics. FW Sears,MW Zemansky & HD Young 13/e,1986.Addison-Wesley</p> <p>□ Mechanics Berkeley Physics course, v.1:Charles Kittel, et.al. 2007, Tata McGraw-Hill</p>
February	<p>Speed Theory of Relativity: Constancy of speed of light. Postulates of Special Theory of Relativity. Length contraction. Time dilation. Relativistic addition of velocities. Dynamics of a system of particles. Centre of Mass. Momentum and Energy: Conservation of momentum. Work and energy. Conservation of energy. Motion of rockets.</p> <p>Ordinary Differential Equations: 1st order homogeneous differential equations. 2nd order homogeneous differential equations with constant coefficients.</p>	<p>□ Physics for scientists and Engineers with Modern Phys., J.W.Jewett, R.A.Serway, 2010,Cengage Learning</p> <p>Mechanics, D.S. Mathur, S.Chand and Company Limited, 2000</p> <p>□ Differential Equations, George F. Simmons, 2006, Tata McGraw-Hill.</p>
March	<p>Rotational Motion: Angular velocity and angular momentum. Torque. Conservation of angular momentum.</p> <p>Elasticity: Hooke's law - Stress-strain diagram - Elastic moduli-Relation between elastic constants - Poisson's Ratio-Expression for Poisson's ratio in terms of elastic constants - Work done in stretching and work done in twisting a wire - Twisting couple on a cylinder - Determination of Rigidity modulus by static torsion - Torsional pendulum-Determination of Rigidity modulus and moment of inertia - q, η and \square by Searles method.</p>	<p>An introduction to mechanics, D. Kleppner, R.J. Kolenkow, 1973, McGraw-Hill.</p> <p>□ Mechanics, Berkeley Physics, vol.1, C. Kittel, W. Knight, et.al. 2007, Tata McGraw-Hill.</p> <p>Mechanics, D.S. Mathur, S.Chand and Company Limited, 2000</p>

April	Oscillations: Simple harmonic motion. Differential equation of SHM and its solutions. Kinetic and Potential Energy, Total Energy and their time averages. Damped oscillations.	Mechanics, D.S. Mathur, S.Chand and Company Limited, 2000
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The tentative date of test : 20 February

The tentative date of Assignment: 15 March

Teaching Plan

Name of the Faculty : Dr. Anupama

Name of the Course : B.Sc (Physical Sciences) (CBCS)

Semester : II Sec (if any) :

Title of the Paper : Electricity and Magnetism Month	Topics Covered	References
January 2016 February 2016 March 2016	<p>Vector Analysis: Review of vector algebra (Scalar and Vector product), gradient, divergence, Curl and their significance, Vector Integration, Line, surface and volume integrals of Vector fields, Gauss-divergence theorem and Stoke's theorem of vectors (statement only)</p> <p>Electrostatics: Electrostatic Field, electric flux, Gauss's theorem of electrostatics.</p> <p>Applications of Gauss theorem- Electric field due to point charge, infinite line of charge, uniformly charged spherical shell and solid sphere, plane charged sheet, charged conductor. Electric potential as line integral of electric field, potential due to a point charge, electric dipole, uniformly charged spherical shell and solid sphere.</p> <p>Calculation of electric field from potential. Capacitance of an isolated spherical conductor. Parallel plate, spherical and cylindrical condenser. Energy per unit volume in electrostatic field. Dielectric medium, Polarisation, Displacement vector. Gauss's theorem in dielectrics. Parallel plate capacitor completely filled with dielectric.</p> <p>Magnetism: Magnetostatics: Biot-Savart's law and its applications- straight conductor, circular coil, solenoid carrying current. Divergence and curl of magnetic field. Magnetic vector potential. Ampere's circuital</p>	<p>Schaum's Outline of Vector Analysis by Murray R Spiegel, McGraw-Hill</p> <p>□ Electricity and Magnetism, D C Tayal, 1988, Himalaya Publishing House.</p> <p>□ Electricity and Magnetism, N. K. Sehgal, K. L. Chopra, D. L. Sehgal, Sultan Chand & Sons</p> <p>□ Electricity and Magnetism, Edward M. Purcell, 1986, McGraw-Hill Education.</p> <p>□ Electricity and Magnetism, D C Tayal, 1988, Himalaya Publishing House.</p> <p>□ D.J.Griffiths, Introduction to Electrodynamics, 3rd Edn, 1998, Benjamin Cummings.</p> <p>□ Electricity and Magnetism, N. K. Sehgal, K. L. Chopra, D. L. Sehgal, Sultan Chand & Sons</p> <p>□ Electricity and Magnetism, K. K. Tiwari, S. Chand.</p> <p>□ Electricity and Magnetism, Edward M. Purcell, 1986, McGraw-Hill Education.</p> <p>□ Electricity and Magnetism, D C Tayal, 1988, Himalaya Publishing House.</p> <p>□ D.J.Griffiths, Introduction to Electrodynamics, 3rd Edn, 1998, Benjamin Cummings.</p> <p>□ Electricity and Magnetism, N. K. Sehgal, K. L. Chopra, D. L. Sehgal,</p>

	<p>law.</p> <p>Magnetic properties of materials: Magnetic intensity, magnetic induction, permeability, magnetic susceptibility. Brief introduction of dia-, para- and ferromagnetic materials.</p>	
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Teaching Plan

Name of the Faculty : Dr. SmitaKorpal

Name of the Course :B.Sc. (H) Physics (CBCS)

Semester : II Sec (if any) :

Title of the Paper : Waves and Optics (C IV)

Month	Topics Covered	References
January	<p>Superposition of Collinear Harmonic oscillations:Simple harmonic motion (SHM). Linearity and Superposition Principle. Superposition of two collinear oscillations having(1) equal frequencies and (2) different frequencies (Beats). Superposition of N collinear Harmonic Oscillations with (1) equal phase differences and (2) equal frequency Differences.</p> <p>Superposition of two perpendicular Harmonic Oscillations: Graphical and Analytical Methods. Lissajous Figures with equal and unequal frequencies and their uses.</p> <p>Wave Motion: Plane and Spherical Waves. Longitudinal and Transverse Waves. Plane Progressive (Travelling) Waves. Wave</p>	<ul style="list-style-type: none"> • Waves: Berkeley Physics Course, vol. 3, Francis Crawford, 2007, Tata McGraw-Hill. • The Physics of Vibrations and Waves, H. J. Pain, 2013, John Wiley and Sons. • The Physics of Waves and Oscillations, N.K. Bajaj, 1998, Tata McGraw Hill. • Fundamental of Optics, A. Kumar, H.R. Gulati and D.R. Khanna, 2011, R. ChandPublications

February	<p>Equation. Particle and Wave Velocities. Pressure of a Longitudinal Wave. Energy Transport. Intensity of Wave.</p> <p>Superposition of Two Harmonic Waves: Standing (Stationary) Waves in a String: Fixed and Free Ends. Analytical Treatment. Phase and Group Velocities. Changes with respect to Position and Time. Energy of Vibrating String. Transfer of Energy. Normal Modes of Stretched Strings. Longitudinal Standing Waves and Normal Modes. Open and Closed Pipes. Superposition of N Harmonic Waves.</p> <p>Wave Optics: Electromagnetic nature of light. Definition and properties of wave front. Huygens Principle. Temporal and Spatial Coherence.</p> <p>Interference: Division of amplitude and wavefront. Young's double slit experiment. Lloyd's Mirror and Fresnel's Biprism.</p>	<ul style="list-style-type: none"> • Waves: Berkeley Physics Course, vol. 3, Francis Crawford, 2007, Tata McGraw-Hill. • The Physics of Vibrations and Waves, H. J. Pain, 2013, John Wiley and Sons. • The Physics of Waves and Oscillations, N.K. Bajaj, 1998, Tata McGraw Hill. • Fundamental of Optics, A. Kumar, H.R. Gulati and D.R. Khanna, 2011, R. Chand Publications
March	<p>Interference: Phase change on reflection: Stokes' treatment. Interference in Thin Films: parallel and wedge-shaped films. Fringes of equal inclination (Haidinger Fringes); Fringes of equal thickness (Fizeau Fringes). Newton's Rings: Measurement of wavelength and refractive index.</p> <p>Interferometer: Michelson Interferometer-(1) Idea of form of fringes (No theory required), (2) Determination of Wavelength, (3) Wavelength Difference, (4) Refractive Index, and (5) Visibility of Fringes. Fabry-Perot interferometer.</p> <p>Diffraction: Fraunhofer diffraction: Single slit. Rectangular and Circular aperture.</p>	<ul style="list-style-type: none"> • Fundamentals of Optics, F.A. Jenkins and H.E. White, 1981, McGraw-Hill • Principles of Optics, Max Born and Emil Wolf, 7th Edn., 1999, Pergamon Press. • Optics, AjoyGhatak, 2008, Tata McGraw Hill
April	<p>Diffraction: Resolving Power of a telescope. Double slit. Multiple slits. Diffraction grating. Resolving power of grating. Fresnel Diffraction: Fresnel's Assumptions. Fresnel's Half-Period Zones for Plane Wave. Explanation of Rectilinear Propagation</p>	

	of Light. Theory of a Zone Plate: Multiple Foci of a Zone Plate. Fresnel's Integral, Cornu's spiral and its applications. Straight edge, a slit and a wire.	
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Note : The tentative date of Assignment/test/Project may also be provided.

The schedule of Practicals may also be provided

Teaching Plan

Name of the faculty: CHETNA

Name of the course: B.Sc(H) Physics (CBCS)

Semester : II

Title of the paper : Electricity & Magnetism

Month	Topics Covered	References
January	<p>Network theorems: Ideal constant-voltage and constant-current Sources. Review of Kirchhoff's Current Law & Kirchhoff's Voltage Law. Mesh & Node Analysis. Thevenin theorem, Norton theorem, Superposition theorem, Reciprocity Theorem, Maximum Power Transfer theorem. Applications to dc circuits.</p> <p>Electrical Circuits: AC Circuits: Kirchhoff's laws for AC circuits. Complex Reactance and Impedance. Series LCR Circuit: (1) Resonance, (2) Power Dissipation and (3) Quality Factor, and (4) Band Width. Parallel LCR Circuit.</p> <p>Electric Field and Electric Potential Electric field: Electric field lines. Electric flux. Gauss' Law with applications to charge distributions with spherical, cylindrical and planar symmetry.</p>	<p>□ Electricity, Magnetism & Electromagnetic Theory, S.Mahajan and Choudhury, 2012, Tata McGraw</p> <p>□ Electricity and Magnetism, Edward M. Purcell, 1986 McGraw-Hill Education</p> <p>□ Introduction to Electrodynamics, D.J. Griffiths, 3rd Edn., 1998, Benjamin Cummings.</p> <p>□ Feynman Lectures Vol.2, R.P.Feynman, R.B.Leighton, M.Sands, 2008, Pearson Education</p> <p>□ Electricity and Magnetism, J.H.Fewkes & J.Yarwood. Vol.I, 1991, Oxford Univ. Press.</p>
February	<p>Conservative nature of Electrostatic Field. Electrostatic Potential. Laplace's and Poisson equations. The Uniqueness Theorem. Potential and Electric Field of a dipole. Force and Torque on a dipole.</p> <p>Electrostatic energy of system of charges. Electrostatic energy of a charged sphere. Conductors in an electrostatic Field. Surface charge and force on a conductor. Capacitance of a system of charged conductors. Parallel-plate capacitor. Capacitance of an isolated conductor. Method of Images and its application to: (1) Plane Infinite Sheet and (2) Sphere.</p>	
March	<p>Dielectric Properties of Matter: Electric Field in matter. Polarization, Polarization Charges. Electrical Susceptibility and Dielectric Constant. Capacitor (parallel plate, spherical, cylindrical) filled with dielectric. Displacement vector D. Relations between E, P and D. Gauss' Law in dielectrics.</p> <p>Magnetic Field: Magnetic force between current elements and definition of Magnetic Field B. Biot-Savart's Law and its simple applications: straight wire and circular loop. Current Loop as a Magnetic Dipole and its Dipole Moment (Analogy with Electric Dipole). Ampere's Circuital Law and its application to (1) Solenoid and (2) Toroid.</p>	<p>□ Electricity, Magnetism & Electromagnetic Theory, S.Mahajan and Choudhury, 2012, Tata McGraw</p> <p>□ Electricity and Magnetism, Edward M. Purcell, 1986 McGraw-Hill Education</p> <p>□ Introduction to Electrodynamics, D.J. Griffiths, 3rd Edn., 1998, Benjamin Cummings.</p> <p>□ Feynman Lectures Vol.2, R.P.Feynman, R.B.Leighton, M.Sands, 2008, Pearson Education</p>

<p>April</p>	<p>Properties of B: curl and divergence. Vector Potential. Magnetic Force on (1) point charge (2) current carrying wire (3) between current elements. Torque on a current loop in a uniform Magnetic Field.</p> <p>Magnetic Properties of Matter: Magnetization vector (M). Magnetic Intensity(H). Magnetic Susceptibility and permeability. Relation between B, H, M. Ferromagnetism. B-H curve and hysteresis.</p> <p>Electromagnetic Induction: Faraday's Law. Lenz's Law. Self Inductance and Mutual Inductance. Reciprocity Theorem. Energy stored in a Magnetic Field. Introduction to Maxwell's Equations. Charge Conservation and Displacement current.</p>	<p>□ Electricity and Magnetism, J.H.Fewkes & J.Yarwood. Vol.I, 1991, Oxford Univ. Press.</p>
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