

DEPARTMENT OF SCIENCE

Session 2026-27

PHYSICS

CLASS: XI

MONTH	CHAPTER	EXPECTED LEARNING OUTCOMES	PEDAGOGICAL APPROACH (TEACHING METHODS/ STRATEGIES)	ASSESSMENT TOOLS	RUBRICS	ART INTEGRATION	ICT INTEGRATION
JULY	BASIC MATHEMATICAL TOOLS	Basic Calculus, binomial theorem, trigonometric relations	Constructivist, inquiry	assignment problem solving	Content Neatness completion		
	UNIT AND MEASUREMENT	Need for measurement: Units of measurement; systems of units; SI units, fundamental and derived units. Significant figures. Dimensions of physical quantities, dimensional analysis and its applications.	Constructivist, reflective, inquiry	classroom discussion problem solving assignment experiment	Concept Presentation application		
	MOTION IN A STRAIGHT LINE	Motion in a Straight Line- Frame of reference, Motion in a straight line. Elementary concepts of differentiation and Integration for describing motion, uniform and non- uniform motion, and instantaneous velocity, uniformly accelerated motion, velocity - time and position-time graphs. Relations for uniformly accelerated motion (graphical treatment).	Constructivist, reflective, inquiry	Problem based classroom discussion	Concept Presentation Application	Explain various types of motion in one dimension by plotting Graphs	
AUGUST	FIRST PERIODIC ASSESSMENT						

	MOTION IN A PLANE	Motion in a Plane Scalar and vector quantities; position and displacement vectors, general vector and their notations; equality of vectors, multiplication of vectors by a real number; addition and subtraction of vectors Unit vector; resolution of a vector in a plane, rectangular components, Scalar and Vector product of vectors. Motion in a plane uniform velocity and uniform acceleration, projectile motion, uniform circular motion	Constructivist, reflective, inquiry based	Brain storming Problem based classroom discussion assignment	Content Neatness completion		Module-projectile and circular motion
	LAWS OF MOTION	Concept of force, Inertia, Newton's first law of motion; momentum and Newton's second law of motion; impulse; Newton's third law of motion. Law of conservation of linear momentum and its applications. Equilibrium of concurrent forces, Static and kinetic friction, laws of friction, rolling friction, lubrication. Dynamics of uniform circular motion: Centripetal force, examples of circular motion (vehicle on a level circular road, vehicle on a banked road).	Constructivist, reflective, inquiry based	Brain storming Problem based classroom discussion assignment	Content Neatness completion	Share daily life examples on Newton's three laws of Motion.	
SEPTEMBER	WORK ENERGY AND POWER	Work done by a constant force and a variable force; kinetic energy, work energy theorem, power. Notion of potential energy, potential energy of a spring, conservative forces: non-conservative forces, motion in a vertical circle; elastic and inelastic collisions in one and two dimensions.	Constructivist, reflective, Inquiry based	Brain storming classroom discussion problem solving	Concept Sequencing accuracy	Make simple models to show law of conservation of mechanical energy	

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	MOTION OF SYSTEM OF PARTICLES AND ROTATION	System of Particles and Rotational Motion Centre of mass of a two-particle system, momentum conservation and Centre of mass motion. Centre of mass of a rigid body; centre of mass of a uniform rod. Moment of a force, torque, angular momentum, law of conservation of angular momentum and its applications. Equilibrium of rigid bodies, rigid body rotation and equations of rotational motion, comparison of linear and rotational motions. Moment of inertia, radius of gyration, values of moments of inertia for simple geometrical objects (no derivation)	Constructivist, reflective inquiry based	Brain storming classroom discussion problem solving	Concept Sequencing Accuracy		
	GRAVITATION	Gravitation, Newton's universal gravitational law, Kepler's laws, acceleration due to gravity and its variation with altitude and depth, gravitational field, potential and potential energy, escape velocity, orbital velocity, satellites	Constructivist reflective, inquiry based	Brain storming classroom discussion problem solving experiment	Concept Presentation Application		
	MID TERM EXAMINATION						
OCTOBER	MECHANICAL PROPERTIES OF SOLIDS	Mechanical Properties of Solids: Elastic behaviour, Stress-strain relationship, Hooke's law, Young's modulus, bulk modulus, shear modulus of rigidity, Poisson's ratio; elastic energy.	Constructivist reflective, inquiry	Brain storming classroom discussion problem solving	Concept Presentation Application		three modulus of elasticity
	MECHANICAL PROPERTIES OF FLUIDS	Applications (hydraulic lift and hydraulic brakes), effect of gravity on fluid pressure. Viscosity, Stokes' law, terminal velocity, streamline and turbulent flow, critical velocity, Bernoulli's theorem and its applications. Surface energy and surface tension, angle of contact, excess of pressure across a curved surface, application of surface tension ideas to drops, bubbles and capillary rise.	Constructivist reflective, inquiry based	Brain storming classroom discussion	Concept Presentation Application	Make a simple model of venturimeter atomizer	Modules on hydrostatics and stream lined and turbulent flow

NOVEMBER	OSCILLATION	Periodic motion - time period, frequency, displacement as a function of time, periodic functions and their application. Simple harmonic motion (S.H.M) and its equations of motion; phase; oscillations of a loaded spring- restoring force and force constant; energy in S.H.M. Kinetic and potential energies; simple pendulum derivation of expression for its time period..	Constructivist reflective, inquiry	Brain storming classroom discussion problem solving experiment	Concept Presentation Application		
	SECOND PERIODIC ASSESSMENT						
DECEMBER	WAVE MOTION	Transverse and longitudinal waves, speed of travelling wave, displacement relation for a progressive wave, principle of superposition of waves, reflection of waves, standing waves in strings and organ pipes, fundamental mode and harmonics, Beats.	Constructivist reflective, inquiry based	Brain storming classroom discussion problem solving	Concept Presentation Application		Module on wave motion
	THERMAL PROPERTIES OF MATTER	Heat, temperature, thermal expansion; thermal expansion of solids, liquids and gases, anomalous expansion of water; specific heat capacity; Cp, Cv - calorimetry; change of state - latent heat capacity. Heat transfer- conduction, convection and radiation, thermal conductivity, qualitative ideas of Blackbody radiation, Wein's displacement Law, Stefan's law .	Constructivist, reflective, inquiry based	Brain storming classroom discussion problem solving assignment	content Neatness completion	Draw diagrams	
JANUARY 27	THERMODYNAMICS	Thermal equilibrium and definition of temperature zeroth law of thermodynamics, heat, work and internal energy. First law of thermodynamics, Second law of thermodynamics: gaseous state of matter, change of condition of gaseous state isothermal, adiabatic, reversible, irreversible, and cyclic processes. .	Constructivist, reflective inquiry based	Brain storming classroom discussion problem solving assignment	content Neatness completion		Video Carnot's cycle

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	KINETIC THEORY	Equation of state of a perfect gas, work done in compressing a gas. Kinetic theory of gases- assumptions, concept of pressure. Kinetic interpretation of temperature; r.m.s speed of gas molecules; degrees of freedom, law of equipartition of energy (statement only) and application to specific heat capacities of gases; concept of mean free path, Avogadro's number.	Constructivist, reflective inquiry based	Brain storming classroom discussion problem solving assignment	content Neatness completion		
FEB 27	FINAL PRACTICAL EXAMINATION ANNUAL EXAMINATION						

SIGNATURE OF HOD _____

[MANISHA MAHENDRA]

SIGNATURE OF PRINCIPAL _____

[ANJU SHARMA]

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Session 2026-27

CLASS: XII

MONTH	CHAPTER	EXPECTED LEARNING OUTCOMES	PEDAGOGICAL APPROACH (TEACHING METHODS/ STRATEGIES)	ASSESSMENT TOOLS	RUBRICS	ART INTEGRATION	ICT INTEGRATION
APRIL	ELECTRIC CHARGES AND FIELDS	Electric charges and fields involve concepts like conservation of charge and Coulomb's law for forces between point charges. Key topics include superposition of forces, electric fields from point charges and dipoles, torque on dipoles, electric flux, and Gauss's theorem for various charge distributions.	Constructive and collaborative approach Explanation through examples and using various TLMS. Classroom discussion	Asking questions based on application of topic	Content, accuracy	Diagrams	Module on electrostatic
	ELECTROSTATIC POTENTIAL AND CAPACITANCE	Electrostatic Potential and Capacitance Electric potential, potential difference, electric potential due to a point charge, a dipole and system of charges; equipotential surfaces, electrical potential energy of a system of two-point charges and of electric dipole in an electrostatic field. Conductors and insulators, free charges and bound charges inside a conductor. Dielectrics and electric polarization	Constructive and collaborative approach Explanation through examples and using various TLMS Classroom discussion	Asking questions and numerical Problems	Approach Formula Steps Unit	Draw equipotential surfaces	Module on electric potential and capacitance
JULY	ELECTRIC POTENTIAL AND CAPACITANCE	capacitors and capacitance, combination of capacitors in series and in parallel, capacitance of a parallel plate capacitor with and without dielectric medium between the plates, energy stored in a capacitor (no derivation, formulae only).	Constructive, Inquiry based, Integrative	Lab Activity Question answer session Solving numerical	Concept Presentation Application	Diagram	Module on current electricity and its applications

CURRENT ELECTRICITY	Current Electricity Electric current, flow of electric charges in a metallic conductor, drift velocity, mobility and their relation with electric current; Ohm's law, V-I characteristics (linear and non-linear), electrical energy and power, electrical resistivity and conductivity, temperature dependence of resistance, Internal resistance of a cell, potential difference and emf of a cell, combination of cells in series and in parallel, Kirchhoff's rules, Wheatstone bridge.	Constructive, Inquiry based, Integrative	Lab Activity Question answer session Solving numerical	Concept Presentation Application	Diagram	Module on current electricity and its applications
MOVING CHARGES AND MAGNETISM	Moving Charges and Magnetism Concept of magnetic field, Oersted's experiment. Biot - Savart law and its application to current carrying circular loop. Ampere's law and its applications to infinitely long straight wire. Straight solenoid (only qualitative treatment), force on a moving charge in uniform magnetic and electric fields. Force on a current-carrying conductor in a uniform magnetic field,.	Constructive, Inquiry based, Integrative	Asking questions Demonstration Discussion Application based questions	Concept Presentation Application	diagrams	Module on magnetic effect

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AUGUST	MAGNETISM AND MATTER	Force on a current-carrying conductor in a uniform magnetic field, force between two parallel current-carrying conductors- definition of ampere, torque experienced by a current loop in uniform magnetic field; Current loop as a magnetic dipole and its magnetic dipole moment, moving coil galvanometer- its current sensitivity and conversion to ammeter and voltmeter. Magnetism and Matter Bar magnet, bar magnet as an equivalent solenoid (qualitative treatment only), magnetic field intensity due to a magnetic dipole (bar magnet) along its axis and perpendicular to its axis	Constructivist, inquiry , Reflective	Oral Drill Pre Periodic Test Group activity Numerical Class Test	Content Effective formula calculation	Prepare a chart of formulae	
	ELECTRO-MAGNETIC INDUCTION	Electromagnetic Induction Electromagnetic induction; Faraday's laws, induced EMF and current; Lenz's Law, Self and mutual induction.	Inductive – Deductive	Lab activity	Concept Presentation Application	Drawing diagrams	PPT on various Topics (let's speak)
FIRST PERIODIC ASSESSMENT							
SEPTEMBER	ALTERNATING CURRENT	Alternating Current Alternating currents, peak and RMS value of alternating current/voltage; reactance and impedance; LCR series circuit (phasors only), resonance, power in AC circuits, power factor, wattless current. AC generator, Transformer.	Inquiry based Constructivist		Approach Steps Accuracy	Role play (let's speak)	Module on AC

	ELECTRO MAGNETIC WAVES	Electromagnetic Waves Basic idea of displacement current, Electromagnetic waves, their characteristics, their transverse nature (qualitative idea only). Electromagnetic spectrum (radio waves, microwaves, infrared, visible, ultraviolet, X-rays, gamma rays) including elementary facts about their uses.	Deductive Reflective	Lab Activity Assignment	Concept Presentation Application		PPT
	RAY OPTICS	Reflection of light, spherical mirrors, mirror formula, refraction of light, total internal reflection and optical fibers, refraction at spherical surfaces, lenses, thin lens formula, lens maker's formula, magnification, power of a lens, combination of thin lenses in contact, refraction of light through a prism.	Discussion and Explanation	Worksheet Numerical Lab Activity	Concept Formula calculation setting of instruments, accuracy in results	Ray diagrams	PPT Module on ray optics
	MID TERM EXAMINATION						
	OPTICAL INSTRUMENTS	Optical instruments: Microscopes and astronomical telescopes (reflecting and refracting) and their magnifying powers.	Constructivist, Reflective	Oral questions numerical	Concept Application		Module theory
OCTOBER	WAVE OPTICS	Wave Optics Wave optics: Wave front and Huygen's principle, reflection and refraction of plane wave at a plane surface using wave fronts. Proof of laws of reflection and refraction using Huygen's principle. Interference, Young's double slit experiment and expression for fringe width (No derivation final expression only), coherent sources and sustained interference of light, diffraction due to a single slit, width of central maxima (qualitative treatment only).	Constructivist, Reflective	Oral questions numerical	Concept Application		Module on Huygens wave theory

NOVEMBER	SEMICONDUCTOR ELECTRONICS MATERIALS DEVICES AND SIMPLE CIRCUITS	Semiconductor Electronics: Materials, Devices and Simple Circuits Energy bands in conductors, semiconductors and insulators (qualitative ideas only) Intrinsic and extrinsic semiconductors- p and n type, p-n junction Semiconductor diode - I-V characteristics in forward and reverse bias, application of junction diode - diode as a rectifier.	Lecture, Classroom Discussion Constructivist approach Discussion and explanation taking examples of daily life	Worksheet Lab Activity Oral questions	Concept Presentation Application	Draw logic gates	Module on Boolean algebra
	DUAL NATURE OF RADIATION AND MATTER	Dual Nature of Radiation and Matter Dual nature of radiation, Photoelectric effect, Hertz and Lenard's observations; Einstein's Photoelectric equation- particle nature of light. Experimental study of photoelectric effect Matter waves-wave nature of particles, de-Broglie relation.	Constructivist, and reflexive approach	Paper and Pen Test		Draw diagrams	Module on Dual Nature of Radiation and Matter
	ATOMS	Atoms Alpha-particle scattering experiment; Rutherford's model of atom; Bohr model of hydrogen atom, Expression for radius of nth possible orbit, velocity and energy of electron in nth orbit, hydrogen line spectra (qualitative treatment only).	Constructivist, and reflexive approach	Worksheet Numerical and oral questions	Concept Presentation Application	Energy level diagram	
	NUCLEI	Nuclei Composition and size of nucleus, nuclear force Mass-energy relation, mass defect; binding energy per nucleon and its variation with mass number; nuclear fission, nuclear fusion.	Constructivist, and reflexive approach	Worksheet Numerical and oral questions	Approach steps		
DEC	FIRST PRE BOARD EXAMINATION						

JAN 27	SECOND PRE BOARD EXAMINATION FINAL PRACTICAL EXAMINATION
FEB & MARCH 27	ANNUAL EXAMINATION

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