

MONTHWISE SYLLABUS CLASS XI

SUBJECT – PHYSICS (042)

MONTH	SYLLABUS
APRIL	UNIT 1: <u>PHYSICAL WORLD AND MEASUREMENT</u> Physics- Scope and excitement; Nature of physical laws; Physics, technology and society. Need for measurement; Units of measurement; systems of units; SI units, fundamental and derived units. Length, mass and time measurements; accuracy and precision of measuring instruments; significant figures. Experiment: To find the volume of a given cylinder with the help of Vernier Callipers.
MAY	PHYSICAL WORLD AND MEASUREMENT Dimensions of physical quantities, dimensional analysis and its applications. UNIT II <u>KINEMATICS</u> Frame of reference. Motion in a straight line: Position-time graph, speed and velocity. Uniform and non-uniform motion, speed and velocity-average and instantaneous velocity. Uniformly accelerated motion, velocity-time graph and position-time graph, Experiment: To calculate the volume of a given beaker with the help of Vernier Callipers. <u>KINEMATICS</u> Equations for uniformly accelerated motion (graphical treatment only). Simple introduction to elementary concepts of differentiation and integration for describing motion. Scalar and vector quantities: vectors, notation, equality of Unit vector; Resolution of a vector in a plane – rectangular components. Motion in a Plane. Projectile motion, circular motion. Experiment: To calculate of a given wire by using screw Gauge. Activity: To make a paper scale of least count 0.2 cm and 0.5 cm.
JULY	UNIT III: <u>LAWS OF MOTION</u> 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 motion. Law of conservation of linear momentum and its applications.

	Equilibrium of concurrent forces. Static and kinetic friction, laws of friction, rolling friction. Dynamic of uniform circular motion: Centripetal force, examples of circular motion (vehicle on level circular road, vehicle on banked road). Experiment: To calculate the acceleration due to gravity using simple pendulum. Activity: To find atmospheric pressure by using Fortin's Barometer.
AUGUST	UNIT IV: WORK ENERGY AND POWER Scalar product of vectors. Work done by a constant force and variable force; Kinetic energy, work-energy theorem, power. Potential energy, potential energy of a spring, conservative forces: conservation of mechanical energy (kinetic and potential energies); non-conservative force: elastic collisions and elementary idea of inelastic collisions. Experiment: To find the weight of a given body by using parallelogram method. Activity: To verify the conservation law of Energy.
SEPTEMBER	UNIT-V MOTION OF SYSTEM OF PARTICLES AND RIGID BODIES Centre of mass of a two-particle system, centre of rigid bodies. Momentum conservation and motion centre of mass. Vector product of vectors; moment of a force, torque, angular momentum, conservation of angular momentum with some examples. Equilibrium of rigid bodies, rigid body rotation and equations of rotational motion, comparison of linear and rotational motions; Moment of inertia, radius of gyration. Moments of inertia for simple geometrical objects(No derivation). Only statement of parallel and perpendicular axes theorems and their applications. UNIT VI: GRAVITATION Keplar 's laws of planetary motion. The universal law of gravitation. Acceleration due ot gravity and its variation with altitude and depth. Gravitational potential energy; gravitational potential. Escape velocity. Orbital velocity of a satellite. Geo-stationary satellites. Experiment: To calculate the spring constant by using the method of oscillation.

OCTOBER	UNIT VII: PROPERTIES OF BULK MATTER Elastic behaviour; stress-strain relationship, Hooke's law, Young's modulus, bulk modulus, shear, modulus of rigidity. Pressure due to a fluid column; Pascal's law and its applications (hydraulic lift and hydraulic brakes). Effect of gravity on fluid pressure. Viscosity, Stokes' law, terminal velocity, Reynold's number, streamline and turbulent flow; Bernoulli's theorem and its applications. Surface energy and surface tension, angle of contact, application of surface tension to drops, bubbles and capillary action. Heat, temperature thermal expansion; specific heat capacity – calorimetry; change of state-latent heat. Heat transfer – conduction, convection and radiation, thermal conductivity, Newton's law of cooling Experiment: To study the bending of bimetallic strip on heating.
NOVEMBER	UNIT-VIII: THERMODYNAMICS Thermal equilibrium and definition of temperature (zeroth law of thermodynamics). Heat, work and internal energy. First law of thermodynamics. Second law of thermodynamics: reversible and irreversible processes. Heat engines and refrigerators. <u>UNIT IX: KINETIC THEORY OF GASES</u> Equation of state of a perfect gas, work done on compressing a gas. Kinetic theory of gases – assumptions, concept of pressure. Kinetic energy and temperature; rms 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. Experiment: To find the coefficient of viscosity of a given liquid.
DECEMBER	UNIT- X : OSCILLATIONS AND WAVES Periodic motion –period, frequency, displacement as a function of time. Periodic functions. Simple harmonic motion (S.H.M) and its equation; phase; oscillations of spring-restoring force and force constant; energy in S.H.M. Kinetic and potential energies; simple pendulum-derivation of expression for its time period; free and forced (damped) oscillations (qualitative ideas only), resonance.

	Wave motion. Transversal and longitudinal waves. Displacement relation for a progressive wave. Reflection of waves, principle of superposition of waves, standing waves in string and organ pipes, fundamental mode and harmonics, Beats. Experiments: 1. To study the relationship between the temperature of a hot body and time by plotting a cooling curve. 2. To study the relation between frequency and length of a given wire under constant tension using Sonometer.
JANUARY	REVISION