

TOPIC	Content	LEARNING OBJECTIVES
Mathematical Tools	Binomial theorem , integral calculus, differential calculus, trigonometry	Students will be able to apply all the mathematical tools in solving numericals.
Kinematics	Instantaneous speed, average speed, instantaneous acceleration, average acceleration, uniform acceleration, s-t, v-t, a-t graphs, equations of method using graph and calculus method, free fall, relative velocity.	Students will be able to: express the motion of an object in terms of fundamental and derived quantities. ● describe the motion of an object travelling in a straight line or in one dimension. ● define position, displacement, distance, speed and velocity. ● define the concepts of instantaneous velocity and average velocity. ● define the concepts of instantaneous acceleration and average acceleration. ● calculate the position, velocity, and acceleration of an object moving in a straight line. ● describe motion of an object in a straight line with constant acceleration with the help of s-t, v-t and a-t graphs. ● derive equations of motion for a uniformly accelerated motion using graph and calculus method. ● describe free fall in one dimension when

		it undergoes constant acceleration due to gravity. describe relative motion and hence calculate relative velocity of an object with respect to the other. solve numerical problems to calculate position, velocity and acceleration of the body. draw and interpret the graphs for uniform and non-uniform motion. apply the kinematic equations of motion in various situation based problems.
Motion in plane	Cartesian coordinates, vector and its types, vector representation, resolution of a vector in plane, triangle and parallelogram law of vector addition, equilibrium, relative velocity and equations of motion in two and three dimensions, projectile motion.	perform vector algebra ● describe the Cartesian coordinate system in two and three dimension systems. ● explain the sum of vectors using head to tail rule. ● define resultant, negative, unit, null, position and equal vectors ● resolve a vector into its rectangular components. ● determine the sum of vectors using triangle law of addition and parallelogram law of addition. ● define equilibrium of vectors. ● rewrite equations of motion in two and three dimensions. ● Solve numerical problems on

		equations of motion in two and three dimensions. • Determine relative velocity for motion in two and three dimensions • define projectile, projectile motion and trajectory of projectile. derive the relation for time of flight, maximum height and horizontal range of a projectile.
Laws of Motion	(1)Intuitive 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. (2)Equilibrium of concurrent forces. Static and kinetic friction, laws of friction, rolling friction, lubrication. (3)Dynamics of uniform circular motion: Centripetal force, examples of circular motion (vehicle on level circular road, vehicle on banked road).	The Objective of this chapter is to make the student aware of Dynamics of circular which solves many problems in our society. Learners will be able to understand the Concept of force along all the three Newton's laws of motion. Learners will be able to understand the Concept of concurrent forces and dynamics of circular motion
Work, Energy, Power	(1)Work done by a constant force and a variable force; kinetic energy, work-energy theorem, power.	The Objective of this chapter is to clear the concept Work, Energy and Power and its application in our daily life which helps us t

	(2) Notion of potential energy, potential energy of a spring, conservative forces; conservation of mechanical energy (kinetic and potential energies); non-conservative forces; motion in a vertical circle, elastic and inelastic collisions in one and two dimensions.	approach and to solve the Problem technically. Learners will be able to understand the Basic concept of work done along with its mathematical analysis and Classification of work. Learners will be able to understand the Concept of mechanical energy, different forms energy and its conservation with necessary mathematical analysis. Learners will be able to understand the Mechanical power along with its Practical and SI units.
Gravitation	(1) Kepler's laws of planetary motion. The universal law of gravitation. Acceleration due to gravity and its variation with altitude and depth. (2) Gravitational potential energy; gravitational potential. Escape velocity, orbital velocity of a satellite. Geostationary satellites.	To make the learners to understand the concept of gravitational force and gravity with laws of planetary motion and detailed mathematical analysis of acceleration due to gravity above and below the surface of earth. To make the learners to understand the concept of elasticity and rigidity of a body with stress- strain analysis and applying it to solve real life problems. Learners will be able to understand Concept of gravitational force between two bodies and its conservative nature. Learners will be able to understand the Concept of variation of acceleration due to gravity with height and depth.