CURRICULUM DEVELOPMENT PLAN: Dr. V. Bhasker Raj

B.Sc. Physical Science Ist Semester (Odd Semester, 2025-2026)

Paper: Mechanics; UPC: 2222511101; Credit: 04 (Lecture-02, Prac.-02)

Content	Allocation of Lectures	Month-wise Schedule followed	Tutorial Assignment/ presentation etc
Unit 1: Review of vectors and ordinary differential equation Gradient of a scalar field, divergence and curl of vectors field, polar and axial vectors Second order homogeneous ordinary differential equations with constant coefficients (Operator Method Only).	04	August	• Syllabus Overview • Reference Books • Problem-solving
Unit 2: Fundamentals of Dynamics Dynamics of a system of particles, centre of mass, determination of centre of mass for discrete and continuous systems having spherical symmetry Conservation of momentum and energy, Conservative and non-Conservative forces, work – energy theorem for conservative forces, force as a gradient of potential energy. Particle collision (Elastic and in-elastic collisions)	07	September	• Derivations • Problem-solving • Students' difficulties
Unit 3: Rotational Dynamics and Oscillatory Motion Angular momentum, torque, conservation of angular momentum, Moment of inertia, Theorem of parallel and perpendicular axes (statements only). Calculation of moment of inertia of discrete and continuous objects (1-D and 2-D). Idea of simple harmonic motion, differential equation of simple harmonic motion and its solution, Motion of simple pendulum, damped harmonic oscillator	08	October	• Derivations • Problem-solving • Students' difficulties • Assignments
Unit 4: Gravitation Newton's Law of Gravitation, Motion of a particle in a central force field, Kepler's Laws (statements only)	03	October	• Derivations • Problem-solving • Students' difficulties

			• Class Test
Unit 5: Special Theory of Relativity Frames of reference, Galilean transformations, inertial and non-inertial frames, Michelson Morley's Experiment, postulates of special theory of relativity, length contraction, time dilation, relativistic transformation of velocity, relativistic variation of mass	08	November	• Derivations • Problem-solving • Students' difficulties • Previous year's Question Papers