Semester-III		
Paper Code	**Theory**	**Credits:03**
303101	**Title: Mechanics-II**	**45 L**
Unit 1	**Kinematics and Dynamics**	**15 L**
	Motion in One Dimension: Average Velocity, Instantaneous Velocity, Analysis Models—The Particle Under Constant Velocity, Acceleration, Motion Diagrams, The Particle Under Constant Acceleration, Freely Falling Objects. ***Motion in Two Dimensions****:* The Position, Velocity, and Acceleration Vectors, Two-Dimensional Motion with Constant Acceleration, Projectile, The Particle in Uniform Circular Motion, Tangential and Radial Acceleration, Relative Velocity Ref.: SJ1: Chapters 1,2,3. ***Rotational Motion:*** Angular Position, Speed, and Acceleration, Rotational Kinematics: The Rigid Object Under Constant Angular Acceleration, Relations Between Rotational and Translational Quantities, Rotational Kinetic Energy, Torque and the Vector Product, The Rigid Object in Equilibrium, The Rigid Object Under a Net Torque, Angular Momentum, Conservation of Angular Momentum, Processionals Motion of Gyroscope, Rolling motion of rigid objects. Ref.: SJ1: Chapter 10 ***Oscillatory Motion:*** Motion of a Particle Attached to a Spring, Energy Considerations in Simple Harmonic Motion, The Simple Pendulum, The Physical Pendulum,Damped Oscillations,Forced Oscillations. Ref.: SJ1: Chapter 12	

Unit 2		**15 L**
	Applications of Newton's Laws: Forces of Friction, Newton's Second Law Applied to a Particle in Uniform Circular Motion, Non uniform Circular Motion, Motion in the Presence of Velocity-Dependent Resistive Forces, The Fundamental Forces of Nature. ***Energy and Energy Transfer:*** Systems and Environments, Work Done by a Constant force, The Scalar Product of Two Vectors, Work Done by a Varying Force, Kinetic Energy and the Work-Kinetic Energy Theorem, The Non isolated System, Situations Involves Kinetic Friction, Power. Ref.: SJ1: Chapters 4, 5, 6. ***Mechanical Waves:*** Propagation of a Disturbance, The Wave Model, The Travelling Wave, The Speed of Transverse Waves on Strings, Reflection and Transmission of Waves, Rate of Energy Transfer by Sinusoidal Waves on Strings,Sound waves,The Doppler Effect. Ref.: SJ1: Chapter 13. ***Fluid Mechanics:*** Pressure, Variation of Pressure with Depth, Pressure Measurements, Buoyant Forces and Archimedes's Principle, Fluid Dynamics,Streamlines and the Continuity Equation for Fluid, Bernoulli's Equation, Other Applications of Fluid Dynamics. Ref.: SJ1: Chapter 15.	
Unit 3		**15 L**
	Potential Energy Potential Energy of a System, The Isolated System, Conservative and Non conservative Forces, Conservative Forces and Potential Energy, The Non isolated System in Steady State, Potential Energy for Gravitational and Electric Forces, Energy Diagrams and Stability of Equilibrium. Ref.: SJ1: Chapters 7 ***Relativity:*** The Principle of Newtonian Relativity, The Michelson-Morley Experiment, Einstein's Principle of Relativity, Consequences of Special Relativity, The Lorentz Transformation Equations, Relativistic Momentum and the Relativistic Form of Newton's Laws, Relativistic Energy, Mass and Energy, General Relativity. Ref.: SJ1: Chapter 9.	

	Gravity, Planetary Orbits, and the Hydrogen Atom: Neon's Law of Universal Gravitation Revisited Structural Models, Kepler's Laws, Energy Considerations in Planetary and Satellite Motion, Atomic Spectra and the Bohr Theory of Hydrogen. Ref.: SJ1: Chapter 11.	

References:

Physics: A Calculus based approach (Volume I) by Serway and Jewett (SJ1)

Additional References:

1) Physics: (Volumes I and II) H. C. Verma.
2) Physics: (Volumes I and II) by Resnick, Halliday and Krane- Wiley India Edition (5^{th} Edition)