

Semester II

Subject Name: Classical Mechanics	Duration: 6 hrs /Cycle
Subject Code: 2PGM3 (2015 on)	Credit : 4
Unit I: Survey of Elementary Principle: Introduction - mechanics of a particle – mechanics of a system of particles – constraints’ - D’Alembert’s principle and Lagrange’s equation.	
Unit II: Survey of Elementary Principle (Continued): Velocity dependent potentials and the dissipation function- simple applications of the lagrangian formulation – some techniques of the calculus of variations.	
Unit III: Lagrange’s equation and Hamilton’s equation: Derivation of Lagrange’s equation from Hamilton’s principle – extension of Hamilton’s principle to non –Holonomic systems – Advantages of a variational principle formulation – conservation theorems and symmetry properties.	
Unit IV: The two – body central force theorem: Reduction to the equivalent one-body problem – the equation of motion and first integrals – the equivalent one-dimensional problem and classification of orbits – the virial theorem.	
Unit V: Kepler problem: The differential equation for the orbit and integrable power-law potentials – conditions for closed orbits (Betrand’s theorem) – the Kepler problem - Inverse square law of force - The motion in time in the Kepler problems – the Laplace -Runge-Lenz vector.	

Text Book: Classical Mechanics by Herbert Goldstein, 3rd edition, Pearson New International Edition (2001).

Chapters: 1, 2, 3(3.1-3.9).

Reference Books: 1. Classical Mechanics by K. Sankara Rao, PHI (2005).

2. Classical Mechanics by J. C. Upadhyana, Reprint 2009, Himalaya Publishing House.