



MANIPAL UNIVERSITY
JAIPUR

School of Basic Sciences

Department of Mathematics and Statistics

Course Hand-out

DYNAMICS | MA1412 | 4 Credits | 3 1 0 4

Session: Jan – June 2018 | Faculty: Dr. Reema Jain | Class: B. Sc.

COURSE OUTCOMES: At the end of the course, students will be able to

- [1412.1] Understand the basic terms for the description of the motion of particles in a straight line and in a plane and it will hone their skills.
- [1412.2] Solve the problems relating to the Simple harmonic motion & motion of a projectile in the absence of air resistance.
- [1412.3] Understand the basic concepts of force, mass and acceleration, of work and energy and of impulse and momentum.
- [1412.4] Demonstrate the ability to resolve the problems in one dimension that involve one or more of the forces of gravity, friction and air resistance
- [1412.5] Understand the orbital motion of planets in a lucid way and it will improve their employability.

A. SYLLABUS

Kinematics: Radial, Transverse, tangential, normal velocities and accelerations. **SHM:** Repulsion from a fixed point, Motion under inverse square Law, Hooke's law, Horizontal and vertical elastic strings. **Projectiles:** Motion of a projectile and its trajectory, Time of flight, Horizontal range, Greatest height, Range and time of flight up and down an inclined plane. **Work Energy and Impulse:** Conservation of linear momentum, Principle of conservation of energy. **Uniform circular motion:** Motion on a smooth curve in a vertical plane, Motion on the inside of a smooth vertical circle, Cycloidal motion. **Motion in the resisting medium:** Resistance varies as velocity and square of velocity. Central orbits. Kepler's laws of planetary motion.

B. TEXT BOOKS:

1. A. S. Ramsey, Dynamics (Part I), The English Language Book Society and Cambridge University Press, 1962.
2. M. Ray, G. C. Sharma, A Text Book on Dynamics, S. Chand & Co., 2006.
3. M. D. Raisinghania, Dynamics, S. Chand & Co., 2015.
4. W. H. Besant, A. S. Ramsey, A Treatise on Hydromechanics Part I, G. Bell and Sons Ltd., London, 1960.
5. P. L. Meyer, Introduction to probability and statistical applications, IBH.
6. S. S. Sastry, Introductory methods of Numerical analysis, PHI.

