FACULTY OF SCIENCE

M.Sc. Mathematics (SEM-II)

In Effect from Academic Year 2016-17

Subject Code:1SC2040206	Subject Title: APPLIED CLASSICAL MECHANICS

Course Objective:

- How to use Lagrangian formulation of two body central force problem solve advanced problems involving Equations of motion and first integral.
- How to use Generalized coordinates for translation and other advanced mathematics in the solution of the problems Eulerian angles as rotational generalized coordinates, Infinitenisin of rotations.
- How to use Introduction to nonlinear dynamics and chaos.

Teaching scheme (hours) per week		Credit			Theory Marks		Practical Marks		Total
Theory	Tutorial	Theory	Practical	Total	Uni. Assessment	Cont. Assessment	Uni. Assessment	Cont. Assessment	
3	1	4	-	4	60	40	--	--	100

Subject Contents			
Unit. No	Topic	Total Hours	Weight (%)
1	Lagrangian formulation of two body central force problem, Equations of motion and first integral, Kepler problem, Derivation of laws of planetary motions.	16	25
2	Kinematics of rigid bodies, Degrees of freedom, Generalized coordinates for translation, Rotation group of a rigid body, Euler's theorem, Eulerian angles as rotational generalized coordinates, Infinitenisin of rotations.	16	25
3	Dynamics of rigid bodies, Angular momentum and kinetic energy of rotating rigid body, Moment of inertia, Euler's equation of motion, Torque free motion of symmetric top, Precession and nutation.	16	25
4	Rotating coordinate axes, Coriolis force, Small oscillations. Introduction to nonlinear dynamics and chaos.	16	25

Course Outcome:

On successful completion of the course, students should be able to

- Apply the Variational principle to real physical situations using the Applied Classical Mechanics.

List of References:

- "Classical Mechanics with Introduction to Nonlinear Oscillations and Chaos", Bhatia, Narosa Publ.
- "Classical Mechanics", C. R. Mondal, Prentice Hall of India Pvt. Ltd.
- "Classical Mechanics", Tai L. Chow, John Wiley and Sons Inc.
- "Classical Mechanics-System of Particles and Hamiltonian Dynamics", Walter greiner, Springer.
- "Classical Mechanics", Goldstein, H., Poole, C. and Safko, J., Pearson Education, Inc.