DEPARTMENT OF MATHEMATICS,
UNIVERSITY OF KARACHI,
Course Outline
MATH 402: MECHANICS

Course contents:

VECTOR ANALYSIS: Differentiation and integration of vectors, scalar and vector fields, gradient, divergence and curl, line, surface and volume integrals, theorems of Green, Gauss, Stoke (without proofs),and their applications.

STATICS: Composition of forces, equilibrium problems, moments and couples, centre of mass and gravity, friction, virtual work, flexible cables, catenaries.

DYNAMICS I: Galilean-Newtonian principle, inertial frames, Galilean transformations, kinematics, rectilinear motion with variable accelerations, simple harmonic motion, methods of dynamics, principles of energy and momentum.

DYNAMICS II: Motion of a projectile, orbital motion, moment of inertia, motion of a rigid body, plane impulsive motion Compound pendulum.

Books Recommended:

1. Ghori, Q. K., (Ed.), Introduction to Mechanics, West Pakistan Publishing Co. 1971.
2. Synge, J. L. and Griffith, Principles of Mechanics, McGraw Hill, Kogakusha, 1970.
3. Chorlton, F., Vector and Tensor Methods, Ellis Horwood, Chichest, 1977.
4. Chorlton, F., Mechanics, Van Nostrand, Reinhold, 1970.
5. Parakash, N., Differential Geometry, McGraw Hill, 1990.
6. Goetz, A., Introduction to Differential Geometry, Addison Wesley, 1970.
7. Sharma, S. C., Complex Integration, First Edition, Discovery Publishing House, New Delhi, 2007.
8. Meirovitch L., Methods of Analytical Dynamics, First edition, McGraw Hill, New York, 2007.