

Mathematics III (Semester 4)

Analytical Geometry

SECTION A:

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.

SECTION B:

Plane Curves: Curves in Cartesian plane, parametric representation, polar coordinates, tangents and normal, polar equation of a conic, Change of axes, general equation of second degree. Extreme values, singular points, asymptotes, curve tracing, length of arc, curvature, areas in rectangular and polar coordinates.

SECTION C:

Analytic Geometry in Three Dimensions: Direction cosine and direction ratios, equations of a line, angle between two lines, distance: of a point from a line, shortest distance between two lines, equation of a plane, angle between planes, area of a triangle and volume of tetrahedron, spherical and cylindrical polar coordinates, surfaces, intercepts, traces, symmetry, quadric surfaces, sphere, surface of revolution, ruled surfaces.

SECTION D:

Multivariate Calculus: Partial derivatives, geometrical meaning, equation of tangent plane and normal to surfaces,: chain rule, approximation with the help of differentials, homogeneous functions, Euler's theorem, evaluation of simple double and triple integrals, volume and surface areas of solids of revolutions.

Books Recommended:

Chorlton, F. (1970). Mechanics, Van Nostrand, Reinhold.

Chorlton, F. (1977). Vector and Tensor Methods, Ellis Horwood, Chichester.

Ghori, Q.K. (1971). (Ed.). Introduction to Mechanics, West Pakistan Publishing Co.

Goetz, A. (1970). Introduction to Differential Geometry, Addison Wesley.

Meirovitch, L. (2007). Methods of Analytical Dynamics, First edition, McGraw Hill, New York.

Parakash, N. (1990). Differential Geometry, McGraw Hill.

Sharma, S.C. (2007). Complex Integration, First Edition, Discovery Publishing House, New Delhi.

Synge, J.L. & Griffith (1970). Principles of Mechanics, McGraw Hill, Kogakusha.

Talpur, S., Yusuf, M. & Muhammad, N.M. (1971). Calculus and Amin, Analytic Calculus

Geometry with Analytic Ferozesons, Geometry, Ilmi Kitab Khana.

Thomas & Finney (2005). Calculus and Analytic Geometry, Addison Wesley.