

FC 101 : MATHEMATICS I

CREDITS : 4 (L = 4, T = 1, P = 0)

1. DIFFERENTIAL CALCULUS : Explanation and calculation of higher order derivatives (Standard results), Leibnitz's theorem (without proof) and its applications. Application to curvature of cartesian curves.

Taylor's series and Maclaurin's series expansion; Application to evaluate approximate values of functions and integrals, indeterminate forms, L'Hospital rule.

2. Tracing of cartesian, parametric and polar curves.

3. INTEGRAL CALCULUS : Reduction formula for

$$\int_0^{\pi/2} \sin^n x dx, \int_0^{\pi/2} \cos^n x dx \text{ and } \int_0^{\pi/2} \sin^n x \cos^m x dx \text{ where } n, m \text{ are both positive}$$

integers Application of integration to find area of a bounded region, length of a curve, volume and surface area of a solid of revolution (for Cartesian, parametric and polar curves).

4. COMPLEX NUMBERS :

De Moivre's theorem and its applications to simplification, extracting the roots of algebraic equations, expansions of power of trigonometric functions and trigonometric functions of multiple angles; circular and hyperbolic functions, inverse circular and inverse hyperbolic functions; Logarithm of complex quantity.

5. ANALYTICAL GEOMETRY :Coordinate Systems : Cartesian, Cylindrical Polar and Spherical polar systems. Transformation of Coordinates from one system to another system. Identification of Solids, Surfaces and Curves. Quadratic Surfaces and their equations : Cone, Cylinder.

Conicoids (ellipsoid, hyperboloid for one sheet and two sheets), paraboloid (elliptic, hyperbolic and cylindrical). Surfaces of revolution.

REFERENCE BOOKS :

1. Grewal B. S.

Higher Engineering Mathematics

Khanna Publishers

2. Wartikar P.N., Wartikar J.N.

Applied Mathematics Vol. I

Pune Vidyarthi Griha Prakashan

3. *Shanti Narayan*

Engineering Mathematics

S Chand and Co. Ltd.

4. *Vasavada Hema*

Analytic Geometry of two and three dimensions.

