Engineering Mathematics -1

(Syllabus)

UNIT I MATRICES

Eigenvalues and Eigenvectors of a real matrix – Characteristic equation – Properties of eigenvalues And eigenvectors – Statement and applications of Cayley-Hamilton Theorem – Diagonalization of Matrices – Reduction of a quadratic form to canonical form by orthogonal transformation – Nature of Quadratic forms.

UNIT II SEQUENCES AND SERIES

Sequences: Definition and examples – Series: Types and Convergence – Series of positive terms – Tests of convergence: Comparison test, Integral test and D'Alembert's ratio test – Alternating series – Leibnitz's test – Series of positive and negative terms – Absolute and conditional convergence.

UNIT III APPLICATIONS OF DIFFERENTIAL CALCULUS

Curvature in Cartesian co-ordinates – Centre and radius of curvature – Circle of curvature – Evolutes – Envelopes - Evolute as envelope of normals.

UNIT IV DIFFERENTIAL CALCULUS OF SEVERAL VARIABLES

Limits and Continuity – Partial derivatives – Total derivative – Differentiation of implicit functions – Jacobian and properties – Taylor's series for functions of two variables – Maxima and minima of Functions of two variables – Lagrange's method of undetermined multipliers.

UNIT V MULTIPLE INTEGRALS

Double integrals in Cartesian and polar coordinates – Change of order of integration – Area enclosed By plane curves – Change of variables in double integrals – Area of a curved surface - Triple integrals – Volume of Solids.