

**Unit I****Differential calculus**

Indeterminate form, Taylor's and Maclaurin's expansions, function of two or more independent variables, partial differentiation, homogeneous functions and Euler's theorem, Modified Euler's theorem total derivatives. Beta and Gamma function with their properties and duplication formula without proof.

**Unit II****Graph Theory**

Graphs, Definition & basic concepts of finite & infinite graph, Incidence & Degree, Isomorphism, Subgraph, Walk, Path & circuits, Operations on graphs, connected graph, Disconnected graph & components, Complete graph, Regular graph, Bipartite graph, Euler's graph, Hamiltonian paths & circuits, Weighted graphs, Applications, Directed & Undirected graphs, Connectivity of graphs. Definition & properties of trees, Pendent vertices in a tree, Distance between two vertices Centre, Radius & diameter of a tree, Rooted & binary trees, Representation of Algebraic structure by Binary trees, Binary search trees, Spanning trees & fundamental circuits.

**Unit III****Matrices**

Elementary row and column transformation, rank of matrix, Linear dependence, consistency of linear system of equations, characteristic equation, Cayley –Hamilton theorem, Eigen value, Eigen vector.

**Unit IV****Descriptive Statistics**

Mean, Median, Mode, Standard, deviation, Skewness, Fitting of Linear, Quadratic, Exponential and Logarithmic curves, Least squares method

**Suggested Readings**

- Differential Calculus by Narayan Shanti. 2004. S. Chand and Co. Ltd. New Delhi.
- Integral Calculus by Narayan Shanti. 2004. S. Chand and Co. Ltd. New Delhi.
- Higher Engineering Mathematics by Grewal B S. 2004. Khanna Publishers Delhi.
- A Text Book of Vector by Narayan Shanti. 2004. S. Chand and Co. Ltd. New Delhi.
- Rosen K.H., „Discrete Mathematics and Its Applications“, McGraw Hill, 6<sup>th</sup> Ed., 2006.
- Kolman B., Busby R.C. & Ross S., „Discrete Mathematical Structure Prentice Hall of India Pvt. Ltd, 5th Ed, 2003.
- Tremblay J. P. & Manohar R., „Discrete Mathematical structure with applications to computer science“, McGraw Hill, 1999.