Unit – I

Partial Differentiation

Functions of two or more variables – Partial derivatives – Homogeneous Functions – Euler's Theorem – Total Derivative – Change of Variables – Jacobians – Geometrical Interpretation: Tangent Plane and Normal to a Surface.

Unit – II

Application of Partial Differentiation

Taylor's Theorem for functions of two variables – Errors and Approximations – Total Differential – Maxima and Minima of functions of two variables – Lagrange's Method of Undetermined Multipliers – Differentiation Under the Integral Sign – Liebnitz's Rules.

Unit – III

Ordinary Differential Equations of First Order and First Degree

Formation of the ordinary differential equations (ODEs) – Solution of an ordinary differential equation – Equations of the First Order and First Degree – Linear Differential Equation – Bernoulli's Equation – Exact Differential Equations – Equations Reducible to exact equations.

Unit – IV

Applications of Differential Equations of First Order

Orthogonal Trajectories – Simple electric (LR & CR) Circuits – Newton's Law of Cooling – Law of Natural growth and decay.

Unit – V

Linear Differential Equations of Higher Order

Solutions of Linear Ordinary Differential Equations With Constant Coefficients – Rules for finding the Complimentary Functions – Rules for finding the particular integral – Method of variation of parameters – Cauchy's linear equation – Legendre's Linear Equation – Simultaneous linear equations.

Unit – VI

Infinite Series

Introduction to Series – Convergence, Divergence and Oscillation of Series – Comparison Test – Limit form – Integral Test – D Alembert's Ratio Test – Raabe's Test – Logarithm Test – Cauchy's Root Test – Alternating Series: Lebnitz Rule – Series of Positive, Negative terms: Absolute and Conditional Convergence – Uniform Convergence: Weirstrass M –Test (All Tests without Proofs)

TEXT BOOK:

Scope and Treatment as in "Higher Engineering Mathematics", by Dr. B. S. Grewal, 43rd edition, Khanna Publishers.

REFERENCE BOOKS:

1. Advanced Engineering Mathematics by Erwin Kreyszig.
2. A text book of Engineering Mathematics, by N. P. Bali and Dr. Manish Goyal, Lakshmi Publications.
3. Advanced Engineering Mathematics by H. K. Dass, S. Chand Company.

4. Higher Engineering Mathematics by B. V. Ramana, Tata Mc Graw Hill Company
5. Higher Engineering Mathematics by Dr. M. K. Venkataraman.

Mathematics -11syllabus

Unit – I
Matrices – I
Rank of a matrix – Echelon Form, Normal Form – Solutions of Linear System of Equations-Consistency of Linear System of Equations – Direct Methods: Gauss Elimination Method, LU Factorization Method – Eigen Values and Eigen Vectors of a Matrix – Cayley – Hamilton Theorem – Inverse and Powers of a Matrix using Cayley – Hamilton Theorem.

Unit – II
Matrices – II
Diagonalization of a Matrix – Quadratic Forms – Reduction of Quadratic Form to Canonical Form – Nature of a Quadratic Form – Complex Matrices: Hermitian and Unitary Matrices and their Properties.

Unit – III
Laplace Transforms
Introduction – Existence Conditions – Transforms of Elementary Functions – Properties of Laplace Transforms – Transforms of Derivatives – Transforms of Integrals – Multiplication by t^n – Division by t – Evaluation of Integrals by Laplace Transforms – Laplace Transforms of Unit Step Function, Unit Impulse Function and Periodic Functions.

Unit – IV
Laplace Transforms
Inverse Laplace Transform – Convolution Theorem – Applications of Laplace Transforms to Ordinary Differential Equations, Simultaneous Linear Differential Equations with Constant Coefficients.

Unit – V
Special Functions
Bessel's Equation – Bessel's Functions – Recurrence Formulae for Bessel's Function – Generating Function – Equations Reducible to Bessel's Equation – Orthogonality of Bessel's Functions.
Legendre's Differential Equation – General Solution of Legendre Equation – Legendre Polynomials – Rodrigue's Formula – Generating Function, Recurrence Formulae, Orthogonality of Legendre Polynomials.

TEXT BOOK:

Scope and Treatment as in "Higher Engineering Mathematics", by Dr. B. S. Grewal, 43rd edition, Khanna Publishers.

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