

**Unit- I****Chapter 1 : Numerical Computation, Errors & Concept of root of equation 1-1 to 1-30****Syllabus :**

- A) Basic principle of numerical computation. Floating point algebra with normalized floating point technique, Significant digits.
Errors: Different types of errors, causes of occurrence and remedies to minimize them, Generalized error formula (Derivation and Numerical)
- B) Concept of roots of an equation. Descartes' rule of signs, Intermediate value theorem, Roots of Polynomial Equations using Birge-Vieta method.

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**Unit- II****Chapter 2 : Solution of Transcendental and Polynomial Equation & Curve Fitting 2-1 to 2-33****Syllabus :**

- A) Solution of Transcendental and polynomial equation using Bisection, Regula- Falsi, Newton- Raphson method for single variable and two variables.
- B) Curve fitting using least square approximation – First order and second order .

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Unit- III**Chapter 3 : Interpolation****3-1 to 3-54****Syllabus :**

Forward, Backward, Central and Divided Difference operators, Introduction to interpolation.

- A) Interpolation with equal Intervals - Newton's forward, backward interpolation formula (Derivations and numerical), Stirling's and Bessel's central difference formula (Only numerical)
- B) Interpolation with unequal Intervals- Newton's divided difference formula and Lagrange's interpolation (Derivations and numerical).

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Unit - IV

Chapter 4 : Numerical Differentiation and Integration

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Syllabus :

- A) Numerical Differentiation using Newton's forward and backward interpolation formula (Derivation and numerical).
 B) Numerical Integration :Trapezoidal and Simpson's rules as special cases of Newton-Cote's quadrature technique for single integral. Numerical on double integrals using Trapezoidal and Simpson's 1/3 rd rule.

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Unit- V

Chapter 5 : Solution of Linear Simultaneous Equation & Matrix Inversion

5-1 to 5-43

Syllabus :

- A) Solution of the linear simultaneous equation: Direct methods - Gauss elimination method, the concept of pivoting – partial and complete. Gauss Jordan method, Iterative methods – Jacobi method, and Gauss-Seidel method.
 B) Matrix Inversion using Gauss Jordan method.



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Unit - VI

Chapter 6 : Solution of Ordinary Differential Equation 6-1 to 6-25

Syllabus :

A) Solution of First order Ordinary Differential Equation (ODE) using Taylor’s series method, Euler’s method, Modified Euler’s method (Derivation and numerical). Runge-Kutta fourth order method (Numerical).

B) Solution of Second order ODE using 4th order Runge-Kutta method (Numerical)

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