Motilal Nehru National Institute of Technology
Allahabad
Subject (Scientific Computing CS-1602)

Syllabus

Unit 1: Introduction of Algebraic and Transcendental Equation
Bisection Method, Iteration method, Method of false position, Newton-Raphson method, Muller's method, Rate of convergence of Iterative methods, Gauss Elimination, Gauss Jordan Method.

Unit 2: Discussion on different Interpolation Concepts
Interpolation: Finite Differences, Difference tables Polynomial Interpolation: Newton's forward and backward formula Central difference Formulae: Gauss forward and backward formula, Bessel's, Everett's formula. Interpolation with unequal intervals: Langrange's interpolation, Newton Divided difference formula..

Unit 3: Numerical Integration and Differentiation
Introduction, Numerical differentiation Numerical Integration: Trapezoidal rule, Simpson's 1/3 and 3/8 rule, Boole's rule, Waddle's rule

Unit 4: Numerical Linear Algebra
Solution of differential Equations: Picard's Method, Euler's Method, Taylor's Method, Runge-Kutta Methods, Milne's Predictor Corrector Methods.

Unit 5: Statistical Computation
Frequency chart, Curve fitting by method of least squares, fitting of straight lines, polynomials, exponential curves etc, Data fitting with Cubic splines, Regression Analysis, Linear and Non linear Regression, Multiple regression, Statistical Quality Control methods

References :

1. Rajaraman V, "Computer Oriented Numerical Methods", Pearson Education
2. Grewal B S, "Numerical methods in Engineering and Science", Khanna Publishers, Delhi
3. Goyal, M, "Computer Based Numerical and Statistical Techniques", Laxmi Publicationa (P) Ltd., New Delhi.
4. Miller, "Mathematical Statistics with applications", Pearson Education.
5. Iyengyr M.K. Jain & R.K. Jain "Numerical Methods for scientific and engineering computation", Wiley Eastern (New Age).