M.Sc APPLIED MATHEMATICS

N3H11B

III ~~IV~~ SEMESTER

Paper:14 Elective II: NUMERICAL ANALYSIS WITH PRACTICALS (C++)

UNIT I: Transcendental and Polynomial Equations :
Iteration method based on second degree equation : The muller method - the chebyshev method - multipoint iteration methods - state of convergenge - secant method - the newton raphson method - iteration methods for multiple roots .

Polynomial equations :
The brige vieta method - the Pairssow Method - Graeffe's root squaring method .

UNIT II: System of Linear Algebraic Equations and Eigen Value Problems:

Successive over Relaxation method - Iterative Method for A^{-1} Eigen Values and Eigen Vectors - Jacobi method for symmetric matrices -Given method and power method.

UNIT III: Interpolation and Approximation
Higher order interpolation - Hermite interpolation - piecewise and spline interpolation - Bivariate interpolation - Lagrange Bivarite interpolation - Newton's Bivariate interpolation for Equispaced points - Approximation - Least square approximation Gram - Schmidt orthognalizing process - Chebyspev polynomials - Uniform approximation uniform (minimax) polynomial approximation.

UNIT IV: Differentiation and Integration:
Numerical Differentiation - Methods based on interpolation - methods based on finite differences - Extraplation methods - partial differentiation.
Numerical Integration - Methods based on interpolation - Newton - cotes methods - Trapezoidal rule - simpson's rule - methods based on undetermined coefficients - Gauss-Legendre integration methods - Labotto integration method Radau integration method and Gauss-chebyshev integration methods - Composite simpson's rule - Double integration - Trapezoidal and simpson's method.

UNIT V : Ordinary Differential equations:
Numerical methods - Euler method - Backward Euler method - midpoint method - Taylor series method - Runge-Kutta methods Implicit Runge-Kutta method - multistep methods - convergence of multistep methods - Predictor - corrector methods