**MA5705 Numerical Aalysis**

Algorithms. Convergence. Errors: relative, absolute. Round off. Truncation. Transcendental and polynomial equations: Bisection method, Newton’s method, Secant method, Regula-falsi method, fixed point iteration, Newton-Raphson method. Rate of convergence of these methods. System of linear algebraic equations: Gaussian elimination and Gauss Jordan methods. Gauss Jacobi method, Gauss Seidel method and their convergence analysis. Interpolation: Lagrange and Newton’s methods. Error bounds. Finite difference operators. Gregory forward and backward difference interpolation. Numerical differentiation: Methods based on interpolations, methods based on finite differences. Numerical Integration: Newton Cotes formula, Trapezoidal rule, Simpson’s 1/3rd rule, Simpsons 3/8th rule, Weddle’s rule, Boole’s Rule. Midpoint rule, Composite trapezoidal rule, composite Simpson’s 1/3rd rule, Gauss quadrature formula. Ordinary differential equations: The method of successive approximations, Euler’s method, the modified Euler method, Runge-Kutta methods of orders two and four.

**References:**

1. S D Conte and Carl de Boor: Elementary Numerical Analysis, An Algorithmic Approach. McGraw Hill International Edition 3rd Ed. 1980.
2. F B Hildebrand: Introduction to Numerical Analysis, Dover Publications, 2nd Ed 2008.
3. K. D. Atkinson: Elementary Numerical Analysis, John Wiley and Sons, 3rd Edition, 2009
4. M. T. Heath, Scientific Computing: An Introductory Survey, McGraw Hill, 2002.
5. C. F. Gerald and P. O. Wheatley, Applied Numerical Analysis, 5th edition, Addison Wesley, 1994.
6. D. Kincaid and W. Cheney, Numerical Analysis: Mathematics of Scientific Computing, 3rd Edn, AMS, 2002.
7. M.K. Jain, S.R.K. Iyenger, R.K. Jain, Numerical Method for scientific and Engineering Computation, New Age International