

#### **4. Numerical Computing (CS-103)**

**(3-0-2)**

Computing Arithmetic, Significant Digits and Numerical Instability, Root finding methods. Bisection, Newton Raphson, Secant and Regula Falsi, methods for multiple roots. System of Linear Algebraic Equations and Eigenvalue problems-Gauss Elimination, LU Decomposition. Jacobi-Gauss-Seidel and SOR methods, Interpolation and Approximation-spline approximation. Linear, quadratic and Cubic, Differentiation and Integration-Richardson's extrapolation, Gauss Quadrature methods, ordinary differential equations-Initial and Boundary Value Problems, introduction to numerical solutions of Partial Differential Equations.

#### **References**

1. M.K. Jain, SRK Iyengar and R.K.Jain, Numerical Methods for Scientific and Engineering Computation, New Age International Publishers, 2003.
2. S.C. Chopra and Raymond P. Canale, Numerical Methods for Engineers, McGraw-Hill Higher Education, 2005.
3. S. S. Sastry, Introductory Methods of Numerical Analysis, PHI, 2012.
4. E.W. Cheney and D.R. Kincaid, Numerical Analysis, American Mathematical Society, 2010.