

RAMAKRISHNA MISSION VIDYAMANDIRA

NEP Syllabus B.Sc. Computer Science

Semester-III

Course Code: 3CMSSEC1

Credit: 3

Course Type: Skill Enhancement Course (SEC)

Course Outcome:

- i) Demonstrate understanding of common numerical methods and how they are used to obtain solutions to mathematical problems.
- ii) Apply numerical methods to obtain approximate solutions to mathematical problems.
- iii) Derive numerical methods for various mathematical operations and tasks, such as interpolation, differentiation, integration, the solution of linear and nonlinear equations, and the solution of differential equations.

3CMSSEC1: Numerical Methods

Credit: 2

[30 L]

Errors in Approximate Calculations: Mathematical Preliminaries, Approximate and Rounding of Numbers, Significant figures, Error and their computation, Propagation of error, Percentage error.

[3]

Interpolation: Newton Forward and Backward interpolation, Lagrange interpolation.

[4]

Solving Set of Linear Equations: Gaussian Elimination, Gauss– Jordan Elimination, Iterative method and its convergence condition and testing - Gauss-Seidel Iterative Method, Gauss- Jacobi Iterative Methods and different types of convergence, divergence.

[7]

Solving Non-linear equations: Bisection method, Regula-falsi method, Secant and Newton-Raphson method with their geometrical interpretation and convergency test.

[7]

Solving Differential Equations: Euler Method, Runge-Kutta second and fourth order method.

[5]

Numerical Integration: Trapezoidal and Simpson's 1/3rd Rule.

[4]

3CMSSEC1: Numerical Methods Laboratory

Credit: 1

[30L]

Laboratory based on following Numerical Methods theory using C.

Errors: Approximate and Rounding of Numbers, Significant digits, Errors and their types, Propagation of errors.

Interpolation: Newton Forward and Backward interpolation, Lagrange interpolation.

Solving a Set of Linear Equations: Gaussian Elimination, Gauss–Jordan, Iteration methods and their convergence conditions, Gauss-Seidel, Gauss-Jacobi Iterative Methods.

Solving Non-linear equations: Bisection, Regula-falsi, Secant and Newton-Raphson, their order of convergence.

Solving Differential Equations: Euler, Runge-Kutta second and fourth order methods.

Numerical Integration: Trapezoidal and Simpson's 1/3rd rule.

Text and Reference Books:

i) Numerical Analysis and Computational Procedures by Mollah; New Central Book.

ii) Numerical Methods for Scientific and Engineering Computation by M.K.Jain, S.R.K.Iyengar, R.K.Jain, 4th Edition, New Age International Publishers.

iii) Computer Oriented Numerical Methods, 3rd Edition, V Rajaraman, PHI
