

Course Code: MA2208
Course Name: Numerical Methods
Branch: Common to All Branches
Course Credit:4 (3-0-2)
Course Content:

Algebraic and Transcendental equations: Computation of floating-point numbers and round-off errors and machine representation of numbers. Solutions of non-linear and transcendental equations: order and convergence analysis.

System of Algebraic Equations: Norms of vectors and matrices, Linear systems: direct and iterative schemes, ill-conditioning, convergence analysis and finding dominant eigenvalues; Numerical schemes for nonlinear systems (Newton's method); Regression.

Interpolation, numerical differentiation and Integration: Interpolation; Numerical differentiation, Richardson's extrapolation; Numerical integration: Newton-Cotes formulae; Romberg integration, quadrature formulae.

Ordinary differential equations: Difference equations; Numerical solution of differential equations: Single-step and multi-step methods, order consistency, stability and convergence analysis, stiff equations; Solving two-point boundary value problems by shooting methods and finite difference methods.

Text and Reference Books

- David Kincaid and Ward Cheney, Numerical Analysis and mathematics of scientific computing, Books/Cole, 1999.
- Richard L Burden and J Douglas Faires, Numerical Analysis, Thomson Books Cole, Seventh edition 2009.
- Samuel D. Conte and Boor, Elementary Numerical Analysis: Algorithmic Approach, Tata McGraw-Hill, 1980.
- K. Atkinson, Elementary Numerical Analysis, John Wiley, 1978.