NUMERICAL METHODS AND PROGRAMMING
Code : CS 302
Credits : 4

Module I
Computer Number Systems; Overflow and underflow; Approximation in numerical computation; Truncation and round off errors; Propagation and control of round off errors; Chopping and rounding off errors; Pitfalls (hazards) in numerical computations (ill conditioned and well conditioned problems).

Interpolation: Lagrange's Interpolation, Newton's forward & backward Interpolation Formula. Extrapolation; Newton's Divided Difference Formula; Error; Problems.

Module II
Numerical Differentiation: Use of Newton's forward and backward interpolation formula only. 2 Numerical Integration: Trapezoidal formula (composite); Simpson's 1/3rd formula (composite); Romberg Integration (statement only); Problems.

Numerical Solution of System of Linear Equations: Gauss elimination method; Matrix Inversion; Operations Count; LU Factorization Method (Crout's Method); Gauss-Jordan Method; Gauss-Seidel Method; Sufficient Condition of Convergence.

Module III
Numerical Solution of Algebraic and Transcendental Equations: Iteration Method: Bisection Method; Secant Method; Regula-Falsi Method; Newton-Raphson Method.

Numerical solution of Initial Value Problems of First Order Ordinary Differential Equations: Taylor's Series Method; Euler's Method; Runge-Kutta Method (4_{th} order); Modified Euler's Method and Adams-Moulton Method.

Module IV
C Language Overview: Loop; Recursion; Function; Array; Pointers; Structures and Unions; Various types of File Access Methods: Sequential, Indexed Sequential, Random; Binary. Various types of Files in C and Various types of File Handling Statements in C. Implementation above Numerical & Statistical Problems in C Language;