MT-471 Applied Numerical Methods

Credit Hour Theory = 2 Practical = 1

Course Content

Error Analysis, Types of errors (relative, absolute, inherent, round off, truncation), significant digits and numerical instability, flow chart. Use any Computational tools to Analysis the Numerical Solutions. Linear Operators; Functions of operators, difference operates and the derivative operators, identities. Difference Equations, Linear homogenous and non-homogenous difference equations. Solution of Nonlinear Equations; Numerical methods for finding the roots of transcendental and polynomial equations (Secant, Newton - Raphson, Chebyshev and Giraffe's root, squaring methods), rate of convergence and stability of an iterative method. Solution of Linear equations; Numerical methods for finding the solutions of system of linear equations (Gauss-Eliminations, Gauss-Jordan Elimination, triangularization, Cholesky, Jacobi and Gauss-Seildel).Interpolation & Curve Fitting, Lagrange's Newton, Hermit, Spline least approximation (Linear and non-linear curves).Numerical Integration & Differentiation, Computation of integrals using simple Trapezoidal rule, 1/3th Simpson's rule, 3/8th Simpson's rule. Composite Simpson's and Trapezoidal rule, computation of solutions of differential equations using (Euler method, Euler modified method Range Kutta method of order 4), Numerical Solutions of Partial differential Equations, Optimization problem (Simplex Method), Steepest Ascent and steepest Descent Methods.