JIS College of Engineering

(NAAC 'A' Accredited Autonomous Institution)

Syllabus for B. Tech (MECHANICAL ENGINEERING)
2ND YEAR 4TH SEM

Paper Name: Mathematics-III (NUMERICAL METHODS AND APPLICATIONS)
Paper Code: M (ME) 401
Contact: 3L+1T

Course contents

Approximation in numerical computation: Truncation and rounding errors, Fixed and floating-point arithmetic, Propagation of errors.

Numerical integration: Trapezoidal rule, Simpson's 1/3 rule, Weddle's rule, Expression for corresponding error terms.

Numerical solution of Algebraic equation: Bisection method, Regula-Falsi method, Newton-Raphson method.
Calculus of Finite Difference: Finite differences, forward differences, backward differences, Shift Operators, Evaluation of missing terms, central differences, divided differences.

Interpolation: Newton forward/backward interpolation, Lagrange's and Newton's divided difference Interpolation.

Numerical solution of a system of linear equations: Gauss elimination method, Matrix inversion, LU Factorization method, Gauss Jacobi iterative method, Gauss-Seidel iterative method.

Numerical solution of ordinary differential equation: Picard,s Method of Successive Approximation, Taylor's Series Method, Euler's method, Modified Euler's method, Runge-Kutta methods.

Curve fitting: Linear function, Polynomial function, Power function, Exponential function.