

**JIS College of Engineering**

**(NAAC 'A' Accredited Autonomous Institution)**

**Syllabus for B. Tech (CIVIL ENGINEERING)**

**2<sup>ND</sup> YEAR 3<sup>RD</sup> SEM**

**Paper Name: Mathematics-III (NUMERICAL METHODS AND APPLICATIONS)**

**Paper Code: M(CE) 301**

**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.