**EMA202: Numerical Methods**

**Module I**

**Solution of Algebraic and Transcendental Equations:** Bisection method, Secant method, Method of false position, Newton-Raphson method.

**Module II**

**Interpolation:** Finite Differences- Forward, Backward and Central Differences, Differences of polynomial, Relations between the Operators, Newton’s formulae for Interpolation, Divided difference formula , Lagrange’s Interpolation formula.

**Module III**

**Linear System of Algebraic Equations:** Iterative methods, Gauss Jacobi method, Gauss – Seidel method, Power method.

**Module IV**

**Numerical Differentiation:** Derivatives using forward, backward and Central difference formulae. **Numerical Integration:** Newton-cotes quadrature formula, Trapezoidal rule, Simpson’s 1/3 rule, and Simpson’s 3/8 rule.

**Module V**

**Numerical Solutions of Ordinary Differential Equations:** Introduction- Taylor Series method, Picards method, Euler method, Modified Euler method, Runge-Kutta method, Predictor and Corrector method.

**Text Book(s)**

1. M.K. Jain, S.R.K. Iyengar, R.K. Jain, Numerical Methods for Scientific and

Engineering Computation, 5/e, New Age International, 2007.

**References**

1. S.S. Sastry, Introductory Methods of Numerical Analysis, 4/e, Prentice Hall

of India, 2009.