Course Contents:

CLO	Course Contents	Teaching Learning Strategy	Assessment Strategy
CLO1, CLO3	Numerical calculation: Introduction and fundamental concepts of numerical methods for linear equations. Approximation in numerical computation, Truncation and rounding errors, Fixed and floating-point arithmetic, Propagation of errors.	Lecture Discussion Assignment	Short Answer Exercise
CLO2	Roots of Nonlinear Equations using bracketing and open ended methods: Bisection, False Position, Fixed Point, Newton-Raphson, Secant method. Nature of convergence of all methods should also be discussed.	Lecture Discussion Problem Based Learning (PBL) Assignment	Short Answer Exercise
CLO3, CLO4	Direct Solution of Linear Equations: Gaussian Elimination(Naïve Gaussian Elimination, Gaussian Elimination with pivoting,), Gauss-Jordan Method, LU Decomposition Iterative Solution of Linear Equations: Jacobi's Method, Gauss-Seidel Method.	Lecture Problem Based Learning (PBL) Assignment	Exercise
CLO3, CLO4	Curve Fitting- Interpolation and Approximation: Direct Method of Interpolation, Lagrange, Newton's Interpolation Polynomial, Interpolation with Equidistant Points, Spline Interpolation.	Lecture Group Assignment Demonstration	Exercise Practical Exam
CLO3, CLO4	Regression Analysis: Linear, Transcendental and Polynomial equation	Lecture Project Problem Based Learning (PBL) Demonstration	Report Exercise Presentation Practical Exam
CLO3, CLO4	Numerical Integration: Newton-Cotes Methods, Trapezoidal and Simpson rules (⅓ rule, ⅜ rule), Romberg Integration.	Lecture Project Problem Based Learning (PBL) Demonstration	Report Exercise Presentation Practical Exam
CLO3, CLO4	Numerical Solution of Ordinary Differential Equation: Taylor series, Picard, Runge-Kutta, Heun's, Euler's method.	Lecture Group Assignment Problem Based Learning (PBL) Demonstration	Report Exercise Presentation Practical Exam

CLO3, CLO4	Solution of partial Differential Equations: Determination of characteristics equation of a matrix using Faddeev-Leverrier method; Eigenvalue and Eigenvector and matrix inversion.	Lecture Group Assignment Problem Based Learning (PBL) Demonstration	Essay Type Answer Report Exercise Presentation