## PCE6I101 NUMERICAL METHODS& MATLAB

**Module I:**
Interpolation: Piecewise Linear Interpolation, Piecewise Quadratic Interpolation, Piecewise Cubic Hermite Interpolation, Piecewise Spline Interpolation.
Numerical Differentiation: First Derivative, Higher Derivatives, Partial Derivative, Richardson's Extrapolation. Romberg algorithm for numerical integration.

**Module II:**
Eigen values and Eigen Vectors: Basic power method, Rayleigh Quotient, Shifted power method, Accelerating convergence, Inverse power method, Basic QR method, Better QR method, Findingeigen vectors, Accelerating convergence.
Fourier methods: Discrete Fourier Transforms, Fast Fourier Transforms, Matrix form of FFT, Algebraic form of FFT, Mixed-Radix FFT.

**Module III:**
Ordinary Differential Equations: Adams-Bashforth Methods, Adams-Moulton Methods, Adams Predictor-Corrector methods, Other Predictor-Corrector methods (Simpson's method and Milne's method).

**Module IV:**
Parabolic Partial Differential Equation: Explicit Method, Implicit method, Crank-Nicolson method. Hyperbolic Partial Differential Equation: Explicit Method, Implicit method. Elliptic Partial Differential Equation: Finite-difference method.

**Text Books:**
1. *Applied Numerical Analysis Using MATLAB, 2nd ed. by L V Fausett, Pearson*.

**Reference Books:**
1. *Numerical Mathematics and Computing, 7th ed. by E W Cheney and D R Kincaid, Brooks Cole.*
2. *Applied Numerical Methods with MATLAB: for Engineers & Scientists, 3rd ed. by S C Chapra, McGraw-Hill.*
3. *Applied Numerical Methods for Engineers Using MATLAB and C by R J Schilling and S L Harris, S Chand.*