FMCC804 MATRIX COMPUTATION(3-0-0)

MODULE-1 (10)

Gaussian Elimination and Its Variants: Matrix Multiplication Systems of Linear Equations, Triangular Systems, Positive Definite Systems; Cholesky Decomposition, Banded Positive Definite Systems, Sparse Positive Definite Systems, Gaussian Elimination and the LU Decomposition, Gaussian Elimination with Pivoting, Sparse Gaussian Elimination, **Sensitivity of Linear Systems**: Vector and Matrix Norms, Condition Numbers.

MODULE-2 (10)

The Least Squares Problem, The Discrete Least Squares Problem, Orthogonal Matrices, Rotators, and Reflectors, Solution of the Least Squares Problem, The Gram-Schmidt Process, Geometric Approach, Updating the QR Decomposition, **The Singular Value Decomposition**, Introduction, Some Basic Applications of Singular Values.

MODULE-3 (10)

Eigen values and Eigen vectors, Systems of Differential Equations, Basic Facts, The Power Method and Some Simple Extensions, Similarity Transforms, Reduction to Hessenberg and Tridiagonal Forms, The QR Algorithm, Implementation of the QR algorithm, Use of the QR Algorithm to Calculate Eigenvectors, The SVD Revisited, **Eigen values and Eigen vectors**, Eigen spaces and Invariant Subspaces, Subspace Iteration, Simultaneous Iteration, and the QR Algorithm, Eigen values of Large, Sparse Matrices, Eigen values of Large, Sparse Matrices, Sensitivity of Eigen values and Eigenvectors, Methods for the Symmetric Eigenvalue Problem, The Generalized Eigenvalue Problem.

Text Book :

1. **Fundamentals of Matrix Computation by David S Watkins**

Ch1.Ch 2.1,2.2,Ch 3,Ch 4.1,4.2,Ch 5,Ch 6.

Reference Book :

1. Matrix Computations by Gene H. Golub, Charles F.Van Loan The Johns Hopkins University Press, Baltimore.