**MATRIX ALGEBRA(MA20107) SYLLABUS**

**Topic :** **Number of lectures:**

Rank, properties of rank, Row reduced echelon from, system of linear equations (revised): 2

Revision of vector spaces, basis, dimension, linear transformation, null space, rank-nullity theorem: Sylvester Inequality, Matrix representation of linear transformation: 3

Row space, column space, trace of a matrix, properties: 2

Inner products, orthonormal basis, Gram-Schmidt’ orthogonalization: 3

Eigen values, eigen vectors, symmetric, skew-symmetric, Hermitian, skew-Hermitian, orthogonal, unitary matrices, characteristic polynomial, minimal polynomial, Diagonalization, Cayley-Hamiltion Theorem, Rational normal form, Jordan form of square matrices-8

Functions of Matrices, matrix polynomials, exp(A), Sin(A),etc, functions of matrices with a parameter-3

Generalized eigenvalues, eigenvectors-1

Quadratic forms, positive definite, negative definite, non-definite, matrices and their properties, Lagrange’s reduction: 5

Hermitian forms-1

Vector norms, matrix norms, properties, induced norms, equivalent norms, LDU, UDU, Cholesky decompositions: 6

Singular value decomposition: 2

Householder transformation: 2

**Book References:**

1. Matrix & Linear Algebra, by K. B. Dutta
2. Matrix Methods: An Introduction, by R. Bronson