MA-302 LINEAR ALGEBRA

Review of matrices and determinants. Linear spaces. Bases and dimensions. Subspaces. Direct sums of subspaces. Factor spaces. Linear forms. Linear operators. Matrix representation and sums and products of linear operators. The range and null space of linear operators and linear operators. Invariant subspaces. Eigen values and eigen vectors. Transformation to new bases and consecutive transformations. Transformations of the matrix of a linear operator. Canonical form of the matrix of a nilponent operator. Polynomial algebra and canonical form of the matrix of an arbitrary operator. The real Jordan canonical form. Bilinear and quadratic forms and reduction of quadratic form to a canonical form. Adjoint linear operators. Isomorphisms of spaces. Hermitian forms and scalar product in complex spaces. System of differential equations in normal form. Homogeneous linear systems. Solution by diagonalisation. Non-homogeneous linear systems.

RECOMMENDED BOOKS:

1.
2. Shilov, G.E., Linear Algebra, Dover Publication, Inc., New York, 1997.

3. Zill, D.G. and Cullen M.R., Advanced Engineering Mathematics, PWS, publishing company, Boston, 1996.
4. Herstein, I., Topics in Algebra, John-Wiley, 1975.
5. Trooper, A.M., Linear Algebra, Thomas Nelson and Sons, 1969.