MA 402: LINEAR ALGEBRA (3-1-0:4)

Vector spaces, subspaces, linear independence and dependence, bases, dimension, coordinates, row equivalence, computations concerning subspaces.

Linear transformations, kernel and range of a linear transformation, rank-nullity theorem, algebra of linear transformations, isomorphism, representation of transformations by matrices, linear functionals, dual and double dual of a space, annihilator of a subset, transpose of a linear transformation.

Characteristic values and characteristic vectors, characteristic polynomial, diagonalization of matrices and linear transformation, annihilating polynomials, Cayley-Hamilton theorem, invariant subspaces, direct sum decompositions, invariant direct sums, quotient space, spectral theorem.

Inner products, inner product spaces, orthogonality, orthonormal sets, Bessel's inequality, Gram-Schmidt process.

Text Books and References

1. K. Hoffman and R. Kunze, "Linear Algebra", Prentice Hall of India.
2. S. Axler, "Linear Algebra Done Right", Springer.
3. G. Strang, "Linear Algebra and Its Applications", Nelson Engineering.
4. S. Lang, "Linear Algebra", Springer Science & Business Media.