

**Information of the course on “Linear Algebra and its Applications (MAL 104)” offered for B.Tech. students at IIT Jammu, India**

**Course contents:**

- Introduce Fields: fields of numbers, finite fields. Review basis and dimension of a vector space, linear transformations, eigenvalue and eigenvector of an operator. LU Factorization. Some applications giving rise to Linear Systems Problems Dual and double dual of a vector space and transpose of a linear transformation.
- Diagonalizability of linear operators of finite dimensional vector spaces, simultaneous triangulization and simultaneous diagonalization. The primary decomposition theorem - diagonal and nilpotent parts.
- Inner product spaces, Gram-Schmidt orthogonalization, best approximation of a vector by a vector belonging a given subspace and application to least square problems.
- Adjoint of an operator, hermitian, unitary and normal operators. Singular Value Decomposition and its applications. Spectral decomposition. Introduction of bilinear and quadratic forms.

**Credit system for the course:**

- 20 marks for class tests. There will be two class tests.
- 30 marks for Mid-Sem exam.
- 50 marks for End-Sem exam.

**References for the course:**

1. Linear Algebra and its Applications by David C. Lay.
2. Linear Algebra Done Right by Sheldon Axler.
3. Linear Algebra by Kenneth Hoffman and Ray Kunze.
4. Matrix Analysis by Roger A. Horn and Charles R. Johnson.