

**M.SC STATISTICS**  
**SEMESTER -I**  
**LINEAR ALGEBRA**

**AUTHORS**

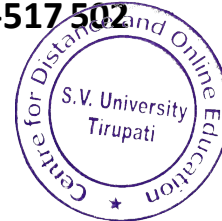
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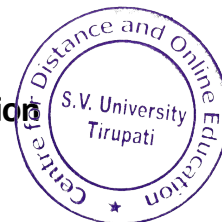
  
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## BRIEF CONTENT

### Unit-I:

- A. Algebra of matrices; Elementary transformations;
- B. Rank and Inverse of a matrix;
- C. Nullity; Partitioned matrices;
- D. Generalized inverse of matrix;
- E. Solutions of simultaneous equations.

### Unit-II:

- A. Finite dimensional Vector Spaces;
- B. Linear dependence and independence;
- C. Basis and dimension of a vector space;
- D. Inner product Spaces; Completion theorem;
- E. Orthogonal projection of a vector.

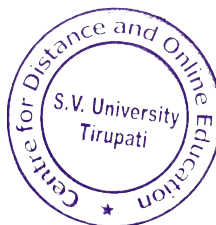
### Unit-III:

- A. Linear transformations and properties; Orthogonal and unitary transformations;
- B. Reduction and classification of quadratic forms;
- C. Canonical reduction of quadratic form.

### Unit-IV:

- A. Characteristic roots and vectors; Cayley – Hamilton theorem;
- B. Minimal polynomial; Similar matrices;
- C. Reduction of a pair of real symmetric matrices;

  
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## DETAILED CONTENT

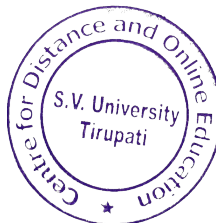
Unit-I: Algebra of matrices; Elementary transformations; Rank and Inverse of a matrix; Nullity; Partitioned matrices; Kronecker product; Generalized inverse of matrix; MoorePenrose generalized inverse; Solutions of simultaneous equations.

Unit-II: Finite dimensional Vector Spaces; Vector Spaces and Subspaces; Linear dependence and independence; Basis and dimension of a vector space; Completion theorem; Inner product Spaces; Orthonormal basis and Gram-Schmidt orthogonalization process; Orthogonal projection of a vector.

Unit-III: Linear transformations and properties; Orthogonal and unitary transformations; Real quadratic forms; Reduction and classification of quadratic forms; Hermitian forms; Sylvesters law of inertia; Canonical reduction of quadratic form.

Unit-IV: Characteristic roots and vectors; Cayley – Hamilton theorem; Minimal polynomial; Similar matrices; Spectral decomposition of a real symmetric matrix; Reduction of a pair of real symmetric matrices; Hermitian matrices.

  
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