

**Course Title: Mathematics A-III [ Linear Algebra]**

**Credits Hours: 4**

**Matrices, Determinants and System of Linear Equations**

- Definition of matrix. various types of matrices
- Algebra of matrices
- Determinant of square matrix, cofactors and minors
- Laplace expansion of determinants
- Elementary matrices, adjoint and inverses of matrices
- Rank of a matrix
- Introduction to systems of linear equations
- Cramer’s rule, Guassian elimination and Gauss Jordan method
- Solution of homogenous and non homogenous linear equations
- Net work flow problems

**Vector Spaces**

- Real vector spaces, subspaces
- Linear combination and spanning set.
- Linear independence and linear dependence, basis and dimension, row space,
- Colum space and Null space

**Linear Transformations**

- Introduction to linear transformation
- Matrices of linear transformations
- Rank and nullity
- Eigen values and Eigen vectors
- Diagonalization
- Orthogonal diagonalization
- Orthogonal matrices, similar matrices

**Evaluation Criteria**

Examination	Type	Marks
Internal Examination	Sessional Work	15%
	Mid-Semester	25%
External Examination	Final Semester	60%

**Recommended Books**

1. Howard Anton and Chris Rorres, *Elementary Linear Algebra Applications Version*, John Wiley and Sons Inc. 9<sup>th</sup> Edition, 2005
2. W. Keith Nicholuson, *Elementary Linear Algebra*, PWS-Kent Publishing Company, Boston, 2004
3. Bernard Kolman, David R. Hill, *Introduction Linear Algebra with Applications*, Prentice Hall International, Inc. 7<sup>th</sup> Edition, 2001

4. Stephen H. Friedberg Et al, *Linear Algebra*, Prentice Hall, Inc. 3<sup>rd</sup> Edition, 2000
5. Seymour Lipschutz, *Theory and Problems of Beginning Linear Algebra*, Schaum's Outline Series, Mc-Graw Hill Company, New York, 1997