19BSM403 - Basic Linear Algebra										
Teaching Scheme					Examination Scheme					
L	T	P	C	Hrs/Week	Theory			Practical		TotalMarks
					MS	ES	IA	LW	LE/Viva	
3	1	--	4	4	25	50	25	--	--	100

OBJECTIVES

1. To provide students with a good understanding of the concepts and methods of linear algebra, described in detail in the syllabus.
2. To help the students develop the ability to solve problems using linear algebra.
3. To connect linear algebra to other fields both within and without mathematics.
4. To develop abstract and critical reasoning by studying logical proofs and the axiomatic method as applied to linear algebra.

SYLLABUS

Unit-I	**10**

Matrix Theory : Matrices, Matrix Operations , Special Types of matrices, Elementary Matrices, inverse of Matrix, Rank and its properties, diagonal and orthogonal matrix, Determinants and its properties, Application of determinants.

UNIT II	**10**

System of Linear Equations: Introduction to systems of Linear Equations, geometry of linear equations, elementary operations on matrix, row-reduced echelon matrices, applying row reduction to obtain the inverse of a matrix, Solution of system of equation by Matrix inversion, cramer's rule, Gauss Elimination and Gauss Jordan Elimination Method, Conditions for consistency of the system.

UNIT III	**10**

Euclidean n - space, Vector space and Subspaces, Linear dependence and Independence; Basis, Dimension, Row space, Null space; column space and rank of a matrix, Rank and Nullity, Dimension Theorem

UNIT IV	**9**

Eigen Values and Eigen Vectors, Properties of Eigen values, Diagonalization, Caley-Hamilton theorem and its application, bilinear and quadratic forms.

APPROXIMATE TOTAL	**39 Hours**

OUTCOMES

1. Solve systems of linear equations by using Gaussian elimination to reduce the augmented matrix to row echelon form or to reduced row echelon form.
2. Understand the basic ideas of vector algebra: linear dependence and independence.
3. Be able to apply the basic techniques of matrix algebra, including finding the inverse of an invertible matrix using Gauss-Jordan elimination.
4. Know how to find the rank of a matrix, and to understand the relationship of the concepts to associated systems of linear equations.
5. Be able to find the eigen values and eigenvectors of a square matrix using the characteristic polynomial and will know how to diagonalize a matrix when this is possible.
6. Be able to orthogonally diagonalize symmetric matrices.
7. Be familiar with the notion of a linear transformation and its matrix.

TEXTS AND REFERENCES

1. Seymour Lipschutz, Marc Lipson, Linear Algebra, Schaum's outlines, Mcgraw-Hill Education India Pvt.Ltd - New Delhi
2. H.Anton, Elementary linear algebra with applications (8th ed.), John Wiley (1995)
3. G.Strang, Linear algebra and its applications (4rh Ed.), Thomson (2006)