ST. JOSEPH'S COLLEGE FOR WOMEN (AUTONOMOUS) VISAKHAPATNAM VI SEMESTER MATHEMATICS TIME: 5 Hrs/week M 5301 (4)

LINEAR ALGEBRA

Max. Marks: 100

w.e.f. 2017 – 2018

SYLLABUS

OBJECTIVES: To enable the students to

- know and apply the principles of linear algebra.
- understand the theorem
- apply the knowledge to study matrices by means of linear transformation.

COURSE

UNIT – I : Vector Spaces-I :

Vector Spaces, General properties of vector spaces, n-dimensional Vectors, Addition and Scalar multiplication of Vectors, Internal and External composition, Null space, Vector subspaces, Algebra of subspaces, Linear Sum of two subspaces, Linear combination of Vectors, Linear span Linear independence and Linear dependence of Vectors.

UNIT –II : Vector Spaces-II :

Basis of Vector Space, Finite Dimensional Vector spaces, Basis extension, Co-ordinates, Dimension of a Vector space, Dimension of a subspace, Quotient space and Dimension of Quotient space.

UNIT –III : Linear Transformations :

Linear transformations, Linear operators, Properties of L.T, Sum and Product of L.Ts, Algebra of Linear Operators, Range and Null space of Linear Transformation, Rank and Nullity of Linear transformations – Rank and Nullity Theorem.

UNIT –IV : Matrix :

Characteristic Roots, Characteristic Values & Vectors of Square Matrix, Cayley – Hamilton Theorem., Derogatory, non Derogatory, Diagonalizability

UNIT –V : Inner product space :

Inner Product Spaces, Euclidean and Unitary Spaces, Norm or length of a Vector, Schwartz Inequality, Triangular Inequality, Parallelogram law, Orthogonality, Orthonormal Set, Complete Orthonormal set, Gram – Schmidt Orthogonalization Process, Bessel's inequality and Parseval's Identity.

Prescribed Text Book : A Text of Mathematics B.Sc. Mathematics Vol – III by S. CHAND Publications(2016)

Reference Books :

- 1. Linear Algebra by J.N. Sharma and A.R. Vasista, published by Krishna Prakashan Mandir, Meerut- 250002.(1996)
- 2. Matrices by Shanti Narayana, published by S.Chand Publications.(1998)
- **3.** Linear Algebra by Kenneth Hoffman and Ray Kunze, published by Pearson Education (low priced edition), New Delhi. (1992)
- **4**. Linear Algebra by Stephen H. Friedberg et al published by Prentice Hall of India Pvt. Ltd. 4th Edition (2007).

ST.JOSEPH'S COLLEGE FOR WOMEN (AUTONOMOUS), VISAKHAPATNAM V SEMESTER MATHEMATICS TIME: 1 Hr /Week M 5351 (1)

Ring Theory and Vector Calculus

&

Linear Algebra

Max. Marks: 100

w.e.f 2017-2018

PRACTICAL SYLLABUS

OBJECTIVES : To enable the students to

- know the principles of abstract algebra .
- understand the theorems and problems.
- Know and understand the definition and theorems of Vector Calculus.
- Apply the theories in every branch of Science and also in commerce.
- know and apply the principles of linear algebra.
- understand the theorem
 - apply the knowledge to study matrices by means of linear transformation.

COURSE

RING THEORY

UNIT – 1 RINGS-I

UNIT – 2 RINGS-II

VECTOR CALCULUS

UNIT –3 VECTOR DIFFERENTIATION

UNIT – 4 VECTOR INTECRA

VECTOR INTEGRATION :

Line Integral, Surface Integral, Volume integral with examples.

UNIT – 5

VECTOR INTEGRATION APPLICATIONS :-

Theorems of Gauss and Stokes, Green's theorem in plane and applications of these theorems.

UNIT – 6 : Vector Spaces-I UNIT -7: Vector Spaces-II UNIT -8: Linear Transformations UNIT -9: Matrix UNIT -10: Inner product space Prescribed Text Book: 1. A Text of Mathematics B.Sc. Mathematics Vol – III by S. CHAND Publications(2016) 2. A Text of Mathematics B.Sc. Mathematics Vol – III by S. CHAND Publications(2016) 2. A Text of Mathematics B.Sc. Mathematics Vol – III by S. CHAND Publications(2016) Reference Books :-Reference Books :-1. Abstract Algebra by J. Fralieh, Published by Narosa Publishing house. (2006)

- Vector Calculus by Santhi Narayana, Published by S. Chand & Company Pvt. Ltd., New Delhi. (2006)
- **3.** A text Book of B.Sc., Mathematics by B.V.S.S.Sarma and others, published by S. Chand & Company Pvt. Ltd., New Delhi. (2016)
- 4. Vector Calculus by R. Gupta, Published by Laxmi Publications. (2002)
- 5. Vector Calculus by P.C. Matthews, Published by Springer Verlag publications. (1998)
- 6. Rings and Linear Algebra by Pundir & Pundir, Published by Pragathi Prakashan.(1996)
- Linear Algebra by J.N. Sharma and A.R. Vasista, published by Krishna Prakashan Mandir, Meerut- 250002.(1996)
- 8. Matrices by Shanti Narayana, published by S.Chand Publications.(1998)
- **9.** Linear Algebra by Kenneth Hoffman and Ray Kunze, published by Pearson Education (low priced edition), New Delhi. (1992)
- **10**. Linear Algebra by Stephen H. Friedberg et al published by Prentice Hall of India Pvt. Ltd. 4th Edition (2007).