(Linear Algebra)

Semester : II   Subject Code: BS21504   Lectures: 40

Objectives:

The syllabus aims in equipping students with

- Understanding and writing mathematical statements and proofs;

- understanding of the wide nature of the subject and applications in

  different disciplines;

- capacity to represent the given information in the mathematical form. use of appropriate mathematical techniques and draw the relevant conclusion;

- The specific aim of this module is to introduce the notion of matrices and their basic uses. mainly in algebra. The main goals are to learn how the algorithm of elementary row and column operations is used to solve systems of linear equations.

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Ms. Chetna Rajput

Prof.Gitanjali Phadnis

Prof. Vrushali Paranjpe

Unit 1: Matrices and System of Linear Equations

- Revision : Elementary operations on matrices.

- Row Echelon and Reduced row echelon form of matrix.

- System of linear equations: Gauss Elimination Method.
  Gauss-Jordan Elimination Method. L.U.Decomposition Method.

- Rank of matrix , Row rank and Column rank of a matrix.

Unit 2 : Real Vector spaces

- Introduction.

- Real Vector Space : Definition and examples.

- Subspaces : Definition with examples and properties.

- Linear Independence.

- Basis and Dimension.

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8

	No. of Lectures
Unit 3 : Eigen values and eigen vectors and diagonalization	8

- Eigen values of a matrix. Definition and examples.

- Eigen vectors of a matrix. Definition and examples.

- Diagonalizable matrix.

- Application of diagonalization.

	No.of lectures
Unit 4: Linear Tranformation	8

- Definition and examples of Linear transformation.

- Properties of linear transformation.

- Kernel of linear transformation.

- Range of linear transformation.

- Rank nullity theorem (without proof) and applications

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Text Book : *Linear Algebra* by Kumaresan: chapter1 .
Chapter2 :theorems 2.3.1,2.3.2,2.3.3,2.3.5(with proof),exercise 2.2.2 ,2.3.3 (with proof)
Chapter 4: 4.1.1,4.4.2(with proof)
Chapter 7 :section 7.3,7.2,7.2.1,7.3.3

Reference Books :

- M. Artin, Algebra, Prentice Hall of India , New Delhi, (1994).

- K. Hoffmann and R. Kunze Linear Algebra, Second Ed. Prentice Hall of India New Delhi, (1998).

- G. Strang, Linear Algebra and its Applications. Third Ed. Harcourt Brace Jovanovich, Orlando, (1988)

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