

## NIRMA UNIVERSITY

<b>Institute:</b>	Institute of Technology
<b>Name of Programme:</b>	B. Tech. (All Programme)
<b>Course Code:</b>	
<b>Course Title:</b>	Mathematics I
<b>Course Type:</b>	Introductory
<b>Year of introduction:</b>	2022-2023

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### Course Learning Outcomes (CLOs):

At the end of the course, the students will be able to –

1. comprehend the concept of vector space (BL2)
2. extend the knowledge of matrix theory and its applications in engineering (BL2)
3. solve real world problems using linear transformations (BL3)
4. apply the knowledge of eigen value & eigen vector for advance matrix calculations (BL3)

### Syllabus:

**Total Teaching hours:30**

Unit	Syllabus	Teaching hours
<b>Unit I</b>	<b>Vector Space:</b> Vector space & Subspace, Linear Combination, Span Set, Linearly independent and Linearly dependent Set, Basis and Dimension of the vector space, Extension & Reduction of a set to the Basis, Coordinate of Basis and Change of basis.	08
<b>Unit II</b>	<b>Matrices and Linear Equations:</b> Row Echelon Form and Rank of matrix, Solution of system of algebraic simultaneous equations using Gauss Elimination Method, Reduced Row Echelon Form and Inverse of matrix by Gauss-Jordan method.	07
<b>Unit III</b>	<b>Linear Transformation:</b> Definition of linear transformation, Standard linear transformations, Matrix of Linear transformations, Range and Kernel of Linear Transformation, Dimension Theorem, Inverse Linear Transformation, Similarity Transformation.	07
<b>Unit IV</b>	<b>Eigne values and Eigen Vectors:</b> Eigen values and Eigen vectors, Basis of Eigen Space, Algebraic and Geometric multiplicity, Caley-Hamilton Theorem, Diagonalization, Symmetric matrices and Orthogonal Diagonalization, Quadratic Forms and Canonical Forms	08

**Tutorial Works:**

This shall consist of 10 tutorials based on the syllabus.

**Self-Study:**

Self-study contents will be declared at the commencement of the semester. Around 10 % of the questions will be asked from the self-study contents.

**Suggested Readings/ References:**

1. H Anton, Elementary linear algebra with applications; John Wiley Publication
2. D C Lay, Linear Algebra and its Application; Pearson Publication
3. B Kolman and D Hill, Elementary linear algebra with applications; Pearson Publication
4. Stephen H. Friedberg, Arnold J. Insel, Lawrence E. Spence, Linear Algebra: Pearson Publication
5. Seymour Lipschutz, Marc Lipson, Schaum's Outline of Linear Algebra: Mc Graw Hill Publication
6. J P Sharma and M Yeolekar, Engineering mathematics Vol-II; PHI Publication