Approved by the BoS in Information Technology on 03-03-2025 Item No. 04

#### **Tolani College of Commerce (Autonomous)**



## Title of the Course: Linear Algebra

### Syllabus for Four credit Course

From the academic year- 2025-2026

## Name of the Course:Linear Algebra I Vertical: Minor , Semester V Programmes:Bachelor of Science (Information Technology)

Sr.	Heading	Particulars	
No.			
1	<b>Description the course:</b>	rse: Linear algebra is a branch of mathematics that focuses on	
		the study of vector spaces and linear transformations. It	
		deals with systems of linear equations, matrices,	
		determinants, eigenvalues, and eigenvectors.	
		Linear algebra is widely applied in various areas, including	
		computer graphics, machine learning, cryptography, signal	
		processing, control theory, and operations research.	
2	Vertical :	Minor	
3	Type :	Theory / Practical	
4	Credit:	4 credits	
5	Hours Allotted :	60 Hours	
6	Marks Allotted:	100 Marks (60 (SE) + 40 (CE))	

7	Course Objectives:					
	<ol> <li>To define matrices and understand their properties, including addition, scalar multiplication 2.</li> <li>To understand matrix multiplication, and transpose.</li> </ol>					
	<b>3.</b> To understand the relationship between the solutions of linear systems					
	4. To learn the geometry of vector spaces.					
8	Course Outcomes:					
	1. Students will demonstrate a clear understanding	ng of fundamental concepts in linear algebra				
	2. Also they will understand vectors, matrices, vector spaces, and linear transformations.					
	<b>3.</b> Students will be able to perform matrix operations efficiently, including addition, scalar					
	multiplication, matrix multiplication					
	4. Student will be able to find the inverse of matrix					
9	Modules:-					
	Module 1: Matrices (15 Hours)					
	• Definition of a matrix. Types of Matrices					
	Scalar multiplication of a matrix					
	Algebra of Matrices ( Addition, Subtraction)					
	Properties of Matrix addition					
	Multiplication of matrices					
	Properties of Matrix multiplication					
	Module 2: Determinants (15 Hours)					
	<ul> <li>Determinants</li> <li>Expansion of Determinants of order 2 and 3</li> </ul>					
	<ul> <li>Determinants of product of two matrices</li> </ul>					
	• Properties of Determinants					
	Module 3. Inverse of a matrix (15 Hours)					
	Minors and co factors of elements in a determinants					
	• Adjoint of a square matrix					
	• Singular and non-singular matrices					
	Inverse of a square matrix using adjoint					
	Module 4: System of Equations (15 Hours)					
	System of non-homogeneous linear equations					
	• Matrix inverse method to solve the system of linear equations					
	<ul> <li>Applications of simultaneous linear equations</li> <li>Transpose of a matrix and its properties</li> </ul>					
10	Symmetric and skew symmetric matices, Orthogonal matrix     Defense Rooks					
10	• S. Kumaresan, Linear Algebra PHL Learn	ing Pyt Ltd				
	Naravan, Shanti, and P.K. Mittal. A Texth	book of Matrices, S. Chand & Co.				
	• Lay, David, Linear Algebra and Its Applications. Pearson Publications.					
	• Sharma, R.D. Theory and Problems of Linear Algebra. Dreamtech.					
11	Internal Continuous Assessment: 40%	Semester End Examination : 60%				
12	Continuous Evaluation through:	Assignments / Periodical Test				

<b>13</b> Format of Question Paper: for the final examination	
Q. 1 Attempt any Three (15 marks)	
a.	
b.	
с.	
d.	
Q. 2 Attempt any Three (15 marks)	
a.	
b.	
с.	
d.	
Q. 3 Attempt any Three (15 marks)	
a.	
b.	
с.	
d.	
Q. 4 Attempt any Three (15 marks)	
a.	
b.	
с.	
d.	

Sr.No	Name	Signature
1.	Ms. Shubha Chaubal	
2.	Ms. Priyanka Malvankar	

# Signatures of Team Members