

		Parul University Faculty of Engineering and Technology Parul Institute of Engineering and Technology Electrical Engineering Department		
Subject Name	Linear Algebra		A.Y	2025-2026
Subject Code	03019102BS01		Semester	II
Assignment-1				
Sr No	Question	COs	B.T	Competence
1.	Solve the following system of equation by Gauss elimination. $-2b + 3c = 1; 3a + 6b - 3c = -2; 6a + 6b + 3c = 5.$	1	3	Apply
2.	Perform LU-Decomposition for the matrix A and find the matrices L and U Where $A = \begin{bmatrix} 3 & 1 & 6 \\ -6 & 0 & -16 \\ 0 & 8 & -17 \end{bmatrix}$	1	3	Apply
3.	Find the Eigen values and Eigen vector of the matrix $A = \begin{bmatrix} -3 & -7 & -5 \\ 2 & 4 & 3 \\ 1 & 2 & 2 \end{bmatrix}$.	3	3	Apply
4.	Find the rank of matrix $A = \begin{bmatrix} 3 & -2 & 0 & -1 & -7 \\ 0 & 2 & 2 & 1 & -5 \\ 1 & -2 & -3 & -2 & 1 \\ 0 & 1 & 2 & 1 & 6 \end{bmatrix}$	1	3	Apply
5.	Solve the following system using LU	1	3	Apply

	Decomposition Method $x + y - z = 4$, $x - 2y + 3z = -6$, $2x + 3y + z = 7$ 3			
6.	If $A = \begin{bmatrix} 1 & 2 \\ -1 & 3 \end{bmatrix}$ find A^2 using Cayley Hamilton theorem.	3	4	Analyze
7.	Find a matrix P that diagonalizes matrix A and determine $P^{-1}AP$ where $A = \begin{bmatrix} 6 & 2 \\ 2 & 3 \end{bmatrix}$.	3	4	Analyze
8.	The matrix A can be factored as $A = PDP^{-1}$ where $D = \begin{bmatrix} -1 & 0 \\ 0 & -2 \end{bmatrix}$ and $D = \begin{bmatrix} -8 & -3 \\ 27 & 10 \end{bmatrix}$ then find A^5 .	3	4	Analyze
9.	Determine if the transformation matrix $A = \begin{bmatrix} 2 & 3 \\ 4 & 6 \end{bmatrix}$ is invertible.	1	2	Understand
10.	Find the characteristic equation of the given matrix $A = \begin{bmatrix} 0 & 1 \\ -2 & 3 \end{bmatrix}$.	3	1	Remember
11.	Let $T: \mathbb{R}^3 \rightarrow \mathbb{R}^3$ be a linear transformation defined by $T(x,y,z) = (x+y, y-z, 2x+3z)$. Find the matrix representation of T .	3	3	Apply
12.	Given the transformation matrix, find its inverse if possible. Given the matrix $A = \begin{bmatrix} 3 & 2 \\ 4 & 5 \end{bmatrix}$, find A^{-1} , if it exists.	1	3	Apply
13.	Verify the Cayley-Hamilton theorem by computing $B^2 - 3B - 2I$ where $B = \begin{bmatrix} 3 & 1 \\ 2 & 0 \end{bmatrix}$.	3	4	Analyze
14.	For a given matrix $A = \begin{bmatrix} 6 & 0 & 0 \\ 0 & 3 & 2 \\ 0 & 2 & 3 \end{bmatrix}$, find A^2 .	3	3	Apply
15.	Find the eigenvalues of the matrix	3	3	Apply

	$A = \begin{bmatrix} 8 & -6 & 2 \\ -6 & 7 & -4 \\ 2 & -4 & 3 \end{bmatrix}$.			
16.	If a matrix is diagonalizable with eigenvalues $\lambda_1=5$, $\lambda_2=2$ what are the eigenvalues of A^3 .	3	2	Understand
17.	If the diagonal matrix is $D = \begin{bmatrix} 4 & 0 \\ 0 & 1 \end{bmatrix}$ then find D^3 .	3	2	Understand
18.	Find the inverse of the given matrix $B = \begin{bmatrix} 3 & 4 \\ 2 & 5 \end{bmatrix}$.	1	3	Apply
19.	For given matrix $A = \begin{bmatrix} 0.8 & 0.4 \\ 0.2 & 0.6 \end{bmatrix}$, find the characteristic equation.	3	1	Remember
20.	If in a 2×2 matrix with trace is 5 and determinant is 6, what is the characteristic equation?	3	2	Understand