



VIT

Vellore Institute of Technology

SCHOOL OF ADVANCED SCIENCES

Winter Semester 2025 ~ 2026

Continuous Assessment Test - I

Programme Name: B.Tech.

Slot: A1+TA1+TAA1

Course Code: BAMAT206

Course Title: Linear Algebra and Integral Transforms

Class Number (s): VL2025260500444; 0446; 0448; 0450; 0452

Date of Examination: 27-01-2026; Time: 9:30 AM

Exam Duration: 90 Min.

Maximum Marks: 50

Answer ALL the Questions (each question carries 10 marks)

CO1: use computational techniques to solve system of linear equations, calculate eigenvalues and eigenvectors.

CO2: understand the concepts of vector space - subspaces and linear transformation.

Q.No.	Question(s)	CO	BT
1	Solve the set of simultaneous equations $2x_1 + 4x_2 + 3x_3 = 4$; $x_1 - 2x_2 - 2x_3 = 0$; $-3x_1 + 3x_2 + 2x_3 = -7$ using the LU Decomposition method. [Hint: for the given set of equations, factorize the matrix A as LU]	CO1	3
2	Find the canonical form of the quadratic form $q(x, y, z) = x^2 + 5y^2 - 4z^2 + 2xy - 4xz$ using orthogonal transformation. [Hint: Write q in matrix notation: X^TAX]	CO1	2
3	If a vector space V is the set of all real-valued continuous functions over the field of real numbers R, then show that the set W of solutions of the differential equation $2\frac{d^2y}{dx^2} - 9\frac{dy}{dx} + 2y = 0$ is a subspace of V. [Hint: Write W and verify the axioms of subspace for W]	CO2	2
4	Find the row space and null space of $B = \begin{bmatrix} 1 & -2 & 1 & 0 \\ 3 & 1 & 4 & 5 \\ 2 & 3 & 5 & -1 \end{bmatrix}$ and hence verify the rank-nullity theorem. [Hint: Reduce B in REF]	CO2	3
5	Let T be a linear transformation $T: R^4 \rightarrow R^4$ given by $T(x, y, z, u) = (x, y, 0, 0), \forall (x, y, z, u) \in R^4$. Then i. Verify whether T is invertible or not? ii. For the given T, show that the Rank of T = Nullity of T [Hint: Write T as a matrix A]	CO2	2