



SCHOOL OF APPLIED SCIENCE & HUMANITIES
DEPARTMENT OF MATHEMATICS

Subject: Linear Algebra

Subject Code : 25MT103

Sem. : I

Academic Year: 2025-2026

Section: 14

Regulation: R25

T5 - Assignment 6

1. Define the following.
 - a. Real Inner Product Space
 - b. Norm of a vector
 - c. Cauchy-Schwarz inequality
2. Show that the function $\langle f, g \rangle = \int_{-2}^2 (1 + x^2) f(x) g(x) dx$ defines an inner product on $C[-2,2]$.
3. In \mathbb{R}^2 with inner product $\langle x, y \rangle = x^T C y$, where $C = \begin{bmatrix} 1 & 1 \\ 1 & 2 \end{bmatrix}$, compute $\|x\|_C$, $(1,3)^T$.
4. In \mathbb{R}^3 with inner product $\langle x, y \rangle = x^T B y$, where $B = \begin{bmatrix} 3 & 0 & 0 \\ 0 & 2 & 0 \\ 0 & 0 & 1 \end{bmatrix}$, compute $\|x\|_B$, $(2, -1, 4)^T$.