



Daffodil International University
Department of Electrical and Electronic Engineering
Faculty of Engineering

Mid-Term Examination, Summer – 2026

Course Code: 0541-113

Course Title: Linear Algebra and Complex Variable

Section: A, B, C, D, E, F

Level-Term: L1-T1

by- Tanvir

Full Marks: 25

Date: June 29, 2026

Time: 1.5 Hours

[Answer all the following questions]

[The second right-most column indicates the Cos with the respective Bloom's level]

[The right-most column indicates the assigned marks]

- Q1.** a) **Explain** the following with example **CO-1** [2]
 i) Skew-Hermitian Matrix ii) Consistent SLE **(C2)**
 b) **Identify** whether the following system of linear equations is consistent or inconsistent. **CO-1** [3]
 (C2)
- $$\begin{aligned} x + y - 2z + s + 3t &= 1 \\ 2x - y + 2z + 2s + 6t &= 2 \\ 3x + 2y - 4z - 3s - 9t &= 3 \end{aligned}$$
- Q2.** a) Using only elementary row transformations to reduce Q to I, **identify** the inverse of Q when **CO-1** [5]
 (C2)
- $$Q = \begin{pmatrix} -1 & 2 & -3 \\ 2 & 1 & 0 \\ 4 & -2 & 5 \end{pmatrix}$$
- b) **Identify** the echelon form, row reduced echelon form and normal form of the following matrix **CO-1** [5]
 (C2)
- $$M = \begin{pmatrix} 1 & 2 & 3 & 0 \\ 2 & 4 & 3 & 2 \\ 3 & 2 & 1 & 3 \\ 6 & 8 & 7 & 5 \end{pmatrix}$$
- Q3.** a) **Categorize** the values of 'δ' for which the following system of linear equations has **CO-1** [5]
 i) No solution **(C2)**
 ii) Infinitely many solutions
 iii) Unique solution
- $$\begin{aligned} u + v - w &= 1 \\ 2u + 3v + \delta w &= 3 \\ u + \delta v + 3w &= 2 \end{aligned}$$
- b) **Express** W as the sum of symmetric matrix and skew-symmetric matrix, **CO-1** [5]
 (C2)
- where $W = \begin{pmatrix} \tan 45^\circ & \frac{d}{dt}(t^2 + 4t)\Big|_{t=2} & e^0 \\ \ln e^2 & \left| \begin{pmatrix} 2 & 1 \\ 4 & 3 \end{pmatrix}^T \right| & \lim_{t \rightarrow 2} (t + 3) \\ |-5| & \frac{4!}{3!} & \sqrt{16} \end{pmatrix}$