



# Daffodil International University

Faculty of Science & Information Technology  
Department of Computer Science and Engineering  
Midterm Examination, Fall 2024

Course Code: MAT211, Course Title: Engineering Mathematics

Level: L2 Term: T1 Batch: 65

Time: 01:30 Hrs

Marks: 25

## Answer ALL Questions

*[The figures in the right margin indicate the full marks and corresponding course outcomes. All portions of each question must be answered sequentially.]*

1.	a)	Explain the conditions of the linear ODE with examples.	[2]	CO1
	b)	Demonstrate the ODE of the following equation $xy = e^{2x} (A \sin x + B \cos x)$ .	[3]	
	c)	Show the solution of the ODE $y - x \frac{dy}{dx} = a \left( y^2 + \frac{dy}{dx} \right)$ is $y = C(x+a)(1-ay)$ .	[5]	
2.	a)	Solve the non-linear (Bernoulli's) ODE $y \frac{dy}{dx} - y^2 = xe^{3x}$ .	[5]	CO2
	b)	Solve the first order first degree homogeneous ODE $xdy - \sqrt{x^2 + y^2} dx = ydx$ .	[5]	
3.	a)	Solve the higher order ODE $D^3y - 2Dy + 4y = e^x \sin x$ .	[5]	CO2