



Course Name: **Linear Algebra & ODE**

Course Code: **EMAT102L**

Academic Year: 2023-24

Semester: Even

Date: March 31, 2024

Type: 3-1-0

Tutorial Sheet: **8**

CO-mapping:

	CO1	CO2	CO3	CO4	CO5
Q1				✓	
Q2				✓	
Q3				✓	
Q4				✓	
Q5				✓	

Objectives: Students will be able to understand and apply the different methods of solving first order and first degree differential equations.

1. Find the general solution of $\frac{dy}{dx} = \frac{xy + y^2}{x^2}$.

2. Find the particular solution of $\frac{2xydy}{dx} = x^2 + y^2$, when $y(1) = 0$.

3. Solve the following differential equations:

(a) $\frac{dy}{dx} = \frac{x + y}{x}$; $y(1) = 1$.

(e) $2x^2 \frac{dy}{dx} = x^2 + y^2$.

(b) $\frac{dy}{dx} = \frac{x - y}{x}$; $y(2) = \frac{1}{2}$.

(f) $(2x - y) \frac{dy}{dx} = 2y - x$.

(c) $\frac{dy}{dx} = \frac{x - 2y}{x}$; $y(1) = 1$.

(g) $\frac{dy}{dx} = \frac{y}{x} + \tan\left(\frac{y}{x}\right)$.

(d) $\frac{dy}{dx} = \frac{x + y}{x - y}$.

(h) $x \frac{dy}{dx} = y + xe^{y/x}$.

Solve the following differential equations:

4. $\frac{dy}{dx} = \frac{x + 2y - 1}{x + 2y + 1}$.

5. $\frac{dy}{dx} = \frac{x + 2y - 1}{x - 2y + 1}$.

6. $(x^2 - 4xy - 2y^2)dx + (y^2 - 4xy - 2x^2)dy = 0$.

7. $(x^3 + y^3)dx = (x^2y + xy^2)dy$.

8. $(2x + y - 1)dy = (x - 2y + 5)dx$.

“The art and science of asking questions is the source of all knowledge.” – Thomas Berger

