AMITY UNIVERSITY UTTAR PRADESH

PRACTICAL FILE REPORT

in the lab of

Basic Simulation Lab (ES204)

Submitted by: **Khushi Sharma**

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B.Tech. 4CSE-Eve2 X batch [redacted]

in partial fulfillment of requirements for the award of the degree of Bachelor of Technology

in

Computer [redacted] and [redacted] Submitted to:

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S. No.	AIM	Submitted Date	SIGNATURE
1.	Creating a one-dimensional and two-dimensional array then perform arithmetic operation: - Addition of Arrays, Subtraction of Arrays, Multiplication of Arrays, Exponential of Array, Inverse of Matrix, Transpose of Matrix, Rank of Matrix, Plot of Matrix.	21-01-2025	
2.	Performing [redacted] Manipulations - Concatenating, Indexing, Sorting, Shifting, Reshaping, Resizing and Flipping about a Vertical Axis / Horizontal Axis; Creating Arrays X & Y of given size (1 x N) and Performing (A). Relational Operations - >, <=, >=, ~= (B). Logical Operations - ~, &, |, XOR.	21-01-2025	
3.	Generating a set of Commands on a given Vector. Add up the values of the elements. Compute the Running Sum, where Running Sum for element j = the sum of the elements from 1 to j, inclusive. Generating a Random Sequence using rand() / randn() functions and plot them.	[redacted]	
4.	:Evaluating a given expression and rounding it to the nearest integer value using Round, Floor, Ceil and Fix functions; Also, generating and Plots of (A) Trigonometric Functions - sin(t),cos(t), tan(t), sec(t), cosec(t) and cot(t) for a given duration, 't'. (B) Logarithmic and other Functions – log(A), log10(A), Square root of A, Real nth root of A.	[redacted]	
5.	Generating a Sinusoidal Signal of a given frequency with Titling, Labeling, Adding Text, Adding Legends, Printing Text in Greek Letters, Plotting as Multiple and Subplot. Time scale the generated signal for different values. E.g. 2X, 4X, 0.25X, 0.0625X.	[redacted]	
6.	Creating a vector X with elements, Xn = (-1)n+1/(2n-1) and Adding up [redacted] elements of the vector, X; And, plotting the functions, x, x3 , ex , exp(x2) over the interval 0 < x < 4 (by choosing appropriate mesh values for x to obtain smooth curves), on A Rectangular Plot	[redacted]	

7.	Writing brief Scripts starting each Script with a request for input (using input) to Evaluate the function h(T) using if-else statement, where, h(T) = (T – 10) for 0 < T < [redacted] ♣ = (0.45 T + [redacted] for T > 100.	[redacted]	
8.	Generating a Square Wave from sum of Sine Waves of certain Amplitude and Frequencies	[redacted]	
9.	plot projectile trajectories using equations for ideal projectile motion where y(t) is the vertical distance and x(t) is the horizontal distance traveled by the projectile in metres, g is the acceleration due to Earth's gravity = 9:8 m/s2 and t is time in seconds. Let us assume that the initial velocity of the projectile v0 = 50:75 m/s and the projectile's launching angle 0 = [redacted] radians. The initial vertical and horizontal positions of the projectile are given by y0 = 0 m and x0 = 0 m. Let us now plot y vs. t and x vs. t in two separate graphs with the vector: t=0:0.1:10 representing time in seconds. Give appropriate titles to the graphs and label the axes.	[redacted]	
10.	Solving First, Second and third Order Ordinary Differential Equation using Built-in Functions and plot.	[redacted]	
11.	Basic 2D and 3D plots, polygons with vertices. 3D contour lines, pie and bar charts.	[redacted]	

Experiment 11

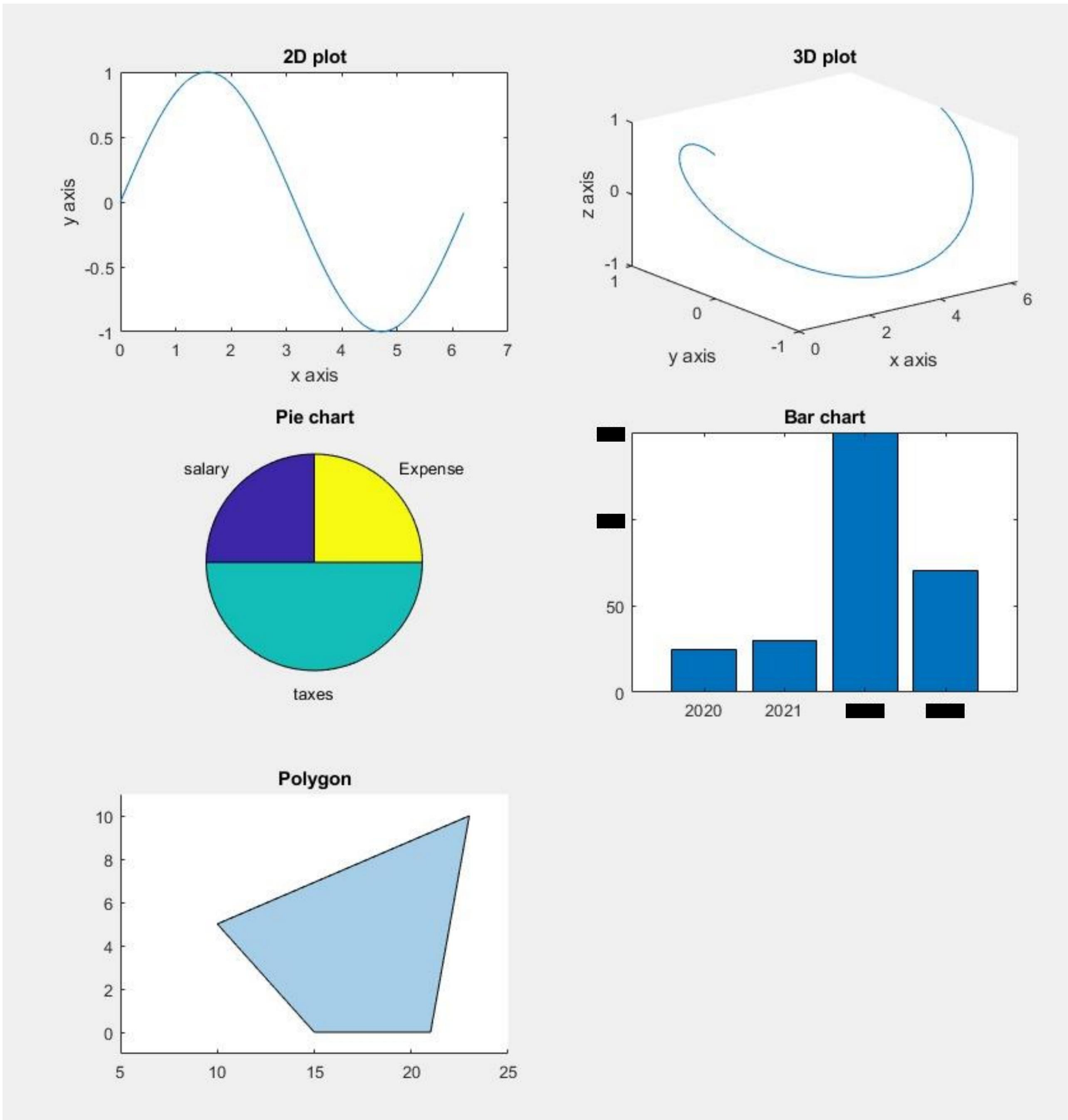
AIM: Basic 2D and 3D plots, polygons with vertices. 3D contour lines, pie and bar charts.

SOFTWARE: - MATLAB [redacted] Laboratory)

Program –

```
% 2D plot
t=0:0.1:2*pi;
y=sin(t)
subplot (3,2,1)
plot (t,y)
xlabel("x axis")
ylabel("y axis")
title ("2D plot")

% 3D plot
z=cos(t)
subplot (3,2,2)
plot3 (t,y,z)
xlabel("x axis")
ylabel("y axis")
zlabel("z axis")
title [redacted] plot")

% Pie chart
X = [0.25 0.5 0.25]
subplot (3,2,3)
labels = ["salary","taxes", "Expense"]
pie (X,labels)
title ("Pie chart")

% Bar chart
A = [25 30 [redacted] 70 ]
subplot (3,2,4)
labels = [redacted]
bar (labels, A)
title ("Bar chart")

% % Polygon
P1 = polyshape ([10 15 21 23], [05 00 00 10])
subplot (3,2,5)
plot (P1)
title ("Polygon")
```

Result –



Conclusion :

This experiment demonstrated MATLAB's ability to create **2D and 3D plots, polygons, contour lines, and bar/pie charts** for effective data visualization. These tools help in analyzing functions, geometric shapes, and data distributions, making MATLAB essential for scientific and engineering applications.