JAYPEEUNIVERSITYOFINFORMATIONTECHNOLOGY
WAKNAGHAT, P.O.–WAKNAGHAT, TEHSIL– KANDAGHAT,
DISTRICT– SOLAN (H.P.) PIN–173234(INDIA)
(Established by H.P. State Legislature vide Act No. 14 of 2002)

18B1WCI674: MACHINE LEARNING LAB

Assignment-3 (Matplotlib)

Jan 05, 2026

Instructions

1. Use Jupyter Notebook or Google Colab.
2. Use only **Matplotlib** for plotting tasks.
3. Avoid using Seaborn or other visualization libraries.
4. Use any suitable dataset (CSV or generated data).
5. Label all plots properly.

Overview of Matplotlib

Matplotlib is a popular Python library used for **data visualization**. It allows users to create **static, animated, and interactive plots** such as line charts, bar graphs, histograms, scatter plots, and more, which are essential for data analysis and machine learning.

Part A: Matplotlib Basics

1. Install Matplotlib:

```
pip install matplotlib
```

2. Import Matplotlib:

```
import matplotlib.pyplot as plt
```

3. Generate sample data using NumPy or Pandas.

1. Basic Plotting

1. Plot a simple line graph:

```
import matplotlib.pyplot as plt

x = [1, 2, 3, 4, 5]
y = [2, 4, 6, 8, 10]
```

```
plt.plot(x, y)
plt.show()
```

2. Plot multiple lines on the same graph:

   —

3. Add title, xlabel, and ylabel:

   —

4. Change line style and marker:

   —

5. Add legend to the plot:

   —

6. Enable grid:

   —

7. Save the plot as an image file:

   —

8. Change figure size:

   —

9. Plot using custom colors:

   —

10. Display the plot: —

2. Statistical Plots

1. Plot a bar chart: s

```
subjects = ["ML", "AI", "DL", "DS"]
marks = [75, 82, 68, 90]

plt.bar(subjects, marks)
plt.xlabel("Subjects")
plt.ylabel("Marks")
plt.title("Bar Chart")
plt.show()
```

2. Plot a horizontal bar chart:

   —

3. Plot a histogram:

   —

4. Change number of bins in histogram:

   —

5. Plot a scatter plot:

   —

6. Add color and size variation in scatter plot:

   —

7. Plot a pie chart:

   —

8. Explode a slice in pie chart:

   —

9. Add percentage labels:

   —

10. Customize chart appearance: —

3. Advanced Visualization

1. Create subplots using `subplot()`:

```
x = [1, 2, 3, 4]

plt.subplot(1, 2, 1)
plt.plot(x, [i for i in x])
plt.title("Plot 1")

plt.subplot(1, 2, 2)
plt.plot(x, [i*i for i in x])
plt.title("Plot 2")

plt.show()
```

2. Plot multiple charts in a single figure:

   —

3. Share axes between subplots:

   —

4. Add annotations to a plot:

   —

5. Plot error bars:

   —

6. Plot boxplot:

   —

7. Plot violin plot:

   —

8. Plot stem plot:

   —

9. Plot step graph:

   —

10. Plot area chart: —

Part B: Advanced Matplotlib

1. Customize ticks and labels:

```
x = [1, 2, 3, 4, 5]
y = [10, 20, 30, 40, 50]

plt.plot(x, y)
plt.xlim(0, 6)
plt.ylim(0, 60)
plt.title("Axis Limits Example")
plt.show()
```

2. Change axis limits:

   —

3. Apply logarithmic scale:

   —

4. Plot time-series data:

   —

5. Format date on x-axis:

   —

6. Use style sheets:

   —

7. Create stacked bar chart:

   —

8. Plot heatmap using Matplotlib:

   —

9. Save plots in different formats (PNG, PDF):

   —

10. Combine Matplotlib with Pandas: —