

MATPLOTLIB –

1 Graph Customization

◆ Theory (Brief)

Graph ko **readable aur attractive** banane ke liye:

- color → line ka rang
 - linestyle → line ka style
 - marker → points ka shape
 - grid → reading easy
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◆ Example Code

```
import matplotlib.pyplot as plt

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

plt.plot(x, y, color='red', linestyle='--', marker='o')
plt.grid(True)
plt.title("Customized Line Graph")
plt.show()
```

◆ Explanation

- color='red' → line ka color
- linestyle='--' → dotted line
- marker='o' → points dikhte hain
- plt.grid(True) → background grid

2 Labels & Legend

Graph ko **self-explanatory** banane ke liye:

- X-axis label
 - Y-axis label
 - Legend (line ka meaning)
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◆ Example Code

```
plt.plot(x, y, label="Sales")
plt.xlabel("Days")
plt.ylabel("Amount")
plt.legend()
plt.show()
```

◆ Explanation

label → line ka name
legend() → label display karta hai
xlabel() / ylabel() → axis names

3 Multiple Lines (Comparison)

Ek graph me 2 ya 3 datasets compare karte hain.

◆ Example Code

```
y1 = [10, 20, 30, 40, 50]
y2 = [8, 18, 28, 38, 48]
```

```
plt.plot(x, y1, label="2024")
plt.plot(x, y2, label="2025")
plt.legend()
plt.show()
```

◆ Explanation

Same x ke saath different y
Multiple lines ek hi graph me

4 Subplots

Ek window me multiple graphs dikhane ke liye.

◆ Example Code

```
plt.subplot(1, 2, 1)
plt.plot(x, y)
plt.title("Line Graph")
```

```
plt.subplot(1, 2, 2)
plt.bar(x, y)
plt.title("Bar Graph")
```

```
plt.show()
```

◆ Explanation

subplot(1,2,1) → 1 row, 2 columns, 1st graph
subplot(1,2,2) → 2nd graph

5 Pandas + Matplotlib (Real Data)

Real data mostly CSV / Excel me hota hai.

◆ Example Code

```
import pandas as pd
import matplotlib.pyplot as plt

data = {
    "Day": [1, 2, 3, 4, 5],
    "Sales": [100, 150, 130, 180, 200]
}
```

```
df = pd.DataFrame(data)
```

```
plt.plot(df["Day"], df["Sales"])
plt.title("Sales Data")
plt.show()
```

◆ Explanation

Pandas data handle karta hai
Matplotlib graph banata hai

6 Save Graph as Image

Graph ko image file me save karte hain.

◆ Example Code

```
plt.plot(x, y)

plt.savefig("sales_graph.png")

plt.show()
```

◆ Explanation

savefig() → graph ko file me save karta hai

.png, .jpg supported

7 Large Data Handling (Concept Only)

Large data me:

- Trend important hota hai
- Har point dikhana zaroori nahi
- Same code kaam karta hai

🔪 PRACTICE QUESTIONS (IMPORTANT)

🔍 Level 1 – Basic

1. Create a line graph using numbers from 1 to 10.

2. Create a bar chart showing marks of 5 students.
 3. Create a scatter plot using any 5 values.
 4. Create a histogram using random numbers.
 5. Create a pie chart showing percentage distribution of any 3 categories.
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□ **Level 2 – Intermediate**

6. Create a line graph and add a title, X-axis label, and Y-axis label.
 7. Create a graph with two lines showing comparison of two subjects' marks.
 8. Create a bar chart and add labels and title to it.
 9. Display a line graph and a bar graph in the same window using subplots.
 10. Customize a line graph by changing color, line style, and marker
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● **Level 3 – Advanced / Practice Project**

11. Create a Pandas DataFrame using a dictionary.
12. Plot a graph using the DataFrame values.
13. Read a CSV file and plot a graph using one column as X-axis and another as Y-axis.
14. Save a plotted graph as an image file.
15. Create a graph using a large dataset and explain the trend.