DAY – 2

30 July 2025

❖ What is NumPy?

NumPy is a powerful Python library used for numerical computations. It provides support for arrays, matrices, and mathematical functions.

Features of NumPy

- Faster than Python lists
- Multidimensional arrays
- Mathematical & statistical operations
- Used in Data Science & ML

Example-

```
Import numpy as np

arr = np.array([1, 2, 3, 4])

print(arr)

print(arr + 2)
```

Use Cases

- Scientific calculations
- Image processing
- Machine learning preprocessing

- ❖ **Pandas – Data Handling & Analysis**

Introduction

Pandas is used for data manipulation and analysis. It provides **Series** and **DataFrame**.

```
import pandas as pd
data = {
   "Name": ["Aman", "Simran", "Karan"],
   "Marks": [85, 90, 88]
}
df = pd.DataFrame(data)
print(df)
```

Operations

- Reading CSV files
- Data cleaning
- Handling missing values

Real-world Use

- Student records
- Sales analysis
- Government data analysis

- ❖ **Matplotlib – Data Visualization**

Introduction

Matplotlib is used to represent data graphically.

Types of Graphs

- Line graph
- Bar chart
- Histogram
- Scatter plot

```
import matplotlib.pyplot as plt

x = [1,2,3,4]

y = [10,20,25,30]

plt.plot(x, y)

plt.xlabel("X-axis")

plt.ylabel("Y-axis")

plt.title("Simple Line Graph")

plt.show()
```

Importance

- Easy data interpretation
- Used in reports & presentations

❖ **Scikit-learn – Machine Learning Basics**

Introduction

Scikit-learn is used for ML algorithms like:

- Classification
- Regression
- Clustering

Example (Simple ML Concept – no heavy code)

Explain:

- Dataset
- Training
- Testing
- Prediction

Applications

- Spam detection
- Recommendation systems
- Prediction models

❖ **NLP Libraries – NLTK & spaCy (1 page)**

What is NLP?

Natural Language Processing helps machines understand human language.

Tasks Covered

- Tokenization
- Stopword removal
- Text classification
- Sentiment analysis

Use Cases

- Chatbots
- Voice assistants
- Text summarization

Installation of Python Libraries

- **Installation of TensorFlow**

TensorFlow can be installed using the pip package manager:

```
pip install tensorflow
```

- **Installation of Keras**

```
pip install keras
```

- **Installation of Flask**

```
pip install flask
```

- **Installation of Counter**

Counter is part of Python's standard library, so no installation is required**.**

```
from collections import Counter

data = ['apple', 'banana', 'apple', 'orange', 'banana', 'apple']

result = Counter(data)

print(result)
```

- **Installation of NumPy**

NumPy can be installed using the pip command:

```
pip install numpy
```

- **Installation of Pandas**

pip install pandas

- **Installation of Matplotlib**

pip install matplotlib

- **Installation of Scikit-learn**

pip install scikit-learn

- **Installation of Seaborn**

pip install seaborn