

Day 2 – Introduction to Python & Data Science

==> Why This Topic is Important

Before learning AI, ML, or GenAI, we must understand **two foundations**:

- 1 **Python** – the language we use to talk to machines
- 2 **Data Science** – the process of turning raw data into decisions

👉 Without Python + Data Science, **AI Engineer cannot exist**.

==> What is Python?

Definition

Python is a high-level, interpreted, general-purpose programming language that is **easy to read, easy to write, and very powerful**.

In simple words:

👉 *Python is a language that allows humans to easily communicate instructions to computers.*

Key Features of Python

- Easy English-like syntax
- No need to compile (interpreted)
- Cross-platform (Windows, Mac, Linux)
- Open-source & free
- Huge library ecosystem

==> Example

```
print("Hello, AI Engineer!")
```

Output:

Hello, AI Engineer!

==> Why Python is Used for AI & Data Science

Python is used because:

- AI works with **huge data**
- Python has **ready-made libraries**
- Faster development, less code
- Strong community & industry support

==> Popular Python Libraries for AI

Library	Use
NumPy	Numerical computation
Pandas	Data handling
Matplotlib / Seaborn	Visualization
Scikit-learn	Machine Learning
TensorFlow / Py Torch	Deep Learning
Lang Chain	LLM & GenAI apps

==> What is Data Science?

Definition

Data Science is the process of **collecting, cleaning, analyzing, and interpreting data** to make decisions.

👉 Data Science answers questions like:

- What happened?
- Why did it happen?
- What will happen next?

Data Science Flow

Data → Cleaning → Analysis → Visualization → Insight → Decision

==> Real-World Example of Data Science

Example: Amazon / Flipkart

- Collects user clicks, searches, purchases
- Cleans data (remove noise)
- Analyzes buying behavior
- Predicts what user may buy next
- Shows **recommended products**

==> Role of Python in Data Science

Python is used in **every stage**:

Stage	Python Use
Data Collection	APIs, files
Data Cleaning	Pandas
Analysis	NumPy

Visualization	Matplotlib
ML Models	Scikit-learn
AI Apps	TensorFlow, LLMs

==> Where Python & Data Science Are Used

- IT Companies
- Startups
- Banking & Finance
- Healthcare
- E-commerce
- Government projects
- AI & GenAI tools (ChatGPT, recommendation engines)