VECTOR INDIA

DRIVES YOU TO INDUSTRY



PYTHON FOR AI & DATA SCIENCE

FROM PYTHON FOUNDATIONS TO DATA-DRIVEN INSIGHTS

Python Programming Foundations

Core Syntax & Logic :

- Python syntax & execution flow
- Data types, variables & operators
- Conditional statements & control flow
- Loops, patterns & nested logic
- String manipulation
- List comprehensions

Data Structures & Algorithms

- Lists, tuples, sets & dictionaries
- Searching & sorting algorithms
- Stack & Queue implementations
- Time complexity (Big-O notation)

Advanced Python

- Functions & recursion
- Lambda, map, filter & reduce
- Decorators & generators
- Regular expressions
- Modules & Packages
- Logging
- OOP — classes, objects, inheritance, Encapsulation, Polymorphism, Abstraction
- Exception handling
- File & I/O handling
- Type Hints
- Dataclasses
- Pydantic
- Os, requests library
- Environment variables (python-dotenv)
- Concurrency
- Working with dates/times & JSON
- Virtual Environments & Dependency Management (pip, uv)
- Testing with pytest

Data Analysis & Visualization

Numerical Computing

- NumPy arrays & broadcasting
- Array indexing, slicing & boolean masking
- Vectorized operations & reshaping
- Linear algebra basics
- Random number generation

Data Wrangling - Pandas

- DataFrames & Series
- Reading & writing data — CSV, Excel, JSON, SQL
- Data cleaning & imputation
- Feature engineering
- Merging & reshaping data
- GroupBy & aggregations
- Datetime data handling



Visualization & Databases

- Matplotlib charts & subplots
- Seaborn statistical plots
- Plotly interactive charts
- EDA — Univariate, Bivariate & Multivariate analysis, Correlation analysis, Outlier detection, Data quality assessment and Business insight generation
- SQL — joins, subqueries, window functions
- Connecting Python to databases (SQLAlchemy)
- MongoDB — CRUD & aggregation pipelines

