

Python Programming, Automation, APIs, and Agentic AI Foundations

Duration: 5 days/ 40 hours

Prerequisites: Basic computer knowledge and logical thinking.

Day 1: Python Programming Fundamentals

Topics

- Python ecosystem and use cases
- Python installation and IDE setup
- Variables, data types, and operators
- Input/output handling
- Conditional statements
- Loops
- Functions
- Modules and packages
- Basic debugging

Labs

- Create a calculator application
- Build a simple student marks processing program
- Write reusable functions and modules

Outcome

Participants will be able to write basic Python programs using functions and modules.

Day 2: Data Structures, File Handling, and Error Handling

Topics

- Strings and string operations
- Lists, tuples, sets, dictionaries
- List comprehension
- Working with dates and times
- Exception handling
- Custom exceptions
- File handling
- CSV and JSON handling
- Virtual environments and pip

Labs

- Create a contact management application using dictionaries
- Read and process CSV files

- Convert CSV data into JSON format
- Handle runtime errors using exceptions

Outcome

Participants will be able to work with Python data structures and process files effectively.

Day 3: Object-Oriented Python, Database Access, and APIs

Topics

- Classes and objects
- Constructors
- Inheritance and polymorphism
- Encapsulation in Python
- Working with SQLite / PostgreSQL / MySQL
- CRUD operations using Python
- Introduction to REST APIs
- Flask / FastAPI basics
- Request and response handling
- JSON APIs

Labs

- Build an OOP-based library management system
- Connect Python application with database
- Create a simple REST API using FastAPI or Flask

Outcome

Participants will be able to build structured Python applications with database and API support.

Day 4: Python Automation, Data Processing, and Testing

Topics

- Python for automation
- Working with Excel files
- Working with APIs using requests
- Data processing using pandas
- Logging in Python
- Unit testing using unittest / pytest
- API testing basics
- Environment variables and configuration management

Labs

- Automate Excel report generation
- Fetch data from a public API and process it
- Create logs for application execution

- Write unit tests for Python functions

Outcome

Participants will be able to automate business tasks and build testable Python applications.

Day 5: Agentic AI with Python and Capstone Project

Topics

- Introduction to Generative AI and Agentic AI
- AI agents vs traditional automation
- Agentic AI architecture
- Prompt engineering for developers
- Tool use and function calling concepts
- Memory and context in agents
- Planning and reasoning in agents
- Building a basic Python AI agent
- Using AI for code generation, debugging, documentation, and test creation
- Responsible AI and data privacy basics

Labs

- Create prompts for code generation and debugging
- Build a basic Python agent that can call functions
- Create an AI-powered FAQ or support assistant
- Capstone: Build a Python-based task assistant that reads user input, selects an action, and returns a structured response

Outcome

Participants will understand Python's role in AI application development and build a basic Agentic AI-style assistant.
