

# **Modern Python Web APIs Development with FastAPI**

**Total Duration:** 5 days

**Prerequisite:** Knowledge of API and Python Programming

## **Day 1: Python Programming Essentials and Fast API**

### **Module 1: Python Programming Basics**

- Python Syntax, Data Types, Variables
- Lists, Dictionaries, Sets, and Tuples
- Conditional Statements and Loops
- Functions and Lambda Expressions
- Exception Handling (try, except, raise)

### **Module 2: Getting Started with FastAPI (4 hrs)**

- Introduction to FastAPI and REST APIs
- Python Type Hints Overview
- Installing FastAPI and Uvicorn
- Creating your first FastAPI App (Hello World)
- Understanding GET, POST Requests
- Path & Query Parameters

### **Labs**

- Build basic Python scripts with loops, functions, error handling
  - Create a basic FastAPI app with query/path parameters
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## **Day 2: Python OOP + FastAPI Data Handling & Routing**

### **Module 3: Python OOP Concepts**

- Classes, Objects, Inheritance
- Constructors and `__init__` method
- Method Overriding
- Practical use in API structures

### **Module 4: FastAPI Models & Routing**

- Pydantic Models for Request/Response
- Field Validation and Aliases
- Dependency Injection with `Depends()`
- Error Handling and Status Codes
- FastAPI Routers (modular app structure)

### **Labs**

- Create Pydantic models and validate user input
- Use OOP to structure reusable logic in FastAPI
- Modularize API routes using routers

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## Day 3: Database, Middleware, and Async Operations

### Module 5: Connecting Python with SQL

- Intro to SQLAlchemy ORM
- SQLite/MySQL Integration with Python

### Module 6: FastAPI with Databases

- Sync vs Async DB connections
- SQLAlchemy Models and DB Session
- CRUD Operations with SQLAlchemy
- Database Initialization on App Start
- Environment Variables (dotenv)

### Module 7: Middleware & App Structure

- Using Middleware (CORS, Logging)
- Event Hooks: startup and shutdown
- Structuring large apps with services, repositories

### Labs

- Setup SQLite/MySQL DB with SQLAlchemy
- Perform CRUD operations from API
- Add middleware for logging and CORS

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## Day 4: Authentication, Testing, and Deployment

### Module 8: Authentication & Security

- OAuth2 & JWT Basics
- Secure Password Hashing (bcrypt)
- Login, Register, Protected Routes

### Module 9: Testing & Deployment

- Writing Unit Tests with pytest
- Deploy FastAPI

### Module 10: Docker & Project Capstone

- Dockerizing FastAPI App (Basics)
- Final Project: ToDo / Blog / Inventory API (includes auth, DB, and modular routes)

### Labs

- Implement secure login system with JWT
- Write unit tests for API endpoints
- Dockerize and deploy your API locally