

KOENIG SOLUTIONS · COURSE OUTLINE

Fundamental of Python API and Microservices

Learn to design, build, secure and deploy Python REST APIs and microservices, from FastAPI basics to Docker containerisation.

4 Days

DURATION

18

MODULES

36

TOPICS

13

HANDS-ON ACTIVITIES

COURSE OVERVIEW

This course covers API and microservices fundamentals, including REST architecture and building APIs with FastAPI. It then addresses API design practices, request and response models, parameter handling, error handling and documentation with OpenAPI and Swagger UI. Database integration follows, covering ORM concepts with SQLAlchemy, CRUD operations, service-layer architecture and configuration management. Finally, it covers inter-service communication, API versioning, security fundamentals, logging and monitoring basics, and deployment with Docker.

WHO THIS COURSE IS FOR

API Developers

Backend Developers

Python Developers

Software Engineers

Microservices Architects

PREREQUISITES

- Knowledge of Python Programming

LEARNING OBJECTIVES

- Compare monolithic and microservices architectures
- Apply REST principles and HTTP methods in API design
- Build REST APIs using FastAPI
- Design request and response models with JSON schema validation
- Implement path, query and body parameter handling
- Document APIs using OpenAPI and Swagger UI
- Integrate databases using SQLAlchemy and CRUD operations
- Deploy containerised Python microservices using Docker

18 Modules, 36 Topics

DAY 1 API Fundamentals & REST with Python

Ability to build and test basic Python REST APIs.

01

Introduction to APIs & Microservices

TOPICS

Monolithic vs Microservices architecture · Real-world enterprise API use cases · API-first development approach

02

REST Architecture Fundamentals

TOPICS

REST principles · HTTP methods (GET, POST, PUT, DELETE) · HTTP status codes & headers

03

Python API Framework Overview

TOPICS

Why FastAPI (enterprise readiness) · Project structure & setup · Request-response lifecycle

3 Lab Modules

DAY 2 API Design, Validation & Documentation

Participants design clean, validated, and documented APIs.

01

API Design Best Practices

TOPICS

Resource naming · Clean endpoint structure

02

Request & Response Models

TOPICS

JSON schema design · Request validation · Response formatting

03

Parameters Handling

TOPICS

Path parameters · Query parameters · Request body

04

Error Handling

TOPICS

HTTP exceptions · Custom error responses

05**3 Lab Modules**

API Documentation

TOPICS

OpenAPI & Swagger UI

DAY 3

Database Integration & Microservices Concepts

Ability to build data-driven microservices.

01

Microservices Architecture Fundamentals

TOPICS

Service independence · Database-per-service concept

02

Database Integration

TOPICS

ORM concepts · SQLAlchemy overview

03

CRUD Operations

TOPICS

Create, Read, Update, Delete APIs

04

Service Layer Architecture

TOPICS

Controller vs service separation · Business logic isolation

05**3 Lab Modules**

Configuration Management

TOPICS

Environment variables · Config files

DAY 4

Microservices Communication, Security & Deployment

Participants understand how microservices communicate, secure, and deploy.

01

Inter-Service Communication

TOPICS

REST-based service-to-service calls · Sync vs async communication (conceptual)

02

API Versioning Strategies

03

Security Fundamentals

TOPICS

API keys · Token-based authentication (intro)

04

Logging & Monitoring Basics

05

4 Lab Modules

Deployment Fundamentals

TOPICS

Introduction to Docker · Containerizing Python APIs · Local deployment strategies

HANDS-ON ACTIVITIES

Practise What You Learn

#	MODULE	ACTIVITY
03	Python API Framework Overview	■ Lab 1: Setup Python API development environment ■ Lab 2: Create first REST API using FastAPI ■ Lab 3: Test APIs using Postman / curl
05	API Documentation	■ Lab 1: Design structured API models ■ Lab 2: Implement validation & error handling ■ Lab 3: Generate auto-documented APIs
05	Configuration Management	■ Lab 1: Connect API to relational database ■ Lab 2: Implement CRUD microservice ■ Lab 3: Refactor API using service-layer architecture
05	Deployment Fundamentals	■ Lab 1: Create multiple microservices ■ Lab 2: Enable service-to-service communication ■ Lab 3: Secure APIs with basic authentication ■ Lab 4: Dockerize and run Python microservices

WHAT IS INCLUDED

Everything You Need to Succeed

- Koenig course material for every module
- Delivery by certified instructors and subject matter experts
- Hands-on exercises throughout the course
- Course completion certificate from Koenig

ABOUT KOENIG

Who We Are

Established in 1993, Koenig Solutions is a globally recognised training provider with 35+ technology partnerships, 5,000+ training programmes and a network of certified instructors and subject matter experts, supporting individuals and enterprise teams worldwide.

FLEXIBLE DELIVERY

Learn the Way That Suits You

Classroom Training

Live Online Classes (ILO)

Fly-Me-A-Trainer (FMAT)

Flexi (Self-Paced)

1-on-1 Training

Ready to Get Started?

Talk to a learning advisor about schedules, group training and customised delivery.

Visit koenig-solutions.com

✉ info@koenig-solutions.com