

Python API Design: Flask, REST & JSON

Learn to build and document Python APIs, from REST principles and JSON handling to Flask-based web services and SQLite integration.

5 Days

40 HOURS

12

MODULES

103

TOPICS

COURSE OVERVIEW

The API Design with Python course is a comprehensive program tailored for learners looking to gain expertise in building robust APIs using Python. This course covers a plethora of topics starting from a Python Review to ensure a strong foundation in Python's core concepts such as lists, dictionaries, and functions. As learners progress, they will delve into OS Interfacing with Python, mastering file and directory manipulation, and executing shell commands programmatically. The course then advances into Web and RESTful APIs, where students will learn the principles of REST, how to create Python clients for APIs, and manage authentication with tokens. The Python Protocol Clients module teaches scripting with HTTP and building clients and servers, while the JSON, YAML, XML, CSV, and Excel module focuses on data handling. Learners will also explore Generating and Sending Emails, handling Dates and Times, and utilizing Python Regular Expression (Regex) for advanced data processing. Code Review practices and tools like pylint ensure code quality, and Web API Design with Flask module provides hands-on experience in creating APIs with Python's popular micro-framework. The course also touches on database interactions through SQLite and concludes with Processes and Threads to understand concurrent programming in Python. By the end of this course, participants will be well-equipped to design, implement, and document APIs effectively, making them valuable assets in the tech industry.

Who Should Attend

The “API Design with Python” course equips learners with essential skills for developing robust APIs using Python, catering to IT professionals looking to enhance their expertise.

Software Developers and Engineers

Backend Developers

Systems Architects

Data Scientists who need to integrate systems or expose data through APIs

DevOps Engineers involved in continuous integration and deployment processes

IT Professionals focusing on web services and cloud solutions

Full Stack Developers looking to strengthen their backend skills

Technical Project Managers overseeing API development projects

Technical Leads and Senior Developers designing system architectures

Quality Assurance Engineers specializing in API testing

Application Developers building APIs for mobile or desktop applications

Network Engineers interested in network automation using Python APIs

Security Professionals assessing API security and conducting penetration testing

LEARNING OBJECTIVES

- Apply core Python constructs such as lists, dictionaries and functions
- Use the os module for file, directory and shell operations
- Explain REST principles and build Python clients for API endpoints
- Implement protocol clients using HTTP, SSH and SFTP
- Process data formats such as JSON, YAML, XML and CSV
- Apply regular expressions to search files and API results
- Review code quality using pylint and Python conventions
- Build web APIs with Flask, including sessions and file uploads

12 Modules, 103 Topics

01

Python Review

TOPICS

- Lists
- Dictionaries
- Tuples
- Conditionals (if, elif, else)
- Loops (for and while)
- Functions
- Variable scope review
- Converting boilerplate code to functional code
- Writing reusable functions
- Using pip
- Useful third-party modules
- Publishing a module
- Documenting modules

02

OS Interfacing

TOPICS

- **os module:** `listdir()`, `getcwd()`, `makedirs()`
- Common `sys` module attributes & methods
- Working with the `os` module and files/directories
- Walking file trees with `os.walk()`
- File, path, and directory operations
- Working with `os.path`
- `os` and `os.path` module examples
- Environment variables
- Running shell commands
- Compressing and archiving (`gzip`, `tar`, `zip`)

03

Web and RESTful APIs

TOPICS

- Understanding REST
- REST APIs and HTTP CRUD operations
- REST and OpenStack
- URI analysis and formation
- Capturing requests with Wireshark
- Using `cURL`
- `etcd` keystore
- Creating a Python client to interact with API endpoints
- API development keys
- SSH and Python
- Secure password retrieval
- Tokens and APIs

04

Python Protocol Clients

TOPICS

- Scripting the browser
- Scripting with HTTP
- Creating an HTTP client and server
- Python and SSH
- Building an SFTP client and server
- Python and SFTP limitations
- Using Paramiko for SSH
- Netmiko for major network vendors (Cisco, Juniper, Arista)

05

JSON, YAML, XML, CSV, and Excel

TOPICS

- JSON (RFC 7159)
- JSON formatting
- Introduction to YAML
- YAML lists and dictionaries
- YAML line spanning
- Reading YAML files
- XML parsing
- Working with CSV files
- Importing JSON and YAML
- Decoding JSON and YAML in Python
- Using Python to process data structures (YAML, XML, CSV, JSON)
- Reading from Excel files
- Writing to Excel files

06

Generating and Sending Emails

TOPICS

Overview of email modules · Creating simple emails · Interfacing with email accounts

07

Dates and Times

TOPICS

Python and cron · Importing time and using `time.time()` · Suspending execution with `sleep()` · Working with time data · Time formatting · Time tuples · Creating calendars

08

Python Regular Expressions (Regex)

TOPICS

- Metacharacter review
- re module basics
- search() and match() functions
- findall() method
- Compiling regex search patterns
- Creating efficient searches
- Sorting datasets
- sort() vs. sorted()
- Sorting with functions
- Applying regex to file searches
- Applying regex to API results

09

Code Review

TOPICS

Best practices · Using pylint for code analysis · Python coding conventions · Using underscores in variable names · Double underscores (__) and name mangling · Monkey patching

10

Web API Design with Flask

TOPICS

Flask overview · Using decorators · Building APIs with Python and Flask · APIs returning Jinja2 templating · Returning a cookie · Building sessions · Redirecting from URIs · Building an API to accept file uploads

11

SQLite

TOPICS

Overview of SQLite · Connecting SQLite with Python · Read and write operations · Useful SQLite commands · Connecting APIs with SQLite · Reading and writing to databases using APIs

12

Processes and Threads

TOPICS

Threading basics · Context switching · Deadlock errors · Thread starvation · Race conditions and race specifics · Working with locks

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