

KOENIG SOLUTIONS · COURSE OUTLINE

Python for Beginners

Learn to write Python programs using core data types, data structures, control flow, functions and generators, from file handling to serialization.

15

MODULES

45

TOPICS

8

HANDS-ON ACTIVITIES

COURSE OVERVIEW

This course introduces core Python object types, including numbers, strings and booleans, along with mutability and the main data structures: lists, tuples, sets and dictionaries. It covers dynamic typing, file handling with context managers, string manipulation, and data serialization using pickle and json. It then moves through control flow, conditionals, loops and comprehensions, before introducing functions, scope, closures, recursion, lambda expressions and generators. The course closes with benchmarking techniques and project work combining file handling, JSON output and custom benchmarking utilities.

WHO THIS COURSE IS FOR

Python Developers

Software Developers

Data Analysts

Programming Beginners

Backend Developers

PREREQUISITES

- Knowledge of any programming language.

LEARNING OBJECTIVES

- Identify Python's core object types and their mutability
- Apply lists, tuples, sets and dictionaries to organise data
- Explain dynamic typing and shared references in Python
- Implement file handling using modes and context managers
- Apply string manipulation methods including slicing and formatting
- Build serialization routines using pickle and json
- Develop conditional logic and loop constructs for iteration
- Build functions, closures and generators for data processing

15 Modules, 45 Topics

01

Core Python Data Types

TOPICS

- Introducing Python Object Types
- Conceptual hierarchy and built-in object types
- **Core data types:** int, str, float, bool
- Mutability and immutability

02

Data Structures

TOPICS

List · Tuple · Sets · Dictionary

03

The Dynamic Typing Interlude

TOPICS

Python's dynamic typing mechanism · Shared references and garbage collection

04

File Handling

TOPICS

File Opening · File Closing · Different modes of file handling · Context Manager

2 Hands-On Labs

05

String Manipulation and Structured Data

TOPICS

- String Fundamentals
- String methods, slicing, and formatting techniques
- Advanced string operations (templates and Unicode)

06

Lists and Dictionaries and Tuples

TOPICS

- List comprehensions, nesting, and operations
- Dictionary methods, comprehensions, and optimizations
- Tuples vs. lists.

07

Hands-On Lab

Data Storage and Transmission

TOPICS

Data serialization with ``pickle`` · Data serialization with ``json`` · Data deserialization

08

Control Flow and Iterations

TOPICS

- Python Statements
- Understanding Python's indentation-based syntax
- Interactive loops and error handling basics

09

2 Hands-On Labs

Conditionals, Loops, and Comprehensions

TOPICS

- Writing complex conditional logic with ``if``, ``elif``, ``else``
- **Loop constructs:** ``while``, ``for``, and ``else``
- Iteration protocols and advanced comprehensions

10

Functions, Scopes, and Generators

TOPICS

- Functions and Arguments
- **Function basics:** defining and calling
- Scope and closure concepts
- Argument-passing techniques, including ``*args`` and ``**kwargs``

11

Advanced Functions

TOPICS

- Recursive functions and functional programming tools (``map``, ``filter``)
- ``lambda`` expressions and introspection

12

2 Hands-On Labs

Generators and Comprehensions

TOPICS

- Generator functions with ``yield``
- Generator expressions and comparisons to list comprehensions
- Advanced use cases for generators in pipelines

13

Benchmarking and Practical Applications

TOPICS

Benchmarking Techniques · Timing operations with ``timeit`` · Performance analysis using iteration

14

Hands-On Lab

Practical Applications and Best Practices

TOPICS

- Review of covered concepts applied to real-world scenarios
- Writing efficient, maintainable Python code

15

Project Work

TOPICS

- Data aggregator with file handling and JSON output
- Custom benchmarking utility for Python scripts

Practise What You Learn

#	MODULE	ACTIVITY
04	File Handling	■ Implement basic file handling operations ■ Explore dynamic typing with custom examples
07	Data Storage and Transmission	Perform serialization and Deserialization of data
09	Conditionals, Loops, and Comprehensions	■ Develop a multi-condition data filter ■ Use list comprehensions to transform nested data
12	Generators and Comprehensions	■ Create a recursive function for hierarchical data traversal ■ Implement a generator pipeline for processing live data streams
14	Practical Applications and Best Practices	Build a custom benchmarking script for comparing sorting algorithms

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

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.

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