

# ADVANCED PYTHON

Course Code: 821512

Understand Python's capabilities beyond basic syntax in this hands-on advanced-level course.

This course will help you gain an understanding of Python's capabilities beyond basic syntax with a focus on widely accepted Pythonic constructs and procedures that will enable you to write reliable, optimized, and modular applications. This very hands-on course includes a deep dive into Pythonic data structures, exception handling, meta programming, regular expression, advanced file-handling, asynchronous programming, and more. At the completion of the course, you will also gain an understanding of unit testing in Python with lab-based practices designed to help you create and run unit test cases.

## What You'll Learn

This course has 50% hands-on labs to 50% lecture ratio with engaging instruction, demos, group discussions, labs, and project work in which you'll learn:

- Enhancements to classes
- Advanced Python metaprogramming concepts
- Writing robust code using exception handling
- Working with different data structures supported in Python
- Search and replace text with regular expressions
- Easy-to-use and easy-to-maintain modules and packages
- Creating multithreaded and multi-process applications
- Implementing and execute unit tests

## Who Needs to Attend

This course is designed for students with Python programming literacy who want to learn about advanced Python features and how to automate and simplify tasks.

## Prerequisites

Students should have experience writing Python scripts, as well as a user-level knowledge of Unix/Linux, Mac, or Windows.

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CLASSROOM LIVE

\$3,255 CAD

5 Day

## Classroom Live Outline

### Day 1

#### 1. Python refresher

- Built-in data types
- Lists and tuples
- Dictionaries and sets
- Program structure
- Files and console I/O
- If statement
- for and while loops

#### 2. Data Structures and Algorithms

- Linked list
- Stack
- Queue
- Trees
- Graphs
- Sorting algorithms

### Day 2

#### 1. Errors and Exception Handling

- Syntax errors
- Exceptions
- Using try/catch/else/finally
- Handling multiple exceptions
- Ignoring exceptions

#### 2. Implementing Regular Expressions

- RE Objects
- Searching and matching
- Using Regular Expression to search data sets
- Searching for data in Wireshark Traces (Python and \*.pcaps)
- Compilation flags
- Groups and special groups

- Replacing text
- Splitting strings

### 3. **Advanced Functional Features of Python**

- Advanced unpacking
- List Comprehension
- Anonymous functions
- Lambda expressions
- Generator Expression
- Decorator
- Closure
- Single/multi dispatch
- Relative imports
- Using `__init__` effectively
- Documentation best practices

## **Day 3**

### 1. **Metaprogramming**

1. OOP conventions
2. Class/static data and methods
3. Parse information to create classes using a dictionary
4. `Super()` method
5. Metaclasses
6. Abstract base classes
7. Implementing protocols (context, iterator, etc.) with special methods
8. Implicit properties
9. `Globals()` and `locals()`
10. Working with object attributes
11. The `inspect` module
12. Callable classes
13. Monkey patching

### 2. **Advanced file handling**

- Paths, directories, and filenames
- Checking for existence
- Permissions and other file attributes
- Walking directory trees
- Creating filters with `fileinput`
- Using `shutil` for file operations

## **Day 4**

### 1. **Advanced Data Structure features in Python**

- Use `defaultdict`, `Counter`, and `namedtuple`
- Create data classes
- Store data offline with `pickle`
- Pretty printing data structures
- Compressed archives (`zip`, `gzip`, `tar`, etc.)
- Persistent data

## 2. **Multiprogramming**

- Concurrent programming
- Multithreading
- The threading module
- Sharing variables
- The queue module
- The multiprocessing module
- Creating pools
- Coroutines
- About async programming

## 3. **Python Design Patterns**

- Need for design patterns and types
- Creational
- Structural
- Behavioral
- Best coding practices

## **Day 5**

### 1. **Developer Tools**

- Analyzing programs with pylint
- Using the debugger
- Profiling code
- Testing speed with benchmarking

### 2. **Unit testing with PyTest**

- What is a unit test
- Testing with Unit-test framework
- Testing with PyTest
- Testing with doctest
- Writing tests
- Working with fixtures
- Test runners
- Mocking resources

### 3. **Writing real-life applications**

- Build the classic minesweeper game in the command line
- Build a program that can go into any folder on your computer and rename all of the files based on the conditions set in your Python code
- Implement the binary search algorithm
- Build a random password generator
- Build a countdown timer using the time Python module.

## Classroom Live Labs

About 50% of the content of this very hands-on course is lab-based practice.

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VIRTUAL CLASSROOM LIVE

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9. Globals() and locals()
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11. The inspect module
12. Callable classes
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Mar 16 - 20, 2026 | 8:30 AM - 4:30 PM EDT

May 18 - 22, 2026 | 8:30 AM - 4:30 PM EDT

Jul 20 - 24, 2026 | 8:30 AM - 4:30 PM EDT

Sep 21 - 25, 2026 | 8:30 AM - 4:30 PM EDT

Nov 2 - 6, 2026 | 8:30 AM - 4:30 PM EST





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PRIVATE GROUP TRAINING

5 Day

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