Certified Professional in Python Programming 1 (PCPP1)

This Certified Professional in Python Programming 1 (PCPP1) training covers how to use the Python programming language in accomplishing coding tasks and advanced programming objectives. Use the PCPP1 course to prepare for the first exam needed to earn the Certified Professional in Python Programming certification (a two-part certification from the Python Institute).

CBT Nuggets course material →

STUDY PLAN

WEEK 1

Understand Object-Oriented Programming Basics — 168 min.

Inheritance, Subclasses, and Superclasses	7
Basic Class, Instance, and Attribute Syntax	15
Basic Instance Method Syntax	6
Reflexion Basics: isinstance and issubclass	10
Challenge: Build a Library Management System	4
Solution Walk-Through: Build a Library Management System	13

Understand Comparison Magic Methods

What are Magic Methods?	10
Comparison Magic Method Basics	9
Other Comparison Magic Methods	10
Challenge and Solution: Build a Fraction Class	20

Understand Numeric Magic Methods

Numeric Magic Methods	12
Other Numeric Magic Methods	10
Hands-On Example: Numeric Methods	16
Challenge: Lunar Arithmetic	7
Solution Walk-Through: Lunar Arithmetic	19

WEEK 2

Understand Type Conversion Magic Methods — 155 min.

Basic Type Conversion Magic Methods	16
Instance Representations and Formatting	17
Challenge and Solution: Type Conversion Methods for Fractions	23

Understand Attribute Access Magic Methods

Basic Attribute Access Magic Methods	14
Creating "Computed Attributes"	9
Automatic Unit Conversion	12
Challenge and Solution: "Person" Class Enhancements	27

Understand Container Access Magic Methods

Container Access Method Basics	7
Using Container Access Methods	12
Indexing Options for Container Access	9
More Advanced Indexing Options	9

WEEK 3

156 min.

Challenge: Build A Matrix Class	4
Solution Walk-Through: Build A Matrix Class	8

Understand Iterator Magic Methods

Iterator Magic Method Basics	6
Using Iterator Magic Methods	15
Creating Iterator "Wrappers"	11
What Syntaxes Trigger __iter__?	13
Challenge: Iterator Magic Methods	3
Solution Walk-Through: Iterator Magic Methods	6

Learn the Basics of Inheritance and Polymorphism

Class Hierarchies	5
Creating a Class Hierarchy	13
Polymorphism and Why it Matters	12
Duck-Typing	10
Challenge: Resetting Passwords	2
Solution Walk-Through: Resetting Passwords	5

Understand Multiple Inheritance in Python

Basics of Multiple Inheritance	9
Multiple Inheritance with Methods	9
Multiple Inheritance with Attributes	9
Method Resolution Order (MRO)	16

WEEK 4

154 min.

Challenge and Solution: Method Resolution Order	11

Learn the Basics of Composition

Inheritance vs. Composition	7
Composition in Code	16
Interesting Benefits of Composition	13
Hands-On Example: Video Game Characters	13

Master Arguments in Python

Python's Six Argument Types	15
Use Cases for Regular Argument Types	9
Use Cases for Arbitrary and Restricted Arguments	12
Challenge: Using Argument Types	9
Solution: Using Argument Types	8

Learn About Python Function Decorators

What are Decorators?	5

Basic Function Decorator Syntax 10

Implementing Simple Decorators 15

Decorator Arguments and Stacking 11

WEEK 5

157 min.

Challenge: Improved Debugging Decorator 3

Solution: Improved Debugging Decorator 7

Implement Common Function Decorator Patterns

Pattern #1: Monitoring Decorator 10

Pattern #2: Retry Decorator 12

Pattern #3: Caching Decorator 10

Closure in Python Decorators 8

Challenge: Average Performance Decorator 8

Learn About Python Class Decorators

What are Class Decorators? 7

Basic Class Decorator Syntax 13

Decorating Functions with Classes 15

Decorating Classes with Classes 10

Challenge: Attribute Type Validation 2

Solution: Attribute Type Validation 7

Implement Common Class Decorator Patterns

Pattern #1: Counting Instances 12

Pattern #2: Observing Attribute Changes 10

Pattern #3: Singleton Classes 10

Challenge: Accessing Other Instances 6

Solution: Accessing Other Instances 7

WEEK 6

Work with Class and Static Methods

160 min.

What are Class Methods? 13

What are Static Methods? 6

Instance Counting with Class Methods 10

Combining Class Methods and Attributes with Decorators 8

Challenge and Solution: Alternative Constructors 11

Implement Class Method Examples

Class-Level Settings 13

Flexible Defaults for Instance Attributes 14

Making Fluent, Chainable Methods 1

Challenge and Solution: Flexible Defaults Decorator 9

Learn About Abstract Classes and Methods

What are Abstract Classes and Methods? 5

Basic Abstract Syntax 14

Abstract Class Inheritance 7

Abstract Class and Static Methods 7

Challenge and Solution: Working with Shapes 18

Use Abstract Classes with OOP Design Patterns

The Observer Pattern 6

Implementing the Observer Pattern 6

A Concrete Observer Pattern Example 12

WEEK 7

158 min.

The Template Method Pattern	6
Implementing the Template Method Pattern	11
Challenge and Solution: Combining Patterns	10

Learn Attribute Encapsulation

Basics of Private and Protected Attributes	12
Private and Protected Attribute Examples	13
Implementing "Private" Attributes with Magic Methods	11
Challenge and Solution: Bank Account Management	10

Work with Properties

Basics of Properties	9
Getters, Setters, and Deleters	7
Read-Only Properties	6
Setter Validation and "Wrangling"	9
Property Chaining	11
Challenge and Solution: Person Properties	14

Extend Built-in Types and Classes

The Basic Idea	8
Extending Strings	12
Extending Ints and Floats	9

WEEK 8

151 min.

Mutable vs. Immutable Types	8
Challenge and Solution: No Empty Strings	8

Extend Lists, Dictionaries and Other Types

Extending Lists	10
Adding New Methods to Lists	9
Extending Dictionaries	9
Extending Tuples	9
Challenge and Solution: History List	11

Practice Built-in Type Extension

Example #1: Instance Counting with Ints	6
Example #2: Sanitized Strings	9
Example #3: Default-Value Dictionaries	10
Using Magic Methods with Built-in Type Extensions	9
Example #4: Percentage Floats	8
Challenge and Solution (Example #5): Representing Units	12

Learn the Basics of Exceptions

Basic Terminology	12
Python's Built-in Exceptions	9
Raising Our Own TypeErrors and ValueErrors	12

WEEK 9

152 min.

Raising Our Own KeyErrors, AttributeErrors, etc.	4
Challenge and Solution: Library Enhancements	14

Handle Exceptions Effectively

"Try" and "Except" Basics	15
The "Finally" and "Else" Blocks	9
Program Flow During Exceptions	9

Program Flow in "Layered" Programs 8

Challenge and Solution: Creating Instances from User Input 20

Understand Advanced Exception Handling

Where Should We Handle Exceptions? 13

Exception Handling in Different Locations 16

Creating Custom Exceptions 6

Basics of Exception Chaining 14

Challenge and Solution: Custom Exceptions and Chaining 12

Understand Copy Operations

The Basics of Shallow Copying 12

WEEK 10 — 152 min.

The Basics of Deep Copying 12

Shallow- and Deep-Copying Pros and Cons 12

Label vs. Identity vs. Value 10

Challenge & Solution: What Happens to Arguments? 9

Serialize and Deserialize Data

The Basics of Serialization and Deserialization 10

Serializing with the Pickle Library 9

What Types of Data Can I Pickle? 9

Serializing with JSON 12

Challenge and Solution: Serializing Instances 12

Learn the Basics of Metaprogramming

Reflection and Introspection Functions, Part I 11

Reflection and Introspection Functions, Part II 9

The __name__ Attribute 8

Other Special Attributes 1

Challenge and Solution: Tell Me About... 16

Learn Intermediate Metaprogramming Concepts

Metaprogramming with Decorators 12

WEEK 11 — 152 min.

Dynamic Code Execution 11

Building a "Code Quiz" with Dynamic Code Execution 9

Modifying Code Programmatically 12

Challenge and Solution: There Is (Almost Always) A Better Way 2

Understand the Basics of Metaclasses

What is a Metaclass? 10

Some Simple Metaclass Examples 11

Modifying Classes with Metaclasses 1

Challenge and Solution: Metaclass Creator Functions 4

Practice Working with Metaclasses

Example #1: Metaclass Instance Counting 12

Example #2: Preventing Multiple Inheritance 9

Example #3: Adding Metaclasses by Using Decorators 11

Example #4: Metaclasses and Inheritance 12

Challenge & Solution: Combining Metaclasses 6

Follow PEP8 Formatting Guidelines

Function Indentation Basics	11
Other Indentation Rules	6
Breaking Up Lines	1
When to Use Blank Lines	11
Challenge & Solution: PEP8 in Action	13

WEEK 12

PEP8 Naming and Whitespace Conventions — 151 min.

Basic Whitespace Guidelines	12
More Whitespace Guidelines	15
Comment Guidelines	9
Naming Convention Guidelines	13
Challenge & Solution: PEP8 In Action	7

Build Simple GUIs with Tkinter

Displaying the Main Window	1
Creating and Adding Widgets	9
Widgets for Displaying Text	12
Challenge & Solution: Fibonacci GUI	10

User Input and Event Handling

User Input Widgets	6
Buttons and Entries	12
The Text Widget	7
Checkbuttons and Radiobuttons	14
Challenge & Solution: Building a Form	2

Organize Tkinter Interfaces

Moving Widgets Around with Pack	12
The Place Method	9
Geometry Managers and the Grid Method	1

WEEK 13

159 min.

Challenge & Solution: Container Widgets	25

Observe Variables and Bind Events

Working with Observable Variables	13
Hiding Widgets with Observable Variables	11
Using the bind() Method	11
Binding Keyboard Events	11
Challenge & Solution: Form Validation	11

Learn the Basics of Widget Styling

Basic Widget Styling Options	12
Borders and Reliefs	13
Highlighting Entries	12
Challenge & Solution: Styling Playground	3

Learn Advanced Widget Styling

Themed Tkinter Widgets	11
Creating Simple Shared Styles	11
Tkinter's Built-in Themes	1
Challenge & Solution: Dark Mode	14

WEEK 14

Work with Tkinter Canvas — 163 min.

Creating and Displaying a Canvas	7

Drawing Simple Shapes	10
Drawing Text and Images	11
Using Windows to Insert Widgets	7
Challenge: A Simple Drawing Application	14

Draw Charts and Graphs with Tkinter Canvas

Draw the Axes	13
Draw the Bar Widths	11
Draw the Bar Heights	9
Draw a Pie Chart	1
Challenge & Solution: Line Graphs	2

Learn the Basics of Network Requests

Making Basic Network Requests in Python	14
Working with API Keys	14
Creating a Simple Server	15
Challenge: Go Forth and Practice	3

Build and Utilize REST APIs

What is REST Anyway?	7
RESTful Basics	12
Creating a REST API	13

WEEK 15

161 min.

Building Read Endpoints	13
Challenge & Solution: Create a Client	8

Learn Intermediate Network Request Concepts

Adding Extra Request Data	9
Handling Request Bodies on the Server-Side	11
Including Request Bodies on the Client-Side	10
Query Parameter Basics	14
Challenge & Solution: Finish the Endpoints	10

Understand Socket Programming

Creating A Socket Server	8
Creating A Socket Client	7
Sending Socket Messages	10
Keeping Socket Connections Open	11
Handling Multiple Clients	9
Challenge & Solution: Forwarding Messages	11

Build Effective Socket Applications

Handling Common Socket Exceptions	15
Sending Different Types of Data	15

WEEK 16

153 min.

Sending Complex Data Using Pickle	4
A Harder Way to Send Data	7
Challenge & Solution: Rock, Paper, Scissors	13

Understand the JSON Data Format

JSON Syntax and Structure Basics	13
JSON Data Types	11
Loading and Dumping JSON Data with the "json" Module	1

Challenge & Solution: A JSON Database 13

Understand the XML Data Format

XML Syntax and Structure Basics 12

Representing Data with XML 1

Parsing and Working with XML Data 14

Challenge & Solution: Translating JSON to XML 9

Learn the Basics of SQLite3

SQLite Basic Concepts 6

Creating Tables in SQLite 8

Executing SQLite Statements in Python 1

Inserting Data in SQLite 7

Selecting Data in SQLite 11

Challenge & Solution: Creating Another Table 10

Learn Intermediate SQLite3

Deleting Data in SQLite 12

WEEK 17 **159 min.**

Avoiding SQL Injection 10

Updating Data in SQLite 9

Challenge & Solution: Interactive Product Management System 15

Learn Advanced SQLite3

Narrowing Queries 12

Grouping and Manipulating Query Results 14

Narrowing Queries Practice 13

Grouping and Manipulating Queries Practice 14

Challenge & Solution: More Complex Query Practice 13

Build a Simple Chat Application

What Will We Be Building? 3

Basic Application Setup 16

Implementing the Init Methods 11

Receiving and Broadcasting Messages on the Server 10

Creating the User Interface 10

Implementing the Client-Side Logic 9

WEEK 18 **152 min.**

Challenge & Solution: Adding User Ids 12

Build a Full-Stack Expense Tracker

What Will We Be Building? 4

Setting Up the Back-end 9

Implementing the Load Endpoint with SQLite 12

Implementing the Create and Delete Endpoints with SQLite 10

Creating the Basic Interface 12

Making Requests from the Front-End 15

Challenge & Solution: Deleting Expenses 11

Build a Spreadsheet Program, Part I

What Will We Be Building? 2

Basic Project Setup 15

Implementing Cell Behavior 13

Adding and Removing Cell Dependencies 5

Challenge & Solution: Arithmetic Magic Methods 12

Build a Spreadsheet Program, Part II

Implementing Spreadsheet Behavior 7

Building the Interface 13

WEEK 19

82 min.

Making the Cells Update Automatically 11

Challenge & Solution: Updating Cells More Efficiently 13

Build a GUI Web-Scraper Tool

What We'll Be Building 2

Setting Up the Interface 8

Loading and Parsing HTML 10

Using User-Defined Selectors 7

Pulling Data Out Of HTML 13

Writing Scraped Data to a CSV 9

Challenge: Adding and Removing Fields 9