uCertify

# Course Outline

## Software Architecture with Python




27 Mar 2024

1. Course Objective
2. Pre-Assessment
3. Exercises, Quizzes, Flashcards & Glossary

   Number of Questions
4. Expert Instructor-Led Training
5. ADA Compliant & JAWS Compatible Platform
6. State of the Art Educator Tools
7. Award Winning Learning Platform (LMS)
8. Chapter & Lessons

   Syllabus

   Chapter 1: Preface

   Chapter 2: Principles of Software Architecture

   Chapter 3: Writing Modifiable and Readable Code

   Chapter 4: Testability – Writing Testable Code

   Chapter 5: Good Performance is Rewarding!

   Chapter 6: Writing Applications that Scale

   Chapter 7: Security – Writing Secure Code

   Chapter 8: Design Patterns in Python

   Chapter 9: Python – Architectural Patterns

   Chapter 10: Deploying Python Applications

   Chapter 11: Techniques for Debugging

   Chapter 12: Appendix - A

   Chapter 13: Appendix - B

   Videos and How To
9. Practice Test

   Here's what you get

   Features
10. Live labs

Lab Tasks

Here's what you get

11. Post-Assessment

## 1. Course Objective

Use Software Architecture with Python course and lab to get to know how Python fits into an application architecture. The lab is cloud-based, device-enabled, and can easily be integrated with an LMS. The software architecture training will help you gain an understanding of the different architectural quality requirements to help build a product that satisfies business needs. The course also provides knowledge and skills required to work with various techniques such as incorporating DevOps, Continuous Integration, and more to make your application robust.

## 2. Pre-Assessment

Pre-Assessment lets you identify the areas for improvement before you start your prep. It determines what students know about a topic before it is taught and identifies areas for improvement with question assessment before beginning the course.

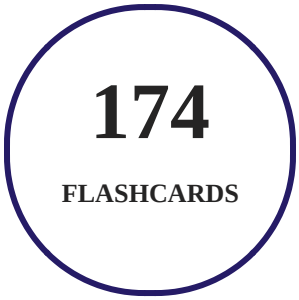
## 3. Quizzes

Quizzes test your knowledge on the topics of the exam when you go through the course material. There is no limit to the number of times you can attempt it.




## 4. flashcards

Flashcards are effective memory-aiding tools that help you learn complex topics easily. The flashcard will help you in memorizing definitions, terminologies, key concepts, and more. There is no limit to the number of times learners can attempt these. Flashcards help master the key concepts.




## 5. Glossary of terms

uCertify provides detailed explanations of concepts relevant to the course through Glossary. It contains a list of frequently used terminologies along with its detailed explanation. Glossary defines the key terms.




## 6. Expert Instructor-Led Training

uCertify uses the content from the finest publishers and only the IT industry's finest instructors. They have a minimum of 15 years real-world experience and are subject matter experts in their fields. Unlike a live class, you can study at your own pace. This creates a personal learning experience and gives you all the benefit of hands-on training with the flexibility of doing it around your schedule 24/7.

## 7. ADA Compliant & JAWS Compatible Platform

uCertify course and labs are ADA (Americans with Disability Act) compliant. It is now more accessible to students with features such as:

- Change the font, size, and color of the content of the course
- Text-to-speech, reads the text into spoken words
- Interactive videos, how-tos videos come with transcripts and voice-over
- Interactive transcripts, each word is clickable. Students can clip a specific part of the video by clicking on a word or a portion of the text.

JAWS (Job Access with Speech) is a computer screen reader program for Microsoft Windows that reads the screen either with a text-to-speech output or by a Refreshable Braille display. Student can easily navigate uCertify course using JAWS shortcut keys.

## 8. State of the Art Educator Tools

uCertify knows the importance of instructors and provide tools to help them do their job effectively. Instructors are able to clone and customize course. Do ability grouping. Create sections. Design grade scale and grade formula. Create and schedule assessments. Educators can also move a student from self-paced to mentor-guided to instructor-led mode in three clicks.

## 9. Award Winning Learning Platform (LMS)

uCertify has developed an award winning, highly interactive yet simple to use platform. The SIIA CODiE Awards is the only peer-reviewed program to showcase business and education technology's finest products and services. Since 1986, thousands of products, services and solutions have been recognized for achieving excellence. uCertify has won CODiE awards consecutively for last 7 years:

- **2014**
    1. Best Postsecondary Learning Solution

- **2015**
    1. Best Education Solution

2. Best Virtual Learning Solution
3. Best Student Assessment Solution
4. Best Postsecondary Learning Solution
5. Best Career and Workforce Readiness Solution
6. Best Instructional Solution in Other Curriculum Areas
7. Best Corporate Learning/Workforce Development Solution

- **2016**
    1. Best Virtual Learning Solution
    2. Best Education Cloud-based Solution
    3. Best College and Career Readiness Solution
    4. Best Corporate / Workforce Learning Solution
    5. Best Postsecondary Learning Content Solution
    6. Best Postsecondary LMS or Learning Platform
    7. Best Learning Relationship Management Solution

- **2017**
    1. Best Overall Education Solution
    2. Best Student Assessment Solution
    3. Best Corporate/Workforce Learning Solution
    4. Best Higher Education LMS or Learning Platform

- **2018**
    1. Best Higher Education LMS or Learning Platform
    2. Best Instructional Solution in Other Curriculum Areas
    3. Best Learning Relationship Management Solution

- **2019**
    1. Best Virtual Learning Solution
    2. Best Content Authoring Development or Curation Solution
    3. Best Higher Education Learning Management Solution (LMS)

- **2020**

1. Best College and Career Readiness Solution
2. Best Cross-Curricular Solution
3. Best Virtual Learning Solution

## 10. Chapter & Lessons

uCertify brings these textbooks to life. It is full of interactive activities that keeps the learner engaged. uCertify brings all available learning resources for a topic in one place so that the learner can efficiently learn without going to multiple places. Challenge questions are also embedded in the chapters so learners can attempt those while they are learning about that particular topic. This helps them grasp the concepts better because they can go over it again right away which improves learning.

Learners can do Flashcards, Exercises, Quizzes and Labs related to each chapter. At the end of every lesson, uCertify courses guide the learners on the path they should follow.

## Syllabus

### Chapter 1: Preface

- What this course covers
- Conventions

### Chapter 2: Principles of Software Architecture

- Defining software architecture
- Characteristics of software architecture
- Importance of software architecture
- System versus enterprise architecture

- Architectural quality attributes
- Summary

## Chapter 3: Writing Modifiable and Readable Code

- What is modifiability?
- Aspects related to modifiability
- Understanding readability
- Fundamentals of modifiability – cohesion and coupling
- Exploring strategies for modifiability
- Metrics – tools for static analysis
- Refactoring code
- Summary

## Chapter 4: Testability – Writing Testable Code

- Understanding testability
- White-box testing principles
- Summary

## Chapter 5: Good Performance is Rewarding!

- What is performance?
- Software performance engineering
- Performance testing and measurement tools
- Performance complexity
- Measuring performance
- Profiling
- Other tools
- Programming for performance – data structures
- Summary

## Chapter 6: Writing Applications that Scale

- Scalability and performance
- Concurrency
- Thumbnail generator
- Multithreading – Python and GIL
- Multithreading versus multiprocessing
- Pre-emptive versus cooperative multitasking
- The asyncio module in Python

- Waiting for a future – async and await
- Concurrent futures – high-level concurrent processing
- Scaling for the web
- Scaling workflows – message queues and task queues
- Celery – a distributed task queue
- Summary

## Chapter 7: Security – Writing Secure Code

- Information security architecture
- Secure coding
- Common security vulnerabilities
- Is Python secure?
- Security issues with web applications
- Strategies for security – Python
- Secure coding strategies
- Summary

## Chapter 8: Design Patterns in Python

- Design patterns – elements
- Categories of design patterns
- Patterns in Python – creational
- Patterns in Python – structural
- Patterns in Python – behavioral
- Summary

## Chapter 9: Python – Architectural Patterns

- Introducing MVC
- Event-driven programming
- Microservice architecture
- Pipe and Filter architectures
- Summary

## Chapter 10: Deploying Python Applications

- Deployability
- Tiers of software deployment architecture
- Software deployment in Python
- Deployment – patterns and best practices

- Summary

## Chapter 11: Techniques for Debugging

- Maximum subarray problem
- Simple debugging tricks and techniques
- Logging as a debugging technique
- Debugging tools – using debuggers
- Advanced debugging – tracing
- Summary

## Chapter 12: Appendix - A

- Installing Python
- Running Python
- Basic syntax
- Conditional statements and loops
- Data structures
- Functions
- Summary

Chapter 13: Appendix - B

- Object-oriented programming
- Modules and packages
- File operations
- Error and exception handling
- Summary

## 11. Practice Test

### Here's what you get

| 71 | 85 |
|---|---|
| PRE-ASSESSMENTS QUESTIONS | POST-ASSESSMENTS QUESTIONS |

### Features

Each question comes with detailed remediation explaining not only why an answer option is correct but also why it is incorrect.

**Unlimited Practice**

Each test can be taken unlimited number of times until the learner feels they are prepared. Learner can review the test and read detailed remediation. Detailed test history is also available.

Each test set comes with learn, test and review modes. In learn mode, learners will attempt a question and will get immediate feedback and complete remediation as they move on to the next question. In test mode, learners can take a timed test simulating the actual exam conditions. In review mode, learners can read through one item at a time without attempting it.

## 12. Live Labs

The benefits of live-labs are:

- Exam based practical tasks
- Real equipment, absolutely no simulations
- Access to the latest industry technologies
- Available anytime, anywhere on any device
- Break and Reset functionality
- No hardware costs

## Lab Tasks

**Writing Modifiable and Readable Code**

- Documenting the Code
- Understanding the Concept of Cohesion
- Finding the McCabe Metric
- Running a Static Checker
- Fixing Code Smells by Refactoring the Code
- Fixing Code Complexity by Refactoring the Code

**Testability – Writing Testable Code**

- Measuring Code Coverage
- Unit Testing a Module
- Using Test-Driven Development
- Unit Testing Using doctest

**Good Performance is Rewarding!**

- Measuring the Performance of Code Using timeit
- Collecting and Reporting Statistics
- Profiling with cProfile
- Implementing an LRU Cache Dictionary

**Writing Applications that Scale**

- Using the Multiprocessing Pool Object
- Creating a Co-operative Multitasking Scheduler Using Simple Python Generators
- Using the asyncio Module
- Using async and await
- Using the concurrent.futures Module

**Security – Writing Secure Code**

- Serializing an object using code jail
- Making the Code Secure for Input

**Techniques for Debugging**

- Debugging Maximum Subarray Problem
- Generating Random Patient Data Using the schematics Library
- Debugging the Word Searcher Program
- Creating a Log File Using Logger Objects
- Creating a Simple Log File
- Debugging with pdb

## Here's what you get

27

LIVE LABS

## 13. Post-Assessment

After completion of the uCertify course Post-Assessments are given to students and often used in conjunction with a Pre-Assessment to measure their achievement and the effectiveness of the exam.

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