

# uCertify

## Course Outline

### Data Visualization with Python



04 Aug 2025

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## 1. Course Objective

Data Visualization with Python course is designed to equip you with the fundamentals of data visualization using Python, one of the most popular programming languages in the world. The course covers a range of topics, including Introduction to Visualization with Python, Static Visualization, Static to Interactive Visualization, Interactive Visualization of Data across Strata, Interactive Visualization of Data across Time, Interactive Visualization of Geographical Data and more. Upon completing the course, you'll have a comprehensive understanding of data visualization with Python and be able to create compelling visualizations that communicate complex data insights.

## 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.

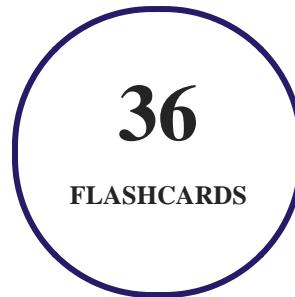
## 3. Quiz

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.



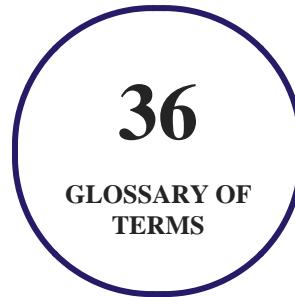
## 4. flashcards

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: Introduction

- About
- About the Course

#### Chapter 2: Introduction to Visualization with Python – Basic and Customized Plotting

- Introduction
- Handling Data with pandas DataFrame
- Plotting with pandas and seaborn
- Tweaking Plot Parameters

- Summary

## Chapter 3: Static Visualization – Global Patterns and Summary Statistics

- Introduction
- Creating Plots that Present Global Patterns in Data
- Creating Plots That Present Summary Statistics of Your Data
- Summary

## Chapter 4: From Static to Interactive Visualization

- Introduction
- Static versus Interactive Visualization
- Applications of Interactive Data Visualizations
- Getting Started with Interactive Data Visualizations
- Summary

## Chapter 5: Interactive Visualization of Data across Strata

- Introduction
- Interactive Scatter Plots
- Other Interactive Plots in altair

- Summary

## Chapter 6: Interactive Visualization of Data across Time

- Introduction
- Temporal Data
- Types of Temporal Data
- Understanding the Relation between Temporal Data and Time-Series Data
- Examples of Domains That Use Temporal Data
- Visualization of Temporal Data
- Choosing the Right Aggregation Level for Temporal Data
- Resampling in Temporal Data
- Interactive Temporal Visualization
- Summary

## Chapter 7: Interactive Visualization of Geographical Data

- Introduction
- Choropleth Maps
- Plots on Geographical Maps

- Summary

## Chapter 8: Avoiding Common Pitfalls to Create Interactive Visualizations

- Introduction
- Data Formatting and Interpretation
- Data Visualization
- Cheat Sheet for the Visualization Process
- Summary

## Chapter 9: Appendix A: Data Structures, Strings, and Numpy

## Videos and How To

uCertify course includes videos to help understand concepts. It also includes How Tos that help learners in accomplishing certain tasks.

**47**

VIDEOS

**06:36**

HOURS

## 11. Practice Test

## Here's what you get

33

PRE-ASSESSMENTS QUESTIONS

34

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

### **Introduction to Visualization with Python – Basic and Customized Plotting**

- Creating a User-defined Function
- Applying the ceil() Function on a DataFrame Column
- Adding a Column to a DataFrame
- Applying the describe() Function
- Viewing Data from Dataset
- Deleting Columns from a DataFrame
- Reading Data from a File
- Creating a Bar Plot and Calculating the Mean Growth Rate Distribution
- Creating Bar Plot Grouped by a Specific Feature
- Plotting a Histogram
- Tweaking the Plot Parameters of a Grouped Bar Plot
- Annotating a Bar Chart

### **Static Visualization – Global Patterns and Summary Statistics**

- Presenting Data across Time with Multiple Line Plots
- Creating a Static Line Plot
- Creating a Static Hexagonal Binning Plot
- Creating a Static Scatter Chart
- Creating a Static Contour Plot
- Creating a Static Heatmap
- Creating a Linkage in a Static Heatmap
- Creating a Static Box Plot
- Creating a Static Violin Plot

## **From Static to Interactive Visualization**

- Creating the Base Static Plot for Interactive Data Visualization
- Adding a Slider to the Static Plot
- Adding a Hover Tool to a Scatter Plot Using bokeh
- Creating an Interactive Scatter Plot
- Using the merge() function

## **Interactive Visualization of Data across Strata**

- Adding Zoom-In and Zoom-Out to a Static Scatter Plot Using altair
- Adding Hover and Tooltip Functionality to a Scatter Plot Using altair
- Exploring Select and Highlight Functionality on a Scatter Plot Using altair
- Performing Selection across Multiple Plots
- Performing a Selection Based on the Values of a Feature
- Adding the Zoom Feature and Calculating the Mean on a Static Bar Plot
- Representing the Mean on a Bar Plot using a Shortcut
- Linking a Bar Plot and a Heatmap Dynamically
- Adding a Zoom Feature on a Static Heatmap
- Creating a Bar Plot and a Heatmap Next to Each Other

## **Interactive Visualization of Data across Time**

- Calculating zscore to Find Outliers in Temporal Data
- Performing Upsampling and Downsampling in Temporal Data
- Using shift and tshift to Shift Time in Data
- Adding Zoom-in and Zoom-out Functionality on a Line Plot Using Bokeh
- Adding Interactivity to Static Line Plots using Bokeh
- Changing the Line Color and Width on a Line Plot
- Adding Box Annotations to Find Anomalies in a Dataset

## **Interactive Visualization of Geographical Data**

- Creating a Worldwide Choropleth Map
- Tweaking a Worldwide Choropleth Map

- Adding Animation to a Choropleth Map
- Creating a Choropleth Map for the US Population across States
- Creating a Scatter Plot on a Geographical Map
- Creating a Bubble Plot on a Geographical Map
- Creating Line Plots on a Geographical Map

#### Avoiding Common Pitfalls to Create Interactive Visualizations

- Visualizing Outliers in a Dataset with a Box Plot
- Dealing with Outliers
- Dealing with Missing Values
- Creating a Confusing Visualization

### Here's what you get

54

LIVE LABS

37

VIDEO TUTORIALS

45

MINUTES

### 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.

You can't stay away! Get



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