

Python Journey Skills Immersion Series

Applied Python for Data Science and Engineering (TTPS4874)

Essential Python for Analytics, Scientific and Math Computing | With Numpy, Pandas & More

Course Snapshot

- **Course: Applied Python for Data Science & Engineering (TTPS4874)**
- **Duration:** 4 days
- **Audience & Skill-Level:** This introductory-level course is geared for technical professionals new to Python. Roles include data analysts, developers, engineers or anyone tasked with utilizing Python for data analytics tasks. Familiarity with basic scripting skills is recommended, as this course does not teach general scripting basics.
- **Format / Hands-on:** This course combines engaging instructor-led presentations and practical demonstrations with hands-on programming exercises, challenge labs, use case exploration and engaging group activities. Student machines are required.
- **Flexible Delivery Options:** This course can be delivered for your team or organization online-live (virtual), onsite in-person, self-paced or across our immersive blended learning experience platform (LXP).
- **Public Schedule:** This course is currently available on our Public Open Enrollment Schedule.
- **Customizable:** We're flexible! This course agenda, topics, labs, hours and delivery modalities can be adjusted to target your specific training skills objectives, tools and learning goals. Please ask for details.

Overview

Geared for scientists and engineers with limited practical programming background or experience, **Applied Python for Data Science & Engineering** is a hands-on introductory-level course that provides you with a ramp-up to using Python for scientific and mathematical computing. Working in a hands-on learning environment, you'll learn basic Python scripting skills and concepts, as well as the most important Python modules for working with data, from arrays, to statistics, to plotting results.

Throughout the course, guided by our expert instructor, you'll gain a robust skill set that will equip you to make data-driven decisions and elevate operational efficiencies within your organization. You'll explore data manipulation with Pandas, advanced data visualization using Matplotlib, and numerical analysis with NumPy. You'll also delve into best practices for error and exception handling, modular programming techniques, and automated workflow development, equipping you with the skill set to enhance both the effectiveness and efficiency of your data-driven projects.

Learning Objectives

Working in a hands-on learning environment, guided by our expert team, attendees will learn about and explore:

- **Core Python Proficiency:** By the close of the course, participants will have a firm grasp on the foundational elements of Python, such as variables, data types, and flow control, empowering them to write scripts and build simple programs with confidence.
- **Analytical Problem-Solving:** Utilizing libraries such as NumPy and SciPy, students will develop the ability to perform complex mathematical operations and statistical analyses, significantly amplifying their analytical capabilities for tasks such as data modeling or optimization problems.
- **Data Manipulation Mastery:** By the end of the course, participants will be proficient in employing Pandas to clean, transform, and analyze data sets, enabling them to make data-driven decisions effectively.
- **Automated Workflow Development:** Students will acquire the ability to construct automated scripts using Python's Standard Library, optimizing repetitive tasks and thereby enhancing operational efficiency in their organizations.
- **Advanced Data Visualization:** Upon course completion, learners will be equipped to utilize Matplotlib and other Python libraries to craft intricate visual representations of data, facilitating clearer and more impactful reporting and presentations.
- **Error-Resilient Coding:** Attendees will learn best practices for implementing robust error and exception handling techniques, leading to the creation of more stable and secure Python applications.

- **Modular Programming Proficiency:** By mastering Python functions, modules, and packages, students will be adept at developing modular and maintainable code, a key skill for scalability and collaborative programming projects.

Audience & Pre-Requisites

This introductory-level course is geared for technical professionals new to Python. Roles include data analysts, developers, engineers or anyone tasked with utilizing Python for data analytics tasks. Familiarity with basic scripting skills is recommended, as this course does not teach general scripting basics.

Follow On Courses: Our core Python, data science and machine learning training courses provide students with a solid foundation for continued learning based on role, goals, or their areas of specialty. Our learning paths offer a wide variety of related follow-on courses such as:

- TTPS4876 Next Level Python in Data Science / Intermediate (5 days)
- TTPS4880 Hands-On Practical Python for Data Wrangling & Transformation (3 days)
- TTPS4883 Forecasting, Behavioral Analysis, and What-If Scenarios with Python (3 days)
- TTML5503 Introduction to AI, AI Programming & Machine Learning (3 days)
- TTML5506-PMachine Learning Essentials with Python (3 days)

Next Steps / Follow-on Courses: We offer a wide variety of follow-on courses and learning paths for Python, Big Data, AI, Machine Learning, AI for Business, GPT-3.5 / GPT 4, Applied AI, Azure OpenAI, Google BARD, AI for developers, testers, data analytics, machine learning, deep learning, programming, intelligent automation and many other related topics. Please see our catalog for the current **Python or AI & Machine Learning Courses, Learning Journeys & Skills Roadmaps**, list courses and programs.

Enhanced Learning Services: Please also ask about our **Pre-Training Class OnRamp & Prep / Primer offerings, Skills Gap Assessment Services, Case Studies, Knowledge Check Quizzes, Skills Immersion Programs & Camps, Collaborative Mentoring Services and Extended Learning Support & Post Training services.**

Course Topics / Agenda

Please note that this list of topics is based on our standard course offering, evolved from typical industry uses and trends. We will work with you to tune this course and level of coverage to target the skills you need most. Course agenda, topics and labs are subject to adjust during live delivery in response to student skill level, interests and participation.

1. The Python Environment

- About Python
- Starting Python
- Using the interpreter
- Running a Python script
- Python scripts on Unix/Windows
- Using the Spyder editor

2. Getting Started

- Using variables
- Builtin functions
- Strings
- Numbers
- Converting among types
- Writing to the screen
- String formatting
- Command line parameters

3. Flow Control

- About flow control
- White space
- Conditional expressions (if,else)
- Relational and Boolean operators
- While loops
- Alternate loop exits

4. Array Types

- About sequences
- Lists
- Tuples
- Indexing and slicing
- Iterating through a sequence
- Using enumerate()
- Functions for all sequences
- Keywords and operators for all sequences

- The range() function
- Nested sequences
- List comprehensions
- Generator expressions

5. Working with files

- File overview
- Opening a text file
- Reading a text file
- Writing to a text file
- Raw (binary) data

6. Dictionaries and Sets

- Creating dictionaries
- Iterating through a dictionary
- Creating sets
- Working with sets

7. Functions, modules, and packages

- Four types of function parameters
- Four levels of name scoping
- Single/multi dispatch
- Relative imports
- Using `__init__` effectively
- Documentation best practices

8. Errors and Exception Handling

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

9. Using the Standard Library

- The `sys` module
- Launching external programs
- Walking directory trees
- Grabbing web pages
- Sending e-mail
- Paths, directories, and filenames
- Dates and times
- Zipped archives

10. Pythonic Programming

- The Zen of Python
- Common idioms
- Named tuples
- Useful types from **collections**
- Sorting
- Lambda functions
- List comprehensions
- Generator expressions
- String formatting

11. Introduction to Python Classes

- Defining classes
- Constructors
- Instance methods and data

- Attributes
- Inheritance
- Multiple inheritance

12. Developer tools

- Program development
- Comments
- `pylint`
- Customizing `pylint`
- Using `pyreverse`
- The `unittest` module
- `Fixtures`
- Skipping tests
- Making a suite of tests
- Automated test discovery
- The Python debugger
- Starting debug mode
- Stepping through a program
- Setting breakpoints
- Profiling
- Benchmarking

13. Excel spreadsheets

- The `openpyxl` module
- Reading an existing spreadsheet
- Creating a spreadsheet from scratch
- Modifying an existing spreadsheet
- Setting Styles

14. Serializing Data

- Using `ElementTree`
- Creating a new XML document
- Parsing XML
- Finding by tags and XPath
- Parsing JSON into Python
- Parsing Python into JSON
- Working with CSV

15. iPython and Jupyter

- iPython features
- Using Jupyter notebooks

- Benchmarking
- External Commands
- Cells
- Sharing Notebooks

16. Introduction to NumPy

- NumPy basics
- Creating arrays
- Shapes
- Stacking
- Indexing and slicing
- Array creation shortcuts
- Matrices
- Data Types

17. Brief intro to SciPy

- What is SciPy?
- The Python science ecosystem
- How to use SciPy
- Getting Help
- SciPy subpackages

18. Intro to Pandas

- Pandas overview & architecture
- Series
- Dataframes
- Reading and writing data
- Data alignment and reshaping
- Basic indexing
- Broadcasting
- Removing Entries
- Timeseries
- Reading Data

19. Introduction to Matplotlib

- Overall architecture
- Plot terminology
- Kinds of plots
- Creating plots
- Exporting plots
- Using Matplotlib in Jupyter
- What else can you do?

Setup Made Simple! Learning Experience Platform (LXP)

All applicable course software, digital courseware files or course notes, labs, data sets and solutions, live coaching support channels, CodeCoach.AI anytime tutor access, and rich extended learning and post training resources are provided for you in our “easy access, single source, no install required” online **Learning Experience Platform (LXP)**, remote lab and content environment. Access periods vary by course. We’ll collaborate with you to ensure your team is set up and ready to go well in advance of the class. Please inquire about set up details and options for your specific course of interest.

For More Information

For more information about our training services (instructor-led, self-paced or blended), collaborative coaching services, robust Learning Experience Platform (LXP), Career Experiences, public course schedule, partner programs, courseware licensing options or to see our complete list of course offerings, solutions and special offers, please visit us at www.triveratech.com, email Info@triveratech.com or call us toll free at **844-475-4559**. Our pricing and services are always satisfaction guaranteed.

TRIVERA TECHNOLOGIES • Collaborative IT Training, Coaching & Skills Development Solutions
www.triveratech.com • toll free +1-844-475-4559 • Info@triveratech.com • Twitter TriveraTech

ONSITE, ONLINE & BLENDED TRAINING SOLUTIONS • PUBLIC / OPEN ENROLLMENT COURSES
LEARNING EXPERIENCE PLATFORM (LXP) • COACHING / MENTORING • ASSESSMENTS • CONTENT LICENSING & DEVELOPMENT
LEARNING PLAN DEVELOPMENT • SKILLS IMMERSION PROGRAMS / RESKILLING / NEW HIRE / BOOT CAMPS
PARTNER & RESELLER PROGRAMS • CORPORATE TRAINING MANAGEMENT • VENDOR MANAGEMENT SERVICES

Trivera Technologies is a Woman-Owned Small-Business Firm

