Data Science, AI & Machine Learning SkillJourney

Next-Level (Intermediate) Python for Data Science and /or Machine Learning (TTPS4876)

Gain advanced skills to handle complex data sets, understand machine learning algorithms, and translate data into actionable insights

Course Snapshot

- **Course: Next-Level (Intermediate) Python for Data Science and / or Machine Learning (TTPS4876)**
- **Duration**: 5 days
- **Audience & Skill-Level**: This **intermediate-level course** is for skilled Data Scientists, Software Engineers, and Data Engineers already experienced with basic Python and data science
- **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.

Description

Geared for experienced Python users with basic data science skills, **Next Level Python for Data Science** is a comprehensive hands-on course that deep dives the advanced skills and tools used to perform exploratory data analysis, create complex visualizations, and perform large-scale distributed processing on Big Data.

Throughout the course, guided by our expert instructor, you'll learn, gain the advanced skills required to leverage Python to effectively solve real-world problems and contribute to data-driven projects in a professional setting. Working in a workshop style, hands-on environment, you'll hone your skills in numerical operations using NumPy and delve into advanced data manipulation techniques with Pandas. From applying complex mathematical functions in SciPy to mastering data visualization through Matplotlib, this program equips you for a broad spectrum of data science tasks. You'll also get practical experience in merging, joining, and concatenating data sets, while gaining an understanding of machine learning fundamentals via scikit-learn. These technical abilities are framed within a problem-solving context, empowering you to contribute effectively to data-driven initiatives in your professional role.

With these advanced Python and data science skills, you'll be equipped to lead complex data analysis projects that transform raw data into actionable insights for strategic decision-making. You'll also have the capability to design and implement machine learning models, allowing your organization to harness the power of predictive analytics for enhanced operational efficiency and competitive advantage. You'll exit this course with advanced skills tailored specifically for applications in data science, able to handle complex data sets, understand machine learning algorithms, and translate data into actionable insights.

Learning Objectives

This course combines engaging instructor-led presentations and useful demonstrations with valuable hands-on labs and engaging group activities. Throughout the course you'll explore:

- **Master Numerical Operations with NumPy**: Gain proficiency in handling large numerical data sets, performing array operations, and using vectorized computation for increased efficiency.
- **Advanced Data Manipulation with Pandas**: Acquire the ability to clean, filter, and manipulate complex data sets using Pandas, allowing for more insightful data analysis.
- **Implementing Scientific Computing with SciPy**: Learn to apply complex mathematical functions and algorithms in Python using SciPy, thereby broadening your toolbox for scientific computing tasks.

- **Data Merging and Concatenation Techniques**: Understand and implement advanced techniques to merge, join, and concatenate data sets effectively, enabling better data integrity and usefulness.
- **Utilizing Pillow for Image Processing**: Become proficient in basic image processing tasks like loading, transforming, and saving images using the Pillow library, thus widening the range of data types you can manipulate.
- **Applying Machine Learning Models with scikit-learn**: Understand the fundamentals of machine learning algorithms and how to implement them using scikit-learn for tasks such as classification, regression, and clustering.
- **Developing Problem-Solving Skills for Real-world Application**s: Cultivate the ability to apply the acquired technical skills to solve real-world problems, enhancing your capacity to contribute effectively to data-driven projects in a professional setting.

If your team requires different topics, additional skills or a custom approach, our team will collaborate with you to adjust the course to focus on your specific learning objectives and goals.

Audience & Pre-Requisites

This course is geared for experienced data analysts, developers, engineers or anyone tasked with utilizing Python for data analytics or eventual machine learning tasks. **Attending students are required to have a background in basic Python for data science.**

Take Before: Students should have incoming practical skills aligned with those in the course(s) below, or should have attended the following course(s) as a pre-requisite:

- TTPS4873 Fast Track to Python for Data Science and Machine Learning (3 days)
- TTPS4874 Applied Python for Data Science & Engineering (4 days)

Take Next: Some recommended options:

- TTML5503 AI / ML JumpStart | Introduction to AI, AI Programming & Machine Learning (3 days)
- TTML5506-P Machine Learning Essentials with Python (3 days)
- TTPS4879 Hands-on Predictive Analysis with Python (3 days)
- TTPS4880 Hands-On Practical Python for Data Wrangling & Transformation (3 days)
- TTPS4883 Forecasting, Behavioral Analysis, and What-If Scenarios with Python (3 days)
- TTAI2360 Applied AI: Building Recommendation Systems with Python (3 days)
- TTAI2361 Quick Start to Building AI-Driven Intelligent Web Applications (2 days)

We offer wide variety of additional follow-on courses and learning paths for leveraging Python for next-level development, data science and analytics, AI and machine learning, automation, testing, networking, security and more. Please see our **Python Pro Training Suite & Learning Paths** or our **AI & Machine Learning Courses, Learning Journeys & Skills Roadmaps** or inquire for recommendations based on your specific role and goals.

Enhanced Learning Services: Please also ask about our robust Learning Experience Platform (LXP), Skills Assessment & Skills Prep Services, Skills Immersion Programs & Camps, Coaching and Mentoring Services and Extended Learning Support programs.

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'll work with you to tune this course and level of coverage to target the skills you need most. Topics, agenda and labs are subject to change, and may adjust during live delivery based on audience skill level, interests and participation.

1. Python Review (Optional)

- Why Python?
- Python syntax compared to other programming languages
- Python interpreter
- Strings
- Understanding lists
- Tuples and Sets
- Dictionaries
- Parsing command-line arguments
- Decision making
- Loops
- Iterators
- Generators
- Functions & Modules

2. NumPy Arrays and Vectorized

Computation
- NumPy arrays
- Array functions
- Data processing using arrays
- Linear algebra with NumPy
- NumPy random numbers

3. SciPy
- Cluster
- Constants
- FFTpack
- Integrate
- Interpolate
- Linalg
- Ndimage
- Spatial

4. Next-Level Pandas
- Data in the 21st century
- Introducing pandas
- A tour of pandas

5. The DataFrame Object
- Overview of a DataFrame
- Similarities between Series and DataFrames
- Sorting by index
- Setting a new index
- Selecting columns and rows from a DataFrame
- Selecting rows from a DataFrame
- Extracting values from Series
- Renaming columns or rows
- Resetting an index

6. Filtering a DataFrame
- Optimizing a data set for memory use
- Filtering by a single condition
- Filtering by multiple conditions
- Filtering by condition
- Dealing with duplicates
- Coding challenge

7. Merging, Joining and Concatenating
- Introducing the data sets
- Concatenating data sets
- Missing values in concatenated DataFrames
- Left joins
- Inner joins
- Outer joins
- Merging on index labels
- Coding challenge

8. Visualization Using Matplotlib
- A crash course in Matplotlib
- Covariance and correlation
- Conditional probability
- Bayes' theorem

9. Using PIL/Pillow
- How to Install Pillow
- How to Load and Display Images
- How to Convert Images to NumPy Arrays and Back
- How to Save Images to File
- How to Resize Images
- How to Flip, Rotate, and Crop Images
- Extensions

10. Machine Learning with scikit-learn
- An overview of machine learning models
- The scikit-learn modules for different models
- Data representation in scikit-learn
- Supervised learning – classification and regression
- Unsupervised learning – clustering and dimensionality reduction
- Measuring prediction performance

Bonus Content / Time Permitting

Working with TensorFlow

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.

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.