

APPLIED PYTHON FOR DATA SCIENCE & ENGINEERING

Course Code: 100670

Getting Started with Python for Engineers – Hands-on Python Basics for Analytics, Scientific and Math Computing

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.

What You'll Learn

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.

Who Needs to Attend

This introductory-level course is geared for technical professionals new to Python who are interested in data science or from an engineering background.

Roles include:

- Data analysts
- Developers
- Engineers

anyone tasked with utilizing Python for data analytics tasks.

Prerequisites

Familiarity with basic scripting skills is recommended, as well as being comfortable working with the command line.

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VIRTUAL CLASSROOM LIVE

\$3,374 CAD

4 Day

Virtual Classroom Live Outline

1. **Getting Started with the Python Environment**

- Starting Python
- Using the interpreter
- Running a Python script
- Editors and IDEs

2. **Variables and Values**

- Using variables
- Builtin functions
- String data
- Numeric data
- Converting types

3. **Basic input and output**

- Writing to the screen
- String formatting
- Command line arguments
- Reading the keyboard

4. **Flow Control**

- About flow control
- The if statement
- Relational and Boolean values
- while loops
- Exiting from loops

5. **Array types**

- Sequence types in general
- Lists and list methods

- Tuples
- Indexing and slicing
- Iterating through a sequence
- Sequence functions, keywords, and operators
- List comprehensions and generators

6. **Working with files**

- File I/O overview
- Opening a text file
- Reading a text file
- Writing to a text file

7. **Dictionaries and Sets**

- About dictionaries
- Creating dictionaries
- Getting values
- Iterating through a dictionary
- About sets
- Creating sets
- Working with sets

8. **Functions, modules, and packages**

- Returning values
- Types of function parameters
- Variable scoping
- Documentation best practices
- Creating and importing modules
- Organizing modules into packages

9. **Virtual Environments**

- Why do we need virtual environments
- Creating an environment
- Activating and deactivating
- Replicating an environment
- Tools for environments

10. **Exception handling and logging**

- About exceptions
- Using try/catch/else/finally
- Handling multiple exceptions
- Logging setup
- Basic logging

11. **Introduction to Python Classes**

- Defining classes
- Constructors
- Instance methods and data
- Attributes
- Inheritance
- Multiple inheritance

12. **Excel spreadsheets**

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

13. **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

14. **iPython and Jupyterlab**

- iPython features & iPython "magic" commands
- iPython configuration
- Creating Jupyter notebooks
- Managing notebooks with Jupyterlab

15. **Intro to NumPy**

- NumPy basics
- Creating arrays
- Indexing and slicing
- Large number sets
- Transforming data
- SciPy overview

16. **Intro to Pandas**

- Pandas overview
- Series and Dataframes
- Reading and writing data
- Data summaries
- Data alignment and reshaping
- Selecting and indexing
- Merging and joining data sets
- Plotting data

17. **Matplotlib**

- Creating a basic plot
- Commonly used plots
- Ad hoc data visualization
- Advanced usage
- Exporting images

Optional Topics or Day Five:

For Dedicated / Private Classes:

1. Introduction to AI with Python for Data Analysis

- Overview of AI Libraries
- Setting Up Your Environment:
- Understanding AI Models

- Creating Your First Model
- Evaluating Model Performance
- 2. **Practical AI Projects in Python**
 - Set up a Python project for AI applications.
 - Data Handling
 - Model Development
 - Test and validate your AI model's effectiveness.
 - Applying Your Model
- 3. **Using GPT Tools for Record Analysis in Data Science**
 - Introduction to GPT
 - Setting Up GPT Tools
 - Analyzing Text Data
 - Generating Insights
 - Practical Applications

Virtual Classroom Live Labs

This course combines expert led instructor-led presentation with practical demonstrations with hands-on programming exercises, challenge labs, use case exploration and engaging activities. Student machines are required.

Jul 21 - 24, 2025 | 10:00 AM - 6:00 PM EDT

Sep 15 - 18, 2025 | 10:00 AM - 6:00 PM EST

Oct 20 - 23, 2025 | 10:00 AM - 6:00 PM EST

Nov 17 - 20, 2025 | 10:00 AM - 6:00 PM EST



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PRIVATE GROUP TRAINING

4 Day

Visit us at www.globalknowledge.com or call us at 1-866-716-6688.

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