

Data Science using Python

Move from spreadsheet-heavy work to practical Python analytics through a focused 3-day program covering Python foundations, pandas mastery, and business-ready data analysis and visualization.

Overview

This 3-day practical program helps participants use Python for real-world data analysis, reporting, visualization, and insight generation. It is designed for Excel users who want a more powerful, repeatable, and scalable way to work with data.

Introduction

Python has become one of the most practical languages for data analysis because it allows professionals to move beyond repetitive spreadsheet work into faster, cleaner, and more scalable analytics workflows. This program is designed for learners who want to use Python as a serious data analysis tool, especially those coming from an Excel background. Participants will build confidence with Python syntax, work deeply with pandas Series and DataFrames, and apply analytical techniques that help transform raw data into business insight, productivity improvements, and clearer decision support.

Topics Covered

- Introduction to Python for Data Work
- Python Syntax, Variables, and Data Types
- Control Structures and Program Flow
- Python Data Structures for Analysis
- Functions, Modules, and Reusable Analysis Logic
- NumPy Foundations for Numerical Data
- Introduction to pandas and Why It Matters
- pandas Series Fundamentals
- DataFrame Creation and Structure
- Selecting, Filtering, and Transforming DataFrames
- Data Cleaning with pandas
- Aggregation, Grouping, and Reshaping
- Working Beyond Excel with pandas
- Exploratory Data Analysis for Business Decisions
- Numerical Data Analysis

- Text Data Analysis and Sentiment Analysis
- Data Visualization with Matplotlib and Seaborn
- Turning Analysis into Productivity and Business Improvement

Prerequisites

There are no formal prerequisites required to attend this course, although basic computer literacy and familiarity with spreadsheet-based work will be helpful.

Audience:

Excel users, business analysts, aspiring data analysts, operations staff, reporting professionals, and anyone who wants to perform stronger data analysis using Python.

Duration: 3 Days

Course Outline

Day 1 - Python Language Foundations for Data Analysis

1. Introduction to Python for Data Work
 - 1.1. Python in data analysis and reporting
 - 1.2. Python vs spreadsheet workflows
 - 1.3. Notebooks, scripts, and environments
 - 1.4. Python workflow for data professionals
 - 1.5. Setting up the analysis environment
2. Python Syntax, Variables, and Data Types
 - 2.1. Python syntax basics
 - 2.2. Variables and naming rules
 - 2.3. Numbers, strings, and booleans
 - 2.4. Type conversion
 - 2.5. Comments and readable code style
3. Control Structures and Program Flow
 - 3.1. if, elif, and else
 - 3.2. for loops and while loops
 - 3.3. Looping through collections
 - 3.4. break and continue
 - 3.5. Simple control flow patterns

4. Python Data Structures for Analysis
 - 4.1. Lists and tuples
 - 4.2. Dictionaries
 - 4.3. Sets and uniqueness checks
 - 4.4. Indexing and slicing
 - 4.5. Choosing the right structure

5. Functions, Modules, and Reusable Analysis Logic
 - 5.1. Defining and calling functions
 - 5.2. Parameters and return values
 - 5.3. Scope and variable visibility
 - 5.4. Importing modules and libraries
 - 5.5. Reusable analysis functions

6. NumPy Foundations for Numerical Data
 - 6.1. Why NumPy matters
 - 6.2. Creating arrays
 - 6.3. Vectorized operations
 - 6.4. Array indexing and slicing
 - 6.5. Basic numerical calculations

7. Lab 1: Python and NumPy Practice for Data Work
 - 7.1. Variables, loops, and functions
 - 7.2. Lists and dictionaries
 - 7.3. NumPy calculations
 - 7.4. Preparation for pandas work

Day 2 - Mastering pandas Series and DataFrames

8. Introduction to pandas and Why It Matters
 - 8.1. What pandas is
 - 8.2. Why pandas beats manual spreadsheet work
 - 8.3. Series and DataFrame concepts
 - 8.4. Business use cases for pandas
 - 8.5. pandas for reporting productivity

9. pandas Series Fundamentals
 - 9.1. Creating a Series
 - 9.2. Series indexing and selection
 - 9.3. Filtering Series data
 - 9.4. Applying functions to a Series
 - 9.5. Missing values in a Series

10. DataFrame Creation and Structure
 - 10.1. Creating DataFrames
 - 10.2. Rows, columns, index, and data types
 - 10.3. Shape, columns, and metadata
 - 10.4. Reading CSV and Excel-style data
 - 10.5. Saving DataFrames

11. Selecting, Filtering, and Transforming DataFrames
 - 11.1. Column and subset selection
 - 11.2. Using loc and iloc for row and column access
 - 11.3. Conditional filtering
 - 11.4. Sorting and resetting indexes
 - 11.5. Calculated columns and transformations

12. Data Cleaning with pandas
 - 12.1. Nulls, blanks, and inconsistent values
 - 12.2. Handling missing data
 - 12.3. Duplicates and formatting issues
 - 12.4. Renaming and standardizing columns
 - 12.5. Data type conversion

13. Aggregation, Grouping, and Reshaping
 - 13.1. groupby summaries
 - 13.2. sum, mean, count, min, and max
 - 13.3. Value counts and frequencies
 - 13.4. Pivot-style analysis
 - 13.5. Merging and joining datasets

14. Working Beyond Excel with pandas
 - 14.1. Spreadsheet formulas vs pandas operations
 - 14.2. Automating repetitive report tasks
 - 14.3. Handling larger datasets
 - 14.4. Repeatable workflows
 - 14.5. Reducing human error

15. Lab 2: Business Reporting with pandas
 - 15.1. Load CSV business data
 - 15.2. Clean and standardize the dataset
 - 15.3. Filter, sort, group, and summarize
 - 15.4. Create a reusable reporting workflow

Day 3 - Data Analysis, Visualization, and Business Insight

16. Exploratory Data Analysis for Business Decisions
 - 16.1. Patterns, distributions, and anomalies
 - 16.2. Trends, gaps, and outliers
 - 16.3. Descriptive statistics
 - 16.4. Summaries for deeper analysis
 - 16.5. Turning observations into questions

17. Numerical Data Analysis
 - 17.1. Totals, averages, and ratios
 - 17.2. Category and segment comparisons
 - 17.3. Top and low performers
 - 17.4. Practical correlation ideas
 - 17.5. Interpreting numeric findings

18. Text Data Analysis and Sentiment Analysis
 - 18.1. Text analysis in business
 - 18.2. Cleaning text data
 - 18.3. Word frequency and keyword patterns
 - 18.4. Basic sentiment analysis workflow
 - 18.5. Customer feedback insights

19. Data Visualization with Matplotlib and Seaborn
 - 19.1. Choosing the right chart
 - 19.2. Bar, line, scatter, and histogram charts
 - 19.3. Seaborn basics
 - 19.4. Trends, comparisons, and distributions
 - 19.5. Business presentation visuals

20. Turning Analysis into Productivity and Business Improvement
 - 20.1. Improving reporting speed and quality
 - 20.2. Finding inefficiencies and bottlenecks
 - 20.3. Supporting business decisions
 - 20.4. Repeatable analysis for productivity
 - 20.5. Data-driven confidence

21. Lab 3: Applied Data Analysis Project
 - 21.1. Prepare and clean a business dataset
 - 21.2. Analyze numeric and text data
 - 21.3. Create charts for findings
 - 21.4. Present business improvement insights