



Data Science I: **Essential Tools**

The tools needed to take on the future

Essential Tools is a three-day course that teaches students hands-on data science with Python. Students create scripts to perform data analysis and manipulation, produce visualizations and more. This course gives students greater knowledge of programming in Python for data analysis, so they can dive into their data and uncover greater insights, automate tedious tasks and encourage data-driven decision making.

Who should attend?

Analysts and related positions who have reached the limits of spreadsheets and want to expand their understanding of data science with hands-on experience, and those interested in a career in data science

Key Concepts Covered

Python and relevant packages, data analysis and manipulation, automation of tasks and programs

Prerequisites

To achieve the greatest benefit from this course, students should understand:

- Basic boolean algebra, such as concepts of “or” and “and”
- Conditional statements
- Basic statistical definitions (mean, median, mode)
- Basic linear algebra (metrics, arrays)
- Common file formats like Comma Separated Values (CSV)



Register for **Data Science I: Essential Tools** or learn more about other courses in our data curriculum by visiting pragmaticinstitute.com or calling 480.515.1411.



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Data Science I: Essential Tools

What Students Learn

Over the course of three days, attendees get their hands dirty with live code and real programs they can use to build their own models.



**PRAGMATIC
DATA
CERTIFIED**

Attendees earn a coveted data science certification upon successful completion of class project

DAY 1

ON THE FIRST DAY, students learn the essentials of Python for data science. This provides the foundational knowledge students need to begin processes and automating tasks. Students will:

- Construct variables in Python and understand commonly used data structures like lists and dictionaries
- Perform iterations in Python to easily apply a process over multiple values
- Encapsulate a process into a function to streamline and reduce repetition
- Utilize if/else statements to handle various cases and conditions
- Understand string data types and common operations applied to strings
- Express complicated pattern matching using regular expressions to find and replace text

DAY 2

DURING THE SECOND DAY, students learn object-oriented programming (OOP) and are introduced to NumPy and Pandas Python packages. These packages provide students with the skills needed to begin moving past the limitations of traditional spreadsheets and process more information faster than ever before. Students will:

- Understand how OOP is implemented and used throughout Python and its packages
- Use NumPy ndarray data structures for fast, multidimensional numerical operations
- Utilize Pandas' data structures and easily load CSV and Excel files as Pandas dataframes
- Combine tables across multiple spreadsheets into one dataframe
- Easily handle missing entries/data with Pandas, and utilize multiple methods to replace the missing values

DAY 3

ON THE FINAL DAY OF THE COURSE, students learn advanced techniques with Pandas and begin automating tasks. These techniques provide students with the ability to automate time-consuming tasks so they can put their new data skills to work on other projects. Students will:

- Use grouping operations in Pandas to create groups within a dataframe and apply operations like aggregating functions to those groups
- Use NumPy functions in Pandas and understand the connection between them
- Utilize manipulation and analysis tools in Pandas for times series
- Up and down sample time series to change frequency, and understand time series transformations like rolling and moving window statistics
- Visualize data analysis results using Matplotlib to create line and scatter plots, histograms and bar charts
- Use Seaborn package to generate statistically focused plots



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