



Python 203 - Data Sciences

- 5 Days
- Lecture and Hands-on Labs

Course Overview

In this course you will learn to use Python, the most popular programming language for data sciences, for data analysis and data visualization. Explore Python libraries to more easily sort and analyze data sets for emerging trends. Quickly produce Excel quality visualizations appropriate for displaying data in real time monitoring systems.

Who Should Attend

This course was written for professionals interested in Python and Data Sciences. This includes: Engineers, Mathematicians, Actuaries, Network Specialists, System Admins, and developers.

What You'll Learn

Intro to data science using Python libraries, including:

- Use `pandas` and `numpy` to identify trends within datasets - Create rich visualizations with `matplotlib` and visual applications with `folium` - Use open source toolset `scipy` for mathematics, science, and engineering applications - Sourcing data sets, including pulling data from APIs, and cleaning data for training - Introduction to `scikit-learn`, a machine learning tool for datasets - Making predictions - AI LLM prompt engineering for Python snippets and jumpstarting solutions

Outline



Certification

-  Lecture + Lab: Data Sciences with Python - Alta3 Research Certification Project

AI LLM Toolkit

-  Lecture + Lab: Large Language Model toolkit for AI Solution Assistance

Software Control Management

-  Lecture + Lab: SCM Option #1 - GitHub
-  Lecture + Lab: SCM Option #2 - GitLab






Jupyter Notebook

-  Lecture + Lab: Introduction to Jupyter Notebook







Common Data Types

-  Lecture: Converting JSON to Python Data Types
-  Lecture + Lab: Python, APIs, and JSON

Regular Expression

-  Lecture: Introduction to Regular Expression (RegEx)
-  Lecture + Lab: Use RegEx to Search Text
-  Lecture + Lab: Search and Replace Data
-  Lecture + Lab: Compiling RegEx Search Objects
-  Lecture + Lab: Testing if a Match Exists


Pandas

-  Lecture + Lab: Intro to Pandas
-  Lecture + Lab: Examining Cashflow with Pandas
-  Lecture: Cleaning Data with Pandas
-  Lecture + Lab: Cleaning Data with Pandas
-  Challenge: Modifying DataFrames
-  Lecture + Lab: Boolean Masks for DataFrames



YAML

-  Lecture + Lab: Python Data to YAML file


Python and Databases

-  Lecture: Interacting with Databases








SQL

-  Lecture + Lab: Learning sqlite3
-  Lecture + Lab: postgresSQL with Python


noSQL

-  Lecture + Lab: Python and MongoDB




Matplotlib

-  Lecture: Matplotlib
-  Lecture + Lab: Creating Plots with Matplotlib
-  Lecture + Lab: Matplotlib - Histograms and Bar Graphs
-  Lecture + Lab: Annotating Graphs on Matplotlib
-  Lecture + Lab: Making Subplots with Matplotlib
-  Lecture + Lab: Customizing Matplotlib Graphs
-  Challenge: Create a Graph with Matplotlib




Time Series

-  Lecture + Lab: Time Series Data

Numpy

-  Lecture + Lab: Using Numpy Arrays
-  Lecture + Lab: Generating Data with Numpy's arange and linspace
-  Lecture + Lab: Indexing, Slicing, and Reshaping Multi-Dimensional Arrays


Interactive Maps

-  Lecture + Lab: Building Interactive Maps
-  Lecture + Lab: folium and Flask - Returning Maps from Custom API Endpoints
-  Challenge: Map the Location of the ISS



Seaborn

-  Lecture + Lab: Pandas groupby and Graphing Relational Data with Seaborn
-  Lecture + Lab: Visualizing Multi-Dimensional Data Using Seaborn




Scipy

-  Lecture + Lab: Introducing SciPy

Machine Learning Metrics

-  Lecture: Accuracy, Precision, Recall and F-scores
-  Lecture + Lab: Accuracy, Precision, Recall, and F-scores

Classifications

-  Lecture + Lab: Identifying Images with ImageAI and PyTorch
-  Lecture + Lab: Iris Data and Scikit-learn
-  Lecture + Lab: Natural Language Processing

Prerequisites

Next Courses

- Recommended Follow up: APIs and API Design with Python 5 days
- Recommended Follow up: Introduction to Julia Programming 5 days