



Python for Data Analysis

Course Duration:
12 weeks (3 hours per week)

Material link 

Course Description:

- This course is designed to equip you with the essential Python programming skills needed for data analysis.
- Python is a versatile and widely-used language in the field of data analysis and manipulation.
- Through practical examples and hands-on exercises, you will learn to use Python to collect, clean, analyze, and visualize data.

Course Objectives:

By the end of this course, students should be able to:

1. Understand the fundamentals of Python programming.
2. Apply Python libraries and tools for data analysis.
3. Manipulate and preprocess data using Python.
4. Perform exploratory data analysis (EDA) and data visualization.
5. Develop basic data analysis projects.

Prerequisites:

- 1.No prior programming experience is required.
- 2.Basic familiarity with data and data-related concepts is helpful but not mandatory.

Install Anaconda distribution:

<https://docs.anaconda.com/free/anaconda/install/index.html>



Course Outline:

Week 1: Introduction to Python for Data Analysis

- Introduction to Python and its significance in data analysis.
- Setting up a Python environment.
- Basic Python syntax and data types.

Week 2: Data Structures in Python

- Lists, tuples, and dictionaries in Python.
- Indexing, slicing, and operations on data structures.
- Using data structures to organize and manipulate data.

Week 3: Control Flow and Functions

- Conditional statements (if, elif, else) and loops (for, while).
- Writing and defining functions.
- Using functions to automate data-related tasks.

Week 4: Libraries for Data Analysis

- Introduction to Python libraries for data analysis (NumPy, Pandas).
- Data manipulation with Pandas DataFrames.
- Loading and exploring datasets.

Course Outline:

Week 5: Data Cleaning and Preprocessing

- Identifying and handling missing data.
- Data transformation and feature engineering.
- Data cleaning best practices.

Week 6: Data Visualization with Matplotlib

- Introduction to data visualization.
- Creating basic plots using Matplotlib.
- Customizing plots for effective data communication.

Week 7: Advanced Data Visualization with Seaborn

- Introduction to the Seaborn library.
- Creating more advanced data visualizations.
- Enhancing data storytelling through visualization.

Week 8: Exploratory Data Analysis (EDA)

- Principles of EDA in data analysis.
- Statistical summaries and visualization techniques.
- Uncovering patterns and trends in data.

Course Outline:

Week 9: Introduction to Statistical Analysis

- Basic statistical concepts in data analysis.
- Descriptive statistics and inferential statistics.
- Applying statistical tests to analyze data.

Week 11: Real-World Data Analysis Projects

- Hands-on projects involving real-world datasets.
- Applying Python skills to solve data analysis challenges.
- Presentation and discussion of project outcomes.

Week 10: Introduction to Machine Learning with Scikit-Learn

- Overview of machine learning concepts.
- Supervised and unsupervised learning.
- Building simple machine learning models.

Week 12: Final Project and Course Conclusion

- Final data analysis project.
- Presentation of the final project.

Assessment:

1. Weekly assignments and quizzes to assess understanding.
2. Mid-term and final data analysis project assessments.
3. Final project.

This course primarily focuses on Python programming skills and their application in the context of data analysis. Students are encouraged to further explore advanced topics in data analysis, machine learning, and specialized libraries beyond the scope of this introductory course.