CodeCruise

SAIL SMOOTH IN TECH OCEAN

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Mastering Python

This course covers the key concepts and techniques for mastering Python programming and data analysis, from basic syntax and control flow to advanced topics like objectoriented programming, data manipulation, and visualization. Depending on the audience's background and goals, you can adjust the depth and complexity of each topic and incorporate hands-on exercises and projects to reinforce learning.

Tech Stack To Be Covered



Mastering Python

Module 1: Introduction to Python Programming

- Overview of Python: history, features, and applications
- Installing Python and setting up the development environment
- Basics of Python syntax: variables, data types, operators, and expressions

Module 2: Control Flow and Functions

- Conditional statements: if, elif, else
- Looping constructs: for loops, while loops
- Writing functions in Python: defining functions, arguments, return values

Module 3: Data Structures in Python

- Lists, tuples, and dictionaries
- Understanding sets and their operations
- List comprehensions and generator expressions

Module 4: File Handling and Error Handling

- Reading from and writing to files
- Handling exceptions: try-except blocks, raising exceptions
- Context managers and the 'with' statement

Module 5: Object-Oriented Programming (OOP) in Python

- Introduction to OOP concepts: classes, objects, methods, and attributes
- Encapsulation, inheritance, and polymorphism
- Advanced OOP features: class methods, static methods, properties

Module 6: Advanced Python Techniques

- Decorators and closures
- Generators and iterators
- Working with modules and packages

Module 7: Introduction to NumPy

- Overview of NumPy and its advantages
- Creating NumPy arrays: arrays vs. lists
- Indexing and slicing arrays

Module 8: Array Operations with NumPy

- Performing mathematical operations on arrays
- Broadcasting and vectorized operations
- Array manipulation and reshaping

Module 9: Introduction to Pandas

- Introduction to Pandas: Series and DataFrames
- Loading and exploring data with Pandas
- Indexing and selecting data in DataFrames

Module 10: Data Manipulation with Pandas

- Working with missing data: handling null values
- Data cleaning and preprocessing techniques
- Combining and merging DataFrames

Module 11: Data Visualization with Matplotlib

- Introduction to Matplotlib: basic plots and customization
- Creating line plots, scatter plots, bar plots, and histograms
- Adding titles, labels, and legends to plots

Module 12: Advanced Visualization with Seaborn

- Introduction to Seaborn: enhancing data visualization
- Creating advanced plots: pair plots, heatmaps, violin plots
- Customizing aesthetics and styles in Seaborn

Module 13: Interactive Visualization with Plotly

• Overview of Plotly: creating interactive plots and dashboards

- Building line charts, scatter plots, and bar charts with Plotly
- Adding interactivity and annotations to Plotly visualizations

Module 14: Real-World Data Analysis Project

- Applying Python programming and data analysis skills to a real-world dataset
- Data exploration, visualization, and analysis using Pandas, NumPy, and visualization libraries
- Presenting findings and insights from the analysis

Module 15: Best Practices and Tips for Python Programming

- Writing clean and efficient Python code
- Code optimization techniques and performance tuning
- Documenting code and following PEP 8 guidelines

Module 16: Python Certification and Career Path

- Overview of Python certification exams and preparation resources
- Career opportunities for Python developers and data analysts
- Building a portfolio of Python projects and showcasing skills