Advance Python Programming

Course Duration: 32 Hrs **Course Code-PCAP**

Course Overview

The *Python Programming Essentials* course provides a comprehensive introduction to programming fundamentals using Python. It covers key topics such as variables, data types, control flow, functions, object-oriented programming (OOP), file handling, and error handling. Additionally, the course includes modules on data manipulation, basic data analysis, and best practices for writing clean, efficient, and well-documented code. Through hands-on exercises, participants will develop problem-solving skills and gain practical experience in Python programming for various applications, including data analysis and software development.

What you'll learn?

- Understand programming basics, Python syntax, and data types
- Work with operators, expressions, and control flow statements
- Define and call functions, including lambda and recursive functions
- Manipulate data using lists, tuples, dictionaries, and sets
- Implement object-oriented programming (OOP) concepts such as inheritance, polymorphism, and encapsulation
- Handle files, read and write CSV and JSON files, and manage exceptions effectively
- Use Python modules, packages, and libraries for efficient coding
- Perform basic data analysis and visualize data using Python libraries
- Write clean, readable, and well-documented Python code following PEP 8 guidelines
- Debug and test Python programs using best practices and tools

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Target Audience

This course is ideal for beginners, students, aspiring programmers, and professionals looking to build a strong foundation in Python. It is also suitable for individuals interested in automation, data science, or software development, as well as those looking to enhance their coding skills for career advancement.

Pre-Requisites

No prior programming experience is required. However, familiarity with basic computer operations and logical thinking will be beneficial for a smoother learning experience.

Course content

1. Basic Programming Concepts

- Understanding programming and the Python programming language
- Understanding variables, expressions, and data types
- Use of operators in Python: arithmetic, relational, logical, and bitwise
- Python data types: int, float, str, list, tuple, dict, set, and bool
- Type conversion and type casting

2. Control Flow

- Conditional statements: if, elif, else
- Loops: for, while, nested loops
- Loop control statements: break, continue, pass
- Exception handling: try, except, finally, raise

3. Functions

- Defining and calling functions
- Function arguments and return values
- Lambda functions
- Scope of variables (local, global)
- Recursive functions

4. Data Collections

- Lists: creation, indexing, slicing, methods, and list comprehensions
- Tuples: creation, indexing, slicing, and immutability
- Dictionaries: creation, accessing, modifying, and dictionary comprehensions
- Sets: creation, operations, and methods

5. Object Oriented Programming (OOP)

- Classes and objects: creation, attributes, methods
- Inheritance: base and derived classes
- Polymorphism and method overriding
- Encapsulation: private and public attributes and methods
- Constructors and destructors

6. Modules and Packages

- Importing modules and packages
- Standard library modules and thirdparty packages
- Creating and using custom modules and packages

7. File Handling

- Reading from and writing to files
- Working with file objects
- Handling different file formats (text, CSV, JSON)

8. Error Handling and Exceptions

- Detailed understanding of exception types
- Custom exception classes
- Exception handling best practices

9. Data Handling

- Understanding data types and structures for data analysis
- Basic data manipulation using lists, dictionaries, and sets
- Introduction to data libraries (e.g., NumPy, pandas)

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10. Basic Data Analysis

- Performing basic statistical operations
- Data aggregation and summarization
- Visualizing data using basic plotting libraries

11. Code Quality

- Writing clean and readable code
- Adhering to PEP 8 guidelines
- Code documentation and comments

12. Testing and Debugging

- Writing and executing unit tests
- Debugging techniques and tools
- Common debugging practices

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