



Python Course Details

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1. Introduction to Python

- **What is Python?**
 - Overview of Python
 - History of Python
 - Features and Benefits
- **Setting Up the Environment**
 - Installing Python
 - Using an IDE (PyCharm, VS Code)
 - Writing and running your first Python script

2. Python Basics

- **Syntax and Semantics**
 - Writing and Executing Python Programs
 - Python Syntax and Indentation
- **Basic Data Types**
 - Numbers (int, float, complex)
 - Strings
 - Booleans
- **Variables and Operators**
 - Declaring Variables
 - Arithmetic, Comparison, Logical, and Assignment Operators

3. Control Flow

- **Conditional Statements**
 - if, elif, else Statements
- **Loops**
 - for Loops
 - while Loops
 - Loop Control Statements (break, continue, pass)

4. Functions

- **Defining Functions**
 - Function Syntax
 - Parameters and Arguments

- Return Values
- **Advanced Functions**
 - Default Parameters
 - Variable-Length Arguments
 - Lambda Functions

5. Data Structures

- **Lists**
 - Creating and Accessing Lists
 - List Methods
 - List Comprehensions
- **Tuples**
 - Creating and Accessing Tuples
 - Tuple Methods
- **Dictionaries**
 - Creating and Accessing Dictionaries
 - Dictionary Methods
- **Sets**
 - Creating and Accessing Sets
 - Set Methods

6. Modules and Packages

- **Modules**
 - Importing Modules
 - Creating Your Own Modules
- **Packages**
 - Installing Packages using pip
 - Importing and Using Packages

7. File Handling

- **Reading and Writing Files**
 - Opening and Closing Files
 - Reading from Files
 - Writing to Files
- **Working with Different File Formats**
 - CSV Files
 - JSON Files

8. Error Handling

- **Exception Handling**
 - try, except, finally Blocks
 - Handling Multiple Exceptions
- **Raising Exceptions**
 - Using raise Keyword

- Creating Custom Exceptions

9. Object-Oriented Programming (OOP)

- **Classes and Objects**
 - Defining Classes
 - Creating Objects
- **Attributes and Methods**
 - Instance and Class Attributes
 - Defining Methods
- **Inheritance and Polymorphism**
 - Inheriting Classes
 - Method Overriding
 - Using super()
- **Encapsulation and Abstraction**
 - Private and Protected Members
 - Abstract Classes and Methods

10. Advanced Topics

- **Decorators**
 - Function Decorators
 - Class Decorators
- **Generators**
 - Creating Generators
 - Using yield Keyword
- **Context Managers**
 - Using with Statement
 - Creating Custom Context Managers

11. Working with Libraries

- **NumPy for Numerical Computations**
 - Arrays and Array Operations
 - Basic Mathematical Functions
- **Pandas for Data Analysis**
 - DataFrames and Series
 - Reading and Writing Data
 - Data Manipulation
- **Matplotlib for Data Visualization**
 - Plotting Graphs
 - Customizing Plots

12. Web Development with Python

- **Introduction to Flask**
 - Setting Up Flask
 - Creating Routes

- Rendering Templates
- **Introduction to Django**
 - Setting Up Django
 - Creating Django Projects and Apps
 - Working with Models and Views

13. Data Science and Machine Learning

- **Introduction to Data Science**
 - Data Analysis Workflow
 - Cleaning and Preparing Data
- **Introduction to Machine Learning**
 - Basic Concepts
 - Using Scikit-Learn for Machine Learning Tasks

14. Project Work

- **Building Real-World Projects**
 - Choose a Project Topic
 - Plan and Develop the Project
 - Present the Project