Course Overview

This course provides a foundational understanding of Python programming, focusing on core concepts, syntax, and practical applications. It's designed for beginners with no prior programming experience and aims to develop problem-solving skills and basic software development practices.

Python Introduction
Course Content

Module 1: Introduction to Python

- **What is Python?**

  - Overview of Python programming language.

  - Applications of Python in various domains.

- **Setting Up the Environment**

  - Installing Python (Windows, macOS, Linux).

  - Introduction to Integrated Development Environments (IDEs): VS Code, PyCharm, Jupyter Notebook.

- **Running Your First Python Program**

  - Writing and executing a basic Python script.

  - Interactive mode vs script mode.

Module 2: Python Basics

- **Basic Syntax and Structure**

  - Comments, indentation, and coding conventions.

- **Variables and Data Types**

  - Numbers (int, float, complex), strings, booleans.

  - Type conversion and type checking.

- **Operators**

  - Arithmetic, comparison, logical, assignment, and membership operators.

Module 3: Control Structures

- **Conditional Statements**

  - if, elif, else.

  - Nested conditions.

- **Loops**

  - for loops and while loops.

  - Loop control statements (break, continue, pass).

Module 4: Functions and Modules

- **Functions**

  - Defining and calling functions.

  - Function arguments and return values.

  - Scope and lifetime of variables.

- **Modules and Packages**

  - Importing modules (math, random, datetime).

  - Creating and using custom modules.

Module 5: Data Structures

- **Lists**

  o Creating, accessing, slicing, and modifying lists.

  o List comprehensions.

- **Tuples**

  o Immutable data structures.

  o Tuple operations.

- **Dictionaries**

  o Key-value pairs.

  o Adding, updating, and deleting entries.

- **Sets**

  o Unique elements and set operations.

Module 6: File Handling

- **Reading and Writing Files**

  - Working with text and binary files.

  - File modes (r, w, a, rb, wb).

- **Exception Handling**

  - try, except, finally blocks.

  - Raising and catching exceptions.

Module 7: Object-Oriented Programming (OOP) Basics

- **Classes and Objects**

  - Defining classes and creating objects.

  - Attributes and methods.

- **Inheritance**

  - Parent and child classes.

- **Encapsulation**

  - Private and public attributes.

- **Polymorphism**

  - Method overriding.

Module 8: Working with Libraries

- **Popular Python Libraries**

    - Overview of libraries like NumPy, Pandas, matplotlib.

- **Basic Usage**

    - Installing libraries using pip.

    - Exploring library documentation.

Module 9: Final Project

- **Capstone Project**

  - **Students work on a real-world problem.**

  - **Examples:**

    - ▶ **A simple calculator.**
    - ▶ **A to-do list application.**
    - ▶ **A basic data analysis tool.**