Python Programming Language

Course Duration

- **Total Duration:** 60–80 Hours
- **Theory:** 40%
- **Practical:** 60%

Prerequisites

- Basic Computer Fundamentals
- Logical Thinking
- No prior programming experience required

Module 1: Introduction to Python (6 Hours)

- What is Python?
- History and Features of Python
- Python Applications
- Installing Python & IDEs (IDLE, VS Code, PyCharm)
- Python Interpreter & Execution Modes
- Writing and Running First Python Program
- Python Syntax and Indentation Rules

Module 2: Data Types, Variables & Operators (8 Hours)

- Variables and Naming Rules
- Built-in Data Types
  - int, float, complex
  - bool
  - str
- Type Conversion
- Operators
  - Arithmetic
  - Relational
  - Logical
  - Assignment
  - Membership
  - Identity
- Input and Output Functions

Module 3: Control Flow Statements (8 Hours)

- Conditional Statements
  - if
  - if-else
  - elif
- Looping Statements

    - for loop
    - while loop
- Loop Control Statements
    - break
    - continue
    - pass
- Nested Loops
- Practical Examples

Module 4: Strings, Lists, Tuples & Sets (8 Hours)

- String Operations and Methods
- List Creation, Indexing & Slicing
- List Methods
- Tuples and Immutability
- Sets and Set Operations
- Use Cases and Examples

Module 5: Dictionaries (6 Hours)

- Dictionary Creation
- Accessing and Updating Values
- Dictionary Methods
- Nested Dictionaries
- Real-world Examples

Module 6: Functions & Modules (8 Hours)

- Defining Functions
- Function Arguments
    - Positional
    - Keyword
    - Default
    - Variable Length
- Return Statement
- Lambda Functions
- Built-in Functions
- Modules and Packages
- Using `import`

Module 7: File Handling (6 Hours)

- File Concepts
- Opening and Closing Files
- File Modes
- Reading and Writing Files
- Working with CSV Files
- Practical Programs

Module 8: Exception Handling (6 Hours)

- Types of Errors
- try, except, else, finally
- Multiple Exceptions
- Custom Exceptions
- Best Practices

Module 9: Object-Oriented Programming (OOP) (8 Hours)

- Introduction to OOP
- Class and Object
- Constructors
- Instance and Class Variables
- Inheritance
- Polymorphism
- Encapsulation
- Abstraction

Module 10: Standard Libraries & Advanced Topics (6 Hours)

- Python Standard Library Overview
- datetime module
- math module
- random module
- os and sys modules
- Regular Expressions (re)
- Virtual Environments (Overview)

Module 11: Introduction to Databases (Optional) (6 Hours)

- Database Basics
- SQLite with Python
- CRUD Operations
- Connecting Python with MySQL (Overview)

Module 12: Mini Projects & Practice (8 Hours)

Project Ideas:

- Calculator Application
- Student Management System
- File-based Data Analyzer
- Password Generator
- Number Guessing Game

Learning Outcomes

After completing the course, students will be able to:

- Write clean and efficient Python programs
- Apply problem-solving skills using Python
- Understand OOP concepts
- Work with files and exceptions
- Build real-world applications