Python Programming Language

Installation

- Python version and pip package manager

Introduction to Development Environments

- Google Colab
- Jupyter Notebook / IDE

Introduction to Markdown

Python Program and Statements

- Python Arithmetic Operators
- Using Python as a Calculator
- Variable Naming Convention
- Operator, Operands, and Operator Precedence
- Changing and Updating Variable Values
- Assigning Multiple Values to Multiple Variables

Data Types in Python

- Number Data Type: int, float, complex
- Taking Input from Users
- Type Casting and Type Checking
- Type Validation
- Number Type with Conditionals

Control Flow

- Conditions and Recursion
- Modulus Operator
- Boolean Expressions
- Logical Operators
- Conditional Execution
- Chained Conditionals
- Nested Conditionals

- Recursion
- Stack Diagrams for Recursive Functions
- Infinite Recursion

Iteration

- Multiple Assignments
- Updating Variables
- The While Statement
- Break
- Debugging
- For Loop

Strings in Python

- Single-line vs Multiline Strings
- Indexing
- Slicing
- Length
- Looping
- String Methods

Python Built-in Data Types

- Lists
- Tuples
- Sets
- Dictionaries

Python Functions

- Introduction and Syntax
- Function Definition and Call
- Arguments/Parameters
- Return Statement
- Handling Multiple Return Values
- Default vs Non-default Arguments
- Global and Local Variables
- *args vs **kwargs
- Introduction to Recursion
- pass Keyword

Object-Oriented Programming (OOP) in Python

- Classes and Objects
- Attributes
- Initialization
- self Keyword
- Inheritance
- Abstraction
- Polymorphism
- Operator Overloading
- Encapsulation

Exceptions

- Introduction
- Types of Exceptions
- Exception Handling
- Raising Exceptions

File Handling

- Modes
- Reading and Writing
- CSV Files
- Exception Handling

Other Python Features

- Lambda Functions
- map() and filter()
- os Library
- random Library
- math Library

Introduction to SQL in Python

- Database Operations

Introduction to Git and GitHub

- Installation and Setup
- Creating Repositories
- Branching

- Adding a Remote
- Pushing Changes
- Cloning

Pandas

- Introduction to Pandas
- DataFrame Data Structure
- Reading and Writing CSV Files
- Manipulating DataFrame
- Basic Data Visualization

Project Work

- Web Scraping + Database OR
- Desktop Application