

Python Curriculum (Beginner to Advanced Level)

□ Introduction to Python

- History, Features, Applications
- Installation and Setup
- First Python Program (Hello World)

□ Data Types and Variables

- Numbers (int, float, complex)
- Strings (String Methods, Slicing, Formatting)
- Lists (Indexing, Slicing, Nesting)
- Tuples (Packing, Unpacking)
- Dictionaries (Key-Value Pairs, Nested Dictionaries)
- Sets (Union, Intersection, Difference)
- Type Conversion
- Mutable vs Immutable Types

□ Operators

- Arithmetic Operators
- Comparison Operators
- Logical Operators
- Bitwise Operators
- Assignment Operators
- Membership Operators
- Identity Operators

Control Flow:

□ Conditional Statements

- if, if-else, if-elif-else
- Nested Conditions
- Ternary Operators

□ Loops

- for loop
- while loop
- Nested loops
- Loop Control Statements (break, continue, pass)
- List and Dictionary Iteration

Functions: **Defining Functions**

- Parameters and Arguments
- Return Statement
- Default Arguments
- Keyword Arguments

 Built-in Functions

- range(), len(), type(), zip()
- map(), filter(), reduce()

 Lambda Functions **Recursive Functions**

- Factorial Calculation
- Fibonacci Series

Data Structures: **Lists**

- List Methods and Operations
- List Comprehension
- Nested Lists

 Tuples

- Tuple Methods
- Packing and Unpacking

 Dictionaries

- Dictionary Methods
- Dictionary Comprehension

 Sets

- Set Methods
- Frozensets

Object-Oriented Programming: **Classes and Objects**

- Creating Classes and Objects
- Instance Variables and Methods

□ **Constructors**

□ **Inheritance**

- Single Inheritance
- Multiple Inheritance
- Multilevel Inheritance

□ **Polymorphism**

- Method Overloading
- Method Overriding

□ **Encapsulation**

- Private and Protected Members

File Handling:

□ **Reading and Writing Files**

- Text Files
- Binary Files
- File Modes

□ **File Methods**

- read(), readline(), readlines()
- write(), writelines()

□ **Exception Handling**

- try, except, else, finally
- Raising Exceptions
- Custom Exceptions

Modules and Packages:

- Creating and Importing Modules
- Built-in Modules (os, sys, math, random)
- pip and Virtual Environments
- Creating Packages
- init.py

Advanced Concepts:

□ **Regular Expressions**

- re Module
- Match, Search, Findall

- Decorators
 - Function Decorators
 - Class Decorators
- Generators
 - yield keyword
- Multithreading
 - Thread Module
 - Thread Synchronization
- Database Connectivity (MySQL, SQLite)
 - Connecting to Databases
 - Executing Queries

Libraries for Data Engineering

- NumPy
 - Arrays
 - Array Operations
 - Pandas
 - DataFrames
 - Data Cleaning
 - JSON & XML Parsing
 - json Module
 - xml.etree.ElementTree
 - AWS Boto3
 - S3 File Upload
 - DynamoDB Interaction
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