Python Syllabus

1. Program Logic & Flowcharts

- Introduction to Programming Logic
- Problem-Solving Methodologies
- Algorithms & Flowcharts

2. Introduction to Python

- Key Features of Python
- Running Python Programs
- Identifiers & Reserved Keywords
- Variables & Comments
- Indentation & Code Blocks
- Single-Line & Multi-Line Statements
- Grouping Multiple Statements (Suite)
- Working with Quotes
- Input, Output & Import Functions
    - Displaying Output
    - Reading Input
    - Using Import Function
- Operators in Python
    - Arithmetic | Comparison | Assignment
    - Bitwise | Logical | Membership | Identity
    - Operator Precedence

Lab Exercises

3. Data Types & Operators

- Numbers
  - Mathematical, Trigonometric & Random Functions
- Strings
  - Escape Characters, Formatting Operators & Functions
- Lists
  - Built-in Functions & Methods
- Tuples
  - Built-in Functions
- Sets & Frozensets
  - Set Functions & Methods
- Dictionaries
  - Dictionary Functions & Methods
- Mutable vs Immutable Objects
- Data Type Conversion

Lab Exercises

4. Flow Control

- Decision Making
  - if, if-else, if-elif-else, Nested if
- Loops
  - for, while, and loop-else statements
- Nested Loops
- Control Statements
  - break, continue, pass
- Loop Types
  - Infinite | Top-Tested | Mid-Tested | Bottom-Tested

Lab Exercises

5. Functions

- Defining & Calling Functions
- Function Arguments
    - Required | Keyword | Default | Variable-Length
- Anonymous (Lambda) Functions
    - Uses and Applications

Lab Exercises

6. Modules & Packages

- Built-in Modules
- Creating Custom Modules
- Importing Modules
    - import, from-import, import *, Renaming Imports
- Module Search Path & PYTHONPATH
- Namespaces & Scope
- Useful Functions: `dir()`, `reload()`
- Working with Packages
- Date & Time Modules
    - time, calendar, datetime

Lab Exercises

7. File Handling

- Opening Files (Modes & Attributes)
- Reading & Writing Files
- Closing Files Safely
- File Methods
- Renaming & Deleting Files
- Directory Operations
    - mkdir(), chdir(), getcwd(), rmdir()

Lab Exercises

8. Object-Oriented Programming (OOP)

- Defining Classes & Creating Objects
- Class Attributes & Methods
- Constructors & Destructors
- Encapsulation & Data Hiding
- Inheritance
    - Single, Multilevel, Multiple
    - Base Class Constructor Invocation
- Method Overriding
- Polymorphism & Operator Overloading

Lab Exercises

9. Exception Handling

- Built-in Exceptions
- Handling with try, except, finally
- Multiple Exception Clauses
- Raising Exceptions
- Exception Arguments
- Assertions

Lab Exercises

10. Regular Expressions

- Functions: `match()`, `search()`, `findall()`, `compile()`
- Search & Replace Patterns
- Modifiers (Option Flags)
- Character Classes & Special Classes
- Repetition Cases

Lab Exercises

11. Database Programming Basics

- Connecting to Databases
- Creating & Managing Tables
- CRUD Operations (Insert, Update, Delete, Select)
- Transaction Control
    - COMMIT, ROLLBACK
- Disconnecting from Databases
- Exception Handling in Database Operations

Lab Exercises