**Syllabus - Python Programming Language**

**Basic Beginner Level**

**Week 1: Introduction to Python and Basic Data Types**

1. **Introduction to Python:**
   * Overview of Python and its history
   * Installing Python and setting up the environment
   * Running Python programs (Interpreters, IDEs)
   * Python syntax and indentation
   * Writing first Python program (Hello, World!)
2. **Data Types and Variables:**
   * Numbers (int, float, complex)
   * Strings and string operations
   * Boolean types

(Include practicing python programs using all data types and related problems)

### Week 2: Lists, Tuples, Sets, Dictionaries, and Input/Output

1. **Data Structures:**
   * (Lists, Tuples, Sets, and Dictionaries )– **related in-built functions**
   * Typecasting and type conversions + usage in problems
2. **Basic Input/Output:** 
   * Using print() for output
   * Taking input using input()
   * Formatting output
3. **Operators:**
   * Arithmetic operators
   * Relational operators
   * Logical operators
   * Bitwise operators
   * Assignment operators
   * Identity and Membership operators

### Week 3: Control Flow, Loops and Functions

1. **Control Flow:** 
   * Conditional statements (if, elif, else)
2. **Loops:** 
   * Loops (for, while)
   * Loop control (break, continue, pass)
3. **Functions:** 
   * Defining functions (def)
   * Function arguments (default, keyword, arbitrary)
   * Return values
   * lambda functions (anonymous functions)
   * Scope of variables (local vs. global)

### Week 4: Modules, Packages, and List Comprehensions

1. **Modules and Packages:** 
   * Importing modules (import, from ... import)
   * Creating custom modules
   * Exploring Python's standard library (e.g., math, datetime, random)
   * Introduction to packages (pip and PyPI\*)
2. **Practicing Data Structures:** 
   * List creation, indexing, slicing, and methods
   * Tuple creation, immutability, and operations
   * Set operations: add, remove, union, intersection
   * Dictionary creation, key-value pairs, and common methods

**Intermediate Level**

**Week 5: Advanced Data Structures and File Handling**

1. **Data Structures:**
   * List operations and comprehensions
   * Tuple operations
   * Set operations
   * Dictionary operations
   * Nested data structures
   * Iterating through data structures

(Also learn and practice Customizable Data Structures in python like linkedlist, BST etc.,)

1. **File Handling:**
   * Reading and writing files (open(), read(), write())
   * Working with file modes (r, w, a, rb, wb)
   * Context managers (with statement)
   * Handling CSV files

**Week 6: Exception Handling and OOPS Concepts**

1. **Exception Handling:**
   * Errors in Python (syntax vs. runtime errors)
   * Try-except blocks
   * Handling multiple exceptions
   * Raising exceptions (raise)
   * Custom exceptions
2. **Object-Oriented Programming (OOP):**
   * Classes and objects
   * Constructors (\_\_init\_\_)
   * Class and instance variables
   * Methods (instance, class, static)
   * Inheritance (single, multiple)

### Week 7: Advanced OOP and Regular Expressions

1. **OOP:**
   * Polymorphism (method overriding)
   * Encapsulation and data hiding
   * Dunder (magic) methods (\_\_str\_\_, \_\_repr\_\_, etc.)
2. **Regular Expressions:**
   * Introduction to regular expressions
   * Using the re module
   * Patterns, meta-characters, and special sequences
   * Searching and matching
   * Substitutions and splitting

### Week 8: Decorators, Generators, and Working with Libraries

1. **Decorators and Generators:**
   * Introduction to decorators
   * Writing custom decorators
   * Introduction to generators
   * Generator functions and yield
   * Practical use of decorators and generators
2. **Working with Libraries(Basic understanding about libraries):**
   * numpy (basic operations)
   * pandas (data manipulation)
   * matplotlib (data visualization basics)

**References:**

**Basic Level**

Prefer using **Python IDLE (For initial practice)** and move on to **Visual Studio Code** / **Jupyter Notebook** for practicing python problems.

**Programmiz:** <https://www.programiz.com/python-programming/getting-started>

**Tutorials Point:** <https://www.tutorialspoint.com/python/index.htm>

**W3 Schools:** <https://www.w3schools.com/python/>

**Geeks For Geeks:** <https://www.geeksforgeeks.org/python-programming-language-tutorial/>

**YouTube Playlists (Tamil):**

*Error Makes Clever :* <https://www.youtube.com/playlist?list=PLvepBxfiuao1hO1vPOskQ1X4dbjGXF9bm>

*Full length video:* <https://www.youtube.com/watch?v=m67-bOpOoPU&t=11874s>

*Logic First Tamil*: <https://www.youtube.com/watch?v=BiDOehqG68g&t=4296s>

**YouTube Playlists (English):**

*Telusko*: <https://www.youtube.com/playlist?list=PLsyeobzWxl7poL9JTVyndKe62ieoN-MZ3>

*Free code camp*: <https://www.youtube.com/watch?v=rfscVS0vtbw&t=402s>