Python Course Content

1. Introduction to Python

- What is Python? History and Features
- Installing Python and Setting Up Environment
- Running Python Scripts
- Introduction to IDEs (VS Code, PyCharm)

2. Basic Python Syntax

- Writing Your First Python Program (`Hello, World!`)
- Variables and Data Types (int, float, string, bool)
- Comments and Documentation
- Input and Output (`input()`, `print()`)

3. Control Structures

- Conditional Statements: `if`, `else`, `elif`
- Loops:
    - `for` loops
    - `while` loops
- Loop Control Statements: `break`, `continue`, `pass`

4. Functions

- Defining and Calling Functions
- Function Arguments (default, keyword, variable-length)
- Return Values
- Lambda Functions
- Scope (Local and Global Variables)

5. Data Structures

- Lists
- Tuples
- Sets
- Dictionaries
- List Comprehensions

6. String Handling

- String Methods and Formatting
- f-Strings
- String Slicing
- Regular Expressions Basics (`re` module)

7. Error Handling

- Introduction to Errors and Exceptions
- `try`, `except`, `finally`
- Custom Exceptions

8. Object-Oriented Programming (OOP)

- Classes and Objects
- Attributes and Methods
- Inheritance
- Polymorphism
- Encapsulation

9. File Handling

- Reading and Writing Files

- Working with Text and Binary Files
- Using `with` statement (Context Managers)

10. Modules and Packages

- Importing Modules
- Standard Python Libraries (math, datetime, random, os, sys)
- Creating Your Own Modules and Packages
- Introduction to `pip` and installing external libraries

11. Working with Libraries

- `requests` for HTTP Requests
- `pandas` Basics (for Data Handling)
- `matplotlib` Basics (for Data Visualization)

12. Database Connectivity

- Introduction to SQLite
- CRUD Operations using `sqlite3` module
- Basics of ORM (Object Relational Mapping)

13. Introduction to Advanced Topics

- Introduction to Web Development (Flask/Django Basics)
- Introduction to APIs (REST Basics)
- Basics of Data Analysis with Python (pandas, numpy)

14. Projects and Assignments

- Simple Calculator Program
- To-do List Application (CLI)

- Web Scraper with `requests` and `BeautifulSoup`
- Mini Database Application (using SQLite)
- Basic Web App using Flask (optional advanced project)