Python Programming Course Syllabus

Course Modules & Topics

□ Module 1: Advanced Data Types & Collections

- List, Set, Tuple, Dictionary — Performance Comparison
- Nested Data Structures
- Collections Module: Counter, defaultdict, namedtuple, deque
- Comprehensions (List, Set, Dict)

🛠 Module 2: Functional Programming in Python

- Lambda Functions
- map(), filter(), reduce(), zip()
- any() vs all()
- Generator Expressions and Iterators
- Decorators & Closures

□ Module 3: Object-Oriented Programming

- Classes & Objects
- __init__, __str__, __repr__
- Inheritance & Polymorphism
- Encapsulation & Abstraction
- Special Methods & Dunder Methods

⚙ Module 4: Error Handling & Debugging

- Try-Except-Else-Finally
- Built-in Exceptions

- Creating Custom Exceptions
- Debugging with pdb

🗁 Module 5: Working with Files & JSON

- Reading & Writing Text/CSV Files
- File Context Managers
- JSON Serialization & Deserialization
- Directory and File Manipulation (os, shutil)

🌐 Module 6: Web and API Basics

- Intro to Web Scraping using requests & BeautifulSoup
- Basics of REST APIs
- Using APIs with requests
- JSON response handling

□ Module 7: Unit Testing and Best Practices

- Writing Test Cases using unittest
- Assertions
- Code Style (PEP8) & Linting
- Virtual Environments (venv)

🛠 Module 8: Project & Assessment

- Mini Project: Choose between
    - Text Analyzer
    - API Consumer Dashboard
    - File Organizer
- Final Assessment Test