

## Advanced Python Syllabus

### 1. Advanced Data Types & Collections

- Advanced List Operations
- Collections Module (Counter, defaultdict, namedtuple, deque)
- Itertools and Functools

### 2. Advanced Functions

- Lambda Functions
- Map, Filter, Reduce
- Closures and Decorators
- Generators and Iterators

### 3. Object-Oriented Programming (OOP)

- Advanced Inheritance (Multiple, Multilevel, MRO)
- Abstract Classes and Interfaces (abc module)
- Magic/Dunder Methods
- Encapsulation and Polymorphism

### 4. Modules and Packages

- Creating and Importing Custom Modules
- Python Package Structure
- Virtual Environments (venv, pipenv)

### 5. File Handling & Serialization

- Advanced File Operations
- Working with JSON, CSV, and XML
- Pickle and Shelve Modules

### 6. Error & Exception Handling

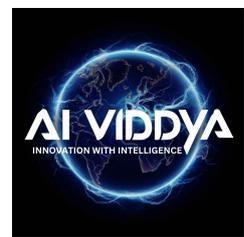
- Custom Exceptions
- Logging and Debugging Techniques
- Context Managers (with statement)

### 7. Multithreading & Multiprocessing

- Threading Module
- Multiprocessing Module
- Concurrency and Parallelism
- AsyncIO Programming

### 8. Database Connectivity

- SQLite with Python
- MySQL/PostgreSQL Integration



- ORM (SQLAlchemy basics)
9. Testing in Python
    - Unit Testing with unittest & pytest
    - Test Fixtures and Mocking
    - CI/CD Basics for Testing
  10. Web Development Basics
    - Flask/Django Introduction
    - REST API Basics with Flask
    - Request Handling & JSON APIs
  11. Advanced Libraries
    - NumPy (Advanced Functions)
    - Pandas (Data Cleaning, Merging, Grouping)
    - Matplotlib & Seaborn (Advanced Visualization)
  12. Project
    - End-to-End Python Project
    - Integrating OOP, File Handling, Database, and APIs