Subject Code	Subject Name	Credits
26CS501	ADVANCED OBJECT-ORIENTED PROGRAMING USING PYTHON	4

Course Objectives:

1. To provide knowledge of object-oriented programming principles.
2. To enable students to design and implement advanced Python programs.
3. To introduce students to Apply Advanced Python Features.

Learning Objectives:

After completion of the course the students will be able to:

1. To design Object oriented Programs.
2. To Implement Advanced Python Concepts.
3. To Develop Real-World Applications.

Unit I - Introduction to Python and OOP Concepts (12 Hrs.)

Introduction to Python programming language, features of Python, installation and environment setup. Basic syntax, variables, data types, operators, input and output statements. Introduction to Object-Oriented Programming concepts: class, object, attributes and methods. Creating classes and objects in Python, constructors, instance variables and class variables.

Unit II - Advanced Object-Oriented Concepts (12 Hrs.)

Encapsulation and data hiding, access modifiers public, private, protected. Inheritance in Python: single inheritance, multiple inheritance, multilevel inheritance and hierarchical inheritance. Method overriding and the use of super () function. Polymorphism in Python and operator overloading.

Unit III - Python Objects and Data Structures (12 Hrs.)

Python objects and memory management. Built-in data structures: lists, tuples, sets and dictionaries. String manipulation, string methods, indexing and slicing. List comprehension and dictionary operations.

UNIT IV - Exception Handling and File Handling (12 Hrs.)

Introduction to errors and exceptions in Python. Exception handling using try, except, else, and finally. User-defined exceptions. File handling in Python: opening, reading, writing and appending files. Working with text files and basic data storage techniques.

UNIT V - Advanced Python Programming (12 Hrs.)

Modules and packages in Python. Regular expressions for pattern matching. Debugging techniques and error handling. Database connectivity using Python. Data visualization using Matplotlib and introduction to simple clustering visualization.

Reference Books:

1. Dusty Phillips, Python 3 Object-Oriented Programming, Packet Publishing.
2. Steven F. Lott, Mastering Object-Oriented Python, Packet Publishing.
3. Luciano Ramalho, Fluent Python, O'Reilly Media.
4. Mark Lutz, Learning Python, O'Reilly Media.
5. Allen B. Downey, Think Python: How to Think Like a Computer Scientist, O'Reilly Media.