Data Structures using Python

Course Code	23SO8354	Year	II	Semester	I
Course Category	Skill Enhancement course	Branch	ECE	Course Type	Lab
Credits	2	L-T-P	0-1-2	Prerequisites	Introduction to Programming -23ES1103 Computer Programming Lab- 23ES1153
Continuous Internal Evaluation:	30	Semester End Evaluation:	70	Total Marks:	100

Course Outcomes		
Upon successful completion of the course, the student will be able to		BL
CO1	Interpret the concepts of Object-Oriented Programming as used in Python..	L2
CO2	Examine Python syntax and semantics and apply Python flow control and functions	L3
CO3	Create, run and manipulate Python Programs using core data structures like Lists, sort	L4
CO4	Apply Dictionaries and use Regular Expressions.	L4
CO5	Make an effective report based on experiments.	L2

Mapping of course outcomes with Program outcomes (CO/PO/PSO Matrix)
Note:1-Weak correlation 2-Medium correlation 3-Strong correlation

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2
CO1	2		2	2	1						2	2	
CO2			3	2	2						2	3	
CO3		2	2	3	2							2	2
CO4		2	2	2	3							2	
CO5								3	3		1	1	
Avg.,	**2**	**2**	**2**	**2**	**2**			**3**	**3**		**2**	**2**	**2**

Syllabus		
Expt. No.	**Contents**	**Mapped CO**
1	Write a Python program for class, Flower, that has three instance variables of type str, int, and float that respectively represent the name of the flower, its number of petals, and its price. Your class must include a constructor method that initializes each variable to an appropriate value, and your class should include methods for setting the value of each type, and retrieving the value of each type.	CO1, CO2,CO4, CO5
2	Develop an inheritance hierarchy based upon a Polygon class that has abstract methods area( ) and perimeter( ). Implement classes Triangle, Quadrilateral, Pentagon, that extend this base class, with the obvious meanings for the area( ) and perimeter( ) methods. Write a simple program that allows users to create polygons of the various types and	CO1, CO2,CO4, CO5

	input their geometric dimensions, and the program then outputs their area and perimeter	
3	Write a python program to implement Method Overloading and Method Overriding.	CO1, CO2, CO4, CO5
4	Write a Python program to illustrate the following comprehensions: a) List Comprehensions b) Dictionary Comprehensions c) Set Comprehensions d) Generator Comprehensions	CO1, CO2,CO4, CO5
5	Write a Python program to generate the combinations of n distinct objects taken from the elements of a given list. Example: Original list: [1, 2, 3, 4, 5, 6, 7, 8, 9] Combinations of 2 distinct objects: [1, 2] [1, 3] [1, 4] [1, 5] .... [7, 8] [7, 9] [8, 9].	CO1, CO2,CO4, CO5
6	Write a program for Linear Search and Binary search.	CO1-CO5
7	Write a program to implement Bubble Sort and Selection Sort.	CO1-CO5
8	Write a program to implement Merge sort and Quick sort.	CO1-CO5
9	Write a program to implement Stacks and Queues.	CO1-CO5
10	Write a program to implement Singly Linked List.	CO1-CO5
11	Write a program to implement Doubly Linked list.	CO1-CO5
12	Write a program to implement Binary Search Tree.	CO1-CO5
13	Write a program to implement Merge sort and Quick sort.	CO1-CO5

Learning Resources
1. Reema Thareja, Python programming using problem solving approach oxford university press, 9th Ed., 2020 2. Aditya Kanetkar, Let us Python, 6th Ed., BPB Publications, 2024 3. R. Nageswara Rao, Core Python Programming, 3rd Ed., , Dream tech Press, 2021
Software Requirements
PC with Python 3 software, numpy or Jupiter software
e- Resources & other Digital Material
1. Programming, Data Structures And Algorithms Using Python - Course (nptel.ac.in) 2. Python Data Structures Course by University of Michigan | Coursera