(Computer Science Courses for Undergraduate Programme of study with Computer Science discipline as one of the three Core Disciplines)

CREDIT DISTRIBUTION, ELIGIBILITY AND PRE-REQUISITES OF THE COURSE

Course title & Code	Credits	Credit distribution of the course			Eligibility criteria	Pre-requisite of the course (if any)
		Lecture	Tutorial	Practical/ Practice		
DSE 01a PYTHON Programming for Data Handling	**4**	**3**	**0**	**1**	Pass in Class XII	NIL

Learning Objectives

The course introduces students to the concept of data handling using files and GUI designing. This would equip the students with knowledge to work on real world data from various applications and GUI development for effective data handling.

Learning outcomes

On successful completion of the course, students will be able to:

- Learn constructs of Python language
- Perform data handling with files using Python.
- Design and implement GUI applications using Tkinter.

SYLLABUS OF DSE 01a

Unit 1 (15 Hours)

Introduction to Python Programming, Basic Constructs, and Python Built-in Data Structures: Introduction to Python programming language, Basic syntax, variables, and data

types in Python, Functions and modular programming; Conditional statements (if, elif, else); Looping structures (for and while loops); Mutable and Immutable Data Structures, Strings-Indexing, slicing, traversal, operations; Lists-indexing, slicing, traversal, operations; tuples, dictionaries, and sets and their operations in Python

Unit 2 (5 Hours)

File Handling: Opening, reading, writing, and closing files; File modes and file object methods; Reading and writing text and binary files; Working with CSV files

Unit 3 (15 Hours)

Designing GUI Applications with Tkinter (15): What is Tkinter? Creating a Tkinter window, Layout managers, Tkinter widgets -Entry, Spinbox, Combobox, Checkbutton, Text, Button, LabelFrame; Implementing the application - LabelInput class, building of form, adding LabelFrame and other widgets, retrieving data from form, resetting form, building our application class.

Unit 4 (10 Hours)

Combining Python file handling and Tkinter: Creating a simple Tkinter application, Reading and writing to csv files in a Tkinter application

Essential/recommended readings

1. Taneja S., Kumar, N. Python Programming- A modular approach, 1st Edition, Pearson Education India, 2018,

2. Moore, Alan D. Python GUI Programming with Tkinter: Develop responsive and powerful GUI applications with Tkinter. Packt Publishing Ltd, 2021.

Additional References:

1. Guttag, J.V. Introduction to computation and programming using Python, 2nd edition, MIT

Online references/material:

1. https://docs.python.org/3/library/csv.html

Suggested Practical List (If any): (30 Hours)

Installing and setting up Python and relevant libraries; Python development environments (e.g., Anaconda, Jupyter Notebook)

1. Write a Python program to calculate the factorial of a number.
2. Write a Python program to generate prime numbers between 1 to n, where n is provided as input by the user.
3. Write a Python program to find the sum and average of numbers in a given list.
4. Given two sets, set1 and set2, write a Python program to find their union, intersection and difference.
5. Given a list of numbers, write a Python program to count the number of times an element occurs in a list and create a dictionary with *element:count* as *key:value* pairs.
6. Write a Python program to swap the first two and last two characters in a given string.
7. Write a Python program to create a text file having names of ten Indian cities.
8. Write a Python program to create a text file having atleast five lines about your college using `writelines()` function.
9. Write a Python program which reads the data from three input files having Employee Names and merges them into one output file.
10. Write a Python program to count the number of vowels in a file and write the *vowel : count* in a dictionary.
11. Write a Python program to create a CSV file having student data: RollNo, Enrollment No, Name, Course, Semester.
12. Write a Python program library to read the CSV file created in the above program and filter out records of II semester students.
13. Write a Python program using tkinter library to create a GUI to enter registration details for an event.
14. Write a Python program using tkinter library to create a calculator to perform addition, subtraction, multiplication and division of two numbers entered by the user.
15. Write a Python program using tkinter library to create an age calculator to calculate age when DOB is entered.
16. Write a Python program using tkinter library to read and write student data to and from a CSV file (refer question 11).

Note: **Examination scheme and mode shall be as prescribed by the Examination Branch, University of Delhi, from time to time.**