7. List of Experiments

Week No	TOPICS	Course Outcome Addressed
Week 1	**Demo 1: Python Language Basics** **Exercises** 1. Write a Python function to input two numbers and perform the Calculator operations of (+, -, *, /). 2. Write a Python function that takes an integer and returns True if it's a prime number and False otherwise. 3. Create a Python function that creates a sequence between 1 and 100 and prints all the odd numbers. Compute and display the sum of all the even numbers. 4. Write a Python function to add two elements and display the result. The elements can be of type integer, float or string. 5. Write a Python function that takes a string input from the user and counts the number of vowels and consonants in the string.	CO1
Week 2	**Demo 2: Python built-in Data structures, Functions, modules, packages** **Exercises** 1. Write a Python code block that inputs numbers into a list. Print the largest, smallest, the sum, and the average of the numbers. Count occurrences of a specific number in the list. 2. Write a Python code block to create a tuple with five elements. Try to change one of the elements and handle the error that occurs. Print a message that explains why the error occurred. 3. Write a Python code block to create a dictionary of cricket World Cup winners. Let the key be the year; the value is the country that won the World Cup that year. Print the name of the best-performing country. Display the unique list of countries that have won the World Cup. 4. Write a Python code block that inputs a sentence from the user. Count the frequency of each word in the sentence and store the result in a dictionary. Prints the dictionary with words as keys and their frequencies as values. 5. Write a Python code block to input numbers into two sets. Perform union, intersection, and difference operations on the sets and print the results.	CO1
Week 3	**Demo 3: NumPy basics and vectorized computation** **Exercises** 1. Generate a 3x4 NumPy array with random integers between 1 and 50. a. Calculate and print the Mean, Median, and Standard Deviation of the array b. Print the Sum of all elements and the sum of each row. c. Reshape the 3x4 array into a 2x6 array and print it.	CO2

	2. Create two (3 * 3) matrices using NumPy and print it. Perform and print the results of the following linear algebra operations a. Matrix addition b. Matrix subtraction c. Matrix multiplication (element-wise and dot product) d. Transpose of a matrix e. Determinant and inverse (if applicable)	
Week 4	**Demo 4: Pandas, Data loading, Storage and File formats** **Exercises** 1. Create a Series from a list of integers representing daily temperatures (in Celsius) over a week. Assign index labels as day of the week. a. Find and print the average (mean) temperature for the week. b. Identify and print the maximum and minimum temperatures and their respective days. c. Display the temperatures greater than a specific value. d. Convert all temperatures to Fahrenheit. e. Print the days had temperatures above the average. 2. Create a data frame with details of 10 students and columns as Roll Number, Name, Gender, Marks1, Marks2, Marks3. a. Create a new column with total marks b. Find the lowest marks in Marks1 c. Find the Highest marks in Marks2 d. Find the average marks in Marks3 e. Find student name with highest average f. Find how many students failed in Marks2 (<40)	CO2
Week 5	**Demo 5: Data Cleaning and Preparation** 1. Create a CSV file called "Movies.csv" with details of 10 movies- Movie Name, Language, Genre, Rating, Review. a. Read CSV file into a dataframe and find the movie with the highest rating. b. Write the details of all "Hindi movies into a file "HindiMovies.csv". 2. For the CEREALS dataset, perform data preprocessing and answer the following questions. a. Create a table with the 5 number summary of all the numeric attributes. b. For each of the numeric attributes (proteins upto vitamins) , identify and replace all missing data(indicated with -1) with the arithmetic mean of the attribute. c. Create a table with the 5 number summary of all the numeric attributes after treating missing values. Do you think the strategy used in dealing with missing values was effective? d. For each numeric attribute (proteins upto vitamins), identify and replace all noisy data with the median of attribute. e. Create a table with the 5 number summary of all the numeric attributes after treating noisy values. Do you think the strategy used in dealing with noisy values was effective?	CO3

Week 6	**Demo 6: Data Visualization: context, effective visuals and storytelling** **Exercise** 1. For the MTCARS dataset, answer the specified questions with summarization and effective visuals. 2. For the CEREALS dataset, answer the specified questions with summarization and effective visuals.	CO3, CO4
Week 7	**Demo 7: Plotting and Visualization using Matplotlib & Seaborn** **Exercise** 1. For the IPL dataset, answer the specified questions with summarization and effective visuals using Matplotlib & Seaborn libraries	CO4
Week 8	**Demo 8: Data Aggregation and Group Operations** **Exercise** 1. For the NORTHWIND dataset, answer the specified questions with summarization and effective visuals.	CO3
Week 9	**Demo 9: String Manipulation and Data Wrangling** **Exercise** 1. For the SENTIMENT dataset, answer the specified questions with string operations and effective visuals.	CO3
Week 10	**Discussion of case study and data set.** 1. For the case study given, answer the questions with a report with story, visuals and data summaries.	CO5
Week 11	**Discussion of case study and data set.** 1. For the case study given, answer the questions with a report with story, visuals and data summaries.	CO5
Week 12	***End-term lab examination***	