VIVEKANANDA INSTITUTE OF PROFESSIONAL STUDIES - TECHNICAL CAMPUS

Class: B.Tech. **Semester:** 3rd

Subject: FOUNDATIONS OF DATA SCIENCE **Course Code:** AIDS203 / AIML203 / IIOT203

Branch: AIDS / AIML / IIOT **Session:** 2024-25

LIST OF EXPERIMENTS

1. Introduction and installation of Python and Python IDEs for data science (Spyder-Anaconda, Jupyter Notebook etc.) Student must install anyone of the popular IDEs, configure them and test.
2. To design a Python program that generates a list of squares of numbers between 1 and 30 and prints the list excluding the first 5 elements.
3. Design a Python program to understand the working of loops.

(a) Reverse a given string using both for and while loops.
(b) Write a program to find the sum of the digits of a given number
(c) To find factorial of a number.
(d) To generate Fibonacci series.
(e) Write a program to print the following pattern (equilateral triangle)

```
    *
   * *
  * * *
 * * * *
* * * * *
```

4. To design a Python function that determines and returns the maximum of three given numbers.
5. Design a Python program for creating a random story generator.
6. Create a synthetic dataset (.csv/.xlsx) to work upon and design a Python program to read and print that data.
7. Create a NumPy array with specific characteristics and perform various operations to analyze and manipulate the data.

(a) Create a 2D NumPy array of shape (4, 5) with random integers between 1 and 50.

(b) Calculate the Sum: Compute the sum of all elements in the array.

(c) Find the Maximum Value: Determine the maximum value in the array.

(d) Calculate the Mean: Compute the mean of the array elements.

(e) Sum of Each Row: Calculate the sum of elements in each row.

(f) Transpose the Array: Transpose the array and display it.

(g) Filter Elements: Create a boolean mask to find all elements greater than 25.

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8. Perform Statistics and Data Visualization in python.

Assume you have a .csv file containing 10 student details along with their marks in python, java and C language. Perform following operations on it.

- Print mean, standard deviation, minimum marks, maximum marks 1st quantile, 3rd quantile, maximum marks in each category.
- Plot a histogram plot for each subject.

9. Design a Python program to implement Linear Regression House price prediction using california_housing from scikit-learn.
10. Design a Python program to create a recommender system.

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LIST OF EXPERIMENTS

(Beyond Curriculum)

1. Write a program in Python to read a text file and write a text file.
2. Write a program in Python to implement exception handling.
3. Data Science Project: students can take any dataset of their choice (titanic / stock price prediction / credit card fraud detection, etc.) and show all the steps of the data science life cycle.