**Lab Assignment in Artificial Intelligence and Machine Learning Laboratory (OMC309)**

In this assignment, you are required to submit a lab manual containing the lab records of all exercises included in the curriculum. There are in total **17 Exercises** whose reports you should write. Here is the list of the exercises which you should record carefully.

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| **Exercise Number** | **Part** | **Title of the Exercise** |
| **1** |  | Familiarization with the Python Programming Language |
| **2** | **A** | Development of a Python program to implement a simple calculator. |
| **2** | **B** | Development of a Python program to perform operations on string, set, tuple data types, and bitwise operations |
| **3** | **A** | Development of a Python program to create multidimensional data arrays and perform mathematical operations on them using the NumPy library |
| **3** | **B** | Development of a Python program to generate data visualizations, such as line plots, scatter plots, bar graphs and histograms |
| **3** | **C** | Development of a Python program to perform basic scientific operations using the SciPy library |
| **4** | **A** | Python implementation of the DFS Algorithm to traverse a given graph |
| **4** | **B** | Python implementation of the BFS Algorithm to traverse a given graph |
| **5** |  | Python implementation of the PSO algorithm to determine the minimum of the Sphere function |
| **6** | **A** | Python implementation of a Support Vector Classifier |
| **6** | **B** | Python implementation of a Support Vector Regression Model |
| **7** | **A** | Development of a Python program to implement a three-class Naïve Bayes’ Classifier to classify the Iris Flower dataset |
| **8** |  | Python implementation of the K-NN Classifier |
| **9** | **A** | Python implementation of the Linear Regression Model |
| **9** | **B** | Python implementation of the Logistic Regression Model |
| **10** | **A** | Python implementation of K-Means Clustering |
| **10** | **B** | Python implementation of Hierarchical Clustering |

The lab exercise of each experiment should be in the following template:

1. **Objective of the Experiment: State the objective of the experiment in your handwriting. The objectives should be the same as the ones given in the SLM. If an experiment has multiple parts A, B, C, etc., then you must write a separate record for each part.**
2. **Brief Background of the Topic: Write in your handwriting about two paragraphs about the topic on which the experiment is based.**
3. **Algorithm Steps: Write the steps in the algorithm in your handwriting.**
4. **Python Program Code: Present the Python code. It can be handwritten, or you can include a screenshot. You may also copy-paste the contents of your Python source file.**
5. **Sample Results: Include the screenshots of the output of the program.**
6. **Conclusion: In your own handwriting, write your critical comments on the experiment, the ML model used, the results, etc.**

**Instructions to Students**

1. Write lab records for all 17 exercises listed above.
2. Write your name, registration number on all pages of your writeup. Sign each page.
3. Save each write-up as a single PDF file. Do not create multiple files for the same exercise.
4. Compress all 17 PDF files using a file compressor.
5. Submit the single ZIP file on Brightspace LMS.
6. Copying from any other source or submitting a copy of the write-up submitted by another student will lead to zero marks in the assignment.