END-SEMESTER LAB EXAMINATION, May 2025

Python for Computer Science and Data Science 2 (CSE 3652)

Programme: B.Tech. (CSE) **Semester: 6th**

Full Marks: 20 **Time: 2 Hours**

Subject/Course Learning Outcome	*Taxonomy Level	Ques. Nos.	Marks
Apply object-oriented programming principles and advanced Python features to design and test reusable, efficient applications for real-world problems.	L1, L2, L3		
Analyze and implement recursive algorithms, searching, and sorting techniques, and evaluate their efficiency using Big O notation to optimize performance.	L3, L4		
Apply natural language processing (NLP) techniques using tools and libraries to analyze, process, and visualize text data, including sentiment analysis, language translation, and entity recognition, with applications in machine learning.	L3, L4		
Utilize APIs to collect, analyze, and visualize social media data, identify trends, and develop cognitive computing applications.	L3, L4		
Apply supervised and unsupervised machine learning techniques, including classification, regression, clustering, and dimensionality reduction, using libraries and APIs to analyze data, evaluate models, and solve real-world problems.	L3, L4	1, 2	20
Implement deep learning models for applications like image classification, sentiment analysis, and reinforcement learning, while using big data technologies to process and visualize large datasets efficiently	L3, L4		

*Bloom's taxonomy levels: Remembering (L1), Understanding (L2), Application (L3), Analysis (L4), Evaluation (L5), Creation (L6)

Answer all questions

Q's	Questions	COs	LL

	Dataset:
	Use the following subset of the **Iris dataset** consisting of 10 samples:
	`Sepal length(cm)` | `Sepal width(cm)` | `Petal length(cm)` | `Petal width(cm)` | `Class`
	`5.1` | `3.5` | `1.4` | `0.2` | `setosa`
	`4.9` | `3.0` | `1.4` | `0.2` | `setosa`
	`4.6` | `3.1` | `1.5` | `0.2` | `setosa`
	`4.7` | `3.2` | `1.3` | `0.2` | `setosa`
	`7.0` | `3.2` | `4.5` | `1.5` | `versicolor`
	`6.4` | `3.2` | `4.5` | `1.5` | `versicolor`
	`6.9` | `3.1` | `4.9` | `1.5` | `versicolor`
	`6.3` | `3.3` | `6.0` | `2.5` | `virginica`
	`7.1` | `3.0` | `5.9` | `2.1` | `virginica`
	`6.3` | `2.9` | `5.6` | `1.8` | `virginica`		

1.	**Dataset Creation and Reading [10 Marks]** (a) Create a CSV file named `iris_subset.csv` using the above data. (b) Write a Python program using the *pandas* library to: • Read the `iris_subset.csv` file. • Display the entire dataset in the console. *Hint: Use pandas.read_csv() to read the CSV file.*	CO5	L3, L4
2.	**(a) Statistical Analysis and Visualization [6 Marks]** Write a Python program using *pandas, NumPy, and matplotlib.pyplot* to: • Calculate the standard deviation of each numerical feature (Sepal Length, Sepal Width, Petal Length, Petal Width). • Plot a scatter plot of Sepal Length vs Sepal Width. **(b) KNN Classification [4 Marks]** Using the scikit-learn library: • Apply the K-Nearest Neighbors (KNN) classification algorithm with k=3 to the dataset. • Predict the class of a new instance: [6.3, 2.8, 5.1, 1.5] *Hint: Use LabelEncoder to convert the class labels to numeric values before training the model.*	CO5	L3, L4