

**MODERN EDUCATION SOCIETY'S
NOWROSJEE WADIA COLLEGE (AUTONOMOUS)**

LAB COURSE ON:

**COURSE NAME: Laboratory Course on Artificial
Intelligence and Machine Learning**

COURSE CODE:

Total Credits: 2

**CHOICE BASED CREDIT SYSTEM
AS PER**

**National Education Policy (NEP) Syllabus
To be implemented from Academic Year 2023-2024**

M. SC. (COMPUTER SCIENCE) – I SEMESTER II

2023-24

**Modern Education Society's
NOWROSJEE WADIA COLLEGE (Autonomous)
Artificial Intelligence and Machine Learning**

Assignment Completion Sheet

Sr No.	Assignment Name	Marks
1	Search Algorithms	
2	Data Pre-processing	
3	Regression Models	
4	Classification Models	
5	Clustering Models	
	Total Marks (Out of 25)	
	Total Marks (Out of 10)	
	Viva (5)	
	Total Marks (Out of 15)	

Batch In-charge:

Examiner I:

Examiner II:

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Assignment 1: Search Algorithms

Prerequisites:

1. Concept of using dictionaries in python for creating a chatbot
 2. Use of Uninformed search and Heuristic search strategies
 3. Use of State space search
 4. Local Search and Optimization problems
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Lab Assignments:

Set A

1. Write a python program to implement Simple Chatbot.
2. Write a python program to implement Breadth First Search Traversal.
3. Write a python program to implement Depth First Search Traversal.
4. Write a python program to implement a Water Jug Problem. (Consider two jugs A and B , the capacity of A is four and the capacity of B is 3 , the target value is 2)

Set B (Practice Assignment)

1. Write a python program to implement Best First Search Traversal.
2. Write a python program to implement Missionaries and Cannibals Problem.
3. Write a python program to implement A* Search.

Signature of Instructor:

Date:

0: Not Done

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1: Incomplete

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2: Late Complete

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3: Needs Improvement

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4: Complete

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5: Well Done

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Assignment 2: Data Pre-processing

Prerequisites:

1. Plotting using Matplotlib.pyplot
 2. Handling missing data
 3. Encoding Categorical Data
 4. Feature scaling
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Lab Assignments:

Set A

1. Write a python program to Prepare Scatter Plot using Matplotlib library (Use Iris.csv).
2. Write a python program to find all null values in a given data set and replace them with mean using SimpleImputer (Use Iris.csv).
3. Write a python program to convert categorical values to numeric format in a given dataset using LabelEncoder and OneHotEncoder (Use Iris.csv).
4. Write a python program to scale values in a given dataset using standardization technique (Salary_Data.csv).

Set B (Practice Assignment)

1. Write a python program to split the data into a training set and test set. (Use Iris.csv)
2. Write a python program to scale the features using Standardization technique. (data_preprocess.csv)

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Assignment 3: Regression Models

Prerequisites:

1. Simple Linear Regression algorithm
 2. Multiple Linear Regression algorithm
 3. Polynomial Regression algorithm
 4. Support Vector Regression algorithm
 5. Decision Tree Regression algorithm
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Lab Assignments:

Set A

1. Write a python program to implement following Linear Regression Models for predicting house price: (House_price_prediction.csv)
 - i. Simple Linear Regression (Use sqft_living column)
 - ii. Multiple Linear Regression.
2. Write a python program to implement Polynomial Regression for a given dataset. (Use Position_Salaries.csv)
3. Write a python program to implement following Non-linear Regression Models on a given dataset:
 - i. Decision Tree Regression (Use Position_Salaries.csv)
 - ii. Support Vector Regression (Use Position_Salaries.csv)

Set B (Practice Assignment)

1. Write a python program to implement Simple Linear Regression to find the student's scores based on their study hours. (Use StudentHoursScores.csv)
2. Write a python program to prepare a prediction model for profit using multiple linear regression. (50_Startups.csv)

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Assignment 3: Regression Models (Cont.)

3. Consider the given dataset in the Position_Salaries.csv file:
- a) Implement the Simple linear regression on the dataset. Using scatter plot, show that Simple linear regression is not fitting well on the given data.
 - b) Apply Polynomial regression on the same data and visualize the results.

Signature of Instructor:

Date:

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4: Complete

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Assignment 4: Classification Models

Prerequisites:

1. Bayes Theorem, Naïve Bayes classification algorithm
 2. Decision Tree Classification algorithm
 3. Support Vector Machine classification algorithm
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Lab Assignments:

Set A

1. Write a python program to implement following classification algorithms on a given Dataset:
 - i. Naïve Bayes algorithm (Use Social_Network_Ads.csv)
 - ii. Random Forest (Use Social_Network_Ads.csv)
 - iii. Kernel SVM (Use Social_Network_Ads.csv)
2. Write a python program to Implement Decision Tree whether or not to play tennis. (Use Tennis.csv)
3. Write a python program to implement k-Nearest Neighbors algorithm to build a prediction model on a given dataset (Use Social_Network_Ads.csv).

Set B (Practice Assignment)

1. Consider the given dataset in the User_Data.csv file:
 - a) Write a python program to implement k-nearest Neighbors algorithm to build a prediction model for whether to buy an SUV car or not on a given dataset.
 - b) Plot the graph to show classification.
 - c) Show Accuracy and Precision of the model.

Signature of Instructor:

Date:

0: Not Done

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1: Incomplete

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2: Late Complete

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3: Needs Improvement

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4: Complete

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5: Well Done

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Assignment 5: Clustering Models

Prerequisites:

1. Clustering Concept
2. K-means clustering algorithm
3. Hierarchical Clustering – Agglomerative Clustering

Lab Assignments:

Set A

1. Write a python program to implement the k-means algorithm on a synthetic dataset. (Use make_blobs module from sklearn.datasets)
2. Write a python program to implement Agglomerative clustering on a synthetic dataset. (Use make_blobs module from sklearn.datasets)

Set B (Practice Assignment)

1. Consider the given dataset in the Mall_Customers.csv file:
 - a) Find the optimal number of clusters using the Elbow method. (Plot the graph as Number of clusters versus WCSS)
 - b) Apply k-means on the given data with optimal value of k (found in (a)).
2. Consider the given dataset in the penguins.CSV file:
 - a) Form clusters using Agglomerative clustering to plot dendrogram. Identify the correct number of clusters from dendrogram.
 - b) Show all clusters in different colors using a scatter plot.