Machine Learning Algorithms Lab		Semester	5
Course Code	**BCIL504**	CIE Marks	50
Teaching Hours/Week(L: T:P)	0:0:2	SEE Marks	50
Credits	01	Exam Hours	2
Examination type(SEE)	Practical		

Course outcomes:

At the end of the course the student will be able to:

1. Demonstrate proficiency in using Python libraries to carry out an end-to-end machine learning project.
2. Implement and evaluate various machine learning algorithms.
3. Apply dimensionality reduction techniques and understand their impact on machine learning models.
4. Implement unsupervised learning techniques for clustering.

Mapping with POs and PSOs:

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12		PSO1	PSO2
CO1	2	2	1	-	3	-	-	-	-	-	-	2		2	2
CO2	2	2	2	2	3	-	-	-	-	-	-	-		2	2
CO3	2	2	2	3	2	-	-	-	-	-	-	-		3	3
CO4	2	2	2	2	3	-	-	-	-	-	-	-		2	2

Mapping Strength: Strong– 3 Medium – 2 Low – 1

Sl. No	CO's	Experiments
1	CO1	**Introduction to Python for Machine Learning** **Objective**: Install necessary libraries and set up the environment for machine learning in Python. **Tasks**: Install Anaconda (or another Python distribution suitable for data science). Create a new Python environment specifically for machine learning projects. Write a Python script to install numpy , pandas, matplotlib, scikit-learn, and tensor flow. Import these libraries and print their versions.
2	CO1	**End-to-End Machine Learning Project** **Objective**: Work through a complete machine learning project. **Tasks**: Use a real-world dataset, perform data cleaning, feature engineering, model training, and evaluation.
3	CO2	**Implementing Bayesian Decision Theory** **Objective**: Implement Bayesian Decision Theory for classification. **Tasks**: Write a Python program to classify a given dataset using Bayesian Decision Theory.
4	CO2	**Classification Using MNIST Dataset** **Objective**: Implement a classifier for the MNIST dataset. **Tasks**: Train a binary classifier on the MNIST dataset and evaluate its performance using various metrics.
5	CO2	**Training and Evaluating Linear Regression Models** **Objective**: Implement linear regression and evaluate its performance. **Tasks**: Use a suitable dataset to train a linear regression model and evaluate its performance using metrics such as RMSE and R^2 score.
6	CO2	**Regularized Linear Models** **Objective**: Implement Ridge and Lasso regression. **Tasks**: Compare the performance of Ridge and Lasso regression on a dataset and analyze the effect of regularization.

7	CO3	**Dimensionality Reduction Techniques** **Objective**: Apply PCA and LDA for dimensionality reduction. **Tasks**: Implement PCA and LDA on a high-dimensional dataset and visualize the results.
8	CO2	**Support Vector Machines** **Objective**: Train and evaluate SVM classifiers. **Tasks**: Implement linear and kernelized SVMs on a given dataset and compare their performance.
9	CO2	**Decision Trees and Random Forests** **Objective**: Implement and evaluate decision trees and random forests. **Tasks**: Train a decision tree and a random forest classifier on a dataset, visualize the trees, and evaluate their performance.
10	CO4	**Clustering Algorithms** **Objective**: Implement various clustering algorithms. **Tasks**: Apply K-means, Spectral, and Hierarchical clustering on a dataset and compare the clustering results.

Textbook:

1. Introduction to Machine Learning by EthemAlpaydin
2. Hands-on Machine Learning with Scikit-Learn and TensorFlow by AurélienGéron

Virtual Labs(CSE):

1. **http://cse01-iiith.vlabs.ac.in/ https://playground.tensorflow.org/**