PRASAD V. POTLURI SIDDHARTHA INSTITUTE OF TECHNOLOGY
(Autonomous)
Kanuru, Vijayawada-520007

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING (AI & ML)

B.Tech CSE (AI&ML) - II Year – I I Semester
Machine Learning Lab

Course Code	23AM3451	Year	II	Semester	II
Course Category	PCC Lab	Branch	CSE(AI&ML)	Course Type	Practical
Credits	1.5	L-T-P	0-0-3	Prerequisites	Python Programming
Continuous Internal Evaluation	30	Semester End Examination	70	Total Marks	100

Course Outcomes		
Upon successful completion of the course, the student will be able to		
CO1	Demonstrate experimental procedures through oral communication and submit comprehensive documentation reports.	L2
CO2	Apply supervised and unsupervised machine learning techniques for developing predictive and descriptive models using tools.	L3
CO3	Analyze machine learning problems, and critically assess their performance and limitations.	L4
CO4	Evaluate the performance of machine learning models using suitable metrics across various datasets.	L5

Contribution of Course Outcomes towards achievement of Program Outcomes&
Strength of correlations (3:High,2:Medium, 1:Low)

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

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Syllabus		
Expt No.	**Contents**	**Mapped CO**
1	Explore different Tools: Jupyter Notebook, PyTorch, TensorFlow, Google Colab, Kaggle.	CO1
2	Explore the different dataset: Kaggle, UCI Machine Learning Repository	CO1
3	Retrieve, preprocess, explore, and visualize the data to gain valuable insights and prepare it effectively for machine learning.	CO1
4	Develop and implement linear and non-linear regression models, and evaluate their performance using a comprehensive set of appropriate metrics across various datasets.	CO1 to CO4
5	Implement logistic regression on different datasets & evaluate using accuracy, precision, recall, AUC-ROC to assess generalizability.	CO1 to CO4
6	Implement Decision Tree Learning Algorithm on different datasets & evaluate using accuracy, precision, recall, F1-Score to assess generalizability	CO1 to CO4
7	Evaluate the performance of KNN on various Datasets using Accuracy as the metric, with a focus on determining the optimal number of neighbors (K).	CO1 to CO4
8	Implement Support Vector Machines (SVM) for classification on various datasets and evaluate their performance using confusion matrices, precision, recall, and F1 scores.	CO1 to CO4
9	Implement a simple perceptron and multi-layer perceptron to classify handwritten digits using the MNIST dataset.	CO1 to CO4
10	Evaluate ANNs for image recognition (e.g., MNIST). Compare with SVMs & KNNs using accuracy, precision, recall, F1. Explore ANN strengths & weaknesses: impact of network architecture & data quality, and interpretability vs. other algorithms.	CO1 to CO4
11	Implement Partitioning Clustering Methods on various datasets and evaluate their performance.	CO1 to CO4
12	Implement Hierarchical Clustering Methods on various datasets and evaluate their performance.	CO1 to CO4
13	**Capstone Project:** Development of a robust end-to-end machine learning pipeline adhering to the Cross-Industry Standard Process for Data Mining (CRISP-DM) methodology, culminating in a comprehensive paper that elucidates the chosen machine learning technique, the specific application domain, and the empirical results obtained	CO1 to CO4

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Learning Resources
Text Books
1. Hands-On Machine Learning with Scikit-Learn, Keras, and TensorFlow: Concepts, Tools, and Techniques to Build Intelligent Systems, Aurelien Geron, Third Edition, 2022, O'Reilly   2. Pattern Recognition and Machine Learning, Christopher M. Bishop, First Edition, 2016, Springer
Reference Books
1. Machine Learning, Tom M. Mitchell, First Edition, 2017, McGraw Hill Education   2. Machine Learning: A Probabilistic Perspective, Kevin P. Murphy, 2012, MIT Press
e- Resources & other digital material
1. Practical Machine Learning with TensorFlow: https://nptel.ac.in/courses/106106213   2. https://www.tensorflow.org/tutorials   3. https://pytorch.org/tutorials/