COMPUTER DEPARTEMNT
LORETO COLLEGE
TIME PLAN 2024-2025

Name of the teacher: CHINMOYEE RAY
Initials: CR
Course Title: CVAC – 4 (HANDS-ON MACHINE LEARNING)

Teaching Objective: To introduce students to the fundamentals of machine learning and develop hands-on skills in implementing supervised, unsupervised, and ensemble learning models using Python. Students will also gain practical experience through coding exercises and a mini-project.

Semester II Topic-wise Time Plan

Topics	Hours Allotted	Topics (as per Curriculum)	Learning Outcome (Output)	Teaching Method	Assessment
Introduction & Supervised Learning	3 hrs (2T + 1P)	Basics of supervised & unsupervised learning, Linear regression, Cost & loss functions, Gradient descent, Feature engineering, Train-test split	Understand regression models and implement linear regression in Python	Lecture, Demo, Lab Practice	MCQs + Hands-on coding
Polynomial Regression & Evaluation Metrics	3 hrs (2T + 1P)	Polynomial regression, Python implementation, Performance metrics (MSE, RMSE, R^2, Adjusted R^2)	Apply regression to non-linear data and evaluate models	Lecture, Problem-Solving, Coding	Lab exercise
Logistic Regression	3 hrs (2T + 1P)	Logistic regression, Decision boundary, Gradient descent, Regularization (L1, L2), Python implementation	Implement classification using logistic regression and apply regularization	Lecture, Whiteboard, Lab Practice	Coding assignment
Evaluation of Classification Models	3 hrs (2T + 1P)	Performance metrics: Precision, Recall, F1-score, ROC-AUC, KS	Interpret classification results using standard metrics	Lecture, Discussion, Lab	Quiz + Lab
Neural Networks	3 hrs (2T + 1P)	Neural networks, Forward & backward propagation, Cross-validation, Bias-variance trade-off, Error analysis	Build and evaluate simple neural networks for classification	Lecture, Simulation, Lab Coding	Practical: Digit recognition
Decision Trees	3 hrs (2T + 1P)	Decision tree classifier & regressor, Entropy, Gini index	Design decision tree models and interpret results	Lecture, Example-based Learning, Lab	Class test
Ensemble Methods	3 hrs (2T + 1P)	Bagging, Boosting, Random Forest, XGBoost	Apply ensemble models to improve predictive performance	Lecture, Coding Demo, Lab Work	Hands-on: Ensemble model coding
Project Work	9 hrs (3T + 6P)	End-to-end ML pipeline: Data collection, Problem definition, Data cleaning, Model building, Performance evaluation	Apply ML concepts to a real dataset and present results	Guided Project, Mentoring, Lab	Final project presentation