Title: Applied ML/DL

Course Syllabus: Machine Learning and Deep Learning Fundamentals

This course offers a practical introduction to Machine Learning (ML) and Deep Learning (DL), providing foundational concepts, key algorithms, and real-world projects. The course is ideal for beginners with a technical background and includes hands-on coding exercises using Python.

## Week 1: Introduction to Machine Learning

* • Overview of Machine Learning
* • Types of Machine Learning: Supervised, Unsupervised, Reinforcement Learning
* • Basics of Python for Machine Learning
* • Introduction to Python
* • Essential Libraries like NumPy, Pandas
* • Basic Data Structures and Operations

## Week 2: Supervised Learning - Classification Algorithms

* • Linear Classification
* • Perceptron Algorithm

## Week 3 & 4: Advanced Supervised Learning

* • Linear Regression
* • Logistic Regression
* • Decision Trees
* • Support Vector Machines (SVM)
* • Model Evaluation: Confusion Matrix, Precision, Recall, F1 Score
* • Ensemble Methods: Random Forest, Gradient Boosting Machines (GBM)
* • Model Evaluation and Hyperparameter Tuning
* • Cross-Validation Techniques
* • Project 1 - Classification Problem: Real-world dataset, end-to-end model development and evaluation

## Week 5 & 6: Unsupervised Learning

* • Clustering Techniques: K-Means, Hierarchical Clustering
* • Project 2 - Unsupervised Learning: Real-world clustering or anomaly detection problem

## Week 7 & 8: Deep Learning and Special Topics

* • Introduction to Deep Learning
* • Basics of Neural Networks
* • Building and Training Neural Networks
* • Hyperparameter Tuning
* • Model Evaluation
* • Convolutional Neural Networks (CNN): Introduction and applications in image recognition