

**Panipat Institute of Engineering & Technology**

**Department of CSE-AI&DS**

**LESSON PLAN**

**Subject: Applied Machine Learning**

**Subject code: PC-CS-AIDS-308A**

**Session: Jan.-June 2023-24**

**Semester: 6<sup>th</sup> Sem.**

S. No	Topic	CO Covered	Assignment No.	Teaching Methodology
1	<b>Unit-1:</b> Intelligent machines, well-posed machine learning problems	<b>CO1</b>	<b>Assignment No.1</b>	Smart Board
2	examples of applications in diverse fields, data representation			Power Point Presentation
3	domain knowledge for productive use of machine learning, diversity of data: structured/unstructured			Black Board
4	forms of learning, machine learning and data mining			Smart Board
5	Basic linear algebra in machine learning techniques			Power Point Presentation
6	Statistical learning-machine learning and inferential statistical analysis			Black Board
7	descriptive statistics in learning techniques			Smart Board
8	Bayesian reasoning: a probabilistic approach to inference			Power Point Presentation
9	<b>Unit-2:</b> rationale and basics, Learning from observations	<b>CO2</b>	<b>Assignment No.2</b>	Black Board
10	bias and variance, why learning works: computational learning theory			Smart Board
11	Occam's razor principle and overfitting avoidance, heuristic search in inductive learning,			Power Point Presentation
12	Estimating generalization errors, metrics for assessing regression (numeric prediction) accuracy			Black Board
13	metrics for assessing classification (pattern recognition) accuracy, an overview of the design cycle and issues in machine learning			Smart Board
14	Introduction to SVM, linear discriminant functions for binary classification, perceptron algorithm			Power Point Presentation
15	Linear maximal margin classifier for linearly separable data, linear soft margin classifier for overlapping classes			Black Board
16	Nonlinear classifier, regression by support vector machines			Smart Board
17	Decision tree learning, Building a decision tree			Power Point Presentation
18	Combining weak to strong learners via random forest, choosing a split with information gain			Black Board
19	<b>Unit-3:</b> Data clustering and data transformations	<b>CO3</b>	<b>Assignment No.3</b>	Smart Board

20	Engineering the data, overview of basic clustering methods			Power Point Presentation
21	k-means clustering			Black Board
22	fuzzy k-means clustering			Smart Board
23	expectation-maximization (EM) algorithm and gaussian mixtures clustering			Power Point Presentation
24	some useful data transformations, entropy-based method for attribute discretization			Black Board
25	principal components analysis (PCA) for attribute reduction			Smart Board
26	Rough sets-based methods for attribute reduction			Power Point Presentation
27	k-nearest neighbor(k-nn) classifier, discriminant functions and regression functions			Black Board
28	Linear regression with least square error criterion			Smart Board
29	logistic regression for classification tasks			Power Point Presentation
30	fisher's linear discriminant and thresholding for classification, minimum description length principle			Black Board
31	<b>Unit-4:</b> towards cognitive machine, neuron models, network architectures	<b>CO4</b>	<b>Assignment No.4</b>	Smart Board
32	perceptron, linear neuron and the widrow-hoff learning rule, the error-correction delta rule			Power Point Presentation
33	multi-layer perceptron (MLP) networks and the error-backpropagation algorithm			Black Board
34	multi-class discrimination with MLP networks			Smart Board
35	radial basis functions (RBF) networks			Power Point Presentation
36	genetic-neural systems			Black Board
37	Fuzzy inference systems-introduction, cognitive uncertainty and fuzzy rule-base			Smart Board
38	Fuzzy quantification of knowledge, fuzzy rule-base and approximate reasoning			Power Point Presentation
39	Mamdani model for fuzzy inference systems			Black Board
40	takagi-sugeno fuzzy model			Smart Board
41	neuro-fuzzy inference systems, genetic-fuzzy systems			Power Point Presentation