Indraprastha College for Women
University of Delhi

Work Plan for ODD SEMESTER – 2025

Course Name:	B.A. (Program)
Paper Title:	MACHINE LEARNING
Unique Paper Code:	2342203502
Semester:	V
Faculty(s):	DIKSHA JAIN
Year:	2025 – 26

Work Plan

Unit No.	Learning Objective	Lecture No.	Topics to be Covered
I	Familiarisation with basic terminology and the difference between supervised and unsupervised learning tasks.	1	Basic definitions and concepts, key elements, supervised and unsupervised learning.
I	Applications of Machine Learning	2	Introduction to reinforcement learning, applications of ML.
III	Understand the fundamentals of regression	3	Simple Linear regression – Ordinary Least Squares Method
III	Using multiple variables for making predictions	4	Linear regression with multiple variables – Gradient Descent
III	Using Gradient Descent for multiple regression	5	Gradient Descent Method Contd.
III	Evaluating regression models using metrics	6	Regression Evaluation Metrics
III	Understanding the phenomenon of over-fitting and using regularization to prevent over-fitting	7	Overfitting Vs. Underfitting
III	Understanding L1 and L2 Regularisation	8	L1 and L2 Regularisation
IV	Understand the fundamentals of classification	9	Logistic Regression
IV	Using Logistic Regression	10	Logistic Regression (Contd.)
IV	Using performance evaluation metrics for classification	11	Classification Metrics
IV	Using performance evaluation metrics for classification	12	Classification Metrics (Contd.)

IV	Using performance evaluation metrics for classification	13	Classification Metrics (Contd.)
IV	Introduction to Bayesian Learning Methods	14	Baye's Theorem and Bayes Optimal Classifier
IV	Understanding Naïve Bayes Classifier	15	Naïve Bayes Classifier
IV	Understanding Naïve Bayes Classifier	16	Naïve Bayes Classifier (Contd.)
IV	Introduction to Tree Based Learners	17	Entropy and Information Gain
IV	Understanding Decision Tree Learning	18	Decision Trees (Contd.)
IV	Understanding Decision Tree Learning	19	Decision Trees (Contd.)
IV	Introduction to various distance metrics	20	Distance Metrics
IV	Using k-nearest neighbour as classifier	21	k-Nearest Neighbour (for classification)
IV	Using k-nearest neighbour as regressor	22	k-Nearest Neighbour (for regression)
V	Clustering using k-means algorithm	23	k-Means Clustering
V	Clustering using k-means algorithm	24	k-Means Clustering (Contd.)
V	Clustering Algorithm	25	Hierarchical Clustering
V	Clustering Algorithm	26	Hierarchical Clustering (Contd.)
IV	Learning neural networks	27	Introduction to Perceptron
IV	Learning neural networks	28	Activation Functions
IV	Learning neural networks	29	Multi-layer Perceptron
IV	Understanding support vector classifiers	30	Support Vector Machines
IV	Understanding support vector classifiers	31	Support Vector Machines (Contd.)
II	Appreciate the need for preprocessing, feature scaling, and feature selection.	32	Feature Selection Methods
II	Understanding PCA	33	Principal Component Analysis
II	Understanding PCA	34	Principal Component Analysis (Contd.)
I	Revision	35	Revision
II	Revision	36	Revision
III	Revision	37	Revision
IV	Revision	38	Revision

Unit	Contents/Syllabus
I	Introduction: Basic definitions and concepts, key elements, supervised and unsupervised learning, introduction to reinforcement learning, applications of ML.
II	Preprocessing: Feature scaling, feature selection methods. dimensionality reduction (Principal Component Analysis).
III	Regression: Linear regression with one variable, linear regression with multiple variables, gradient descent, over-fitting, regularization. Regression evaluation metrics.
IV	Classification: Decision trees, Naive Bayes classifier, logistic regression, k-nearest neighbor classifier, perceptron, multilayer perceptron, neural networks, Support Vector Machine (SVM). Classification evaluation metrics.
S. No.	**Name of Authors/Books/Publishers**
1.	Essential/recommended readings Mitchell, T.M. Machine Learning, McGraw Hill Education, 2017.
2.	James, G., Witten. D., Hastie. T., Tibshirani., R. An Introduction to Statistical Learning with Applications in Python, Springer, 2014.
3.	Alpaydin, E. Introduction to Machine Learning, MIT press, 2009.

<table>
<tr><td></td><td colspan="3">Paper Components</td></tr>
<tr><td>Credits</td><td>Lecture
(L)</td><td>Tutorial
(T)</td><td>Practical
(P)</td></tr>
<tr><td>4</td><td>03</td><td>0</td><td>01</td></tr>
<tr><td colspan="4">Assessment Scheme</td></tr>
<tr><td>S.No.</td><td>Component</td><td>Marking Scheme</td><td>Total Marks</td></tr>
<tr><td rowspan="5">1.</td><td>Internal Assessment</td><td></td><td rowspan="5">30</td></tr>
<tr><td>• Assignment/Quiz/Project/ Presentation</td><td>12</td></tr>
<tr><td>• Class Test</td><td>12</td></tr>
<tr><td>• Attendance</td><td>6</td></tr>
<tr><td rowspan="4">2.</td><td>Continuous Assessment (Tutorial)</td><td>NA</td><td rowspan="4">NIL</td></tr>
<tr><td>• Activity 1</td><td>NA</td></tr>
<tr><td>• Activity 2</td><td>NA</td></tr>
<tr><td>• Attendance</td><td>NA</td></tr>
<tr><td rowspan="4">3.</td><td>Practical</td><td></td><td rowspan="4">40</td></tr>
<tr><td>• Continuous Assessment</td><td>10</td></tr>
<tr><td>• End Term Written/Practical Exam</td><td>20</td></tr>
<tr><td>• Viva</td><td>10</td></tr>
<tr><td>4.</td><td colspan="2">End Semester Examination</td><td>90</td></tr>
</table>