



**GURU GOBIND SINGH INDRAPRASTHA UNIVERSITY,
EAST DELHI CAMPUS,
SURAJMAL VIHAR-110092**

Semester: 4th			
Paper code: AIDS210/AIML210	L	T/P	Credits
Subject: Fundamentals of Machine Learning	3	0	3
Marking Scheme			

1. Teachers Continuous Evaluation: As per university examination norms from time to time
2. End term Theory Examination: As per university examination norms from time to time

INSTRUCTIONS TO PAPER SETTERS: Maximum Marks: As per university norms	
<ol style="list-style-type: none"> 1. There should be 9 questions in the end term examination question paper 2. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. 3. Apart from Question No. 1, the rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, students may be asked to attempt only 1 question from each unit. 4. The questions are to be framed keeping in view the learning outcomes of course/paper. The standard/ level of the questions to be asked should be at the level of the prescribed textbooks. 5. The requirement of (scientific) calculators/ log-tables/ data-tables may be specified if required. 	
Course Objectives:	
1.	To understand regression, classification and prediction algorithms to classify data.
2.	To gain knowledge about feature selection.
3.	To analyse feature engineering techniques to formulate the solutions for the complex problems
4.	To apply machine learning techniques in real world problems.
Course Outcomes:	
CO1	Understand machine learning tools and techniques with their applications.
CO2	Apply machine learning techniques for classification and regression.
CO3	Perform feature engineering techniques.
CO4	Design supervised and unsupervised machine learning based solutions for real-world problems.

CO/PO	PO01	PO02	PO03	PO04	PO05	PO06	PO07	PO08	PO09	PO10	PO11	PO12
CO1	3	3	3	3	3	1	1	1	1	1	1	2
CO2	3	3	3	3	2	1	1	1	1	1	1	1
CO3	3	3	3	3	2	-	-	-	-	-	-	-
CO4	3	3	3	3	2	1	1	1	1	1	1	2



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Course Overview:

This course covers fundamental concepts and methods of computational data analysis, including pattern classification, prediction, visualization, and recent topics in machine learning. The course will give the student the basic ideas and intuition behind modern machine learning methods as well as a bit more formal understanding of how, why, and when they work. The underlying theme in the course is a statistical inference as it provides the foundation for most of the methods covered.

UNIT I:

[8]

Introduction to Machine Learning- Basic concepts, developing a learning system, Learning Issues, and challenges. Types of Machine Learning. Feature Selection Mechanisms, Imbalanced Data, Bias in Data, Outlier Detection

UNIT II:

[8]

Supervised Learning- Linear Regression, Multiple Regression, Logistic Regression, Classification; Classifier Models, K Nearest Neighbor (KNN), Naive Bayes, Decision Trees, Support Vector Machine (SVM), Random Forest

UNIT III:

[8]

Unsupervised Learning- Dimensionality Reduction; Clustering; K-Means Clustering; C-Means Clustering; Fuzzy C Means Clustering, Association Analysis- Association Rules in Large Databases, Apriori Algorithm, Markov Models: Hidden Markov Models (HMMs).

UNIT IV:

[8]

Reinforcement Learning- Introduction to Reinforcement Learning, Elements of Reinforcement Learning, Approaches to Reinforcement Learning, Applications of Reinforcement learning. Applications of Machine Learning in different sectors: Medical Diagnostics, Fraud Detection, Email Spam Detection

Text Books:

1. Tom M. Mitchell, Machine Learning, McGraw-Hill, 2010.
2. Ethem Alpaydin, Introduction to Machine Learning, MIT Press, Pearson, Third Edition, 2014.
3. Bishop, Christopher. Neural Networks for Pattern Recognition. New York, NY: Oxford University Press, 1995

Reference Books:

1. Ethem Alpaydin, (2004), Introduction to Machine Learning (Adaptive Computation and Machine Learning), The MIT Press
2. T. Astie, R. Tibshirani, J. H. Friedman, The Elements of Statistical Learning, Springer (2nd ed.), 2009
3. Bishop, C., Pattern Recognition and Machine Learning. Berlin: Springer-Verlag