

Subject Code: 2CS2010304	Subject Title: Machine Learning (Elective-III)
Pre-requisite:	Basics of computer science including algorithms, data structure etc.

Course Objective:

The objectives of the course are to:

- Basic concepts of various learning methods.
- To learn mathematical concepts, and algorithms used in machine learning

Teaching Scheme (Hours per week)				Evaluation Scheme (Marks)				
Lecture	Tutorial	Practical	Credit	Theory		Practical		Total
				University Assessment	Continuous Assessment	University Assessment	Continuous Assessment	
3	-	3	6	60	40	30	20	150

Subject Contents

Sr. No	Topic	Total Hours	Weight (%)
1	Introduction Learning Problems, designing a learning system, Issues with machine Learning. Concept Learning, Version Spaces and Candidate Eliminations, Inductive bias	6	15
2	Supervised and Unsupervised learning Decision Tree Representation, Appropriate problems for Decision tree learning, Algorithm, Hypothesis space search in Decision tree learning, inductive bias in Decision tree learning, Issues in Decision tree learning K- Nearest Neighbor Learning Locally Weighted Regression, Radial Bases, Functions, Case Based Reasoning	10	25
3	Artificial Neural networks Neural Network Representation, Appropriate problems for Neural Network Learning, Perceptions, Multilayer Networks and Back Propagation Algorithms, Remarks on Back Propagation Algorithms Case Study: face Recognition	8	25
4	Bayesian Learning Bayes Theorem, Bayes Theorem and Concept Learning, Maximum Likelihood and Least squared Error Hypothesis, Maximum likelihood hypothesis for Predicting probabilities, Minimum Description Length Principle, Bayes Optimal Classifier, Gibbs Algorithm, Naïve Bayes Classifier, Bayesian Belief Network	8	25
5	Overview of typical application areas, such as Recommender System, etc.	4	10

Course Outcome:

At the end of this course, the student would be able

- Student will be able to understand the concept of Machine learning and range of problems that can be solved by machine learning.
- They will be able to compare different types of learning algorithms and apply machine learning concepts in real life problems

List of References:

1. Tom M Mitchell, "Machine Learning", McGraw Hill
2. Peter Harrington, "Machine Learning in Action", DreamTech

List of Experiments:

Practical's to implement following ten algorithms, using Python

1. Classifying with distance measures
2. Constructing Decision trees and Classification using Decision Trees
3. K-means
4. Classification with k-Nearest Neighbors
5. Support vector machines
6. Expectation Maximization
7. Page Rank
8. AdaBoost
9. Naïve Bayes Classification
10. CART

Few Examples which apply above algorithms:

1. Improving a handwriting recognition system
2. Using decision trees to predict contact lens type
3. Classifying text
4. Classifying spam mail with naïve Bayes
5. Using naïve bayes to reveal local attitudes from personal ads

Book for Practical:

1. Peter Harrington, "Machine Learning in Action", DreamTech