



Sardar Patel Institute of Technology

Bhavan's Campus, Munshi Nagar, Andheri (West), Mumbai-400058-India
(Autonomous Institute Affiliated to University of Mumbai)

Course Code	Course Name	Teaching Scheme (Hrs/week)			Credits Assigned			
		L	T	P	L	T	P	Total
CEE92D	Machine Learning(ML)	3	--	--	3	--	--	3
		Examination Scheme						
		ISE		MSE		ESE		
		10		30		100 (60% Weightage)		

Pre-requisite Course Codes	Fundamentals of AI and Soft Computing, Statistics and probability
At the end of successful completion of the course, students will be able to	
Course Outcomes	CO1 Exhibit the knowledge about basic concepts of Machine Learning
	CO2 Identify machine learning techniques suitable for a given problem
	CO3 Solve the problems using various machine learning techniques
	CO4 Apply Dimensionality reduction techniques.
	CO5 Design application using machine learning techniques

Module No.	Unit No.	Topics	Ref	Hrs.
1		Introduction to Machine Learning		4
	1.1	Machine Learning, Types of Machine Learning, Issues in Machine Learning, Application of Machine Learning, Steps in developing a Machine Learning Application.	1,2,3,4	
2		Introduction to Neural Network		4
	2.1	Introduction – Fundamental concept – Evolution of Neural Networks – Biological Neuron, Artificial Neural Networks, NN architecture, Activation functions, McCulloch-Pitts Model.	6	
3		Learning with Regression and trees:		10
	3.1	Learning with Regression: Linear Regression, Logistic Regression. Learning with Trees: Decision Trees, Constructing Decision Trees using Gini Index, Classification and Regression Trees (CART).	2,3	
4		Learning with Classification and clustering:		10
	4.1	Classification: Rule based classification, classification by Bayesian Belief networks, Hidden Markov Models. Support Vector Machine: Maximum Margin Linear Separators, Quadratic Programming solution to finding maximum margin separators, Kernels for learning non-linear functions.	3,4	



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	4.2	Clustering: Expectation Maximization Algorithm, Supervised learning after clustering, Radial Basis functions.	2	
5		Dimensionality Reduction:		8
	5.1	Dimensionality Reduction Techniques, Principal Component Analysis, Independent Component Analysis, Single value decomposition.	1,4	
6		Machine Learning Applications		6
	6.1	Learning Associations, Classification, Regression, Unsupervised learning.	2	
		Total		42

References:

- [1] Peter Harrington "Machine Learning In Action", DreamTech Press
- [2] Ethem Alpaydm, "Introduction to Machine Learning", MIT Press
- [3] Tom M.Mitchell "Machine Learning" McGraw Hill
- [4] Stephen Marsland, "Machine Learning An Algorithmic Perspective" CRC Press
- [5] J.-S.R.Jang "Neuro-Fuzzy and Soft Computing" PHI 2003.
- [6] Samir Roy and Chakraborty, "Introduction to soft computing", Pearson Edition.