



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
CPE8031	Elective-III Machine Learning	4	--	-	4	--	-	4
		Examination Scheme						
		ISE		MSE		ESE		
		10		30		100 (60% Weightage)		

Pre-requisite Course Codes	-
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At end of successful completion of this course, student will be able to		
Course Outcomes	CO1	Ability to analyze and appreciate the applications which can use Machine Learning Techniques
	CO2	Ability to understand regression, classification, clustering methods.
	CO3	Ability to understand the difference between supervised and unsupervised learning methods.
	CO4	Ability to appreciate Dimensionality reduction techniques.
	CO5	Students would understand the working of Reinforcement learning.

Module No.	Unit No.	Topics	Ref.	Hrs.
1	1.1	Introduction to Machine Learning: What is Machine Learning? , Key Terminology, Types of Machine Learning, Issues in Machine Learning, Applications of Machine Learning, How to choose Right Algorithm, Steps in Developing a Machine Learning Application	1,2,3,4	6
2	2.1	Learning with Regression: Linear Regression, Logistic Regression	1,2,4,5	4
3	3.1	Learning with Trees: Using Decision Trees, Constructing Decision Trees, Classification and Regression Trees (CART)	1,2,7	8
4	4.1	Support Vector Machine: Maximum Margin Linear Separator, Quadratic Programming Solution to finding maximum margin separators, Kernels for learning non-linear functions	1,2,4	6
5	5.1	Learning with Classification: Rule based Classification, Classification by Back propagation,	1,2,6	6



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		Bayesian Belief Networks, Hidden Markov Model		
6	6.1	Dimensionality Reduction: Dimensionality Reduction Techniques, Principal Component Analysis, Independent Component Analysis	1,2,5	6
7	7.1	Learning with Clustering: K-means Clustering, Hierarchical Clustering, Expectation Maximization Algorithm, Supervised Learning after Clustering, Radial Basis Functions	1,2,6	6
8	8.1	Reinforcement Learning: Introduction, Elements of Reinforcement Learning, Model based Learning, Temporal Difference Learning, Generalization, Partially Observable States	1,2,6	6
			Total	48

References:

- [1] Peter Harrington "Machine Learning In Action", DreamTech Press.
- [2] EthemAlpaydin, "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] William W.Hsieh, "Machine Learning Mehods in the Environmental Sciences", Cambridge.
- [6] Han Kamber, "Data Mining Concepts and Techniques", Morgann Kaufmann Publishers.
- [7] Margaret.H.Dunham, "Data Mining Introductory and Advanced Topics", Pearson Education.