



# Sardar Patel Institute of Technology

Bhavan's Campus, Munshi Nagar, Andheri (West), Mumbai-400058-India

Course Code	Course Name	Teaching Scheme (Hrs/week)			Credits Assigned			
		L	T	P	L	T	P	Total
ETE91C	Machine Learning and Artificial Intelligence	3	--	--	3	--	--	3
		<b>Examination Scheme</b>						
		<b>Theory Marks</b>						
		<b>ISE</b>		<b>MSE</b>		<b>ESE</b>		
		<b>10</b>		<b>30</b>		<b>100 (60% Weightage)</b>		

Pre-requisite Course Codes		
<b>Course Outcomes</b>	CO1	To describe the basic concepts and techniques of Machine Learning.
	CO2	To apply knowledge representation, reasoning, and machine learning techniques to real-world problems
	CO3	To use recent machine learning software for solving practical problems.
	CO4	To know various AI algorithms (uninformed, informed, heuristic, constraint satisfaction, genetic algorithms)

Module No.	Unit No.	Topics	Ref.	Hrs.
1		INTRODUCTION: Definition of learning systems. Goals and applications of machine learning. designing a learning system: training data, concept representation, function approximation. well posed learning problems, perspective & issues in machine learning		06
2		CONCEPT LEARNING: The concept learning task. Concept learning as search through a hypothesis space. General-to-specific ordering of hypothesis. FIND-S, candidate elimination algorithm		04
3		DECISION TREE LEARNING: Introduction, Decision tree representation, appropriate problems, for decision tree learning, basic decision tree algorithm, hyper space, search in decision tree learning, issues in decision tree learning . BAYESIAN LEARNING: Probability theory and Bayes rule. Naive Bayes learning algorithm. Parameter smoothing. Generative vs. discriminative training. Logistic regression. Bayes nets and Markov nets for representing dependencies. INSTANCE BASED LEARNING: Introduction, K-nearest neighbour learning, case based learning, radial basis functions		12
4		CLUSTERING & UNSUPERVISED LEARNING: Learning from unclassified data. Clustering. Hierarchical Agglomerative Clustering. k-means partitional clustering. Expectation maximization (EM) for soft clustering. Semi-supervised learning with EM using labeled and unlabelled data.		06



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5		ARTIFICIAL NEURAL NETWORK: Introduction, neural network representation, problems for neural network learning, perceptrons , multilayer network & Back propagation Algorithm GENETIC ALGORITHMS: Introduction, genetic operators, genetic programming, models of evolution & learning, parallelizing genetic algorithm		12
			<b>Total</b>	<b>40</b>

## References:

- [1] Tom M. Mitchell. "Machine Learning" McGraw-Hill, 1997.
- [2] P. Langley. "Elements of Machine Learning" Morgan Kaufmann Publishers, Inc. 1996.
- [3] Ethem Alpaydin "Introduction to machine learning" 2nd ed. The MIT Press, 2010
- [4] S. Sivanandam, "Principles of Soft Computing" First Edition Wiley Publications.
- [5] Andreas C. Muller and Sarah Guido. "Introduction to Machine Learning with Python" Oreilly Publication.
- [6] Luger George F, Artificial Intelligence : Structures and Strategies for Complex Problem Solving, 6 th Edition, Addison-Wesley, 2009.
- [7] Stuard Russell and Peter Norvig, "Artificial Intelligence. A Modern Approach", 3rd edition, Prentice Hall, Inc., 2010