

## **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	Т	P	L	Т	Р	Total
EXC7052	Artificial Intelligence	4			4			4
		Examination Scheme						
		ISE		MSE	ESE			
		10		30	100 (60% Weightage)			

Pre-requisite Course Codes		e Codes	Knowledge of linear algebra, multivariate calculus, and probability			
			theory			
			Knowledge of a programming language (MATLAB /C/C ++			
			recommended)			
After successful completion of the course, student will be able to						
	CO1	Classify	different types of neural networks			
Course	CO2	Identify type of neural network algorithm for given application				
Outcomes	CO3	Design a neural network for a given application				
	CO4	Apply d	ifferent fuzzy operations to design fuzzy controller			

Module No.	Unit No.	Topics		Hrs.
1	1100	Fundamental Concepts of Neural Networks		08
	1.1	Difference between fuzzy and crisp sets and applications of fuzzy logic	4	
	1.2	Biological neurons, McCulloch and Pitts models <i>of</i> neuron, Important Terms of ANNs, McCulloch-Pitts Neuron, Hebb Network, Supervised learning	3,2	
	1.3	Applications and scope of Neural Network	3	
2		Supervised Learning Networks		12
	2.1	Perception Networks: Adaline, Madaline	3,2	
	2.2	Back Propagation Network	3	
	2.3	Function Network	3	
3		Unsupervised learning network		12
	3.1	Max Net, Mexican Hat, Kohonen Self-organizing Feature	3	
	3.2	Maps, Learning Vector Quantization, Adaptive Resonance Theory	3	
4 As		Associative networks		10
	4.1	Pattern Association, Auto-associative Memory Network, Hetero- associative Memory Network, Bidirectional Associative Memory, Discrete Hopfield Networks	3	
	4.2	Special networks: Simulated annealing neural networks, Boltzmann machine, Brain-in-a- Box	3	
5		Fuzzy Logic		10
	5.1	Fuzzy sets, Properties, Operations on fuzzy sets, Fuzzy relation Operations on fuzzy relations,	4,3	



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5.2	The extension principle, Fuzzy mean Membership functions,	4,3			
	Fuzzification and defuzzification methods				
5.3	Fuzzy controllers, Adaptive neuro-fuzzy information systems (ANFIS)				
		Total	42		

## **References:**

- [1] Simon Haykin, "Neural Network a Comprehensive Foundation", Pearson Education
- [2] Dr.S.N.Sivanandam, Mrs S.N. Deepa Introduction to Soft computing tool Wiley Publication
- [3] Satish Kumar Neural Networks: A classroom Approach Tata McGraw-Hill
- [4] Thimothy J. Ross, "Fuzz V Logic with Engineering Applications", McGraw -Hill
- [5] Rajsekaran S, Vijaylakshmi Pai, Neural Networks, Fuzzy Logic, and Genetic Algorithms, PHI
- [6] Hagan, Demuth, Beale, 'Neural Network Design', Thomson Learning
- [7] Christopher M Bishop Neural Networks For Pattern Recognition, Oxford Publication

[8] William W Hsieh Machine Learning Methods in the Environmental Sciences Neural Network and Kernels Cambridge Publication

[9] Dr.S.N.Sivanandam, Dr.S.Sumathi Introduction to Neural Network Using Matlab Tata McGraw-Hill