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
CEE91D	Advanced Soft Computing(ASC)	3	--	--	3	--	--	3
		Examination Scheme						
		ISE		MSE		ESE		
		10		30		100 (60% Weightage)		

Pre-requisite Course Codes		Fundamental of AI and Soft Computing
At the end of successful completion of the course, students will be able to		
Course Outcomes	CO1	Identify the various characteristics of soft computing techniques.
	CO2	Apply & design fuzzy controller system.
	CO3	Apply the supervised and unsupervised learning algorithm for real world applications.
	CO4	Solve the problem using associative memory networks
	CO5	Design hybrid system applications

Module No.	Unit No.	Topics	Ref.	Hrs.
		Introduction		
1	**1.1**	Differentiate Hard and Soft Computing	1,5	2
	1.2	Soft Computing Constituents		
	1.3	Neuro Fuzzy and Soft Computing Characteristics		
2		**Fuzzy Logic & Rough Set Theory**		
	2.1	Fuzzy Relations and Fuzzy Rules, Generalized Modens Ponens, Defuzzification and its Types	1,2,5,7	10
	2.2	Fuzzy Inference Systems, Design of Fuzzy Controller, Introduction to Rough Sets		
3		**Supervised and Unsupervised Network**		
	3.1	Supervised Network : Error Back Propagation Training Algorithm, Radial Basis Function	1,2,3,8,9	12
	3.2	Unsupervised Network: Kohenon Self Organizing Maps, Basic Learning Vector Quantization, Basic Adaptive Resonance Theory		
4		**Associative Memory Network**		
	4.1	Introduction, Hebb Rule, Outer Product Rule	4	10
	4.2	Types of associative Memory Network :Auto associative and Hetero associative memory networks,		
	4.3	BAM network, Hopfield Network		

5		**Hybrid Systems**		
	5.1	Fuzzy-Neural Systems, Neuro-Genetic Systems, Fuzzy-Genetic Systems	2,9	4
6		**Applications and Case Study**		
	6.1	Automobile Fuel Efficiency using ANFIS	1	4
	6.2	Color Receipe prediction using CANFIS		
			Total	**42**

References:

[1] J.S.R.Jang "Neuro-Fuzzy and Soft Computing" PHI 2003.

[2] S. Rajasekaran and G.A.Vijaylakshmi Pai.. Neural Networks Fuzzy Logic, and GeneticAlgorithms, Prentice Hall of India.

[3] Satish Kumar "Neural Networks A Classroom Approach" Tata McGrawHill.

[4] S.N.Sivanandam, S.N.Deepa "Principles of Soft Computing" Second Edition, Wiley Publication.

[5] Samir Roy, Udit Chakraborty " Introduction to Soft Computing" Pearson Education India

[6] Fakhreddine O. Karry, Clarence De Silva," Soft Computing and Intelligent systems Design Theory, Tools and Applications" Pearson 2009.

[7] Timothy J.Ross "Fuzzy Logic with Engineering Applications" Wiley.

[8] Jacek.M.Zurada "Introduction to Artificial Neural Sytems" Jaico Publishing House.

[9] Li Deng and Dong Yu "Deep LearningMethods and Applications".