SOFT COMPUTING

Course Code	20IT4703D	Year	IV	Semester	Ι
Course Category	PE-5	Branch	IT	Course Type	Theory
Credits	3	L-T-P	3-0-0	Prerequisites	Mathematics, Probability and Statistics
Continuous Internal Evaluation :	30	Semester End Evaluation:	70	Total Marks:	100

Upon S	Course Outcomes uccessful completion of course, the student will be able to	Blooms Taxonomy Level
CO1	Understand the basic concepts of soft computing, Artificial Neural Network techniques and their applications	L2
CO2	Illustrate the concepts of Supervised Learning Network, Un Supervised Learning Network	L2
CO3	Interpret the concepts of fuzzy logic and fuzzy relations	L2
CO4	Apply genetic algorithms to solve engineering problems	L3

	ontribution of Course Outcomes towards achievement of Program Outcomes &Strength of orrelations(3:Substantial,2: Moderate,1:Slight)													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3												3	
CO2	3												3	
CO3	3					3							3	
CO4	3					3							3	

Syllabus						
Unit No	Contents					
I	Introduction: Neural Networks, Application scope of neural networks, Application scope of Neural Networks, Fuzzy logic, Genetic Algorithm, Hybrid Systems, Soft computing. Artificial Neural Network: An Introduction, Fundamental Concept, Evolution of Neural Networks, Basic models Artificial neural network, Important Terminologies of ANNs, McCulloch-Pitts Neuron, Linear Separability, Hebb Network.					
II	Supervised Learning Network: Introduction, Perceptron Networks, Adaptive Linear Neuron, Multiple adaptive Linear neurons, Back Propagation Network. Unsupervised Learning Network: Introduction, Fixed weight Competitive Nets, Counter Propagation Networks, Adaptive Resonance Theory Network.	CO2				
ш	Introduction to Fuzzy Logic, Classical Sets and Fuzzy Sets: Introduction to Fuzzy Logic, Classical Sets(Crisp Sets):Operations on Classical Sets, Fuzzy Sets: Fuzzy Set Operations. Classical Relations and Fuzzy Relation: Introduction, Cartesian Product of Relation, Classical Relation, Fuzzy Relations.	CO1				
IV	Genetic Algorithm: Introduction, Biological background, Traditional Optimization and Search Techniques: Gradient-Based Local Optimization method, Random Search, Stochastic Hill Climbing, Simulated Annealing, Symbolic Artificial Intelligence Genetic Algorithm and Search space, Genetic Algorithm Vs Traditional Algorithms.	CO4				
V	Basic Terminologies in Genetic Algorithm : Simple GA, General Genetic Algorithm, Operators in Genetic Algorithm: Encoding, Selection, Crossover(Recombination), Mutation, Stopping Condition for Genetic Algorithm Flow: Best Individual, Worst Individual, Sum of Fitness, Median Fitness	CO4				

Learning Resources

Text Books

1. Principles of Soft Computing, S.N.Sivanandam, S.N.Deepa, Wiley India Pvt. Ltd., Second Edition, 2011.

References

- 1. Principles of Soft Computing, S.N.Sivanandam, S.N.Deepa, Wiley India Pvt. Ltd., 2018, Paperback.
- 2. Genetic Algorithms: Search and Optimization. E. Goldberg
- 3. Fuzzy Sets and Fuzzy Logic-Theory and Applications, George J. Klir and Bo Yuan, Prentice Hall, 2015, Paperback.

E- Resources and other Digital Material

1. https://nptel.ac.in/courses/106/105/106105173/

2. https://cse.iitkgp.ac.in/~dsamanta/courses/sca/index.html#resourceS