CS308: Soft Computing	L	T	P	Discrete Mathematics
	3	0	2	

Course Objective: The course integrates the concepts of fuzzy logic, neural networks and optimization techniques for understanding the complex nature of decisions taken by human beings which incorporates partial understanding of the truth with past experience. At the end of this course the student should be able to understand the basic techniques used in soft computing and apply them to solve real world problems.

S. No.	Course Outcomes (CO)
CO1	Understand the basics of soft computing and its applications in artificial intelligence.
CO2	Implement and analyze neural network models and learning algorithms.
CO3	Apply fuzzy logic principles, including fuzzy sets and rule generation.
CO4	Perform arithmetic operations on fuzzy numbers and solve fuzzy equations.
CO5	Develop and apply neuro-fuzzy models and data clustering techniques.
CO6	Utilize genetic algorithms and swarm optimization methods for solving complex problems.

S. No	Contents	Contact Hours
UNIT 1	Soft Computing & Artificial Intelligence: Soft Computing Introduction, Hard Computing, Types of Soft Computing Techniques, Applications of Soft Computing, Al Search Algorithm, Predicate Calculus, Rules of Interference, Semantic Networks, Frames, Objects, Hybrid Models Artificial.	8
UNIT 2	Neural Networks: History, overview of biological Neuro-system, Neuron Model, Neural Network Architecture, Learning Rules, Perceptrons, Single Layer Perceptrons, Multilayer Perceptrons, Back propagation Networks: Kohnen'sself organizing networks, Hopfield network, Applications of NN.	6
UNIT 3	Fuzzy Logic and Fuzzy Sets: Introduction to Fuzzy Logic, Classical and Fuzzy Sets: Compliment, Intersections, Unions, Combinations of Operations, Aggregation Operations, Overview of Classical Sets, Membership Function, Fuzzy rule generation.	8
UNIT 4	Fuzzy Arithmetic: Fuzzy Numbers, Linguistic Variables, Arithmetic Operations on Intervals & Numbers, Lattice of Fuzzy Numbers, Fuzzy Equations.	6
UNIT 5	Neuro-Fuzzy Modeling: Neuro Fuzzy Controls Adaptive Networks Based Fuzzy Interface Systems, Classification and Regression Trees, Data Clustering Algorithms, Rule Based Structure Identification, Evolutionary Computation.	6
UNIT 6	Genetic Algorithms and Swarm Optimizations: Introduction to Genetic Algorithm, Fitness Computations, Evolutionary Programming, Genetic Programming Parse Trees, Variants of GA, Applications, Ant Colony Optimization, Particle Swarm Optimization, Artificial Bee Colony Optimization.	8
	Total	42