MCA- E309 Soft Computing				
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Course objective:

1. Develop the skills to gain a basic understanding of neural network theory, fuzzy logic theory and Genetic Algorithm
2. Introduce students to artificial neural networks, fuzzy theory and Genetic algorithm from an engineering perspective

Course outcomes:

1. Develop the skills to gain a basic understanding of neural network theory and fuzzy logic theory
2. Apply artificial neural networks and fuzzy logic theory for various problems
3. Determine the use of Genetic algorithm to obtain optimized solutions to problems

Introduction: What is Soft Computing? Difference between Hard and Soft computing, Requirement of Soft computing, Major Areas of Soft Computing, Applications of Soft Computing.

Neural Networks: Introduction, what is Neural Network, Learning rules and various activation functions, Supervised Learning Networks, Single layer Perceptron, Back Propagation networks, Architecture of Backpropagation (BP) Networks, Backpropagation Learning, Variation of Standard Back propagation Neural Network, Introduction to Associative Memory, Adaptive Resonance theory and Self Organizing Map, Recent Applications. Unsupervised Learning Networks.

Fuzzy Systems: Fuzzy Set theory, Fuzzy vs. Crisp set, Fuzzy Relation, Fuzzification, Minmax Composition, Defuzzification Method, Fuzzy Logic, Fuzzy Rule based systems, Predicate logic, Fuzzy Decision Making, Fuzzy Control Systems, Fuzzy Classification.

Genetic Algorithm: History of Genetic Algorithms (GA), Working Principle, Various Encoding methods, Fitness function, GA Operators- Reproduction, Crossover, Mutation, Convergence of GA, Bit wise operation in GA, Multi-level Optimization.

Introduction to Hybrid Systems.

Recommended Books:

1. S.N. Sivanandam, S.N. Deepa, Principles of Soft Computing, Wiley India
2. Samir Roy, Udit Chakraborty, Soft Computing, Pearson India

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