

CS 517: SOFT COMPUTING (3-0-0: 3)

Soft Computing- Characteristics of Soft Computing, Applications of Soft Computing.

Fuzzy Logic- Fuzzy Sets And Membership Function, Parameterized Member Functions, Set Operations on Fuzzy Sets, Fuzzy If-Then Rules, Fuzzy Reasoning, Fuzzification and Defuzzification, Mamdani Fuzzy Models, Sugeno Fuzzy Models, Tsukamoto Fuzzy Models, Fuzzy Logic Controller, Applications of Fuzzy Logic.

Genetic Algorithm- Encoding, Selection, Crossover, Mutation, Fitness Function, Convergence, Multi Objective Genetic Algorithm.

Neural Networks- Backpropagation, Extended Backpropagation for Recurrent Networks, Mason's Gain Formula, Hybrid Learning Rules, Artificial Neural Networks, Different Artificial Neural Networks Architectures, Training Techniques for ANNs.

Hybrid Systems- Integration of Neural Networks, Fuzzy Logic and Genetic Algorithms, Genetic Algorithms Based Backpropagation Networks, Fuzzy Backpropagation Networks Fuzzy Logic Controlled Genetic Algorithms.

Optimization Techniques- Particle Swarm Optimization, Ant Colony Optimization, Random Search, Harmony Search, Cuckoo Search.

Applications to Solve Real Life Problems.

Reference Books:

1. Jang, J-S. R., Sun,C-T, Mizutani, E.: "Neuro-Fuzzy and Soft Computing", Prentice Hall of India, 1996.
2. Klir, G. J. and Yuan, B.: "Fuzzy Sets and Fuzzy Logic: Theory and Applications", Prentice Hall, 1995.
3. Rajasekaran, S. and VijayalakshmiPai, G.A.: "Neural Networks, Fuzzy Logic and Genetic Algorithms: Synthesis and Applications", Prentice Hall of India, 2003.