



**STANLEY**  
**COLLEGE OF ENGINEERING & TECHNOLOGY FOR WOMEN**  
( Approved by AICTE , New Delhi | Affiliated to Osmania University ,Hyderabad )  
Address : Chapel Road, Abids ,Hyderabad

**CS 415**

**SOFT COMPUTING**  
**(Elective I)**

**UNIT I**

Introduction: Neural networks, application scope of neural networks, fuzzy logic, genetic algorithm, hybrid systems, Soft computing. Artificial neural networks: Fundamental concepts, Evolution of neural networks, basic model of Artificial neural networks, Important terminology of ANNs, McCulloch-pitts neuron model, Linear separability, Hebb Network Supervised Learning Network: Perceptron networks, adaptive linear neuron (Adaline), Multiple adaptive linear neuron, Back propagation network, Radial basis Function network (Architecture & Training algorithms)

**UNIT II**

Associative Memory Networks: Training algorithm for pattern Association, Associative memory network, Hetroassociative memory network (Architecture & Training algorithm), Bidirectional associative memory network Architecture, Discrete Bidirectional associative memory network, Continuous BAM ,Analysis of hamming distance, Energy function and storage capacity, Hopfield networks discrete & continuous. Unsupervised Learning Networks: Fixed weight competitive Nets, Kohonenself organizing network, Learning vector quantization (Architecture & Training algorithm) Adaptive Resonance theory network. Special networks: Simulated Annealing Networks, Boltzmann machine, Gaussian machine

**UNIT III**

Fuzzy Logic: Introduction to Classical sets and fuzzy sets, Classical sets, Fuzzy sets: Operations and Properties. Fuzzy Relations: Cardinality, Operations and Properties, Equivalence & tolerance. Membership function: Fuzzification, membership value assignment: Inference, rank ordering, angular fuzzy sets

**UNIT IV**

Defuzzification: Lamda Cuts for fuzzy sets and relations, defuzzification methods Fuzzy arithmetic and fuzzy measures: Fuzzy arithmetic, extension principle, fuzzy measures, measures of fuzziness, fuzzy integral Fuzzy rule base and approximate reasoning: truth values and tables in fuzzy logic, fuzzy propositions formation of rules ,decomposition of compound rules, aggregation of fuzzy rules, fuzzy reasoning, fuzzy inference system, fuzzy expert systems

**UNIT V**

Fuzzy decision making: Individual, multiperson, multi objective, multi attribute, Fuzzy Bayesian decision making, Fuzzy logic control system: control system design, architecture & operation of FLC system, FLC system models, Application of FLC system. Genetic Algorithm: Introduction, basic operators & terminology, Traditional algorithm vs genetic algorithm, simple GA, general genetic algorithm, schema theorem, Classification of genetic algorithm, Holland classifier systems, genetic programming , applications of genetic algorithm

**Suggested Reading:**

1. S. N. Sivanandam&S.N.Deepa, “Principles of Soft Computing”, Wiley India, 2008.
2. Limin Fu, “Neural Networks in Computer Intelligence”, McGraw Hill, 1995.
3. Timoty J. Ross, “Fuzzy Logic with Engineering Applications”, McGraw Hill, 1997.

SCETM