PBM7H001   **SOFT COMPUTING**

MODULE-I   (12 Lectures)

Introduction: Soft Computing Constituents and Conventional Artificial Intelligence, Neuro-Fuzzy and Soft Computing Characteristics.
Fuzzy Sets: Introduction, Basic Definitions and Terminology, Set Theoretic Operations, MF Formulation and Parameterization.
Fuzzy Rules & Fuzzy Reasoning: Extension Principle and Fuzzy Relations, Fuzzy If-Then Rules, Fuzzy Reasoning.
Fuzzy Inference Systems: Mamdani Fuzzy Models, Sugeno Fuzzy Models, Tsukamoto Fuzzy Models, Other Considerations.
(BOOK-1:- Chap-1: 1.1 to 1.3, Chap-2: 2.1 to 2.4, Chap-3: 3.2 to 3.4 & Chap-4: 4.2 to 4.5)

MODULE-II   (14 Lectures)

Neural Networks: Neuron Abstraction, Neuron Signal Functions, Mathematical Preliminaries, Neural Networks Defined, Architectures: Feed forward and Feedback, Salient Properties and Application Domains of Neural Networks, Multi-layered Network Architectures, Back-propagation Learning Algorithm, Practical Considerations in Implementing the BP Algorithm, Structure Growing Algorithms, Universal Function Approximation and Neural Networks, Applications of
Feed Forward Neural Networks, Reinforcement Learning, Radial Basis Function Networks, Regularization Theory Route to RBFNs, Generalized Radial Basis Function Network, Learning in RBFNs, Associative Learning, Hopfield Network, Content Addressable Memory, Bidirectional Associative Memory, Self Organizing Feature Maps, Applications of the Self Organizing Map.
(BOOK-2:-Chap-3: 3.1 to 3.6, Chap-6: 6.1 to 6.2, 6.5 to 6.6 & 6.8 to 6.10, Chap-8: 8.4 to 8.7, Chap-10: 10.2 & 10.5 to 10.6 & 10.16 and Chap-12: 12.8 to 12.9)

MODULE-III   (08 Lectures)

Regression & Optimization: System Identification: an Introduction, Least Squares Estimator, Geometric Interpretation of LSE, Recursive Least Squares Estimator.
Derivative-Free Optimization: Genetic Algorithms, Simulated Annealing, random Search, Downhill Simplex Search.
Adaptive Neuro-Fuzzy Inference Systems (ANFIS): ANFIS Architecture, Hybrid Learning Algorithm.
(BOOK-1:- Chap-5: 5.1, 5.3 to 5.5, Chap-7: 7.2 to 7.5 and Chap-12: 12.2 to 12.3)

TEXT BOOK:

1. "Neuro-Fuzzy and Soft Computing" By J.-S.R.Jang, C.-T.Sun & E. Mizutani, PHI
2. "Neural Networks: A Classroom Approach" By Satish Kumar, TMH Education

Reference Book:

1. "Neural Networks Fuzzy Logic & Genetic Algorithms; Synthesis & Applications, S.Rajasekaran & G.A. VijayaLaxmi Pai, Prentice Hall, India, May'2006- LakshmiPai
2. Principle of Soft Computing, S.N. Sivanandan & S.N. Deepa, Wiley India Edition,2010.