

PECS 3401 SOFT COMPUTING (3-0-0)

Module – I

(6 hours)

Basic tools of soft Computing – Fuzzy logic, Neural Networks and Evolutionary Computing , Approximations of Multivariate functions, Non – linear Error surface and optimization.

Module – II

(10 hours)

Fuzzy Logic Systems : Basics of fuzzy logic theory, Crisp and fuzzy sets. Basic set operations. Fuzzy relations, Composition of Fuzzy relations, Fuzzy inference, Zadeh's compositional rule of inference. Defuzzification. Fuzzy logic control: Mamdani and Takagi and Sugeno architectures. Applications to pattern recognition.

Module – III

(16 hours)

Neural networks : Single layer networks, Perceptron. Activation functions. Adalinc: its training and capabilities, weights learning, Multilayer perceptrons : error back propagation, generalized delta rule. Radial basis function networks and least square training algorithm, Kohonen self – organizing map and learning vector quantization networks. Recurrent neural networks, Simulated annealing neural networks. Adaptive neuro-fuzzy information ;systems (ANFIS), Applications to control and pattern recognition.

Module – IV

(08 hours)

Evolutionary Computing : Genetic algorithms : Basic concepts, encoding , fitness function, reproduction. Differences of GA and traditional optimization methods. Basic genetic programming concepts Applications.

Books :

1. V. Keeman, "Learning and Soft computing", Pearson Education, India.
2. J.S.R. Jang. C.T. SUN and E. Mizutani, "Neuro-fuzzy and soft-computing". PHI Pvt. Ltd. , New Delhi.
3. Fredric M. Ham and Ivica Kostanic, "Principle of Neuro Computing for Science and Engineering", Tata McGraw Hill.
4. S. Haykins, "Neural networks : a comprehensive foundation". Pearson Education , India.