NEURAL NETWORKS AND FUZZY LOGIC CONTROL (ELECTIVE – II)

Course Code: 13EC2116 **L P C**
4 0 3

Pre requisites: Set Theory

Course Objective:

1. To cater the knowledge of Neural Networks and Fuzzy Logic Control and use these for controlling real time systems.

Course Outcomes:

1. To Expose the students to the concepts of feed forward neural networks
2. To provide adequate knowledge about feedback networks.
3. To teach about the concept of fuzziness involved in various systems. To provide adequate knowledge about fuzzy set theory.
4. To provide comprehensive knowledge of fuzzy logic control and adaptive fuzzy logic and to design the fuzzy control using genetic algorithm.
5. To provide adequate knowledge of application of fuzzy logic control to real time systems.

UNIT-I
ARCHITECTURES:
Introduction –Biological neuron-Artificial neuron-Neuron modeling-Learning rules-Single layer-Multi layer feed forward network-Back propagation-Learning factors.

UNIT-II
NEURAL NETWORKS FOR CONTROL:
Feedback networks-Discrete time hop field networks-Schemes of neuro –control, identification and control of dynamical systems-case studies (Inverted Pendulum, Articulation Control).

UNIT-III
FUZZY SYSTEMS:
Classical sets-Fuzzy sets -Fuzzy relations- Fuzzification – Defuzzification- Fuzzy rules.

UNIT-IV
FUZZY LOGIC CONTROL:
Membership function – Knowledge base-Decision –making logic – Optimizations of membership function using neural networks-Adaptive fuzzy systems-Introduction to generate to genetic algorithm.

UNIT-V
APPLICATION OF FLC:
Fuzzy logic control-Inverted pendulum-Image processing-Home Heating system-Blood pressure during anesthesia-Introduction to neuro fuzzy controller.

Text Books:

1. Kosko, B, "*Neural Networks and Fuzzy Systems: A Dynamical Approach to Machine Intelligence*," Prentice Hall, NewDehli, 2004.

2. Timothy J Ross, "*Fuzzy Logic with Engineering Applications*," John Willey and Sons, West Sussex, England, 2005.

Reference Books:

1. Jack M. Zurada, *"Introduction to Artificial Neural Systems*," PWS Publishing Co., Boston, 2002.

2. Klir G.J. & Folger T.A.,"*Fuzzy sets, Uncertainty and Information*, "Prentice –Hall of India Pvt. Ltd ., New Delhi,2008.

3. Zimmerman H.J.,"*Fuzzy set theory and its Applications*," Kluwer Academic Publishres Dordrecht, 2001.

4. Driankov,Hellendroonb ,"*Introduction to fuzzy control*,: Narosa Publishers, 2001.

5. LauranceFausett,Englewood cliffs ,N.J.,:"*Fundamentals of Neural Networks*," Pearson Eduction ,New Delhi,2008.