NEURAL NETWORKS AND FUZZY LOGIC CONTROL
(ELECTIVE – II)

Course Code: 15EC2116

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Pre requisites: Set Theory

Course Outcomes: At the end of the course the student will be able to

CO1: Comprehend the concepts of feed forward neural networks

CO2: Analyze the various feedback networks.

CO3: Comprehend the concept of fuzziness involved in various systems and fuzzy set theory.

CO4: Understand the fuzzy logic control and adaptive fuzzy logic and to design the fuzzy Control using genetic algorithm.

CO5: Analyze the application of fuzzy logic control to real time systems.

UNIT - I (10-Lectures)

ARCHITECTURES

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

UNIT - II (10-Lectures)

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 (10-Lectures)

FUZZY SYSTEMS

Classical sets - Fuzzy sets - Fuzzy relations- Fuzzification – Defuzzification- Fuzzy rules.

UNIT - IV (10-Lectures)

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 (10-Lectures)

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, New Dehli, 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 Publishers Dordrecht, 2001.
4. Driankov, Hellendroonb , "*Introduction to fuzzy control*", Narosa Publishers, 2001
5. Laurance Fausett, Englewood cliffs. N.J., "*Fundamentals of Neural Networks*," Pearson Education, New Delhi, 2008.