NEURAL NETWORKS AND FUZZY LOGIC CONTROL
(ELECTIVE-II)

Course Code:15EC2116

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Pre requisites: Set Theory

Course Outcomes: Upon completion 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: Understand the concept of fuzziness involved in various systems and fuzzy set theory.
CO4: Comprehend 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 Delhi, 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.