**13EC32E1-NEURAL NETWORKS AND FUZZY LOGIC** Credits: 4
Hours /week: 4 Hrs Sessional Marks: 40
Univ.Exam.Duration: 3Hrs Univ.Examination.Marks: 60

 **UNIT –I**

**ARTIFICIAL NEURAL NETWORKS:** Introduction to Neural Networks-Biological neurons-artificial neurons-Mc Culloch-pitts model-neuron modeling for artificial neural systems-feed forward network-Feedback network-perception- Supervised and Unsupervised Learning. Learning rules Hebbian learning rule, perception learning rule, Delta learning, winner take all learning rule, Ouster learning rule.

 **UNIT –II**

**SUPERVISED LEARNING:** Perceptors-exclusive OR problem –single layer preceptor network-Multilayer feed forward networks: linearly non-separable pattern classification-delta learning rule for multi preceptor layer-Error back propagation algorithm-training errors-ADALINE-introduction to radial basis function network (RBFN).

 **UNIT –III**

 **UNSUPERVISED LEARNING:** Hamming net- Maxnet-Winner take all learning-counter propagation network-feature mapping-self organizing feature maps. Application of neural algorithms-elementary aspects of applications of character recognition- Neural network control applications- process identification: Basic non dynamic learning control architecture.

 **UNIT –IV**

**FUNDEMENTAL OF FUZZY LOGIC AND FUZZY SETS:** Definition of Fuzzy set, a-level fuzzy set Cardinality-operation of Fuzzy sets- Union, intersection, complement-Cartesian product-Algebraic Sum-definition of Fuzzy relation-properties of fuzzy relations-fuzzy composition.

 **UNIT –V**

 **DESIGN OF FUZZY SYSTEMS:** Components of fuzzy systems- Functions of fuzzification-Rule base patterns-Inference mechanisms-method of de-fuzzification: Centre of Gravity method. Mean of maxima method, weighted average method, Height method. Design of fuzzy systems for temperature setting of storage water heater-fuzzy system for control of air conditioner.

**TEXT BOOKS:**

1. Jacek M Zurada, Introduction to Artificial Neural Systems, Jaico Publications.
2. H.J. Zimmermann, Fuzzy set theory and its applications Kluwer Academic publishers

**REFERENCE BOOKS:**

1. Timothy J. Ross, “Fuzzy logic with Engineering Applications” (Wiley)
2. Nikola K.Kasabov, “Foundations of Neural Networks, Fuzzy Systems and Knowledge Engineering”(The MIT Press)