10 ME 42A NEURAL NETWORKS AND FUZZY LOGIC

IV B.Tech II Semester

(with effect from the academic year 2013-2014)

Credits: 4

Lectures/week: 4 Hrs. *Sessional Marks: 40*

University Exam:3 Hrs *End Examination Marks: 60*

UNIT-I

Introduction to Neural networks : Biological neurons – artificial neurons – Mc Culloch – Pitts model – neuron modeling for artificial neural systems – Feed forward network – Feedback network – Perception network – Supervised and Unsupervised learning.

Learning rules: Hebbian learning rule, Perception learning rule, Delta learning rule, Winner take all learning rule, ouster learning rule.

UNIT-II

Supervised learning: Perceptions – exclusive OR problem – single layer Perception network, Multi layer feed forward networks: linearly nonseparable pattern classification – delta learning rule for multi Perception layer – Error back propagation algorithm – training errors – ADALINE – introduction to Radial basis function networks (RBFN).

UNIT-III

Unsupervised learning: Hamming net – Max net – Winner take all learning – counter propagation network – featyre mapping – Self organizing feature maps Applications of neural alogirths: elementary aspects of applications of character recognition Neural network Control applications: Process identification: Basic non dynamic learning Control architecture.

UNIT-IV

Fundamentals of Fuzzy logic and Fuzzy Sets: Definition of Fuzzy set, a level fuzzy set Cardinality – operations of Fuzzy set Cardinality – operations of Fuzzy Sets: Union, intersection, Complement – Cartercian 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 Pattern – Inference mechanisms- method of defuzzification: Centre of Gracity 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 – Fuzzy system for simple turning process.

TEXT BOOKS:

1.Introduction to Artificial Neural Systems : Kacel M.Zurada
2.Fuzzy Set Theory and its Applications : Zimmerman K.J.

REFERENCES :

1.Fuzzy Logic with Engineering Applications : Timoti J Ross (Wiely Publications)
2.Introduction to neural networks using MAT Lab 6.0 : Sivanandan S.N, Sumati S,
3.Neural Network A comprehensive Foundation : Haykin. S