

CO2														
CO3														
CO4														
CO5														

g) Course Content

UNIT I	Fuzzy Sets	9
Introduction – Basic definitions and terminology – Set-theoretic Operations – MF Formulation and Parameterization – MFs of one Dimension - MFs of two Dimension – Derivatives of Parameterized MFs – Fuzzy Complement – Fuzzy Intersection and Union- Parameterized T-norm and T-conorm.		
UNIT II	Fuzzy Inference System	9
Extension Principle – Fuzzy Relations – Linguistic variables – Fuzzy If-Then Rules – Composite rule of inference – Fuzzy Reasoning – Mamdani Fuzzy Models – Other variants – Sugeno Fuzzy Models – Tsukamoto Fuzzy Models.		
UNIT III	Neural Network	9
Fundamental Concepts – Models of a Neuron – Learning – Supervised Learning – Unsupervised Learning – Reinforcement Learning - Types of activation function – Network Architectures - Adaptive Networks – Backpropagation for Feed forward Networks – Supervised Learning Neural Networks – Perceptrons – Adaline – Backpropagation Multilayer perceptron – Radial Basis Function Networks		
UNIT IV	Other Neural Networks	9
Associative Memory Network – Autoassociative Memory Network – Heteroassociative Memory Network – Bidirectional Associative Memory – Hopfield Network - Unsupervised Learning Neural Networks – Competitive learning networks – Kohonen Self-Organizing Networks – Learning Vector Quantization – Adaptive Resonance Theory – Fundamental Architecture.		
UNIT V	Adaptive Neuro-Fuzzy Inference Systems and Applications	9
Adaptive Neuro-Fuzzy Inference Systems – ANFIS Architecture – Applications - Non-linear system Identification – Channel Equalization – Adaptive Noise cancellation.		

Total 45 Hrs

h) Learning Resources

Text Books

1. J.S.R.Jang, C.T. Sun and E.Mizutani, “Neuro-Fuzzy and Soft Computing”, PHI / Pearson Education 2004.
2. Simon Haykin, “Neural Network, A Comprehensive Foundation”, 2nd Edition Pearson

- Prentice Hall, 2005.
3. S.N.Sivanandam and S.N.Deepa, "Principles of Soft Computing", Wiley India Pvt Ltd, 2011.

Reference Books

1. George J. Klir and Bo Yuan, "Fuzzy Sets and Fuzzy Logic-Theory and Applications", Prentice Hall, 1995.
2. James A. Freeman and David M. Skapura, "Neural Networks Algorithms, Applications, and Programming Techniques", Pearson Edn., 2003.
3. Satish Kumar, "Neural Network, A Classroom Approach", Tata McGraw – Hill, 2007.

Online Resources

1. <https://nptel.ac.in/courses/106105173/2>
2. <https://nptel.ac.in/courses/117105084/>