

Module No.	Unit No.	Topics	Hrs.
<b>1.0</b>		<b>Introduction to Neural Networks and their basic concepts:</b>	<b>07</b>
	<b>1.1</b>	Biological neurons and Artificial neuron, McCulloch-Pitts models of neuron, Types of activation functions and Neural Network architectures, Pre-requisites for training of neural networks. Linearly separable and linearly non-separable systems with examples, Features and advantages of Neural Networks over statistical techniques, Knowledge representation, Terminologies related to artificial neural networks, Concepts of Supervised learning, Unsupervised learning, Reinforcement	
<b>2.0</b>		<b>Supervised Learning Neural Networks:</b>	<b>08</b>
	<b>2.1</b>	Perceptron - Single Layer, Multilayer and their architecture, Error back propagation algorithm, Generalized delta rule, Concept of Training, Testing and Cross-validation data sets for design and validation of networks. Over-fitting. Stopping criterion for training.	
<b>3.0</b>		<b>Unsupervised Learning Neural Networks:</b>	<b>09</b>
	<b>3.1</b>	Competitive Learning Networks – Maxnet, Mexican Hat Net, Kohonen Self-Organizing Networks – architecture, training algorithm, K-means and LMS algorithms, Radial Basis Function (RBF) neural network – architecture and algorithm, and Discrete Hopfield networks. Introduction to the concept of Support Vector Machine based classifier.	
<b>4.0</b>		<b>Applications of Neural Networks:</b>	<b>06</b>
	<b>4.1</b>	Applications of Neural networks in pattern classification, Character Recognition, Face recognition, Image compression and Decompression	
<b>5.0</b>		<b>Fuzzy logic:</b>	<b>12</b>
	<b>5.1</b>	Introduction to fuzzy logic, Basic Fuzzy logic theory, Fuzzy sets - properties & operations, Fuzzy relation - Operations on fuzzy relations, Fuzzy Membership functions, Fuzzy Rules and Fuzzy Reasoning, Fuzzification and Defuzzification methods, Fuzzy Inference Systems, Mamdani Fuzzy Models, Fuzzy knowledge based controllers.	
<b>6.0</b>		<b>Applications of Fuzzy Logic and Fuzzy Systems:</b>	<b>06</b>
	<b>6.1</b>	Fuzzy pattern recognition, fuzzy image processing, Simple applications of Fuzzy knowledge based controllers like washing machines, home heating system, and train break control.	
		<b>Total</b>	<b>48</b>