

## NEURAL NETWORKS

(Professional Elective – I)

<b>Course Code</b>	20IT4501D	<b>Year</b>	III	<b>Semester</b>	I
<b>Course Category</b>	PE-I	<b>Branch</b>	IT	<b>Course Type</b>	Theory
<b>Credits</b>	3	<b>L-T-P</b>	3-0-0	<b>Prerequisites</b>	Linear algebra, Statistics and Probability
<b>Continuous Internal Evaluation :</b>	30	<b>Semester End Evaluation:</b>	70	<b>Total Marks:</b>	100

Course Outcomes		Blooms Taxonomy Level
<b>Upon Successful completion of course, the student will be able to</b>		
<b>CO1</b>	Understand the fundamentals and types of neural networks, Fuzzy logic principles.	L2
<b>CO2</b>	Apply Back propagation networks for various problems	L3
<b>CO3</b>	Use Associative memory and Adoptive resonance theory for real world problems.	L3
<b>CO4</b>	Analyze the applications of ANN techniques for solving various problems.	L3

Contribution of Course Outcomes towards achievement of Program Outcomes & Strength of correlations (3:Substantial, 2: Moderate, 1:Slight)														
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3												3	
CO2	3					3							3	
CO3	3			3		3							3	
CO4			3			3							3	

<b>Syllabus</b>		
<b>Unit No</b>	<b>Contents</b>	<b>Mapped CO</b>
<b>I</b>	<b>Introduction to Artificial Intelligence System:</b> Neural Network, Fuzzy logic, Genetic Algorithm. Fundamentals of Neural Networks: Basic Concepts of Neural Network, Human Brain, Model of Artificial Neuron Neural Network Architecture: Single layer Feed-forward networks, Multilayer Feed-forward networks, Recurrent Networks, Characteristics of Neural networks, Learning methods, Early Neural Network Architectures- Rosenblatt's perceptron, Adaline Network, MADALINE Network.	CO1
<b>II</b>	<b>Back propagation Networks:</b> Back Propagation networks, Architecture of Back-propagation(BP) Networks, Back-propagation Learning, Effect of Tuning parameters of the Back propagation Neural Network, Selection of various parameters in BPN.	CO1 CO2
<b>III</b>	<b>Associative Memory:</b> Auto correlators, Hetero correlators, Wang et al's Multiple Training Encoding Strategy, Exponential BAM, and Associative Memory for Real coded pattern pairs, Applications.	CO1 CO2 CO3
<b>IV</b>	<b>Adaptive Resonance Theory:</b> Introduction-Cluster structure, vector quantization, Classical ART networks, Simplified ART architectures, ART1-Architecture, Special features of ART1 models, ART1 algorithm, Illustration, ART2-Architecture of ART2, ART2 algorithm, Illustration, Applications-Character recognition using ART1.	CO1 CO2 CO3
<b>V</b>	<b>Applications of ANN:</b> Introduction, Direct applications-Pattern Classification, Associative memories, Optimization. Application areas- Applications in speech, applications in image processing	CO1 CO2 CO4

<b>Learning Resources</b>
<b>Text Books</b>
1. Neural Networks, Fuzzy Logic and Genetic Algorithms, S.Rajasekaran and G.A. Vijayalakshmi Pai, second edition, 2017, PHI Publications. 2. Artificial neural network, B. Yegnanarayana, PHIPublication, eleventh edition 2005.
<b>References</b>
1. Neural Networks for Pattern Recognition, Bishop, C. M., 1995, Oxford University Press. 2. Neuro-Fuzzy Systems, Chin Teng Lin, C. S. George Lee, PHI. 3. Build Neural Network with MS Excel sample by Joechoong.
1. <a href="https://www.coursera.org/learn/neural-networks-deep-learning">https://www.coursera.org/learn/neural-networks-deep-learning</a> 2. <a href="https://www.coursera.org/learn/machine-learning">https://www.coursera.org/learn/machine-learning</a>