Program Elective-III

Neural Networks

Course Code	19CS4602A	**Year**	III	**Semester**	II
Course Category	Program Elective-III	**Branch**	CSE	**Course Type**	Theory
Credits	3	**L-T-P**	3-0-0	**Prerequisites**	Linear, algebra, Statistics and Probability
Continuous Internal Evaluation :	30	**Semester End Evaluation:**	70	**Total Marks:**	100

Course Outcomes		
Upon successful completion of the course, the student will be able to:		
CO1	Understand the fundamentals and types of neural networks, Fuzzy logic principles.	**L2**
CO2	Apply Back propagation networks for various problems	**L3**
CO3	Apply Associative memory and Adoptive resonance theory for real world problems.	**L3**
CO4	Apply 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													
CO2	3					1	1							2
CO3	3					1			2	2				
CO4	3					1	1							2

UNIT-1	**Introduction to Artificial Intelligence System**: 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	**CO1**
UNIT-2	**Back propagation Networks:** Architecture of Back-propagation (BP) Networks, Back-propagation Learning – Input Layer Computation, Hidden Layer Computation, Output layer Computation, Calculation of Error, Training of neural network, Back Propagation Algorithm	**CO1,CO2**
UNIT-3	**Associative Memory:** Introduction, Autocorrelators, Heterocorrelators, Wang et al‟s Multiple Training Encoding Strategy, Applications	**CO1,CO3**
UNIT-4	**Adaptive Resonance Theory:** Introduction - Classical ART networks, Simplified ART architectures, ART1-ART1-Architectre, ART2-Architecture of ART2, Applications-Character recognition using ART1	**CO1,CO3**
UNIT-5	**Applications of ANN:** Introduction, Direct applications - Pattern Classification, Associative memories, Application areas -Applications in speech, applications in image processing	**CO1,CO4**

Learning Resources
Text Books
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, PHI Publication.
Reference Books
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 Joe choong.
e-Resources & Other Digital Material
1. https://www.coursera.org/learn/neural-networks-deep-learning 2. https://www.coursera.org/learn/machine-learning