Course Number and Name

BCS002 - NEURAL NETWORKS

Credits and Contact Hours

3 and 45

Course Coordinator's Name

Ms D.Vimala

Text Books and References

TEXTBOOKS

- James Freeman A and David Skapura M. "Neural Networks Algorithms, Applications & Programming Techniques", Pearson Education, 2005.
- 2. Yegnanarayana B., "Artificial Neural Networks", Prentice Hall of India Private Ltd, 2003

REFERNCES

- 1. Neural Network Design, Martin T Hagan, 2nd edition, 2014.
- 2. Principle of neural science, Eric R.Kandel, 5th edition, 2012.
- 3. <u>http://hagan.okstate.edu/NNDesign.pdf</u>

Course Description

- Basic neuron models: McCulloch-Pitts model and the generalized one, distance or similarity based neuron model, radial basis function model, etc.
- Basic neural network models: multilayer perceptron, distance or similarity based neural networks, associative memory and self-organizing feature map, radial basis function based multilayer perceptron, neural network decision trees, etc.

Prerequisites	Co-requisites					
Mathematics-I, Mathematics-II,	NIL					
Numerical Methods						
required, elective, or selected elective (as per Table 5-1)						
selected elective						
Course Outcomes (COs)						

Course Outcomes (COs)

- CO1: Be able to analyze a problem for NN solution in terms of these methods.
- CO2: Have an awareness of the computational theory underlying NN.
- CO3: Have a working knowledge of a typical neural network simulation
- CO4: Experience in programming NN applications from scratch.
- CO5: Have knowledge of sufficient theoretical background to be able to reason about the behavior of neural networks.
- CO6: Have knowledge of sufficient theoretical background to be able to reason about the behavior of neural networks.

Student Outcomes (SOs) from Criterion 3 covered by this Course

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COs/SOs	а	b	С	d	е	f	g	h	i	j	k	
CO1	М	Н		Н								
CO2		Н		Н								
CO3	М	Н		Н								
CO4		Н	Н	Н								
CO5	L	Н		Н		М						
CO6												1

List of Topics Covered	
UNIT-I	9
BACK PROPAGATION	
Introduction to Artificial Neural systems - Perception - Representation - Linea Learning - Training algorithm - The back propagation network - The generality Practical considerations - BPN applications.	r Separability - zed data rule -
UNIT-II	9
STATISTICAL METHODS	
Hopfield nets - Cauchy training - Simulated annealing-The Boltzmann machi memory - Bidirectional associative memory - Applications.	ne. Associative
UNIT-III	9
COUNTER PROPAGATION NETWORK & SELF ORGANISATION MAPS	
CRN building blocks - CPN data processing. SQM data processing - Applications	
UNIT-IV	9
ART AND SPATIO TEMPORAL PATTERN CLASSIFICATION	
ART network description - ART1 -ART2-Application. The formal avalanche - station temporal networks - The sequential competitive avalanche field - Applica	Architecture of tions of STNs.
UNIT-V	9

NEO-CONGNITRON

Cognitron - Structure & training - The neocognitron architecture - Data processing - Performance - Addition of lateral inhibition and feedback to the neocognitron. Optical neural networks - Holographic correlators.