AMITY SCHOOL OF ENGINEERING & TECHNOLOGY
Artificial Neural Networks (ETIC-405)

Total teaching weeks: 14 **Semester – VII**
Total Lectures: 40 **Credit – 4**

	TOPICS TO BE COVERED	LECTURE
1	**UNIT I** Neural networks characteristics, History of development in neural networks principles	2
2	Artificial neural terminology, Model of a neuron	2
3	Topology, Neural Networks: biological concepts, neuron model	2
4	Transfer functions, feed forward, feedback, supervised and unsupervised models	2
5	Learning methods- Hebbs, delta, backpropagation and competitive learning	2
6	**UNIT II** Fundamental Concepts and Models, Learning Process, Learning Rules.	2
7	Single Layer Perceptron Classifier, Multilayer Feedforward Network, Single-Layer Feedback Networks	2
8	Types of learning, Supervised, Unsupervised, Reinforcement learning	2
9	Knowledge, representation, and acquisition. Basic Hop field model	2
10	Competitive learning, K-means clustering algorithm, Kohonen's feature maps	2
	End of 1st Term	
11	**UNIT III** Autoassociative Memory, Performance Analysis of Recurrent Autoassociative Memory, Bidirectional Autoassociative Memory, Associative Memory of Spatio-temporal Patterns	3
12	Radial basis function neural networks, Basic earning laws in RBF nets, Recurrent back propagation. Introduction to counter propagation networks, CMAC network and ART networks	4
13	Matching and Self-Organizing Networks Hamming Net and MAXNET, Unsupervised Learning of Clusters	3
14	**UNIT IV** Applications such as pattern recognition, Pattern mapping	3
15	Associative memories, Optimization, Speech, and decision-making	4
16	VLSI implementation of neural networks	3
17	**End of 2nd Term**	

Text Books:

[T1] B. Yegnanarayana, " Artificial Neural Networks", PHI.
[T2] J.M. Zurada, "Introduction to artificial neural systems", Jaico Publishing House.

Reference Books:

[R1] S. Rajasekaran, G. A. Vijaylakshmi Pai, "Neural Network, Fuzzy Logic & Genetic Algorithms Synthesis & Application", PHI, 1st edition, 2009.
[R2] Simon Haykin, "Neural Networks", PHI, 3rd edition, 2010.

ARTIFICIAL NEURAL NETWORKS

Paper Code: ETIC–405	**L**	**T/P**	**C**
Paper: Artificial Neural Networks	**3**	**1**	**4**

INSTRUCTIONS TO PAPER SETTERS: **MAXIMUM MARKS: 75**

1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 25 marks.
2. Apart from question no. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be of 12.5 marks.

Objective: To give students knowledge about modeling biological neuron networks. To provide students with the neural networks ability to perform computations based on the flexibility and power of human brain by artificial means.

UNIT - I

Introduction:

Neural networks characteristics, History of development in neural networks principles, Artificial neural terminology, Model of a neuron, Topology, Neural Networks: biological concepts, neuron model, transfer functions, feed forward, feedback, supervised and unsupervised models, Learning methods- Hebbs, delta, back-propagation and competitive learning.

[T1, T2] [No. of Hours: 11]

UNIT - II

Learning Methods & Neural Network Models:

Fundamental Concepts and Models, Learning Process, Learning Rules, Single Layer Perceptron Classifier, Multilayer Feedforward Network, Single-Layer Feedback Networks, types of learning, Supervised, Unsupervised, Re-inforcement learning, Knowledge, representation and acquisition. Basic Hop field model, Competitive learning, K-means clustering algorithm, Kohonen's feature maps.

[T1, T2] [No. of Hours: 12]

UNIT - III

Artificial Neural Networks:

Autoassociative Memory, Performance Analysis of Recurrent Autoassociative Memory, Bidirectional Autoassociative Memory, Associative Memory of Spatio-temporal Patterns Radial basis function neural networks, Basic earning laws in RBF nets, Recurrent back propagation. Introduction to counter propagation networks, CMAC network and ART networks. Matching and Self-Organizing Networks Hamming Net and MAXNET, Unsupervised Learning of Clusters, Counter propagation Network, Feature Mapping, Self-Organizing Feature Maps, Cluster Discovery Network**.**

[T1, T2] [No. of Hours: 11]

UNIT – IV

Applications of neural networks:

Applications such as pattern recognition, Pattern mapping, Associative memories, Optimization, Speech and decision-making, VLSI implementation of neural networks.

[T1, T2] [No. of Hours: 10]

Text Books:

[T1] B. Yegnanarayana, " Artificial Neural Networks", PHI.
[T2] J.M. Zurada, "Introduction to artificial neural systems", Jaico Publishing House.

Reference Books:

[R1] S. Rajasekaran, G. A. Vijaylakshmi Pai, "Neural Network, Fuzzy Logic & Genetic Algorithms Synthesis & Application", PHI, 1st edition, 2009.
[R2] Simon Haykin, "Neural Networks", PHI, 3rd edition, 2010.