EC-312B	NEURAL NETWORKS (ELECTIVE - II)	L	T	P	C
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COURSE OBJECTIVES:

1. To gain knowledge about the fundamentals of artificial neural networks.
2. To gain knowledge about single layer networks such as perceptron with supervised learning method.
3. To learn about the Backpropagation which is mostly used supervised learning algorithm for multilayer networks.
4. To learn about unsupervised learning networks which are used to discover special features and patterns from available data without using external help.
5. To learn how to apply the Artificial Neural Networks for real world problems.

COURSE OUTCOMES:

After successful completion of the course, the students are able to

1. understand the fundamentals such as neural networks, learning laws and their applications.
2. understand how to train the neural networks to solve linear separability with perceptions and also to understand support vector classification.
3. understand how to train Back propagation algorithm and setting the parameter values.
4. understand about the clustering process using neural networks such as counter propagation networks and Adaptive Resonance Theory.
5. apply the principles of Artificial Neural Networks in the fields of image processing, pattern recognition.

UNIT I *Text Book - 1,2* **(11)**

Introduction : History of Neural Networks, Structure and function of biological and artificial neuron, models of a neuron, Neural network architectures, Neural learning, Learning laws Applications of neural networks to solve tasks such as clustering and pattern association, Evaluation of Networks.

UNIT II *Text Book - 1* **(11)**

Supervised learning-I : Single layer networks: Supervised and unsupervised learning, Perceptrons, Linear separability, Perceptron training algorithm, Gaurenty of success, Modifications, Support vector classification.

UNIT III *Text Book - 1* **(12)**

Supervised learning-II : Multi layer networks: Multi level discrimination, Preliminaries, Backpropagation algorithm, Classification using Backpropagation, setting the parameter values,Radial basis functions, Support vector machines, Probabilistic neural network, Polynomial networks

UNIT IV *Text Book - 1* **(11)**

Unsupervised learning : Winner - Take - all networks, Learning vector quantizers, Counter propagation networks, Adaptive Resonance Theory, Topologically organized networks, Distance based learning, Principal component analysis networks.

UNIT V *Text Book - 1,2* **(10)**

Associative Memories : Non iterative procedures for association, Hopfield networks, Boltzmann Machines, Hetero-associators, Applications of Neural Networks: Optimization, Travelling salesperson, Applications in Pattern recognition and image processing.

LEARNING RESOURCES:

TEXT BOOK(s):

1. Kishan Mehrotra, Chelkuri K. Mohan, Sanjav Ranka - Elements of Artificial Neural Networks, Penram International, 2001.
2. B. Yegnanarayana - Artificial Neural Networks, PHI, New Delhi, 1999.

REFERENCE BOOK(s):

1. J.M. Zurada - Introduction to Artificial Neural Systems, Jaico Publications, India,1994.
2. Rajasekharan and Pai - Neural Netwroks, Fuzzy Logic and Genetic algorithms: synthesis and applications, PHI Publication, 2003.

WEB RESOURCES:

http://nptel.ac.in/syllabus/syllabus.php?subjectId=117105084