SILVER OAK UNIVERSITY

College of Technology

Master of Technology
Electronics and Communication
Course Name: Neural Networks and Applications
Course Code: 1010097142
Semester: 2nd

Prerequisite: Basics Knowledge of Neural Networks

Course Objective:

1. Understand the basic neural network architectures and learning algorithms, for applications in pattern recognition, image processing, and computer vision.
2. Explore the use of Pattern and Neural Classifiers for classification applications. To introduce neural computing as an alternative knowledge acquisition/representation paradigm.

Teaching Scheme:

Teaching Scheme				
L	T	P	Contact Hours	Credit
3	0	2	5	4

Content:

Unit No.	Course Contents	Teaching Hours	Weightage %
1	**Basics Of Neural Networks**: Basic concept of Neurons – Perceptron Algorithm – Feed Forward and Back Propagation Networks.	4	20
2	**Convolutional Neural Networks**: CNN Architectures – Convolution – Pooling Layers – Transfer Learning – Image Classification using Transfer Learning	5	20
3	**Supervised Network Learning Paradigms** Perceptron and backpropagation – Single Layer Perceptron, Convergence theorem, delta rule, Linear Separability, Multilayer Perceptron, Backpropagation of error, variation and extension to backpropagation. Recurrent perceptron like networks.	5	20

4	**Associative Network and Network Based On Competition**: Associative Memory – Different types of Pattern Association, Bidirectional Associative Memory, and Hopfield Memory. Self Organizing feature maps, Linear Vector Quantization, Counter Propagation Networks.	10	20
5	**Application of Neural Networks:** ANN in Computer-Aided Diagnosis, ANN as multivariate statistical model, ANN for medical Image segmentation, ANN as a predictive model, ANN as a optimizer.	15	20

Course Outcome:

Sr. No.	CO statement	Unit No
CO-1	Describe the neural network architecture and learning algorithms	1,2
CO-2	Analyze the convolution of networks	2
CO-3	NLP tasks such as sentiment analysis, machine translation, text generation	3,4
CO-4	Analyze the counter propagation	4,5
CO-5	Implement Pattern and Neural Classifiers for various classification applications	5

Teaching & Learning Methodology:-

1. Direct Instruction
2. Flipped Classrooms
3. Kinesthetic Learning
4. Context-Based Learning
5. Adaptive Teaching

List of Experiments/Tutorials: **Total Hours : 28**

Sr. No.	Practical Name
1	Study of Matlab.
2	(a) Write a program to perform basic operations. (b) To perform matrix operations.
3	(a) Introduction to script file. (b) Write a program to calculate the factorial of a number by creating a script file by using while loop. (c) Write a program in to find the factorial by creating a function file by using for loop.
4	(a) Write a program in to plot multiple curves in single plot by creating a script file. (b) Write a program in for plotting multiple curves in single figure.
5	(a) Write a program in Matlab to plot Activation function used in neural network (b) Write a program in Matlab to plot piecewise continuous activation function (threshold and signum function in neural network)
6	(a) To realize gates using Mcculloh Pitt model in Matlab. (b) Write a program to implement XOR gate using Mcclloh-Pitts neuron.
7	(a) Write a program to create the Perceptron using GUI in Matlab. (b) Write a program in Matlab to create `Perceptron using commands.
8	(a) Write a program in Matlab to classify the Classes using Perceptron. (b) Write a program in Matlab for Pattern Classification using Perceptron network.
9	Write a program in Matlab for creating a Back Propagation Feed-forward neural network.
10	To design a Hopfield Network which stores 4 vectors
11	Write a program to illustrate how the perception learning rule works for non linearly separable problems.
12	Write a program to illustrate Linearly non-separable vectors.

Major Equipment:

eScience WRF Studio

Books Recommended: -

1. LaureneFausett, Fundamentals of neural networks- Architectures, algorithms and applications, Prentice Hall, 1994.
2. James A Freeman and David M.Skapra, Neural Networks: Algorithms, Applications, and Programming Techniques, Addison-Wesley, 1991, Digital Version 2007.
3. Simon O. Haykins, Neural Networks: A Comprehensive Foundation, 2nd

Edition, Pearson 1994

4. Edited by Kenji Suzuki, Artificial Neural Networks – Methodological Advances and Biomedical Applications, ISBN 978-953-307-243-2, 374 pages, Publisher: InTech, Chapters published April 11, 2011 under CC BY-NC-SA 3.0 license DOI: 10.5772/644

CO-PO Matrix:

CO No.	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO1	PSO 2
CO-1	3	3	-	-	-	-	-	-	-	-	-	-	3	-
CO-2	3	3	-	-	3	-	-	-	-	-	-	-	3	-
CO-3	3	3	3	-	-	-	-	-	-	-	-	-	3	-
CO-4	3	3	3	3	-	-	-	-	-	-	-	-	3	-
CO-5	3	3	-	-	3	-	-	-	-	-	-	-	3	-