

Branch Name:	Artificial Intelligence & Data Science
Program Code:	ET108
Semester/Year:	Semester VI/ Third Year
Course Name:	Deep Learning with Neural Network Practical
Course Code:	2ET1080601P
Pre-requisite:	Probability and statistics, Programming and data structures

Course Objective:

1. To organize synaptic connectivity as the basis of neural computation and learning
2. To learn the ideological basics of artificial neural networks
3. To learn the origins of artificial neural networks
4. To know some application of artificial neural networks
5. To identify the different structures of artificial neural networks

Teaching and Examination Scheme:

Credit	Teaching Scheme Hours per week				Evaluation Scheme (Marks)								Total (Marks)
					Theory (Marks)				Practical (Marks)				
	L	T	P	Total	SEE		CCE		SEE		CCE		
					Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	
1	-	-	2	2	-	-	-	-	10	25	10	25	50

Sr. No	List of Practical	Content Hours
1.	Implementation of different activation functions to train Neural Network.	2
2.	Implementation of different Learning Rules.	2
3.	Design a neural network (NN) model with one hidden layer for classification problems.	2
4.	Implement a basic neural network with a single hidden layer using only NumPy.	2
5.	Implement a multilayer perceptron (MLP) model for prediction such as house prices.	2
6.	Implementation of Adeline network for system identification.	2
7.	Study about Pattern matching using different rules.	2
8.	Design and implement a CNN for Image Classification	2
9.	Implementation of Madeline network.	2
10.	Train a simple neural network using a deep learning framework.	2
11.	Train a neural network to classify multi-class datasets.	2

12.	Design RNN or its variant including LSTM or GRU	2
13.	Implement an artificial neural network on GPUs	2
14.	Implement any one of the project under the following title: Project related to application of machine learning in healthcare. a) Project related to application of machine learning in business analysis. b) Project related to application of machine learning in sports analytics. c) Project related to application of machine learning in Time Series Analysis & Forecasting.	2

List of Reference Books:

1. Deep Learning (Adaptive Computation and Machine Learning series) by Aaron Courville (Author), Ian Goodfellow (Author), YoshuaBengio (Author)
2. Neural Networks and Deep Learning by Charu C. Aggarwal
3. Neural Networks & Deep Learning by Pat Nakamoto

e-Resources (If any):

1. <https://www.knowledgehut.com/blog/data-science/types-of-neural-networks>
2. <https://www.geeksforgeeks.org/introduction-to-recurrent-neural-network/>

Course Learning Outcomes (CLO): On completion of this course, the students will be able to:

CLO	Description	Bloom's Taxonomy Level
CLO1	Understand comprehend the key concepts of deep learning algorithms	1. Remembering 2. Understanding
CLO2	Learn working and applications of neural network	2 Understanding 5. Evaluate
CLO3	Learn back propagation network	4. Analyze
CLO4	Learn Implement Fuzzy Logic	2 Understanding 5. Evaluate

Mapping of CLOs with POs & PSOs

Course Learning Outcomes	Program Outcomes (POs)												Program Specific Outcomes(PSOs)			
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO 10	PO 11	PO 12	PSO 1	PSO 2	PSO 3	PSO 4
CLO1	H	M	M		L	H			L		M	H	H	M	L	
CLO2	H	M	H	M	L			L		L		M		M	L	
CLO3		H	L	H	H					M	M	H	H	H		L
CLO4	H	H	H	H	H			L				H	L	H	M	H

H: High, M: Medium, L: Low