National Institute of Technology Meghalaya

An Institute of National Importance

CURRICULUM

Programme	**Master of Computer Applications**	Year of Regulation	**2024-25**
Department	**Computer Science and Engineering**	Semester	**V**

Course Code	Course Name	Pre-Requisite	Credit Structure				Marks Distribution		
			L	T	P	C	Continuous Evaluation	Quiz/ Viva	Total
CA653	**Deep Learning Lab**		**0**	**1**	**2**	**2**	**70**	**30**	**100**

Course Objectives		Course Outcomes	CO's	Statement	Bloom's Taxonomy
	To gain insight into the historical context and theoretical foundations of deep learning		**CA653.1**	**Able to understand deep learning principles, including neural networks, optimization algorithms, and advanced architectures.**	Understand
	To analyze dimensionality Reduction and Feature Learning		**CA653.2**	**Able to develop practical skills in implementing and applying various deep learning techniques and algorithms across multiple domains.**	Create
	To explore Advanced Architectures and Training Techniques		**CA653.3**	**Able to Understand attention mechanisms and their role in machine translation, along with encoder-decoder architectures**	Understand
	To develop practical skills in implementing deep learning models for various tasks		**CA653.4**	**Able to understand deep learning principles, including neural networks, optimization algorithms, and advanced architectures.**	Understand

COs	Mapping with Program Outcomes (POs)												Mapping with PSOs		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CA653.1	2	1	1		1					1	1	1	1		1
CA653.2	2	1	1	1	1	1			1				1	1	1
CA653.3	1	1	1	1	1				1				2	2	
CA653.4	2	2	2	2									1	1	1
CA653	1.75	1.25	1.25	1.33	1.00	1.00			1.00	1.00	1.00	1.00	1.25	1.33	1.00

SYLLABUS

No.	Content	Hours	COs
I	Implement a simple perceptron model from scratch and train it using gradient descent.	**02**	**CA653.1**
II	Implement a simple MLP with one hidden layer and use it for classification on any open source dataset.	**02**	**CA653.1**
III	Implement a CNN for image classification on any open source dataset.	**02**	**CA653.2**
IV	Implement an autoencoder for reducing the dimensionality of the MNIST dataset.	**02**	**CA653.2**
V	Implement a simple RNN for generating text based on a given input string.	**02**	**CA653.2**
VI	Create a simple GAN to generate synthetic images based on the MNIST dataset.	**04**	**CA653.4**
VII	Use a pretrained CNN (e.g., **VGG16**, **ResNet**) to classify images from a custom dataset.	**04**	**CA653.4**
VIII	Manually implement backpropagation and visualize gradient flow during training.	**04**	**CA653.3**
IX	Implement the attention mechanism in a sequence-to-sequence model for machine translation	**06**	**CA653.3**
Total Hours		**28**	

Essential Readings

1. Ian Goodfelllow, Yoshua Benjio, Aaron Courville, “Deep Learning”, The MIT Press, 2016
2. Richard O. Duda, Peter E. Hart, David G. Stork, “Pattern Classification”, 2nd Edition, John Wiley & Sons Inc., 2012

Supplementary Readings

1. Adam Gibson, Josh Patterson, "Deep Learning: A Practitioner's Approach", 1st Edition, O'Reilly Media, 2017