1.	Title of the course	Deep Learning
2.	Course number	CS518L
3.	Structure of credits	3-0-0-3
4.	Offered to	PG
5.	New course/modification to	Modification To CS5223/12
6.	To be offered by	Department of Computer Science and Engineering
7.	To take effect from	January 2022
8.	Prerequisite	Nil
9.	**Course Objective(s):** To impart knowledge on theory and practices of deep neural networks. To impart skills on problem formulation over deep learning frameworks.	
10.	**Course Content:** Artificial Neural Networks (ANN): Perceptron, learning laws, layers, back propagation, scope of learning, popular architectures, overview of Parallel and Distributed Processes (PDP), linear associative models and stochastic networks; Convolutional Neural Networks (CNN): convolution, filters, pooling, stride, drop out, layers and applications; Recurrent Neural Networks (RNN): unfolding, Backpropagation Through Time (BPTT), LSTM models, bidirectional networks, encoder, decoder and attention models; Advanced models: VAE, GAN, Boltzmann machines and popular architectures; Deep neural network applications for multimedia, sequence and streaming data.	
11.	**Textbook(s):** 1. Goodfellow I, Bengio Y and Courville A, *Deep Learning*, 1st Edition, MIT Press (2017).	
12.	**Reference(s):** 1. Haykin S, *Neural Networks and Learning Machines*, 3rd Edition, Pearson (2008). 2. Rumelhart D E and McClelland J L, *Parallel and Distributed Processing: Explorations in Microstructure of Cognition Vol. 1*, 1st Edition, MIT Press (1986). 3. Rumelhart D E and McClelland J L, *Parallel and Distributed Processing: Explorations in Microstructure of Cognition Vol. 2*, 1st Edition, MIT Press (1986). 4. Yegnanarayana B, *Artificial Neural Networks*, 1st Edition, Prentice Hall India (1999).	