

1.	Title of the course	Deep Learning
2.	Course number	CS5223
3.	Status of the course	Core
4.	Structure of credits	3-0-0-3
5.	Offered to	PG
6.	New course/modification to	New course
7.	To be offered by	Department of Computer Science and Engineering
8.	To take effect from	January 2021
9.	Prerequisite	Nil
10.	Whether approved by the Department	Yes
11.	Course Objective(s): To impart knowledge on theory and practices of deep neural networks. To impart skills on problem formulation over deep learning frameworks.	
12.	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.	
13.	Textbook(s): 1. Goodfellow I, Bengio Y and Courville A, <i>Deep Learning</i> , 1st Edition, MIT Press (2017).	
14.	Reference(s): 1. Haykin S, <i>Neural Networks and Learning Machines</i> , 3rd Edition, Pearson (2008). 2. Rumelhart D E and McClelland J L, <i>Parallel and Distributed Processing: Explorations in Microstructure of Cognition Vol. 2</i> , 1st Edition, MIT Press (1986). 3. Rumelhart D E and McClelland J L, <i>Parallel and Distributed Processing: Explorations in Microstructure of Cognition Vol. 1</i> , 1st Edition, MIT Press (1986). 4. Yegnanarayana B, <i>Artificial Neural Networks</i> , 1st Edition, Prentice Hall India (1999).	