- For laboratories having only one part: Students are allowed to pick one experiment from the lot with equal opportunity.
- For laboratories having PART A and PART B: Students are allowed to pick one experiment from PART A and one experiment from PART B, with equal opportunity.

- Change of experiment is allowed only once and marks allotted for procedure to be made zero of the changed part only.
- Marks Distribution *(Subjected to change in accordance with university regulations)*
  s) For laboratories having only one part – Procedure + Execution + Viva-Voce: 15+70+15 = 100 Marks
  t) For laboratories having PART A and PART B
     i. Part A – Procedure + Execution + Viva = 6 + 28 + 6 = 40 Marks
     ii. Part B – Procedure + Execution + Viva = 9 + 42 + 9 = 60 Marks

NEURAL NETWORKS AND DEEP LEARNING **(Effective from the academic year 2018 -2019)** **SEMESTER – VIII**			
Subject Code	18AI81	**CIE Marks**	40
Number of Contact Hours/Week	3:0:0	**SEE Marks**	60
Total Number of Contact Hours	40	**Exam Hours**	3 Hrs
CREDITS – 03			

Course Learning Objectives: This course will enable students to:

- Identify the deep learning algorithms which are more appropriate for various types of learning tasks in various domains.
- Implement deep learning algorithms and solve real-world problems.
- Execute performance metrics of Deep Learning Techniques.

Module – 1	**Contact Hours**
Introduction to ANN: Biological to Artificial neuron, Training an MLP, Training a DNN with TensorFlow , Fine tuning NN HyperParametersUp and Running with TensorFlow **Chapter 9 and 10**	08
Module-2	
Deep Neural network: Introduction, Vanishing Gradient problems, Reusing Pretrained layers, Faster optimizers, avoiding over fitting through regularization **Chapter 11**	08
Module-3	
Distributing Tensor flow across devices and servers: Multiple devices on a single machine, multiple servers, parallelizing NN on a Tensor Flow cluster **Convolution Neural Network**: Architecture of the visual cortex, Convolutional layer, Pooling layer, CNN architecture	08

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Chapter 12 and 13	
Module-4	
Recurrent Neural Network: Recurrent neurons, Basic RNN in Tensor Flow, Training RNN , Deep RNNs, LSTM Cell, GRU Cell, NLP **Chapter 14**	08
Module-5	
Autoencoders: Efficient data representation, Performing PCA, Stacked autoencoders, Unsupervised pretraining using SA, Denoising, Sparse autoencoders, variational and other autoencoders. **Reinforcement Learning:** Learning to optimize rewards, policy search, Introduction to OpenAI Gym, Neural network polices, Evaluating actions, Policy gradients, Markov decision processes, TDL and Q-learning, Learning to play Ms.Pac-man using Deep Q Learning **Chapter 15 and 16**	08
Course outcomes: The students should be able to:	
• Identify the deep learning algorithms which are more appropriate for various types of learning tasks in various domains. • Implement deep learning algorithms and solve real-world problems. • Execute performance metrics of Deep Learning Techniques.	
Question Paper Pattern:	
• The question paper will have ten questions. • Each full Question consisting of 20 marks • There will be 2 full questions (with a maximum of four sub questions) from each module. • Each full question will have sub questions covering all the topics under a module. • The students will have to answer 5 full questions, selecting one full question from each module.	
Textbooks:	
1. Hands on Machine Learning with Scikit-Learn &TensorFlow, AurelienGeron, O'Reilly, 2019	
Reference Books:	
1. Deep Learning Lan Good fellow and YoshuaBengio and Aaron CourvilleMIT Press2016. 2. Neural Networks and Deep Learning, Charu C. Aggarwal, Springer International Publishing, 2018