B.Sc. (Data Science)
Discipline Specific Elective (DSE)
Semester V
BSDB33501T: Introduction to Deep Learning

Total Marks: 100
External Marks: 70
Internal Marks: 30
Credits: 4
Pass Percentage: 40%

Objective
To enable student to understand the concepts related to tensor flow, explicate the tuning of deep neural networks model and understanding the utility of Keras.

INSTRUCTIONS FOR THE PAPER SETTER/EXAMINER
1. The syllabus prescribed should be strictly adhered to.
2. The question paper will consist of three sections: A, B, and C. Sections A and B will have four questions from the respective sections of the syllabus and will carry 10 marks each. The candidates will attempt two questions from each section.
3. Section C will have fifteen short answer questions covering the entire syllabus. Each question will carry 3 marks. Candidates will attempt any ten questions from this section.
4. The examiner shall give a clear instruction to the candidates to attempt questions only at one place and only once. Second or subsequent attempts, unless the earlier ones have been crossed out, shall not be evaluated.
5. The duration of each paper will be three hours.

INSTRUCTIONS FOR THE CANDIDATES
Candidates are required to attempt any two questions each from the sections A and B of the question paper and any ten short questions from Section C. They have to attempt questions only at one place and only once. Second or subsequent attempts, unless the earlier ones have been crossed out, shall not be evaluated.

SECTION A

UNIT I: Introduction: Introduction to perceptron, Testing Regular perceptron

UNIT: II: Reusability in tensor flow: Restoring and training on already trained deep neural networks in tensor flow, importing saved tensor flow DNN classifier model

UNIT III: Building regression and time series models: Building a DNN regressor for non-linear time series in tensor flow, visualizing ML results with mathplotlib

UNIT IV: Building unsupervised learning models: Unsupervised learning and k means clustering with tensor flow

SECTION B

UNIT V: Tuning deep neural networks model: Optimization algorithms in tensor flow, Activation functions in tensor flow

UNIT VI: Consuming tensor flow via keras: Installing keras, Building DNN classifier with keras, Storing and restoring a trained neural networks model with keras

Unit VII: CNN: Introduction, Architecture of CNN, Convolution Layer, Pooling Layer, Types of Pooling, Activation Functions,

Unit VIII: Role of RELU function and Softmax function in CNN, Fully connected Layer etc.

Suggested Readings

1. Ian Goodfellow and Yoshua Bengio and Aaron Courville, Deep Learning (Adaptive Computation and Machine Learning series), MIT Press 2016
2. François Chollet, Deep Learning with Python, Manning Publications, Ist Ed. 2017
3. Seth Weidman, Deep Learning from Scratch: Building with Python from First, Shroff/O'Reilly1st ed. 2019
4. https://www.udemy.com/course/tensorflow-101-introduction-to-deep-learning/