BIRLA INSTITUTE OF TECHNOLOGY AND SCIENCE, Pilani
Pilani Campus
AUGS/ AGSR Division

FIRST SEMESTER 2022-23
COURSE HANDOUT

Date: 27.08.2022

In addition to part I (General Handout for all courses appended to the Time table) this portion gives further specific details regarding the course.

Course No   : **MPBA G514**
Course Title   : **Deep Learning for Business**
Instructor-in-Charge : **Revendranath T**
Instructor(s)   : **NA**
Tutorial/Practical Instructors: **NA**

1. Scope and Objective of the Course: The course aims to impart skills on application of deep learning algorithms in businesses. Key concepts of neural networks model development (artificial neural networks, optimization, forward and backward propagation, regression, CNN, RNN, LSTM, Transformers) are introduced to the students. Tensorflow and Keras libraries on Google Colab are used to teach algorithms for this course. Students familiar with PyTorch, may assignments in PyTorch. The detailed topics are provided in the course plan (refer to section 4 in the handout).

2. Text Books:

(1) Géron, A. (2019). Hands-on machine learning with Scikit-Learn, Keras, and TensorFlow: Concepts, tools, and techniques to build intelligent systems. " O'Reilly Media, Inc.".

(2) Chollet, F. (2021). Deep learning with Python. Simon and Schuster.

3. Reference Books:

(1) Dive to Deep Learning. Available for free for learning at https://d2l.ai/

(2) Tensorflow, Keras & PyTorch APIs documentation

4. Course Plan:

Session No.	Lecture Session	Reference	Learning outcomes
1-6	Introduction to Google Colab & Mastering tensors using Tensorflow	**Class notes**	To understand how to use Google Colab, and master tensors in Tensorflow API ecosystem
7-12	Model Building Foundations	**Chapter 2, 10 & 11**	To understand the steps involved in artificial neural networks development
13-14	Data Preprocessing using Tensorflow Classification &	**Chapter 13**	To understand the data pipelines and data preprocessing steps, functions and packages in Tensorflow. To apply and transform the data using preprocessing tools in Tensorflow
15-16	Numerical Prediction (AI – neural networks) using Keras	**Class notes**	To implement a numerical prediction (regression) algorithm using Tensorflow/Keras

17-22	Computer Vision using Convolution Neural Networks	**Chapter 14**	To implement convolution neural networks using Keras to solve computer vision related problems such as classification and objects count.
23-30	Processing Sequences using RNNs and LSTM	**Chapter 15-16**	To implement recurrent neural networks (RNN) and LSTM using Keras to solve sequences related problems such as time series and sentiment analysis.
31-36	Encoders and Decoders, and Transformers	**Chapter 16**	To understand and implement auto-encoders, decoders and attention based transformers using Keras to solve text data problems.
37-40	Transfer learning	**Class notes**	To understand and apply concepts of transfer learning to reuse pre-trained models for specific applications
41-44	Deploying models using Tensorflow Extension	**Chapter 19**	To deploy a neural network model on the cloud platform to solve a real-time problem using deep learning.
44-48	Generative Adversarial Networks	**Chapter 17**	To understand & apply generative adversarial networks (GANs) using Keras

5. Evaluation Scheme: Evaluation components assess a range of learning outcomes: basic comprehension of the topics taught, application of different assignments in the group projects, and ability to solve problems using deep learning. The proposed evaluation scheme is given below:

Component	Duration	Weightage (%)	Date & Time	Nature of component (Close Book/ Open Book)
Mid-Semester Examination	3 hours	50	TBA	Open Book
Mid-Semester Project		50	TBA	
End-Semester Project		50	TBA	
Comprehensive Examination	3 hours	50	TBA	Open Book

6. Chamber Consultation Hour: 5:00 to 6:30 pm, Every Friday

7. Notices: Notices will be shared on Google Spaces created for the class

8. Make-up Policy: No extensions shall be granted for projects. Genuine cases such as hospitalization (upon production of the relevant documents/proof) will be considered upon discussion with individuals/team for any make ups for the final Exam.

9. Note (if any): Expect students to be familiar with Python/R Programming

Instructor-in-charge
Course No. MPBA G514