MARRI LAXMAN REDDY
INSTITUTE OF TECHNOLOGY AND MANAGEMENT
(AN AUTONOMOUS INSTITUTION)
(Approved by AICTE, New Delhi & Affiliated to JNTUH, Hyderabad)
Accredited by NAAC with 'A' Grade & Recognized Under Section 2(f) & 12(B) of the UGC act,1956

COURSE CONTENT

DEEP LEARNING LABORATORY								
I Semester: CSE								
Course Code	**Category**	**Hours / Week**			**Credits**	**Maximum Marks**		
		L	**T**	**P**	**C**	**CIA**	**SEE**	**Total**
2515878	**Professional Core courses**	0	0	4	2	40	60	100
Contact Classes: Nil	**Tutorial Classes: 0**	**Practical Classes: 60**				**Total Classes: 60**		
requisites: Strong foundation in deep learning								

Course Overview:

The Deep Learning Lab provides hands-on experience in building and training neural network models using Python and frameworks like TensorFlow, Keras, and PyTorch

Course Objectives:

1. To understand the fundamentals of deep learning and neural network architectures.
2. To develop skills in implementing deep learning models using Python and popular frameworks.
3. To design and train convolutional and recurrent neural networks for real-world applications.
4. To apply deep learning techniques in computer vision and natural language processing tasks.
5. To implement advanced models such as autoencoders and GANs for unsupervised learning and image generation.

Course Outcomes: After Completion of the Course, Students should be able to

1. Implement Python programs and set up IDE environments to execute deep learning workflows for computer vision and NLP tasks.
2. Make use of deep learning libraries such as TensorFlow, Keras, and PyTorch to build and train neural network models for real-world applications.
3. Design convolutional neural networks (CNNs) for image classification tasks such as MNIST digit recognition and other computer vision problems.
4. Utilize recurrent neural network (RNN) models with LSTM/GRU layers to perform sentiment analysis and other sequence modelling tasks in NLP applications.
5. Implement autoencoders and generative adversarial networks (GANs) to perform encoding, image generation, and unsupervised learning tasks in real-world datasets.

LIST OF EXPERIMENTS

1. Setting up the Spyder IDE Environment and Executing a Python Program
2. Installing Keras, Tensorflow and Pytorch libraries and making use of them
3. Applying the Convolution Neural Network on computer vision problems
4. Image classification on MNIST dataset (CNN model with Fully connected layer)
5. Applying the Deep Learning Models in the field of Natural Language Processing
6. Train a sentiment analysis model on IMDB dataset, use RNN layers with LSTM/GRU notes
7. Applying the Autoencoder algorithms for encoding the real-world data
8. Applying Generative Adversial Networks for image generation and unsupervised tasks.

TEXT BOOKS:

1. Deep Learning by Ian Goodfellow, Yoshua Bengio and Aaron Courville, MIT Press.
2. The Elements of Statistical Learning by T. Hastie, R. Tibshirani, and J. Friedman, Springer.
3. Probabilistic Graphical Models. Koller, and N. Friedman, MIT Press.

REFERENCE BOOKS:

1. Bishop, C, M., Pattern Recognition and Machine Learning, Springer, 2006.
2. Yegnanarayana, B., Artificial Neural Networks PHI Learning Pvt. Ltd, 2009.
3. Golub, G.,H., and Van Loan, C.,F., Matrix Computations, JHU Press,2013.
4. Satish Kumar, Neural Networks: A Classroom Approach, Tata McGraw-Hill Education, 2004.

ELECTRONIC RESOURCES:

1. http://www.deeplearning.net
2. https://www.deeplearningbook.org/
3. https://developers.google.com/machine-learning/crash-course/ml-intro
4. www.cs.toronto.edu/~fritz/absps/imagenet.pdf
5. http://neuralnetworksanddeeplearning.com/

MATERIALS ONLINE:

1. Course template
2. Open-ended experiments
3. Definitions and terminology
4. Lab Manual