21AML03	DEEP LEARNING AND ITS APPLICATIONS	L	T	P	C
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Course Objectives
- To understand the theoretical foundations, algorithms and methodologies of Neural Network
- To design and develop an application using specific deep learning models
- To provide the practical knowledge in handling and analysing real world applications.

UNIT I	MACHINE LEARNING BASICS	9 Hours

Learning algorithms, Maximum likelihood estimation, Building machine learning algorithm, Neural Networks Multilayer Perceptron, Back-propagation algorithm and its variants Stochastic gradient decent, Curse of Dimensionality

UNIT II	DEEP LEARNING ARCHITECTURES	9 Hours

Machine Learning and Deep Learning, Representation Learning, Width and Depth of Neural Networks, Activation Functions: RELU, LRELU, ERELU, Unsupervised Training of Neural Networks, Restricted Boltzmann Machines, Auto Encoders, Deep Learning Applications

UNIT III	CONVOLUTIONAL NEURAL NETWORKS	9 Hours

Architectural Overview, Motivation, Layers, Filters, Parameter sharing, Regularization, Popular CNN Architectures: ResNet, AlexNet - Applications

UNIT IV	TRANSFER LEARNING	9 Hours

Transfer learning Techniques, Variants of CNN: DenseNet, PixelNet

UNIT V	SEQUENCE MODELLING – RECURRENT AND RECURSIVE NETS	9 Hours

Recurrent Neural Networks, Bidirectional RNNs, Encoder-decoder sequence to sequence architectures - BPTT for training RNN, Long Short Term Memory Networks.

UNIT VI	CASE STUDY	

Case Study on Neural Networks

TOTAL PERIODS: 45

Course Outcomes:
At the end of the course, Students can able to
- Recognize the characteristics of deep learning models that are useful to solve real-world problems.
- Understand different methodologies to create application using deep nets.
- Identify and apply appropriate deep learning algorithms for analyzing the data for variety of problems

Text books:
1. Ian Goodfellow, YoshuaBengio and Aaron Courville, " Deep Learning", MIT Press, 2017.
2. Josh Patterson, Adam Gibson "Deep Learning: A Practitioner's Approach", O'Reilly Media, 2017

Reference Books:
1. Kevin P. Murphy "Machine Learning: A Probabilistic Perspective", The MIT Press, 2012.
2. Ethem Alpaydin,"Introduction to Machine Learning", MIT Press, Prentice Hall of India, Third Edition 2014.