

## MCPE2013 DEEP LEARNING (3-0-0)

### Module I

Fundamentals of Deep Networks – Defining Deep Learning, What Is Deep Learning? Common Architectural Principles of Deep Networks: Parameters, Layers, Activation Functions, Loss Functions, Hyper parameters

### Module II

Building Blocks of Deep Networks – Restricted Boltzmann Machine, Autoencoders, Variational Autoencoders. Major Architectures of Deep Networks: Unsupervised pretrained networks, Deep Belief Networks, Generative Adversarial Networks.

### Module III

Convolutional Neural Networks (CNNs) – The Convolution Operation, Motivation, Pooling, Variants of the Basic Convolution Function, Structured Outputs, Data Types, Efficient Convolution Algorithms, Random or Unsupervised Features, The Neuro-scientific Basis for Convolutional Networks, Applications.

### Module IV

Sequence Modeling – Recurrent and Recursive Nets – Unfolding Computational Graphs, Recurrent Neural Networks, Encoder-Decoder Sequence-to-Sequence Architectures, Deep Recurrent Networks, Recursive Neural Networks, The Long Short-Term Memory and Other Gated RNNs, Applications  
Deep Learning applications – Computer Vision, Speech Recognition, Natural Language Processing, Other Applications.

### Course Outcomes:

At the end of the course, the student will be able to:

1. Understand the fundamental concepts of Deep learning.
2. Apply concepts of deep networks to analyze various architectures.
3. Apply deep learning models to build applications in various domains.
4. Analyze the given problem and apply suitable deep learning algorithm.

### Text Books

1. Josh Patterson and Adam Gibson, – Deep learning: A practitioner's approach II, O'Reilly Media, First Edition, 2017. 2.
2. Ian Goodfellow, Yoshua Bengio, Aaron Courville, – Deep Learning II, MIT Press, 2016.

### Reference Books

1. Deep learning, Amit Kumar Das, Saptarsi Goswami, Pabitra Mitra, Amlan Chakrabarti, First Edition, 2021, Pearson
2. Fundamentals of Deep Learning, Designing next-generation machine intelligence algorithms, Nikhil Buduma, O\_Reilly, Shroff Publishers, 2019.
3. Deep learning Cook Book, Practical recipes to get started Quickly, Douwe Osinga, O\_Reilly, Shroff Publishers, 2019.
4. Deep learning Illustrated A Visual Interactive Guide to Artificial Intelligence, Jon Krohn, Grant Beyleveld, Aglae Bassens, First Edition, 2020, Pearson.