

**DEEP LEARNING (3-0-0)**

**Objective:**

1. To understand the principles of Deep Learning.
2. To be familiar with the Deep Learning algorithms and their Implementation.

**MODULE – I**

Introduction to Deep Learning, Bayesian Learning, Decision Surfaces, Linear Classifiers, Linear Machines with Hinge Loss, Optimization Techniques, Gradient Descent, Batch Optimization

**MODULE – II**

Introduction to Neural Network, Multilayer Perception, Back Propagation Learning, Unsupervised Learning with Deep Network, Auto encoders, Convolution Neural Network, Building blocks of CNN, Transfer Learning

**MODULE – III**

Revisiting Gradient Descent, Momentum Optimizer, RMSProp, Adam, Effective training in Deep Net- early stopping, Dropout, Batch Normalization, Instance Normalization, Group Normalization, Recent Trends in Deep Learning Architectures, Residual Network, Skip Connection Network, Fully Connected CNN etc.

**MODULE – IV**

Classical Supervised Tasks with Deep Learning, Image Denoising, Semanticd Segmentation, Object Detection etc., LSTM Networks, Generative Modelling with DL, Variation Auto encoder, Generative Adversarial Network Revisiting Gradient Descent, Momentum

**Outcome:**

1. Technical knowhow of the Deep Learning for real time applications.

**Books Recommended:**

1. Deep Learning- Ian Goodfellow, Yoshua Benjio, Aaron Courville, The MIT Press
2. Pattern Classification- Richard O. Duda, Peter E. Hart, David G. Stork, John Wiley & Sons Inc.