21AML06	Machine Learning for Signal Processing	L	T	P	C
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Course Objectives

- The main objective of this course is to understand the Machine learning methods for signal analysis, modelling and information extraction.

UNIT I	Introduction	9 Hours

Introduction to real world signals - text, speech, image, and video.

UNIT II	Representation of Information	9 Hours

Feature extraction and front-end signal processing - information rich representations, robustness to noise and artifacts, signal enhancement, bio inspired feature extraction.

UNIT III	Pattern Recognition Models	9 Hours

Basics of pattern recognition, Generative modeling - Gaussian and mixture Gaussian models, hidden Markov models, factor analysis. Discriminative modeling - support vector machines, neural networks and back propagation.

UNIT IV	Introduction to deep learning	9 Hours

Introduction to deep learning - convolutional and recurrent networks, understanding deep networks.

UNIT V	Applications in Deep generative models	9 Hours

Deep generative models - Auto encoders, Boltzmann machines, Adverserial Networks. Applications in computer vision and speech recognition.

UNIT VI	RECENT TREND	

Recent trends

TOTAL PERIODS: 45

Course Outcomes:

- Understand the basic concept of Machine learning methods
- Understand the basic concepts of different Pattern Recognition Models
- Understand the basic concepts of deep learning and deep generative models
- Students would learn the theory and practice of machine learning methods.

Text books:

1. Deep Learning, I. Goodfellow, Y, Bengio, A. Courville, MIT Press, 2016
2. Digital Image Processing, R. C. Gonzalez, R. E. Woods, 3rd Edition, Prentice Hall, 2008.

Reference Books:

1. Pattern Recognition and Machine Learning, C.M. Bishop, 2nd Edition, Springer, 2011.
2. Neural Networks, C.M. Bishop, Oxford Press, 1995.