SIXTH SEMESTER

Course Code	Course Name	Th	Tu	Pr	Credits	Evaluation		
						CA	ESE	Total
CE604T(ii)	Machine Learning (PE-III)	3	-	-	3	30	70	100

Course Objectives	Course Outcomes
This course is intended ● To provide fundamentals of machine learning ● To develop ML programs using Supervised, unsupervised and neural network ● To develop mini project using ML.	Student will be able to ● Describe the types of Machine Learning Algorithm ● Understand the concept of training and testing dataset ● Apply the concept of supervised learning on given problem ● Analysis the real time problem using clustering and association rule. ● Design and develop Real time problem using neural network.

Unit I **[7Hrs]**

Introduction: Basic definitions, linear algebra, multivariate calculus, types of learning, supervised vs unsupervised, hypothesis space and inductive bias, evaluation, cross-validation, Linear and nonlinear regression, SSE; gradient descent, Decision trees, training, validation, test data, underfitting & overfitting.

Unit II **[8Hrs]**

Instance based learning, Feature reduction, Principle component analysis, Collaborative filtering based recommendation, Probability, Gaussian distribution and Bayes learning, Maximum-Likelihood and Bayesian Parameter Estimation.

Unit III **[7Hrs]**

Logistic Regression, online gradient descent, margin methods and Support Vector Machines, Kernel function and Kernel SVM, Bias/Variance tradeoffs, Time series, Markov models, autoregressive models.

Unit IV **[8Hrs]**

Neural network: Perceptron, multilayer network, back propagation, introduction to deep neural network.

Unit V **[8Hrs]**

Computational learning theory, PAC learning model, Sample complexity, VC Dimension, Ensemble methods: Bagging, random forests, boosting, Clustering: k-means, hierarchical agglomeration, adaptive hierarchical clustering, and Gaussian mixture model.

Text Books

S.N	Title	Authors	Edition	Publisher
1	Machine learning: a Probabilistic Perspective	Kevin P. Murthy	Kindle Edition	
2	Introduction to Machine learning	Ethem Alpaydin		
3.	Understanding Machine Learning: From Theory to Algorithms	Shai Shalev-Shwartz and Shai Ben-David		

Reference Books

S.N	Title	Authors	Edition	Publisher
1	Machine Learning for Absolute Beginners	Oliver Theobald	Third Edition (Kindle Edition)	
2	Deep Learning From Scratch: Building with Python from First Principles	Seth Weidman	Greyscale Indian Edition	Shroff