Semester	**THREE**
Paper Number	**10**
Paper Code	**MDTS 4312**
Paper Title	**Machine learning**
No. of Credits	**6**
Course description	CORE Composite Paper Module 1: 2 classes/week Module 2**:** 2classes/week No. of classes assigned Theory: 4 classes per weekPractical: 3 classes per week
Course Objective	At the end of the course, the students should be able to Understand the difference between supervised and unsupervised learning. Understand the problems arising with high dimensional data. Apply the different dimension reduction techniques to machine learning problems. Apply clustering algorithms to machine learning problems. To understand the association rules. Apply different classifiers to machine learning problems.
Syllabus	**Module 1: Unsupervised Learning** *Clustering algorithms:* Combinatorial algorithm, mixture modelling, mode seekers. [8] *Applications of dimension reduction techniques in machine learning problems.* Principal component, independent component and factor analysis. [10] *Page rank algorithm* used by Google search engine. [4] *High dimensional data* and curse of dimensionality. [4] **Module 2: Supervised Learning** *Learning from association:* Association rules. Market basket analysis**.** Generalized association rules**.** [8] *Support vector:* maximal margin classifier**,** support vector classifier**,** support vector machines, support vector regression. [10] *Tree based methods:* Bagging, random forest, boosting and additive trees [8]

Practical	Based on Theory topics	
Reading/Reference Lists	An Introduction to Statistical learning with applications in R. James G, Witten, D, Hastie T and Tibshirani R. Foundations of Machine learning . M Mohori, A Rostamizadeh and A Talwalkar. Hastie, Tibshirani, Friedman: *The Elements of Statistical Learning, Data Mining, Inference and Prediction*. Second Edition, Springer Series in Statistics. Introduction to computation and Programming using python with applications to understanding data , second edition, John V. Guttag Introduction to data Science : data analysis and Prediction algorithms with R. Rafael A. Irizarry.	
Evaluation	Theory CIA: 10 End Sem Exam: 50 (25+25) Total : 60	Practical Continuous Assessment: 30 End Sem Viva: 10 Total: 40
Paper Structure for End Semester Theory	Short questions: 5 marks each	Long questions: 10 marks each
Module I	1 out of 2	2 out of 3
Module II	1 out of 2	2 out of 3