

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

Practical	Based on Theory topics	
Reading/Reference Lists	<p>An Introduction to Statistical learning with applications in R. James G, Witten, D, Hastie T and Tibshirani R.</p> <p>Foundations of Machine Learning. M Mohori, A Rostamizadeh and A Talwalkar.</p> <p>Hastie, Tibshirani, Friedman: <i>The Elements of Statistical Learning, Data Mining, Inference and Prediction</i>. Second Edition, Springer Series in Statistics.</p> <p>Introduction to Computation and Programming using Python with Applications to Understanding Data, second edition, John V. Guttag</p> <p>Introduction to Data Science: data analysis and Prediction algorithms with R. Rafael A. Irizarry.</p>	
Evaluation	<p>Theory</p> <p>CIA: 10</p> <p>End Sem Exam: 50 (25+25)</p> <p>Total : 60</p>	<p>Practical</p> <p>Continuous Assessment</p> <p>Total: 40</p>
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