MACHINE LEARNING

Course Code	Category	Hours / Week			Credits	Maximum Marks		
		L	**T**	**P**	**C**	**CIA**	**SEE**	**Total**
ACS014	**Core**	3	-	-	3	30	70	100

VIII Semester: CSE / IT

Contact Classes: 45	Tutorial Classes: NIL	Practical Classes: Nil	Total Classes:45

OBJECTIVES:

The course should enable the students to:

I. Apply knowledge of computing and mathematics appropriate to thediscipline.

II. Illustrate the concepts of machine learning and relatedalgorithms.

III. Understand the dimensionality problems using lineardiscriminants.

IV. Study various statistical models for analyzing thedata.

V. Learn clustering algorithms for unlabeleddata.

COURSE OUTCOMES (COs):

CO 1: Understand the concept of learning and candidate elimination algorithms

CO 2: Understand the concept of perception and explore on forward and backward practices

CO 3: Explore on basic statistics like variance, covariance and averages

CO 4: Explore on Evolutionary learning techniques used in genetic algorithms

CO 5: Explore on similarity concept and different distance measures

COURSE LEARNING OUTCOMES (CLOs):

1. Understand the concept of learning and candidate eliminationalgorithms

2. Explore on different types of learning and explore On tree basedlearning

3. Understand the construction process of decision trees used for classificationproblem

4. Understand the concept of perception and explore on forward and backwardpractices

5. Illustrate on kernel concept and optimal separation used in support vectormachines

6. Explore on basic statistics like variance, covariance andaverages

7. Understand the concepts of Gaussian and bias-variancetradeoff

8. Understand the concepts of Bayes theorem and Bayes optimalclassifiers

9. Explore on Bayesian networks and approximate inference on markovmodels

10. Explore on Evolutionary learning techniques used in geneticalgorithms

11. Illustrate the ensemble learning approaches used in bagging andboosting

12. Explain the importance of principal component analysis and itsapplications

13. Explore on similarity concept and different distancemeasures

14. Understand the outlier concept and explain about dataobjects

15. Understand the hierarchical algorithms and explainCART

16. Understand the partitioned algorithms and explainsegmentation

17. Explore on clustering large databases and explain K-means clusteringalgorithm
18. Understand the clustering with categorical Attributes and comparison with other datatypes
19. Understand the clustering large databases and explain clusteringmethods
20. Describe clustering with categorical attributes and explainKNN.

UNIT-I	TYPES OF MACHINE LEARNING	Classes: 9
Concept learning: Introduction, version spaces and the candidate elimination algorithm; Learning with trees: Constructing decision trees, CART, classification example.		

UNIT-II	LINEAR DISCRIMINANTS	Classes: 9
Perceptron (MLP): Going forwards, backwards, MLP in practices, deriving back; Propagation support vector Machines: Optimal separation, kernels.		

UNIT-III	BASIC STATISTICS	Classes: 9
Averages, variance and covariance, the Gaussian; The bias-variance tradeoff Bayesian learning: Introduction, Bayes theorem, Bayes optimal classifier, naïve Bayes classifier. Graphical models: Bayesian networks, approximate inference, making Bayesian networks, hidden Markov models, theforward algorithm.		

UNIT-IV	EVOLUTIONARY LEARNING	Classes: 9
Genetic Algorithms, genetic operators; Genetic programming; Ensemble learning: Boosting, bagging; Dimensionality reduction: Linear discriminate analysis, principal component analysis (JAX-RPC).		

UNIT-V	CLUSTERING	Classes: 9
Similarity and distance measures, outliers, hierarchical methods, partitional algorithms, clustering large databases, clustering with categorical attributes, comparison		

Text Books:

1. Tom M. Mitchell, "Machine Learning ", McGraw Hill, 1st Edition,2013.
2. Stephen Marsland, "Machine Learning - An Algorithmic Perspective ", CRC Press, 1st Edition,2009.

Reference Books:

1. Margaret H Dunham, "Data Mining", Pearson Edition, 2nd Edition,2006.
2. Galit Shmueli, Nitin R el, Peter C Bruce,"Data Mining for Business Intelligence", John Wiley and Sons, 2nd Edition,2007.
3. Rajjal Shinghal, "Pattern Recognition and Machine Learning", Springer-Verlag, New York, 1st Edition,2006.

Web References:

1. https://www.oracle.com/in/cloud/application-development
2. http://computingcareers.acm.org/?page_id=12
1. http://en.wikibooks.org/wiki/cloudapplication

E-Text Books:

1. http://www.acadmix.com/eBooks_Download
2. http://www.ibm.com