

MACHINE LEARNING

VIII Semester: CSE / IT

Course Code	Category	Hours / Week			Credits	Maximum Marks		
		L	T	P	C	CIA	SEE	Total
ACS014	Core	3	-	-	3	30	70	100
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 the discipline.
- II. Illustrate the concepts of machine learning and related algorithms.
- III. Understand the dimensionality problems using linear discriminants.
- IV. Study various statistical models for analyzing the data.
- V. Learn clustering algorithms for unlabeled data.

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 elimination algorithms
2. Explore on different types of learning and explore On tree based learning
3. Understand the construction process of decision trees used for classification problem
4. Understand the concept of perception and explore on forward and backward practices
5. Illustrate on kernel concept and optimal separation used in support vector machines
6. Explore on basic statistics like variance, covariance and averages
7. Understand the concepts of Gaussian and bias-variance tradeoff
8. Understand the concepts of Bayes theorem and Bayes optimal classifiers
9. Explore on Bayesian networks and approximate inference on markov models
10. Explore on Evolutionary learning techniques used in genetic algorithms
11. Illustrate the ensemble learning approaches used in bagging and boosting
12. Explain the importance of principal component analysis and its applications
13. Explore on similarity concept and different distance measures
14. Understand the outlier concept and explain about data objects
15. Understand the hierarchical algorithms and explain CART
16. Understand the partitioned algorithms and explain segmentation

<p>17. Explore on clustering large databases and explain K-means clustering algorithm</p> <p>18. Understand the clustering with categorical Attributes and comparison with other data types</p> <p>19. Understand the clustering large databases and explain clustering methods</p> <p>20. Describe clustering with categorical attributes and explain KNN.</p>		
UNIT-I	TYPES OF MACHINE LEARNING	Classes: 9
<p>Concept learning: Introduction, version spaces and the candidate elimination algorithm; Learning with trees: Constructing decision trees, CART, classification example.</p>		
UNIT-II	LINEAR DISCRIMINANTS	Classes: 9
<p>Perceptron (MLP): Going forwards, backwards, MLP in practices, deriving back; Propagation support vector Machines: Optimal separation, kernels.</p>		
UNIT-III	BASIC STATISTICS	Classes: 9
<p>Averages, variance and covariance, the Gaussian; The bias-variance tradeoff Bayesian learning: Introduction, Bayes theorem, Bayes optimal classifier, naïve Bayes classifier.</p> <p>Graphical models: Bayesian networks, approximate inference, making Bayesian networks, hidden Markov models, the forward algorithm.</p>		
UNIT-IV	EVOLUTIONARY LEARNING	Classes: 9
<p>Genetic Algorithms, genetic operators; Genetic programming; Ensemble learning: Boosting, bagging; Dimensionality reduction: Linear discriminate analysis, principal component analysis (JAX-RPC).</p>		
UNIT-V	CLUSTERING	Classes: 9
<p>Similarity and distance measures, outliers, hierarchical methods, partitional algorithms, clustering large databases, clustering with categorical attributes, comparison</p>		
Text Books:		
<ol style="list-style-type: none"> 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:		
<ol style="list-style-type: none"> 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:		
<ol style="list-style-type: none"> 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:		
<ol style="list-style-type: none"> 1. http://www.acadmix.com/eBooks_Download 2. http://www.ibm.com 		