

**III Year II Semester**

**L T P C**

**Code: 20CS6733**

**4 0 0 4**

**DATA WAREHOUSING AND MINING (Minors)**

**Course Objectives:**

After this course completion, students will be enabled to

1. Understand basic concepts in data ware housing and data mining.
2. They will learn how to analyze the data, identify the problems, and choose the relevant models and algorithms to apply.
3. They will further be able to assess the strengths and weaknesses of various methods and algorithms and to analyze their behavior.

**Course Outcomes:**

1. Understand basic concepts in Data Warehouse and data mining.
2. Understand the need and importance of preprocessing techniques
3. Analyze Classification algorithms
4. Analyze and evaluate performance of algorithms for Association Rules.
5. Analyze Clustering algorithms

**UNIT I:**

**Introduction to Data Mining & Data Warehouse:** What is data mining, motivating challenges, origins of data mining, data mining tasks, Types of Data-attributes and measurements, types of data sets, Data Quality, basic concepts of Data Warehousing, Modelling, Data Cube and OLAP, Data Warehouse implementation, indexing of OLAP data, efficient processing of OLAP operations.

**UNIT II:**

**Data pre-processing, Measures of Similarity and Dissimilarity:** Basics, similarity and dissimilarity between simple attributes, dissimilarities between data objects, similarities between data objects, and examples of proximity measures: similarity measures for binary data, Jaccard coefficient, Cosine similarity, Extended Jaccard coefficient, Correlation, Exploring Data: Data Set, Summary Statistics.

**UNIT III:**

**Classification:** Basic Concepts, General approach to solving a classification problem, Decision Tree induction: working of decision tree, building a decision tree, methods for expressing attribute test conditions, measures for selecting the best split, Algorithm for decision tree induction. Model over fitting: Due to presence of noise, due to lack of representation samples, evaluating the performance of classifier: holdout method, random sub sampling, cross-validation, bootstrap.

**UNIT IV:**

**Association Analysis:** Problem Definition, Frequent Item-set generation- The Apriori principle, Frequent Item set generation in the Apriori algorithm, candidate generation and pruning, support counting (eluding support counting using a Hash tree), Rule generation, compact representation of frequent item sets, FP-Growth Algorithms.

**UNIT V:**

**Clustering:** Overview- types of clustering, Basic K-means, K —means —additional issues, Bisecting k-means, k-means and different types of clusters, strengths and weaknesses, k-means as an optimization problem. Agglomerative Hierarchical clustering, basic agglomerative hierarchical clustering algorithm, and specific techniques, DBSCAN: Traditional density: centre-based approach, strengths and weaknesses.

**Text Books:**

1. Introduction to Data Mining: Pang-Ningtan, Michael Steinbach, Vipin Kumar, Pearson
2. Data Mining, Concepts and Techniques, 3/e, Jiawei Han, Micheline Kamber, Elsevier

**Reference Books:**

1. Introduction to Data Mining with Case Studies 2<sup>nd</sup>: GK Gupta ; PHI.
2. Data Mining: Introductory and Advanced Topics: Dunham, Sridhar, Pearson
3. Data Warehousing, Data Mining & OLAP, Alex Berson, Stephen J Smith, TMH
4. Data Mining Theory and Practice, Soman, Diwakar, Ajay, PHI, 2006.