

FACULTY OF COMPUTER APPLICATIONS
BCA

- **Subject Code** : 05BC0510
- **Subject** : Data Mining
- **Course Objectives** :
 1. Introduce students to fundamental data mining concepts, techniques, and their relationship to knowledge discovery in databases.
 2. Develop proficiency in classification methodologies including statistical, distance-based, decision tree, neural network, and rule-based approaches.
 3. Build competency in clustering techniques and association rule mining for pattern discovery in large datasets.
 4. Explore specialized mining approaches for rich data types including text, spatial-temporal data, and graphs/networks.
 5. Analyze real-world applications of data mining in sentiment analysis, misinformation detection, information propagation, and team productivity.
- **Prerequisites** : Basic concepts of databases and statistics

Unit No	Topics Covered	No of lectures required
1	Introduction Basic data mining tasks, Data mining versus knowledge discovery in databases, Data mining issues, Data mining metrics, Social implications, Data mining from database perspective Related concepts Database / OLAP systems, Fuzzy sets and fuzzy logic, Information retrieval, DSS, Dimensional modeling, Data warehousing, OLAP, Web search engines, Statistics, Machine learning, Pattern matching	8
2	Data mining techniques Introduction, A statistical perspective, Similarity measures, Decision trees, Neural networks, Genetic algorithms	6
3	Classification Introduction, Statistical based algorithms, Distance based algorithms, Decision tree based algorithms, Neural network based algorithms, Rules based algorithms, Combining techniques	10

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4	<p>Clustering Introduction, Similarity and distance measures, Outliers, Hierarchical algorithms, Partitional algorithms, Clustering large databases, clustering with categorical attributes</p> <p>Association rules Introduction, Large itemsets, Basic algorithms, Parallel and distributed algorithms, Comparing approaches, Incremental rules, Advanced association rule techniques, Measuring the quality of rules</p>	10
5	<p>Mining rich data types Mining text data, Spatial-temporal data, Graph and networks</p> <p>Data mining applications Data mining for sentiment and opinion, Truth discovery and misinformation identification, Information and disease propagation, Productivity and team science</p>	6

Course Outcomes :

1. Differentiate between various data mining tasks and select appropriate techniques based on problem requirements and data characteristics.
2. Apply classification algorithms to categorize data and evaluate their performance using appropriate metrics.
3. Implement clustering methods to discover natural groupings in data and extract meaningful association rules from transactional databases.
4. Adapt data mining approaches to handle complex data types including text, spatial-temporal information, and network structures.
5. Design data mining solutions for practical applications in areas such as opinion mining, misinformation detection, and information diffusion analysis.

Course Outcomes – Program Outcomes Mapping Table :

	P01	P02	P03	P04	P05	P06	P07	P08	PS01	PS02	PS03
C01	L	H	M		L	M	M	M	M		M
C02		H	M			M	M	H	M		L
C03		H	M			M	M	H	H		M
C04	L	H	H	L		H	M	H	H		H
C05	L	H	H	L	L	H	M	H	H		H

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BCA**Text Book :**

1. Data Mining : Introductory and Advanced Topics, Margaret Dunham, Pearson Education, 1st Edition
2. Data Mining : Concepts and Techniques, Jiawei Han, Micheline Kamber, Jian Pei, Morgan Kaufmann, Fourth edition

Reference Books :

1. Data Mining : Practical Machine Learning Tools and Techniques, Ian H. Witten, Eibe Frank, Mark A. Hall, Morgan Kaufmann, Third edition
2. Data Mining : The Textbook, Charu C. Aggarwal, Springer, First edition

Web References :

1. www.nptel.ac.in/courses/106105174
2. https://onlinecourses.swayam2.ac.in/cec20_cs12

App References :

1. Udemy
2. Unacademy

Syllabus Coverage from text /reference book & web/app reference:

Unit #	Chapter Numbers
1	Book 1 : 1, 2
2	Book 1 : 3
3	Book 1 : 4
4	Book 1 : 5,6
5	Book 2 : 12