

M.Sc. Computer Science Syllabus First Year (2018-23)

Data Mining and Data Warehousing

Semester II

Subject Code: MS21803

Lectures: 60

Objectives:

The syllabus aims in equipping students with,

- To understand principles behind data analytics.
- To explore and adapt data mining techniques.
- To provide hands on various analytical tools.

Unit 1: Introduction to Data Mining and Data Warehousing

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Ch 1. Introduction to Data Mining

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- Basic Data Mining Tasks
- DM versus Knowledge Discovery in Databases
- Data Mining Issues
- Data Mining Metrics
- Social Implications of Data Mining
- Overview of Applications of Data Mining

Ch 2. Introduction to Data Warehousing

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- Architecture of DW
- OLAP and Data Cubes
- Dimensional Data Modeling-star, snowflake schemas
- Data Preprocessing – Need, Data Cleaning, Data Integration & Transformation, Data Reduction
- Machine Learning
- Pattern Matching

BOS Members :

Dr. Reena Bharati (Subject Expert)

RB

Dr. Manisha Bharambe (Subject Expert)

MB

Manisha

Dr. Jyoti Yadav (Subject Expert)

Jyoti

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Mr. Vishal Salke (Industry Expert)

Ms. Amruta Nambiar (Alumni)

Alka

Prof. Ashwini Kulkarni (Chairman)

Shubhangi
Alka

Prof. Shubhangi Jagtap (Internal Faculty)

Prof. Alka Kalhapure (Internal Faculty)



Ch 3. Association Rule Mining

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- Frequent item-sets and Association rule mining: Apriori algorithm, Use of sampling for frequent item-set, FP tree algorithm
- Graph Mining: Frequent sub-graph mining, Tree mining, Sequence Mining

Ch 4. Classification & Prediction

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- Linear regression
- Non-linear regression
- Decision tree learning:
 - Construction, performance, attribute selection
 - Issues: Over-fitting, tree pruning methods, missing values, continuous classes
 - Classification and Regression Trees (CART)
- Bayesian Classification:
 - Bayes Theorem, Naïve Bayes classifier

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Ch 5. Clustering

- k-means
- Expectation Maximization (EM) algorithm
- Hierarchical clustering, Correlation clustering

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Unit 3:Text Mining and Web Mining

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Ch 6. Accuracy Measures

- Precision, recall, F-measure, confusion matrix, cross-validation, bootstrap

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Ch 7. Text mining

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- Precision, recall, F-Score
- Document selection problem, document ranking problem
- Text Mining Approaches
- Text Mining Applications

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Ch 8. Web Mining

3

- Web usage mining
- Web content mining
- Page Rank Algorithm

Ch 9. Brief overview of advanced techniques

- Active learning
- Reinforcement learning

*Contact hours – 12 hours

Reference Books:

1. Han, Elsevier, *Data Mining: Concepts and Techniques*, ISBN:9789380931913/ 9788131205358
2. Margaret H. Dunham, S. Sridhar, *Data Mining – Introductory and Advanced Topics*, Pearson Education
3. G. K. Gupta, *Data Mining with Case Studies*, Publisher: Prentice-Hall of India Pvt.Ltd, 2nd edition, ISBN13 9788120343269.
4. Tom Mitchell, —*Machine Learning*, McGraw-Hill, 1997

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