

**Subject Code:**  
**01ME0722**

**Subject Name: Data Mining and Analysis**

**B.Tech. IV Year-(Sem-VII) Mechanical Engineering**

**Type of course: Programme core**

**Prerequisite:** Basic of Manufacturing Processes

**Rationale:** The course is prepared to provide the detailed understating of Data Mining and Analysis

**Teaching and Examination Scheme:**

Teaching Scheme( Hours)			Credits	Evaluation Scheme					Total Marks
Theory	Tutorial	Practical		Theory Marks			Practical Marks		
				ESE (E)	IA	CSE	Viva (V)	Term Work (TW)	
4	0	2	5	50	30	20	25	25	150

**Course Outcome**

Students will be able to

1. Understand the basic concept of Data Mining
2. Application of Data mining in production planning and control
3. Application of Data mining in manufacturing Processes
4. Analyzing data mining in PPC and manufacturing processes
5. Evaluate data mining in PPC and manufacturing processes

**Course Contents:**

Sr no	Contents	Weightage	Duration
1	<b>Introduction to Data Mining</b> Introduction to Big Data and Data Science type, type of data , Current Landscape of perspective, Machine learning algorithm, Data Mining tools	10%	4
2	<b>Data Mining in Engineering Design</b> Basic concept of engineering design, Data Mining in selection of components, product specification, assembly data product cost etc, Knowledge acquitting in design from the data obtained through observing design activities using CAD system, Data Mining in feedback from life cycle data, Data Mining in Product Development.	25%	10

3	<b>Data Mining in Manufacturing Processes</b> Data collection methods, Reliability of data, Association of process parameter and product quality, Application of machine learning algorithm	25%	10
4	<b>Data Mining in Production Planning and Control</b> Data mining in effective utilization of resources, Data mining in cell manufacturing, Data mining in scheduling, Data mining in layout generation	25%	10
5	<b>Data mining in Maintenance</b> Data acquisition for Maintenance, Data mining for forecasting components inventory, Data mining for Predictive, Autonomous, Preventive and Breakdown maintenance	15%	8

**Distribution of Theory Marks**

Remembrance	Understanding	Application	Analyze	Evaluate
15	20	25	25	15

**Reference Books:**

1. Data mining for design and manufacturing methods and application by Dan Braha
2. Data Mining in Manufacturing: A Review by J.A. Harding
3. Sim, S. K., and Chan, Y. W., 1992, "A Knowledge-Based Expert System for Rolling-Element Bearing Selection in Mechanical Engineering Design," *Artif. Intell. Eng.*
4. Chao, K. M., Guenov, M., Hills, B., Smith, P., Buxton, I., and Tsai, C. F., 1997, "An Expert System to Generate Associativity Data for Layout Design," *Artif. Intell. Eng.*, 11, pp. 191–196.
5. Apte, C., Weiss, S., and Grout, G., 1993, "Predicting Defects in Disk Drive Manufacturing: A Case Study in High Dimensional Classification," *IEEE Annual Computer Science Conference on Artificial Intelligence in Application*, Los Alamitos, pp. 212–218.
6. Batanov, D., Nagarur, N., and Nitikhumkasem, P., 1993, "Expert—MM: A Knowledge Based System for Maintenance Management," *Artif. Intell. Eng.*, 8, pp. 283–291.
7. Jiawei Han, Micheline Kamber and Jian Pei. *Data Mining: Concepts and Techniques*, Third Edition. ISBN 0123814790. 2011.

**List of Experiments:**

1. Case study on application of data mining in casting industry
2. Case study on application of data mining in fabrication industry
3. Case study on application of data mining in machining industry
4. Case study on application of data mining in forming industry
5. Case study on application of data mining in quality control
6. Case study on application of data mining in production planning
7. Case study on application of data mining in maintenance

**List of Open Source Software/learning website:**

1. [nptel.ac.in](http://nptel.ac.in)
2. <https://www.iitk.ac.in/ee/data-mining-lab>