



## COURSE OUTLINE

INSTITUTION                      **University of Management & Technology, Lahore**  
PROGRAM (S) TO BE        **BS Computer Science**  
EVALUATED

### Course Description:

Course Code	<b>CS458</b>
Course Title	<b>Data Mining</b>
Credit Hours	3
Prerequisites by Course(s) and Topics	Linear Algebra, Probability and statistics, Database, Analysis of algorithm, and data structures.
Assessment Instruments with Weights (homework, quizzes, midterms, final, programming assignments, lab work, etc.)	HW 10 % Quiz's 10 % Midterm 30 % Project 10 % Final Term 40 %
Course Moderator	
URL (if any)	
Textbook (or Laboratory Manual for Laboratory Courses)	Data Mining: Concepts and Techniques (The Morgan Kaufmann Series in Data Management Systems) 3rd Edition
Reference Material	
Course Goals/Objectives	<input type="checkbox"/> To introduce students to basic applications, concepts, and techniques of data mining. <input type="checkbox"/> To develop skills for using recent data mining software (eg. R) to solve practical problems in a variety of disciplines. <input type="checkbox"/> To gain experience doing independent study and research.

### Course Learning Outcomes (CLOs):

	CLOs	Description	Domain & BT Level *
	CLO 1	<b>Evaluate</b> and implement a wide range of emerging and newly-adopted methodologies and technologies to facilitate the knowledge discovery.	Cognitive, Two (C2)
	CLO 2	<b>Assess</b> raw input data, and process it to provide suitable input for a range of data mining algorithms.	Cognitive, Two (C2)

	CLO 3	<b>Discover</b> and measure interesting patterns from different kind of databases.	Cognitive, Four (C4)
	CLO 4	<b>Evaluate</b> and select appropriate data-mining algorithms and apply, and interpret and report the output.	Cognitive, Four (C4)
	CLO 5	<b>Design and implement</b> data mining applications, using sample, realistic datasets and modern tools.	Cognitive, Four (C4)
* BT= Bloom's Taxonomy, C=Cognitive domain, P=Psychomotor domain, A= Affective domain			

**Mapping of CLOs to Program Learning Outcomes (PLOs):**

CLOs/PLOs	CLO 1	CLO 2	CLO 3	CLO 4	CLO 5
PLO 1: Academic Education					
PLO 2: Knowledge for Solving Computing Problems					
PLO 3: Problem Analysis	✓				
PLO 4: Design and Development of Solutions		✓		✓	✓
PLO 5: Modern Tool Usage			✓	✓	✓
PLO 6: Individual and Teamwork					
PLO 7: Communication					
PLO 8: Computing Professionalism and Society					
PLO 9: Ethics					
PLO 10: Life Long Learning					

<b>Tentative Lecture Plan</b>				
	Week	Topics Covered	Assignments /Quizzes	CLOs
	1	Introduction, what pattern can be mined, what technologies are used, applications, and major issues. Data objects and attribute types.		
	2	Basic statistical descriptions of data.	HW 1	CLO 1
	3	Data visualization, measuring data similarity and dissimilarity, and data preprocessing.	Quiz 1	CLO 1
	4	Mining Frequent Patterns, Associations, and Correlations: Basic Concepts and Methods		

	5	Advanced Pattern Mining		
	6	Classification: Basic Concepts	HW 2	CLO 2
	7	Rule-Based Classification	Quiz 2	CLO 2
	8	<b>Mid Term Exam</b>		
	9	Classification: Advanced Methods		
	10	Classification Using Frequent Patterns, SVM	HW 3	CLO 3
	11	Cluster Analysis: Basic Concepts and Methods	Quiz 3	CLO 3
	12	Evaluation of Clustering		
	13	Advanced Cluster Analysis	HW 4	CLO 4
	14	Outlier Detection	Quiz 4	CLO 4
	15	Data Mining Trends and Research Frontiers	Project	CLO5
	16	<b>Final exam</b>		

Laboratory Projects/Experiments Done in the Course	Assignments and Project			
Programming Assignments Done in the Course	1-2 programming assignment			
Class Time Spent on (in credit hours)	3 hours per week			
Oral and Written Communications				

\*-Tentative **Mapping of CLOs to Direct Assessments**

CLO	Quiz-1	Quiz-2	Quiz-3	Quiz-4	HW-1	HW-2	HW-3	HW-4	Project	Midterm	Final
1	✓				✓					✓	✓
2		✓				✓		✓		✓	✓
3			✓				✓				✓
4				✓							✓
5									✓		✓

Instructor Name: Arslan Anjum

Instructor Signature \_\_\_\_\_