



## Course Specifications

<b>Course Title:</b>	Data Mining
<b>Course Code:</b>	CS 475
<b>Program:</b>	Computer Science
<b>Department:</b>	Computer Science
<b>College:</b>	CCIS
<b>Institution:</b>	MAJMAAH UNIVERSITY



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## A. Course Identification

<b>1. Credit hours:</b> (3, 1, 0)
<b>2. Course type</b>
a. University <input checked="" type="checkbox"/> College <input type="checkbox"/> Department <input type="checkbox"/> Others <input type="checkbox"/>
b. Required <input checked="" type="checkbox"/> Elective <input type="checkbox"/>
<b>3. Level/year at which this course is offered:</b> 9
<b>4. Pre-requisites for this course (if any):</b> Knowledge of Statistics, Linear Algebra
<b>5. Co-requisites for this course (if any):</b>

## 6. Mode of Instruction (mark all that apply)

No	Mode of Instruction	Contact Hours	Percentage
1	Traditional classroom	44	100%
2	Blended		
3	E-learning		
4	Distance learning		
5	Other		

## 7. Contact Hours (based on academic semester)

No	Activity	Contact Hours
1	Lecture	33
2	Laboratory/Studio	11
3	Tutorial	
4	Others (specify)	
	<b>Total</b>	44

## B. Course Objectives and Learning Outcomes

### 1. Course Description

This course will introduce data mining and statistical methods for extracting knowledge from data. The principles and theories of data mining methods will be discussed and will be related to the issues in applying data mining to real world problems. Data Mining studies algorithms and computational paradigms that allow computers to find patterns and regularities in databases, perform prediction and forecasting, and generally improve their performance through interaction with data. It is currently regarded as the key element of a more general process called Knowledge Discovery that deals with extracting useful knowledge from raw data. The knowledge discovery process includes data selection, cleaning, coding, using different statistical and machine learning techniques, and visualization of the generated structures. Important related technologies, as data warehousing and on-line analytical processing (OLAP) will be also discussed. This course will utilize data mining techniques on real time data, and best practices as it examines the topics of data preprocessing, data modeling, and discovering knowledge from the data. In this course, Weka and Rapid Miner tools will be used to mine the data.

### 2. Course Main Objective

The course will provide an overview of understanding data and how to identify the right data mining techniques and formulate data mining tasks in order to solve problems using the data



aided by data mining techniques. The topics of the course will include the key tasks of data mining, including data preparation and visualization, concept description, exploration and discovery, statistical methods, association rule mining, classification and Prediction. Through the exploration of the concepts and techniques of data mining and practical exercises, students will develop skills and hands on experience using data mining software that can be applied to data challenges.

### 3. Course Learning Outcomes

CLOs		Aligned PLOs
<b>1</b>	<b>Knowledge and Understanding</b>	
1.1	Understand and apply the basic concepts and techniques of Data Mining	K1
1.2	Understand the steps involved in knowledge Discovery in databases to mine the data	K1
1.3		
1...		
<b>2</b>	<b>Skills :</b>	
2.1	To gain experience of doing independent study/research	S2
2.2	Able to distinguish between various data mining techniques and perform relevant tasks on various kinds of data	S2
2.3	Able to use data mining software for solving practical problems	S4
<b>3</b>	<b>Values:</b>	
3.1		
3.2		
3.3		
3...		

### C. Course Content

No	List of Topics	Contact Hours
1	Introduction to Data Mining, Examples and Applications in Real life, Stages in Data Mining	4
2	Data Collection, Sampling and Preprocessing-Types of Data Sources,	4
3	Statistical Analysis, Missing Values, Outlier Detection and Treatment, Standardizing Data, Categorization	4
4	Sampling, Types of Data Elements, Visual Data Exploration and Exploratory	4
5	Predictive Analytics-Linear Regression, Logistic Regression, Decision Trees,	4
6	Multiclass Classification Techniques, Evaluating Predictive Models	4
7	Neural Networks, Support Vector Machines, Ensemble Methods,	4
8	Descriptive Analytics-Association Rules, Sequence Rules, Segmentation	4
9	Social Network Analytics-Social Network Definitions, Social Network Metrics,	4
10	Probabilistic Relational Neighbor Classifier	4
11	Social Network Learning, Relational Neighbor Classifier,	4
<b>Total</b>		<b>44</b>



## D. Teaching and Assessment

### 1. Alignment of Course Learning Outcomes with Teaching Strategies and Assessment Methods

Code	Course Learning Outcomes	Teaching Strategies	Assessment Methods
1.0	<b>Knowledge and Understanding</b>		
1.1	Understand and apply the basic concepts and techniques of Data Mining	Classroom Teaching	Quiz, Assignment, Mid Exam, Final Exam
1.2	Understand the steps involved in knowledge Discovery in databases to mine the data	Classroom Teaching	Quiz, Assignment, Mid Exam, Final Exam
...			
2.0	<b>Skills</b>		
2.1	To gain experience of doing independent study/research	Classroom Teaching	Assignment, Final Exam, Lab Based Exercises
2.2	Able to distinguish between various data mining techniques and perform relevant tasks on various kinds of data	Classroom Teaching	Assignment, Final Exam, Lab Based exercises
2.3	Able to use data mining software for solving practical problems	Classroom Teaching	Assignment, Final Exam, Lab Based exercises
3.0	<b>Values</b>		
3.1			
3.2			
...			

### 2. Assessment Tasks for Students

#	Assessment task*	Week Due	Percentage of Total Assessment Score
1	Quizzes	4, 8	10%
2	Mid Term Exam	6	20%
3	Assignment	3, 5, 9	10%
4	Lab Based Exercises	Weekly	
5	Final Exam	12	40%
6			
7			
8			

\*Assessment task (i.e., written test, oral test, oral presentation, group project, essay, etc.)

## E. Student Academic Counseling and Support

**Arrangements for availability of faculty and teaching staff for individual student consultations and academic advice :**

- Each student is allotted to an academic advisor for guidance and counselling
- Available for a minimum of 4 hours per week/course, as communicated to the students.
- Student also contacts through social networking websites / D2L/ Email for advice and consultations



## F. Learning Resources and Facilities

### 1. Learning Resources

<b>Required Textbooks</b>	Pang-Ning Tan, Michael Steinbach, Vipin Kumar, Introduction to Data Mining, 2nd Edition. Pearson, 2018
<b>Essential References Materials</b>	J. Han and M. Kamber (2012) Data mining: concepts and techniques. 3rd Edition Morgan Kaufman.
<b>Electronic Materials</b>	
<b>Other Learning Materials</b>	

### 2. Facilities Required

Item	Resources
<b>Accommodation</b> (Classrooms, laboratories, demonstration rooms/labs, etc.)	Classroom, PC Laboratory
<b>Technology Resources</b> (AV, data show, Smart Board, software, etc.)	PC or Laptop with Windows/Linux, Smart Board, Projector
<b>Other Resources</b> (Specify, e.g. if specific laboratory equipment is required, list requirements or attach a list)	

## G. Course Quality Evaluation

Evaluation Areas/Issues	Evaluators	Evaluation Methods
Final Exam Answer Scripts Verification	Peer faculty members	Review
Course Learning Outcomes Feedback	Students	Survey
Final Exam evaluation	Students	Survey

**Evaluation areas** (e.g., Effectiveness of teaching and assessment, Extent of achievement of course learning outcomes, Quality of learning resources, etc.)

**Evaluators** (Students, Faculty, Program Leaders, Peer Reviewer, Others (specify))

**Assessment Methods** (Direct, Indirect)

## H. Specification Approval Data

<b>Council / Committee</b>	
<b>Reference No.</b>	
<b>Date</b>	