1.	Course title	Data Mining
2.	Course number	1905222
3.	Credit hours (theory, practical)	3
	Contact hours (theory, practical)	3
4.	Prerequisites/corequisites	Database Management Systems (1902224).
5.	Program title	AI Program
6.	Year of study and semester (s)	Fall, 2022-2023
7.	Final Qualification	-
8.	Other department (s) involved in teaching the course	-
9.	Language of Instruction	English
10.	Date of production/revision	Oct 18, 2022
11.	Required/ Elective	Required

12. Course Coordinator:

Prof. Ibrahim Aljarah
Office numbers: KASIT – AI Dept.
Office hours:
  Monday: 11:30 – 12:30

  Sunday, Tuesday: 11:30 – 12:30

13. Other instructors:

Prof. Mohammed Bial Alzoubi

Dr. Ali Alrodan

14. Course Description:

This course is an introductory course on data mining. It introduces the basic concepts, principles, methods, implementation techniques, and applications of data mining, with a focus on three major data mining functions: (1) pattern discovery and (2) Classification and (3) cluster analysis. It also gives an

introduction to data warehousing and data acquisition and pre-processing, dimensionality reduction and outlier detection.

15. Course aims and outcomes:

A- Aims:

1. Understanding the different type of data and how to process them.

2. Provide students with knowledge about Pattern Mining.

3. Explain the basic principles and understand the strengths, weaknesses and applicability of Data Mining algorithms for solving massive datasets.

4. Explain different Cluster analysis techniques.

B- Intended Learning Outcomes (ILOs): Upon successful completion of this course students will be able to ...

A. Knowledge and Understanding:
    A1) fundamental concepts of pattern discovery and association rule mining.
    A2) The basic concepts of clustering and classification.
    A3) Understand how to mine massive datasets.
    A4) Understand the Data characteristics and Data processing

B. Subject Specific Skills:
    B1) Distinguish between supervised and unsupervised learning.
    B2) Distinguish between different clustering techniques.
    B3) Distinguish between different types of classification algorithms

C. Cognitive and Intellectual Skills:
    C1) Create and build classification model.
    C2) Implement program to discover patterns in large datasets.

D. Transferable Skills:
    N/A

16. Topic Outline and Schedule:

Topic	Week	ILOs	ABET SOs	TLA (Teaching, Learning and Assessment)
Introduction to Data Mining: - Definition, Objectives.	1	A4 B1	1,2	Teaching: Lecturing/Discussion Learning: Reading material (Chapter 1, 2, and 3)

Topic	Week			Teaching/Learning/Assessment
- Data Processing, and Data cleaning.				Assessment: Exams, and Quizzes
Data warehousing and OLAP	2	A4	2	Teaching: Lecturing/Discussion Learning: Reading material (Chapter 4) Assessment: Exams, and Quizzes
Mining Frequent Patterns - Introduction to Itemset Mining, - Apriori Algorithm, - FP-Growth Algorithm	3-5	A1	2,6	Teaching: Lecturing/Discussion Learning: Reading material (Chapter 6, 7) Assessment: Exams, and Quizzes
Classification algorithms - Basic Concepts and Rule Techniques, - Decision Tree - Naïve Bayes - Artificial Neural networks, - k-Nearest Neighbors (KNN) - Support vector machine (SVM) - Ensemble Learning and Data Imbalance.	6-10	A2, B1-B3 C1	2,6	Teaching: Lecturing/Discussion Learning: Reading material (Chapter 8, 9) Assessment: Exams, and Assignments
Cluster Analysis - Introduction to un-supervised learning - Agglomerative Hierarchical Clustering, - k-means, - The DBSCAN Algorithm. - CUR and BFR algorithms for massive datasets	11-13	A2-A3 B1-B2 C2	2,6	Teaching: Lecturing/Discussion Learning: Reading material (Chapter 10) Assessment: Exams, and Assignments
Dimensionality Reduction - Principal Component Analysis, - Singular Value Decomposition	14	A3 C2	2,6	Teaching: Lecturing/Discussion Learning: External handouts Assessment: Exams, and Quizzes
Outlier Detection	15	A4	2	Teaching: Lecturing/Discussion Learning: Reading material (Chapter 12) Assessment: Exams, and Quizzes
Final Exam	16	-		

(Please mention instructors per topic if the course topics are being taught by more than one instructor)

17. Evaluation Methods and Course Requirements (Optional):

Opportunities to demonstrate achievement of the ILOs are provided through the following <u>assessment methods and requirements</u>:

- **Homework and assignments**
- **Exams**

18. Course Policies:

A- Attendance policies:

1. **Deliberate abstention from attending this class and any other similar acts will lead to student deprivation from the course according to the UJ regulations.**

B- Absences from exams and handing in assignments on time:

1. **If you miss the midterm, then a makeup exam will not be provided unless you submit a valid absence excuse, within three days from the midterm to your lecturer. This excuse, if medical, must be signed and stamped from the UJ hospital in order to be valid. If your lecturer accepts the excuse then you will be able to take the midterm makeup.**
2. **You need to follow up the departmental announcements regarding the makeup date and time.**
3. **Please note that the lecturer may either accept or reject your excuse based on UJ regulations.**

C- Health and safety procedures:

All students are expected to adhere to UJ official safety regulations per COVID-19, including but not limited to:

1. **Wearing your mask PROPERLY all the time while you are in class**
2. **Keeping a distance, no less than 1.5 meters from your instructor and colleagues.**
3. **If you feel any COVID-related symptoms, you should not come to class, and contact your instructor promptly via the Teams platform.**

D- Honesty policy regarding cheating, plagiarism, misbehavior:

All students in this course must read and comply with the University policies on plagiarism and academic honesty

E- Grading policy + Weighting (i.e. weight assigned to exams as well as other student work)

Mid Exam: 30 points
Assignments and quizzes: 20 points
Final Exam: 50 points

F- Available university services that support achievement in the course:

Lab and Library

G- Statement on Students with disabilities

Students with Disabilities: Students with disabilities who need special accommodations for this class are encouraged to meet with the instructor and/or their academic advisor as soon as possible. In order to receive accommodations for academic work in this course, students must inform the course instructor and/or their academic advisor, preferably in a written format, about their needs no later than the 4th week of classes.

19. Required equipment:

R Tools, or MATLAB, or Python

20. References:

A-   Required book (s), assigned reading and audio-visuals:

Data Mining Concepts and techniques, By Jiawei Han, Micheline Kamber and Jian Pei, Elseiver, 3rd ED, 2012.

B-   Recommended books, materials, and media:

Mining of Massive Datasets 3rd Edition, by Jure Leskovec, Anand Rajaraman, Jeffrey David Ullman, 2020.

21. Additional information:

Date: **23/02/2022**

Name of Course Coordinator: **Mohammad Azzeh**   Signature: **Mohammad Azzeh**

Head of curriculum committee/Department: ------------------------ Signature: --------------

Head of Department: ------------------------ Signature: --------------------------------

Head of curriculum committee/Faculty: ------------------------ Signature: ---------------------

Dean: --- -Signature: --------------------------------

Copy to:

Head of Department

Assistant Dean for Quality Assurance

Course File