جامعة الزيتونــة الأردنيــة
Al-Zaytoonah University of Jordan
كلية العلوم وتكنولوجيا المعلومات
Faculty of Science and IT

" عراقة وجودة"
"Tradition and Quality"

QF01/0408-4.0E	**Course Plan for Bachelor program - Study Plan Development and Updating Procedures/ Artificial Intelligence Department**

Study plan No.	**2024/2025**			University Specialization		Data Science & Artificial Intelligence
Course No.	0135323			Course name		Data Mining
Credit Hours	**3**			Prerequisite Co-requisite		Introduction into Data Science
Course type	☐ MANDATORY UNIVERSITY REQUIREMENT	☐ UNIVERSITY ELECTIVE REQUIREMENTS	☐ FACULTY MANDATORY REQUIREMENT	☐ Support course family requirements	☐ Mandatory requirements	Elective requirements
Teaching style	☐ Full online learning		☐ Blended learning		Traditional learning	
Teaching model	☐ 2Synchronous: 1asynchronous		☐ 1 face to face : 1synchronous		3 Traditional	

Faculty member and study divisions information (to be filled in each semester by the subject instructor)

Name	Academic rank	Office No.	Phone No.	E-mail
Bilal Hawashin	Associate professor			b.hawashin@zuj.edu.jo

Division number	Time	Place	Number of students	Teaching style	Approved model
1					

Brief description

In this course, the students will understand the main concepts of data mining including the supervised and unsupervised learning. The students will also apply the data mining techniques for processing, filtering, classifying, clustering, and forecasting data as well as evaluate and interpret the results of the created data mining models.
This course provides the following topics:
Introduction to Data Mining, Classification, Clustering, Association Rule Discovery, Anomaly Detection, Data Selection, Data Preprocessing, Data Transformation, Similarity, Cosine Similarity, KNN, Hyperparameter Tunning, K-Means clustering, Hierarchical Clustering, Apriori, Text Mining, Image Mining, Time Series Mining, Collaborative Filtering, Big Data, Advanced Data Mining Topics.

Learning resources

Course book information (Title, author, date of issue, publisher ... etc)	Data Mining, Concepts and Techniques, Jiawei Han, Jian Pie, and Hanghang Tong, 4th edition, 2022.
Supportive learning resources (Books, databases, periodicals,	1- Data Analytics Made Accessible. Anil Mahishwari, 2020. Ian Witten, Eibe Frank, Mark Hall, and Christopher Pal. Data Mining:

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software, applications, others)	Practical Machine Learning Tools and Techniques. Morgan Kaufmann. 2016.					
Supporting websites						
The physical environment for teaching	Class room	☐	labs	☐ Virtual educational platform	☐	Others
Necessary equipment and software						
Supporting people with special needs						
For technical support						

Course learning outcomes (S = *Skills, C= Competences K= Knowledge,*)

No.	Course learning outcomes	The associated program learning output code
Knowledge		
K1	To have a good comprehension of the Classification, Clustering, and association rule discovery.	**MK2**
K2	To be acquainted with several concepts in data mining	MK2
Skills		
S1	To be able to categorize each scenario to DM or Non DM task.	**MS1**
S2	To be able to use WEKA to solve data mining problems.	**MS1, MS2**
S3	To be able to compute cosine similarity, Euclidian distance between vectors	**MS1**
S4	To be able to select features based on TF.IDF method	**MS1**
S5	To be able to compute manually the results of certain data mining algorithms such as decision tree, ANN, KNN, K-Means, and Apriori.	**MS1, MS2**
Competences		
C1	To be able to use data mining methods to solve real-life problems.	**MC1, MC2**
Transferable		

Mechanisms for direct evaluation of learning outcomes

Type of assessment / learning style	Fully electronic learning	Blended learning	Traditional Learning (Theory Learning)	Traditional Learning (Practical Learning)
First exam	0	**0**	%20	0
Second / midterm exam	%30	**%30**	%20	30%
Participation + Project-Based Learning	%30	**20% + 10%**	0	0
final exam	%40	**40%**	%50	40%

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Note: Asynchronous interactive activities are activities, tasks, projects, assignments, research, studies, projects, work within student groups ... etc, which the student carries out on his own, through the virtual platform without a direct encounter with the subject teacher.

Schedule of simultaneous / face-to-face encounters and their topics

Week	First Lecture (F2F)	Second Lecture (activity)	ILOs	PLOs	JNQF Descriptors*
1	Data Mining Types	Activity: Reading material on Data Mining Types	ILO1-k, ILO3-S	MK2, MS1	K, S
2	Data Selection, Data Preprocessing, Data Transformation	Activity: HW1	ILO6-s, ILO7-S	MS1, MS2	S
3	Cosine Similarity, KNN, KNN python with hyperparameter optimization	Activity: Quiz1	ILO5-S, ILO6-S, ILO7-S	MS1, MS2	S
4	KMeans and Hierarchial Clustering	Activity: Video on KMeans and Hierarchial Clustering	ILO7-S	MS1, MS2	S
5	Text Mining case study in python	Activity: Exercise on Text Mining case study in python	ILO2-k, ILO4-S	MK2, MS1, MS2	K, S
6	Image Mining case study in python	Activity: Exercise on Image Mining case study in python	ILO2-k	MK2	S
7	Association Rule Discovery, Apriori	Activity: HW2	ILO7-S	MS1, MS2	S
Midterm Exam (30%)					
9	Data Visualization	Activity: Video on Data	ILO7-S	MS1	S

		Visualization			
10	Time Series Mining + Case Study in Python	Activity: Quiz2	ILO7-S	MS1, MS2	S
11	Recommender Systems	Activity: Reading material on Recommender Systems	ILO2-k	MK2	K
12	Big Data	Activity: Reading material on Big Data	ILO2-k	MK2	K
13	ANN and Deep Learning	Activity: HW 3	ILO2-k, ILO7-S	MK2, MS2	K, S
14	Advanced Topics in DM	Activity: Video on Advanced Topics in DM	ILO8-c	MC1, MC2, MS2	S, C
15	PBL	PBL	ILO8-c	MC1, MC2, MS2	S, C
16	Final Exam				

* Learning styles: Lecture, flipped learning, learning through projects, learning through problem solving, participatory learning ... etc.
** Reference: Pages in a book, database, recorded lecture, content on the e-learning platform, video, website ... etc.

Schedule of asynchronous interactive activities (in the case of e-learning and blended learning)

Week	Task / activity	Reference	Expected results
1	Activity: Reading material on Data Mining Types		Create a 1-page comparison sheet of Data Mining types (predictive/descriptive, supervised/unsupervised) with one real example each.
2	Activity: HW1		Implement HW1 requirements on a sample dataset and submit results as a clean notebook + brief interpretation of outputs.
3	Activity: Quiz1		Write 10 MCQ questions (with answers + explanations) covering

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			Quiz1 concepts and common traps.
4	Activity: Video on KMeans and Hierarchial Clustering		Implement KMeans + Hierarchical clustering on the same dataset, choose k using Elbow/Silhouette, and compare cluster quality.
5	Activity: Exercise on Text Mining case study in python		Perform a text mining pipeline in Python (cleaning → TF-IDF → clustering/classification) and report top terms per class/cluster.
6	Activity: Exercise on Image Mining case study in python		Build an image mining pipeline in Python (feature extraction → dimensionality reduction → clustering/classification) and evaluate accuracy.
7	Activity: HW2		Complete HW2 by applying two DM algorithms on one dataset and justify the best choice using metrics + error analysis.
8	Activity: Video on Data Visualization		Create 3 visualizations (distribution, correlation, and trend) from a dataset and explain insights in 5 bullet points.
9	Activity: Quiz2		Create a "mistake bank" of 10 common Quiz2 misunderstandings with the correct reasoning and mini-examples.
10	Activity: Reading material on Recommender Systems		Build a simple recommender system (user-based or item-based CF) and evaluate using Precision@K / Recall@K.
11	Activity: Reading material on Big Data		Compare big data tools (Hadoop vs Spark vs NoSQL) in a decision table and recommend the best

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			stack for 2 real scenarios.
12	Activity: HW 3		Complete HW3 by designing a full DM workflow (data prep → model → evaluation) and present results in one summary table.
13	Activity: Video on Advanced Topics in DM		Apply one advanced DM method (e.g., association rules, anomaly detection, or topic modeling) and write findings + visual evidence.
14	Project-Based Learning		Deliver a full DM project: problem → data → methodology → results → evaluation → final report + reproducible code repo.
15			
16			