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 and Artificial Intelligence	
Course No.	0135324		**Course name**	Data Visualization	
Credit Hours	**3**		**Prerequisite Co-requisite**	Fundamentals of 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**		☐ **2 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	
Dr. Dara Aqel	**Associate professor**			**d.aqel@zuj.edu.jo**	
Division number	**Time**	**Place**	**Number of students**	**Teaching style**	**Approved model**

Brief description

This course introduces students to the principles and practices of data visualization, focusing on effective design, data storytelling, and the ethical use of data. Students will explore visualization techniques, tools, and best practices to transform raw data into meaningful insights. The course emphasizes hands-on experience through projects, interactive activities, and real-world applications.

Learning resources

Course book information (Title, author, date of issue, publisher ... etc)	**1-** Kirk, Andy. Data visualization: A handbook for data driven design, 2nd edition (2019)			
Supportive learning resources (Books, databases, periodicals, software, applications, others)	Cole Nussbaumer Knaflic. Storytelling with Data: A Data Visualization Guide for Business Professionals 1st Edition (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,)*

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No.	Course learning outcomes	The associated program learning output code
	Knowledge	
K1	Understand the fundamentals of data visualization and its role in data communication	**MK2**
K2	Explain the visualization design process, including data acquisition, exploration, and representation.	**MK2**
K3	Identify best practices in color theory, composition, interactivity, and annotation for data visualization.	**MK2**
K4	Recognize different visualization types and their appropriate use cases.	**MK2**
	Skills	
S1	Create effective visualizations using tools such as Tableau, Excel, and Python (Matplotlib, Seaborn).	**MS1**
S2	Apply data transformation and preprocessing techniques to prepare datasets for visualization.	**MS1**
	Competences	
C1	Solve real-world problems using data visualization techniques.	**MC1**
C2	Apply critical thinking to assess the effectiveness and impact of different visualization techniques.	**MC2**

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)
Project based learning (PBL)	0	**10%**	%20	0
Second / midterm exam	%30	**30%**	%20	30%
Participation / practical applications/Quizzes	0	**10%**	10	30%
Asynchronous interactive activities	%30	**10%**	0	0
final exam	%40	**40%**	%50	40%

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	Subject	learning style*	Reference **
1	Introduction to Data Visualization (part 1)	Lecture	**Text book**
2	Introduction to Data Visualization (part 2)	Lecture	**Text book**
3	The Visualization Design Process	Lecture	**Text book**
4	Data Preparation and Working with Data	Lecture	**Text book**

5	Exploring Chart Types and Visual Encoding	Lecture	**Text book**
6	Interactivity in Data Visualization	learning through problem solving	**Text book**
7	Annotation and Data Storytelling	learning through problem solving	**Text book**
8	**Midterm exam + Revision**	Lecture	
9	Color Theory and Composition	Lecture	**Text book**
10	Dashboards and Real-World Applications	Lecture	**Text book**
11	Data Visualization Ethics and Accessibility	Lecture	**Text book**
12	Advanced Visualization Techniques	Lecture	**Text book**
13	Case Studies in Data Visualization	Lecture	**Text book**
14	Tools and Technologies in Data Visualization	learning through problem solving	**Text book**
15	Project based learning (PBL): Projects discussions	learning through projects	
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	Introduction to Data Visualization (part 1)		To show a good comprehension of the data visualization basic concepts
2	Introduction to Data Visualization (part 2)		To show a good comprehension of the data visualization basic concepts
3	The Visualization Design Process		To be acquainted of basics of visualization design process
4	Data Preparation and Working with Data		To be familiar with data preparation and working with data
5	Exploring Chart Types and Visual Encoding		To explore chart types and visual encoding
6	Interactivity in Data Visualization		To have a good knowledge in interactivity in data visualization
7	Annotation and Data Storytelling		To apply annotation and

			data storytelling
8	**Midterm exam + Revision**		
9	Color Theory and Composition		To show a good comprehension in color theory and composition
10	Dashboards and Real-World Applications		To implement dashboards and deal with real-world applications
11	Data Visualization Ethics and Accessibility		To have a good knowledge in data visualization ethics and accessibility
12	Advanced Visualization Techniques		To be acquainted with advanced visualization techniques
13	Case Studies in Data Visualization		To deal with case studies in data visualization
14	Tools and Technologies in Data Visualization		To apply tools and technologies in data visualization
15	Project based learning (PBL): Projects discussions		
16	**Final Exam**		