كلية الملك عبد الله الثاني
لتكنولوجيــا المعلومــان
KING ABDULLAH II SCHOOL FOR
INFORMATION TECHNOLOGY

Pre-requisite(s): None   **Course Web Site:**   http://elearning.ju.edu.jo

Course Coordinator: Dr. Omar Sultan Al-Kadi

Course Description:
Web Data visualization course focuses on studying algorithms and state-of-the-art techniques for creating effective visualizations capable of promoting data comprehension and analysis. The course discusses the key techniques and theory used in visualization, including data models, graphical perception, and visual encoding and interaction. Students will learn about the variety of existing approaches and systems in data visualization and develop skills in evaluating different visualization techniques as applied to particular tasks. The course also discusses visual representation methods, such as graph drawing, parallel coordinates, tree mapping, and encourages students to design new innovative visualizations and experiment their potentials on case studies of various data sources.

Intended Learning Outcomes (ILO):
On successfully completing the module, the students are expected to have gained good knowledge of:

No.	Course Intended Learning Outcomes (CILOs)
	Knowledge
A	Identify the importance of web data visualization and its connection with other disciplines
B	Explain the foundations and characteristics of data from a visualization perspective
C	Discuss the human component of the visualization pipeline and the roles it plays in understanding and interpreting visualizations.
D	Understand the foundations of the visualization processes, from basic building blocks to taxonomies and frameworks
E	Discuss different examples of visualization techniques, and describing the methods and algorithms used to map data to graphical depictions
F	Understand the visualization design process as well as techniques for evaluating the resulting visualizations
	Professional Skill
G	Designing and implementing a data visualization pipeline
H	Mapping data to different graphical representations
I	Using JavaScript D3 library for producing dynamic, interactive data visualizations in web browsers

Teaching and Learning Methodology:

Method	Lecture	Demo	Laboratory	Case study
Learning outcomes	A+B+C+D	D+E	G+H	F+H
Assessment	Exams + Assignment + Presentation + Research Paper			

Textbook and Materials:
- Interactive Data Visualization: Foundations, Techniques, and Applications 2nd Ed., by Matthew O. Ward, Georges Grinstein, Daniel Keim, CRC Press, 2015.
- Interactive Data Visualization for the Web, by Scott Murray, O'Reilly Media, 2013.

Course Objectives

On completion of this course, students should be able to:
- Understand the components involved in visualization design
- Understand the role of visualization in processing and analyzing data from broad range of sources
- Learn how to present information in a clear and effective manner
- Identify possible sources of bias with visualization analysis.
- Develop software and tools to create visualizations of data that are effective for analysis.
- Know how to evaluate and assess the results of different visualization techniques

Attendance and Responsibilities:

Students are responsible for class attendance and for all material covered in class. It is the students' responsibility to turn in their homework assignments to their instructors by the announced due date/time.

Class Participation:

Class participation will account for a small percentage of the grade; participation requires reading ahead the assigned material before each class session and being engaged in class discussions, and actively participating in group activities.

Tentative Schedule: *(The coverage order is subject to change as the instructor sees fit)*

Week/Date	Topics	PPT
1	Introduction	**Chapter1**
2 & 3	Data Foundations	**Chapter2**
4	Web-based visualization using D3	**Chapter 6-9 (Scott Murray)**
5	Human Perception and Information Processing	**Chapter3**
6 & 7	Visualization Foundations	**Chapter4**
8 & 9	Techniques for Spatial Data	**Chapter5**
10 & 11	Techniques for Multivariate Data	**Chapter6**
12 & 13	Techniques for Geospatial Data	**Chapter7**
14	Techniques for Trees, Graphs, and Networks	**Chapter8**
15	Comparing and Evaluating Visualization Techniques	**Chapter14**

Grading and Evaluation Criteria: 100 points distributed as follows:

Weight	Criteria	Comments
30%	Midterm Exam (Written)	TBA (in due course)
20%	Assignment/Presentations	At least two
10%	Project/Term Paper	At least one
40%	Final Exam (Written)	TBA (in due course)

Intended (Tentative) Grading Scale:

Range	LG	الحرف	Range	LG	الحرف	Range	LG	الحرف
90 - 100	A	أ	74 - 77	B-	ب-	56 - 60	D+	د+
86 - 89	A-	أ-	70 - 73	C+	ج+	50 - 55	D	د
82 - 85	B+	ب+	66 - 69	C	ج	45 - 49	D-	د-
78 - 81	B	ب	61 - 65	C-	ج-	0 - 44	F	هـ

Additional Reading

- Data Points: Visualization that means something, by Nathan Yau, Wiley, 2013.
- Visualizing Data: Exploring and Explaining Data with the Processing Environment by Ben Fry, O'Reilly Media, 2007.
- The Visual Display of Quantitative Information by Edward Tufte, 2001.
- Selected research papers will be addressed to students during the classes
- Selected websites on web data visualization will be addressed during the classes.

Regulations:

1. Every student is expected to completely adhere to the exams dates and projects strict deadlines, absolutely no exceptions will be given.

2. Maximum allowable absence 15% of number of Lectures/Semester

- الامتناع المدبر عن حضور المحاضرات أو الدروس أو عن الأعمال الاخرى التي تقضي الأنظمة بالمواظبة عليها ، وكل تحريض على هذا الامتناع سوف يؤدي الى حرمان الطالب من المادة المعنية.

- في حالة التغيب عن امتحان ال Mid Term لن يكون هناك امتحان تعويضي الا في حالة وجود عذر وحالة طارئة من المستشفى. على الطالب ابراز العذر لمدرس المادة في فتره لا تتجاوز الثلاثة ايام من تاريخ الامتحان, وللمدرس الحق في قبول او رفض العذر , وحسب التعليمات.

- **Concerns or complaints should be expressed in the first instance to the module lecturer; if no resolution is forthcoming then the issue should be brought to the attention of the module coordinator (for multiple sections) who will take the concerns to the module representative meeting. Thereafter problems are dealt with by the Department Chair and if still unresolved the Dean and then ultimately the Vice President. For the final complaints, there will be a committee to review grading the final exam.**

- **For more details on University regulations please visit http://www.ju.edu.jo/rules/index.htm**