

Detailed Course Description - Course Plan Development and Updating Procedures/ Department of Computer Science	QF01/0408-3.0E
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Faculty	Science & I.T.	Department	Computer Science
Course number	0132441	Course title	Data Visualization
Number of credit hours	3	Pre-requisite/co-requisite	Image Processing

Brief course description

This course defines the concept of data and shows how to use data in providing information. Based on existing data, the student will learn to develop a research question, describe the variables and their relationships, calculate basic statistics, and present the results clearly. By the end of the course, the student will be able to use data analysis tools and applications to manage and visualize data, including how to deal with missing data, variable groups, and graphs.

Course goals and learning outcomes	
Goal 1	Ability to use the principles of computer science in understanding, implantation and analysis of mathematical problems and finding their solutions.
Learning outcomes	1.1 Student should understand and analyze mathematical problems. 1.2 Student should be able to use mathematical concepts in data analysis and representation.
Goal 2	Ability to process digital images and use visual representation of data.
Learning outcomes	2.1 Student should be able to use digital visualization tools in data visualization and reevaluation. 2.2 Student should apply digital image technologies and digital visualization tools to produce different visual applications.
Goal 3	Using practical, scientific and communication skills to enhance team spirit and help the local community.
Learning outcomes	3.1 Student should be able to produce and apply computer applications that comply with local market needs. 3.2 Student should apply digital image technologies and digital visualization tools to present information meaningful and helpful for the local community. 3.3 Student should apply digital image technologies and digital visualization tools to present information in a form accessible to people with special needs such as people with visual and hearing impairment, learning disabilities, and autism.
Goal 4	Ability to use various methods and tools in data visualization.
Learning outcomes	4.1 Student should be able to produce different types of charts to represent data. 4.2 Student should be able to use animation tools in data visualization. 4.3 Student should relate data visualization to infographics.
Textbook	1. Stephanie Evergreen, <i>Presenting Data Effectively: Communicating Your Findings for Maximum Impact</i> , 2 nd Ed., 2017. (The textbook used in the timeline) 2. Andy Kirk, <i>Data Visualisation: A Handbook for Data Driven Design</i> , 1 st Ed., 2016.
Supplementary references	1. Tamara Munzer, <i>Visualization Analysis and Design</i> , 1 st Ed., 2014. 2. Valerie M. Sue and Matthew T. Griffin, <i>Data Visualization & Presentation With Microsoft Office</i> , 1 st Ed, 2015. 3. Scott Murray, <i>Interactive Data Visualization for the Web: An Introduction to Designing with D3</i> , 2 nd Ed., 2017. 4. Wang Shaoqiang, <i>Infographics: Designing & Visualizing Data</i> , 2017.

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Course timeline

Week	Number of hours	Course topics	Pages (textbook)	Notes
01	1 1 1	Forms of data representation: Reports, slideshows, hanouts, posters, data displays, and dashboards.	1-17	Text2: 17-60
02	1 1 1	Effective presentation of data: Pictures, method of presentation, attention and memory, and using suitable software.	18-30	Text2: 17-60
03	1 1 1	Effective use of images: Choices of images, size, location, photographs, and graphically designed images.	34-65	
04	1 1 1	Effective use of graphs: Choices of type, size, location, and format.	66-71	
05	1 1 1	Effective use of text: Choices of font, size, location, and format. Text used with graphs.	76-115	
06	1 1 1	Review of Previous Chapters First Exam (20%)		
07	1 1 1	Tools of data visualization: Graph and chart generators. Animation tools.	Practical Demo / Websites	
08	1 1 1	Effective use of color: Choices of color and color picking tools. Emphasis colors. Accounting for people with color disabilities. Colors in graphs.	120-148	Text2: 263- 292
09	1 1 1	Arrangement: Object locations. Arranging sections of reports.	154-184	
10	1 1 1	Arrangements of graph components: Proportions. Order of objects.	185-191	
11	1 1 1	Design Issues: Appearance: simple vs. informative. Expense: saving time.	195-207	Text2: 313- 334
12	1 1 1	Review of Previous Chapters Second Exam (20%)		
13	1 1 1	Relating data visualization to infographics.	195-207	Text2: 313- 334

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14	1 1 1	Presenting information to people with special needs or disabilities.	195–207	Text2: 223– 246
15	1 1 1	Class presentations of students' projects.		
16	1 1	Final Exam		

Theoretical course evaluation methods and weight	Participation = 10% First exam 20% Second exam 20% Final exam 50%	Practical (clinical) course evaluation methods	Semester students' work = 50% (Reports, research, quizzes, etc.) Final exam = 50%
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Approved by head of department		Date of approval	
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Extra information (to be updated every semester by corresponding faculty member)

Name of teacher		Office Number	
Phone number (extension)		Email	
Office hours			