



UNIVERSITI TEKNOLOGI MARA

CSC788: DATA VISUALIZATION

Course Name (English)	DATA VISUALIZATION APPROVED
Course Code	CSC788
MQF Credit	3
Course Description	This course is an introduction to key design principles and techniques for visualizing data. The aim of this course is to understand how visual representations can help in analysis and understanding of complex data. After taking this course, students should be able to critique presented visualizations and identify the design principles that were used to create them. Furthermore, the students should be able to construct and evaluate their own visualization work.
Transferable Skills	Design principles and techniques in data visualization.
Teaching Methodologies	Lectures, Discussion
CLO	CLO1 Describe the basic concepts of data visualization. CLO2 Construct the role and principles of data visualization. CLO3 Analyze different visualization techniques in case-based applications. CLO4 Propose a new innovative visualization as applied to particular tasks.
Pre-Requisite Courses	No course recommendations
Topics	
1. Introduction to data visualization 1.1) What is visualization? 1.2) History of visualization. 1.3) Relationship between visualization and other fields. 1.4) The visualization process. 1.5) The pseudocode convention. 1.6) The role of the user. 1.7) Related readings.	
2. Rules and principles of scientific data visualization 2.1) The visualization process in detail. 2.2) Semiology of graphical symbols. 2.3) The eight visual variables. 2.4) Historical perspectives. 2.5) Taxonomies. 2.6) Related Readings	
3. Data types and sources 3.1) Types of data. 3.2) Structure within and between records. 3.3) Data pre-processing. 3.4) Related readings.	
4. Visualization techniques 4.1) Human perception and information processing. 4.2) Visualization techniques for spatial data. 4.3) Visualization technique for geospatial data. 4.4) Visualization techniques for multivariate data. 4.5) Visualization techniques for trees, graphs and networks. 4.6) Text and Document Visualization	
5. Evaluation of techniques: a case study 5.1) n/a	

6. Visualization in major application areas
6.1) Research direction in visualization.

Assessment Breakdown	%
Continuous Assessment	100.00%

Details of Continuous Assessment	Assessment Type	Assessment Description	% of Total Mark	CLO
	Assignment	Assignment (20%) to assess the level of practical skill in the role and principles of data visualization	20%	CLO2
	Final Test	Final Test (30%) to assess the level of scientific skill in data visualization techniques.	30%	CLO3
	Group Project	Group Project (15%) to assess the level of practical skill in the role and principles of data visualization.	15%	CLO2
	Group Project	Group Project (15%) to assess the level of different visualization techniques in case-based applications.	15%	CLO3
	Presentation	Presentation (10%) to assess the level of the new innovative visualization as applied to particular tasks	10%	CLO4
	Quiz	Quiz (10%) to assess the level of knowledge and understanding of data visualization concepts.	10%	CLO1

Reading List	This Course does not have any book resources	
Article/Paper List	Recommended Article/Paper Resources	<ul style="list-style-type: none"> • Andy Kirk 2016, <i>Data Visualization: A Handbook for Data Driven Design</i>, 1, 347 [ISSN: 978147391] • Tsoi, K. K., Chan, F. C., Hirai, H. W., Keung, G. K., Kuo, Y. H., Tai, S., & Meng, H. M. 2018, <i>Data Visualization with IBM Watson Analytics for Global Cancer Trends Comparison from World Health Organization, International Journal of Healthcare Information Systems and Informatics (IJHISI)</i>, 13, 10
Other References	<ul style="list-style-type: none"> • Books Andy Kirk 2019, <i>Data Visualisation: A Handbook for Data Driven Design</i>, SAGE Publications Ltd, USA • Books Claus O. Wilke 2019, <i>Fundamentals of Data Visualization: A Primer on Making Informative and Compelling Figures</i>, O'Reilly Media, USA • Books Stephanie Evergreen 2019, <i>Effective Data Visualization: The Right Chart for the Right Data</i>, SAGE Publications, USA • Article Matzen, L. E., Haass, M. J., Divis, K. M., Wang, Z., & Wilson, A. T. 2018, <i>Data Visualization Saliency Model: A Tool for Evaluating Abstract Data Visualizations. IEEE Transactions on Visualization & Computer Graphics</i> • Books Cole Nussbaumer Knaflic 2019, <i>Storytelling with Data: Let's Practice!</i>, Wiley, USA 	