

## DATA C9003: Data Visualisation and Insight

### Module Details

<b>Module Code:</b>	DATA C9003
<b>Full Title:</b>	Data Visualisation and Insight <b>APPROVED</b>
<b>Valid From::</b>	Semester 1 - 2019/20 ( June 2019 )
<b>Language of Instruction:</b>	English
<b>Duration:</b>	1 Semester
<b>Credits::</b>	5
<b>Module Owner::</b>	Kevin McDaid
<b>Departments:</b>	Unknown
<b>Module Description:</b>	This module will enable the student to develop the advanced technical, critical thinking and communication skills required to explore and present data to deliver valued insights to a targeted audience within the context of a data analytics project lifecycle.

Module Learning Outcome	
On successful completion of this module the learner will be able to:	
#	Module Learning Outcome Description
MLO1	Research, identify and evaluate the key insights required to deliver value for a targeted set of stakeholders related to a data analytics project.
MLO2	Devise, implement and critique appropriate visualisation techniques for data exploration within a data analytics process.
MLO3	Devise, implement and critique appropriate data visualisation theory and techniques to communicate results and insights to stakeholders.
MLO4	Effectively present and defend the validity of key insights at the final stage of a data analytics project.
Pre-requisite learning	
<b>Module Recommendations</b> <i>This is prior learning (or a practical skill) that is strongly recommended before enrolment in this module. You may enrol in this module if you have not acquired the recommended learning but you will have considerable difficulty in passing (i.e. achieving the learning outcomes of) the module. While the prior learning is expressed as named DkIT module(s) it also allows for learning (in another module or modules) which is equivalent to the learning specified in the named module(s).</i>	
No recommendations listed	

Module Indicative Content	
<b>Data Analytics Processes</b> Review of lifecycle and processes (CRISP-DM, SEMMA). Types of problems. Role of stakeholders. Statement of problem and related business value. Case studies with guest presentations in areas such as sports analytics.	
<b>Visualisation Theory</b> Overview of visualisation including Information/data/scientific visualisations and infographics. Static, dynamic and interactive visualisations. Exploratory vs explanatory visualisation. Data types. High dimensional data. Hierarchical data. Principles of visualisation design (perception, colour, font). Data density. Data ink maximisation and graphical design. Colour theory.	
<b>Visualisation Techniques for Data Exploration and Explanation</b> Exploration of high dimensional data. Multidimensional scaling. Data preprocessing and cleaning. Exploration of outliers and missing values. Visualisation methods and technologies for structured and unstructured data types such as temporal, geospatial, network, hierarchical and text data. Charts(number and graphical), plots, maps, diagrams, cluster maps, matrices, trees and network diagrams. Simulations. Immersive data analytics. Dealing with big data. Application through appropriate programming, spreadsheet and BI technologies.	
<b>Communication</b> Reporting and presenting. Effective visualisation. Visualisation and presentation tools. Spreadsheets. Dashboards. Business Intelligence tools. Interactive visualisations. Case studies.	
Module Assessment	
Assessment Breakdown	%
Project	100.00%
Module Special Regulation	

## Assessments

Full-time			
No Course Work			
Project			
<b>Assessment Type</b>	Group Project	<b>% of Total Mark</b>	40
<b>Marks Out Of</b>	0	<b>Pass Mark</b>	0
<b>Timing</b>	S1 Week 6	<b>Learning Outcome</b>	1,3
<b>Duration in minutes</b>	0		
<b>Assessment Description</b> Working in teams the learners will identify and document a real analytics problem, describe the data requirements, characterise the stakeholders and establish a set of key insights that would deliver business value. They would then design and critically evaluate a set of potential visualisations that would effectively communicate these insights. The learners would prepare a report on their work and would present these proposed visualisations to the class group and external participants. Throughout the project each learner would keep a diary and at the end of the project would formally reflect on their work.			
<b>Assessment Type</b>	Project	<b>% of Total Mark</b>	60
<b>Marks Out Of</b>	0	<b>Pass Mark</b>	0
<b>Timing</b>	S1 Week 13	<b>Learning Outcome</b>	2,3,4
<b>Duration in minutes</b>	0		
<b>Assessment Description</b> The learner will take a data analytics problem with real data and develop, using suitable methods and technologies, a set of visualisations to communicate key insights. The learner will present and discuss their work in front of an external audience and will critically evaluate their outputs and performance through a reflective journal.			
No Practical			
No Final Examination			

Part-time			
No Course Work			
Project			
<b>Assessment Type</b>	Group Project	<b>% of Total Mark</b>	40
<b>Marks Out Of</b>	0	<b>Pass Mark</b>	0
<b>Timing</b>	S1 Week 6	<b>Learning Outcome</b>	1,3
<b>Duration in minutes</b>	0		
<b>Assessment Description</b> Working in teams the learners will identify and document a real analytics problem, describe the data requirements, characterise the stakeholders and establish a set of key insights that would deliver business value. They would then design and critically evaluate a set of potential visualisations that would effectively communicate these insights. The learners would prepare a report on their work and would present these proposed visualisations to the class group and external participants. Throughout the project each learner would keep a diary and at the end of the project would formally reflect on their work.			
<b>Assessment Type</b>	Project	<b>% of Total Mark</b>	60
<b>Marks Out Of</b>	0	<b>Pass Mark</b>	0
<b>Timing</b>	S1 Week 13	<b>Learning Outcome</b>	2,3,4
<b>Duration in minutes</b>	0		
<b>Assessment Description</b> The learner will take a data analytics problem with real data and develop, using suitable methods and technologies, a set of visualisations to communicate key insights. The learner will present and discuss their work in front of an external audience and will critically evaluate their outputs and performance through a reflective journal.			
No Practical			
No Final Examination			
Reassessment Requirement			
<b>No repeat examination</b> Reassessment of this module will be offered solely on the basis of coursework and a repeat examination will not be offered.			

DKIT reserves the right to alter the nature and timings of assessment

## Module Workload

Workload: Full-time					
Workload Type	Contact Type	Workload Description	Frequency	Average Weekly Learner Workload	Hours
Lecture	Contact	Deliver theory, principles and paradigms.	Every Week	1.00	1
Practical	Contact	In these lecture/practical classes, the delivery of new material will be integrated with the practical implementation of that material.	Every Week	2.00	2
Directed Reading	Non Contact	Guided preparation, reading & project work.	Every Week	2.00	2
Independent Study	Non Contact	Students will be expected to conduct independent review of content & research related topics. Involving both theoretical & practical aspects of content.	Every Week	3.00	3
Total Weekly Learner Workload					8.00
Total Weekly Contact Hours					3.00

Workload: Part-time					
Workload Type	Contact Type	Workload Description	Frequency	Average Weekly Learner Workload	Hours
Lecture	Contact	Deliver theory, principles and paradigms.	Every Week	1.00	1
Practical	Contact	In these lecture/practical classes, the delivery of new material will be integrated with the practical implementation of that material.	Every Week	2.00	2
Directed Reading	Non Contact	Guided preparation, reading & project work.	Every Week	2.00	2
Independent Study	Non Contact	Students will be expected to conduct independent review of content & research related topics. Involving both theoretical & practical aspects of content.	Every Week	3.00	3
Total Weekly Learner Workload					8.00
Total Weekly Contact Hours					3.00

Module Resources
<i>Recommended Book Resources</i>
<p>Kieran Healy. (2018), Data Visualization: A Practical Introduction, Princeton University Press, [ISBN: 0691181624].</p> <p>Claus O. Wilke. (2019), Fundamentals of Data Visualization: A Primer on Making Informative and Compelling Figures, O'Reilly Media, [ISBN: 1492031089].</p> <p>Hadley Wickham. (2016), ggplot2:Elegant Graphics for Data Analysis, Springer International Publishing, [ISBN: 978-3-319-242].</p> <p>Edward R. Tufte. (2001), The Visual Display of Quantitative Information, Graphics Press, [ISBN: 978-193082413].</p> <p>Julie Steele (Editor), Noah Iliinsky (Editor). (2010), Beautiful Visualization: Looking at Data through the Eyes of Experts (Theory in Practice), O'Reilly Media, [ISBN: 9781461471370].</p> <p>Cole Nussbaumer Knaflic. (2015), Storytelling with Data: A Data Visualization Guide for Business Professionals, John Wiley &amp; Sons, [ISBN: 978-111900225].</p>
<i>This module does not have any article/paper resources</i>
<i>Other Resources</i>
<p>Website, KDNuggets,  <a href="https://www.kdnuggets.com">https://www.kdnuggets.com</a></p> <p>Website, Immersive Analytics,  <a href="https://www.immersiveanalytics.com">https://www.immersiveanalytics.com</a></p>