Title:	Interactive Data Visualisation APPROVED
Long Title:	Interactive Data Visualisation
Module Code:	COMP8054
Credits:	5
NFQ Level:	Advanced
Field of Study:	Computer Science
Valid From:	Semester 1 - 2017/18 (September 2017)
Module Delivered in	1 programme(s)
Next Review Date:	November 2021
Module Coordinator:	TIM HORGAN
Module Author:	Ruairi OReilly
Module Description:	Web based data visualisation technology is a critical component of modern web applications. In this module the student will learn how to identify and apply a suitable visualisation technique for a data source. It will enable students to create visualisations of data for the web as well as the ability to incorporate interactive functionality to enhance data analysis.

Learning Outcomes	
On successful completion of this module the learner will be able to:	
LO1	Discuss data visualisation techniques and principles.
LO2	Appraise the suitability of a variety of visualisation techniques for the web.
LO3	Apply a data visualisation technique to a data source.
LO4	Evaluate the suitability of interactive functionality incorporated into a visualisation technique.
LO5	Combine suitable data visualisation techniques and data sources for web-based viewing.

Pre-requisite learning
Module Recommendations *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 CIT module(s) it also allows for learning (in another module or modules) which is equivalent to the learning specified in the named module(s).*
No recommendations listed
Incompatible Modules *These are modules which have learning outcomes that are too similar to the learning outcomes of this module. You may not earn additional credit for the same learning and therefore you may not enrol in this module if you have successfully completed any modules in the incompatible list.*
No incompatible modules listed
Co-requisite Modules
No Co-requisite modules listed
Requirements *This is prior learning (or a practical skill) that is mandatory before enrolment in this module is allowed. You may not enrol on this module if you have not acquired the learning specified in this section.*
No requirements listed
Co-requisites
No Co Requisites listed

Module Content & Assessment

Indicative Content
Introduction Data Visualisation Theory: Targeting appropriate visual elements on a page, mapping values in the data domain to visual domain, human visualisation interaction - adding computation steering to visualisations.
Visualisation Techniques Charts, Plots & Layouts - graphical representations of data: Line Charts, Area Charts, Bubble Charts, Bar Charts, Scatterplots, Scaling Data, Axes, Geomapping (GeoJSON, Paths, Projections). Layouts: Pie Layout, Stack Layout, Force Layout.
Data Interactivity Updating data, Interaction via Event Listeners, Transitions,Updating scales, Updating axes, Binding Event listeners, Grouping SVG Elements, Mouse Events, Multi touch devices, Zoom and pan behaviour, Drag behaviour.
Data practices Generating page elements, chaining methods, representing data in programming constructs, binding data, drawing with data, transition and animation support.
Technologies Web Standards, Canvas, Rendering the Box Model, CSS, Javascript, SVG, D3.js, JSON.

Assessment Breakdown	%
Course Work	50.00%
End of Module Formal Examination	50.00%

Course Work

Assessment Type	*Assessment Description*	*Outcome addressed*	*% of total*	*Assessment Date*
Essay	Describe and discuss an appropriate data visualisation technique for a specified data domain. Provide a rationale for both the visualisation technique and the interactivity features chosen.	1,2,4	20.0	Week 7
Project	Develop a suitable web-based visualisation for a chosen data source. Incorporate interactive functionality that enhances the analysis of that visualisation when viewing online.	1,2,3,4,5	30.0	Week 12

End of Module Formal Examination

Assessment Type	*Assessment Description*	*Outcome addressed*	*% of total*	*Assessment Date*
Formal Exam	End of Semester Formal Examination.	1,2,3,4,5	50.0	End-of-Semester

Reassessment Requirement
Repeat examination *Reassessment of this module will consist of a repeat examination. It is possible that there will also be a requirement to be reassessed in a coursework element.*

The institute reserves the right to alter the nature and timings of assessment

Module Workload

Workload: Full Time				
Workload Type	*Workload Description*	*Hours*	*Frequency*	*Average Weekly Learner Workload*
Lecture	Theoretical content based on indicative content.	2.0	Every Week	2.00
Lab	Practical implementation based on indicative content.	2.0	Every Week	2.00
Independent & Directed Learning (Non-contact)	Self directed study related to theory and implementation of assessed practical work.	3.0	Every Week	3.00
			Total Hours	7.00
			Total Weekly Learner Workload	7.00
			Total Weekly Contact Hours	4.00

Workload: Part Time				
Workload Type	*Workload Description*	*Hours*	*Frequency*	*Average Weekly Learner Workload*
Independent & Directed Learning (Non-contact)	Self directed study related to theory and implementation of assessed practical work.	3.0	Every Week	3.00
Lecture	Theoretical content based on indicative content.	2.0	Every Week	2.00
Lab	Practical implementation based on indicative content.	2.0	Every Week	2.00
			Total Hours	7.00
			Total Weekly Learner Workload	7.00
			Total Weekly Contact Hours	4.00

Module Resources

Recommended Book Resources

- **Scott Murray 2013, *Interactive Data Visualization for the Web*, Packt Publishing [ISBN: 9781449339739]**

Supplementary Book Resources

- **Nick Qi Zhu 2013, *Data Visualization with D3.js Cookbook*, Packt Publishing [ISBN: 9781782162162]**
- **Ben Fry 2007, *Exploring and Explaining Data with the Processing Environment*, O'Reilly Media [ISBN: 9780596514556]**

This module does not have any article/paper resources

Other Resources

- **Website: *The Visual Display of Quantitative Information***
  https://www.edwardtufte.com/tufte/books_vdqi

Module Delivered in

Programme Code	Programme	Semester	Delivery
CR_KWEBD_8	Bachelor of Science (Honours) in Web Development	7	Mandatory