VISU: Data Visualisation

Module Title:	Data Visualisation
Language of Instruction:	English

Credits:	5

NFQ Level:	8

Module Delivered In	5 programme(s)

Teaching & Learning Strategies:	Teaching and learning will take place in the laboratory setting, hands on.

Module Aim:	The aim of this module is to enable students to gain insight and practical skills for creating interactive web visualisations, Apps and dashboard powered by R. Additionally, students will be familiarised with the current trends and practices in data visualisation.

Learning Outcomes	
On successful completion of this module the learner should be able to:	
LO1	Apply and critically evaluate current trends and practices in data visualisation to produce informative, engaging and repeatable interctive web application
LO2	Apply selected and adequate open source methods and tools/ packages to produce interactive web application /graphic for data analysis

Pre-requisite learning
Module Recommendations *This is prior learning (or a practical skill) that is recommended before enrolment in this module.*
No recommendations listed
Incompatible Modules *These are modules which have learning outcomes that are too similar to the learning outcomes of this module.*
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.*
No requirements listed

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Module Content & Assessment

Indicative Content
Visualisation as a phase within the data science workflow Data Science Workflow (Grolemund & Wickham); Visualisation - concepts, definitions, current trends ect.
Introduction to R & RStudio (IDE) environments RStudio: scripts, workflow, packages: ggplot,plotly, tidyverse (dplyr,readr, purrr,forcats,stringr), plots tab: Graphs export, 3D graphs
The Grammar of Graphics The layered grammar of graphic by Hadley Wickham; concepts, definitions, components and layers
Producing the basic visualisations The key packages: ggplot(), plot_ly (), plotly.js(), ggplotly(), functions and arguments
Working with colours RColorBrewer (Colorbrewer palettes),viridis (viridis color scales), wesanderson (Wes Anderson color palettes), ggsci (scientific journal color palettes); ggplot2 (grey color palettes), R base color palettes: rainbow, heat.colors, cm.colors
3D charts 3D charts: Markers, Paths, Lines, Axes, Surfaes
Publishing views Saving and embedding HTML; Exporting static images,Editing views for publishing; Combining multiple views, Linking multiple views,
Creating simple dashboard flexdashboard library; layout, components (htmlwidgets), Sizing, Storyboards,
Key HTML Widgets rbookeh - an interface to Bookeh a framework for creating web-based plots; Leaflet library to create dynamic maps, dygraphs for charting time-series; Highcharter - rich R interface to the Highcharts JavaScript graphic library, visNetwork - an interface to the network visualisation capabilities of the vis.js library
Creating interactive dashboard Introducing Shiny package, and shiny components to enable reactivity;Input Sidebar, Shiny Modules
Creating first Shiny app Basic UI, Basic reactivity, Workfow, Layout, themes, HTML,
Shiny in action User feedback, Uploads and downloads, Dynamic UI, Bookmarking, Tidy evaluation
Mastering reactivity why reactivity, The reactive graph, Reactive building blocks, Escaping the graph
Best practices General guidelines, Functions, Shiny modules, Packages, Testing, Security, Performance

Assessment Breakdown	%
Continuous Assessment	100.00%

Continuous Assessment

Assessment Type	*Assessment Description*	*Outcome addressed*	*% of total*	*Assessment Date*
Project	Students are asked to apply the theory and the practical skills acquired throughout the class as well as explore any other neccessary materials to create interactive visualisation of their choice. Additionally, students will be asked to prepare presentation related to the produced visualisation.	1,2	100.00	Week 11

No Project

No Practical

No End of Module Formal Examination

SETU Carlow Campus reserves the right to alter the nature and timings of assessment

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Module Workload

Workload: Full Time		
Workload Type	*Frequency*	*Average Weekly Learner Workload*
Lecture	12 Weeks per Stage	3.00
Independent Learning	15 Weeks per Stage	5.93
	Total Hours	125.00

Module Delivered In

Programme Code	Programme	Semester	Delivery
CW_KCCGD_B	Bachelor of Science (Honours) in Computer Games Development	8	Group Elective 1
CW_KCIAD_B	Bachelor of Science (Honours) in Computing in Interactive Digital Art and Design	8	Elective
CW_KCCYB_B	Bachelor of Science (Honours) in Cyber Crime and IT Security	8	Elective
CW_KCCIT_B	Bachelor of Science (Honours) in Information Technology Management	8	Group Elective 1
CW_KCSOF_B	Bachelor of Science (Honours) in Software Development	8	Group Elective 1