

## Module specification

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Module Code	COM664
Module Title	Data Analysis and Visualisation
Level	6
Credit value	20
Faculty	FACE
HECoS Code	100755
Cost Code	GACP

## Programmes in which module to be offered

Programme title	Is the module core or option for this programme
BSc (Hons) Computer Science	Core
BSc (Hons) Computer Science with Industrial Placement	Core
Stand-alone module aligned to BSc (Hons) Computer Science for QA and assessment	Option

## Pre-requisites

None

## Breakdown of module hours

Learning and teaching hours	12 hrs
Placement tutor support	0 hrs
Supervised learning e.g. practical classes, workshops	12 hrs
Project supervision (level 6 projects and dissertation modules only)	0 hrs
<b>Total active learning and teaching hours</b>	<b>24 hrs</b>
Placement / work based learning	0 hrs
Guided independent study	176 hrs
<b>Module duration (total hours)</b>	<b>200 hrs</b>

For office use only	
Initial approval date	08/11/2023
With effect from date	Sept 2026



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Date and details of revision	
Version number	1

## Module aims

This module aims to explore the concepts of collecting, analysing and visualising data and to create data analysts who can identify patterns and display information from data of several sources. Student will explore various statistical methods and algorithms for data analysis. Students will be able to discover, analyse, visualise, and present data in a meaningful way that will harness the power of data for new insights as well as evaluate the legal, social and ethical impact of data analysis and its applications. Students will gain practical skills using commercially available industry standard software to apply data analysis and visualisation techniques to real world data analytical problems.

**Module Learning Outcomes** - at the end of this module, students will be able to:

1	Analyse statistical techniques and algorithms within the context of data science.
2	Apply and execute various exploratory data analysis techniques.
3	Synthesise and evaluate analytical theories and methods.
4	Create visual representations and mapping spatial data using various tools and techniques.

## Assessment

Indicative Assessment Tasks:

*This section outlines the type of assessment task the student will be expected to complete as part of the module. More details will be made available in the relevant academic year module handbook.*

The assignments will be designed to analyse real-world problems and will require students to apply their knowledge of exploratory data analysis techniques to identify patterns and display information from the data using visualisation representation.

Students will submit a series of brief written parts of the portfolio throughout the semester. The final part of the assessment will allow students to demonstrate their ability to critically evaluate their work by creating visually impactful outputs from their data. Overall, the assessments will focus on the output results they can draw from their data and their practical visualisation skills.

Assessment number	Learning Outcomes to be met	Type of assessment	Weighting (%)
1	1,2,3,4	Portfolio	100%

## Derogations

None



## Learning and Teaching Strategies

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In line with the Active Learning Framework, this module will be blended digitally with both a VLE and online community. Content will be available for students to access synchronously and asynchronously and may indicatively include first and third-party tutorials and videos, supporting files, online activities any additional content that supports their learning.

As this module progresses, the strategies will change to best support a diverse learning environment. For each week, a topic will be started with tutor-led demonstrations, and practical-based sessions will be given to ensure that the students get to practice what they have been taught in relevant concepts. Sessions will be intertwined between instructional explanation and practical depending on the specific indicated syllabus necessities.

## Indicative Syllabus Outline

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*This list is indicative*

- Data Analytics
- Exploratory Data Analysis
- Data Visualisation Tools and Techniques
  - Principles of effective data visualization
  - Types of visualizations: bar charts, line plots, scatter plots
  - Colour theory and design considerations
- Advanced Data Visualization
  - Geographic data visualization and mapping
  - Network visualization
  - Time series visualization
- Text, Sentiment Analysis and Visualisation
- Statistical Analysis Techniques
  - Descriptive statistics: measures of central tendency and variability
  - Inferential statistics: hypothesis testing, confidence intervals
  - Correlation and regression analysis

## Indicative Bibliography:

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Please note the essential reads and other indicative reading are subject to annual review and update.

### Essential Reads

J. Morrow, *Be Data Analytical: How to Use Analytics to Turn Data into Value*. Kogan Page. 2023.

### Other indicative reading

L. Comber, *Geographical Data Science and Spatial Data Analysis: An Introduction in R (Spatial Analytics and GIS)*. Kindle. 2020.

J.P. Isson, *Unstructured Data Analytics - How to Improve Customer Acquisition, Customer Retention, and Fraud Detection and Prevention*. CENGAGE Learning. 2018.

S. Sedkaoui, *Data Analytics and Big Data*. Wiley. 2018.

Journals (available electronically through the library. ACM Digital Library. IEEE Xplore)