Module Proforma

UNIVERSITY OF WESTMINSTER

Module full title: Data Visualisation and Dashboarding	
SITS Module Code: 7BUIS009W	
Credit level: Masters Level	**Length:** Semester
UK credit value: 20	**ECTS credit value:** 10
College: Design, Creative and Digital Industries	**School:** Computer Science and Engineering
Host programme of study: PMBIS02F (MSc Business Intelligence and Analytics FT)	
Progression and assessment board: COMENG - All Subjects - PG PAB	
Pre-requisites: None	**Co-requisites:** None
Study abroad: No	
Special features: This module is also franchised to IIT Sri Lanka as 7BUIS009C Data Visualisation and Dashboarding (IIT Sri Lanka).	
Access restrictions: None	
Are the module learning outcomes delivered, assessed or supported through an arrangement with organisation(s) other than the University of Westminster: No	
Summary of module content This module covers the theoretical and practical aspects of data visualisation including graphical perception, dynamic dashboard visualisations, and static data 'infographics'. Tools used include R and Tableau. The module prepares students for becoming data visualisation specialists.	

Module aims

This module will cover (a) the importance of data visualisation and making sense of data; (b) the tools and techniques of data visualisations; (c) the application of tools such as R and Tableau, for data visualisation; (d) tools appropriate for Dashboarding.

The general aims of the module are to:

- provide students with good theoretical and practical foundations in data visualisation;
- provide practical experience in using appropriate software packages, such as Tableau and R;
- prepare students for a career of data visualisation, data scientist and data analyst.

Assessment Methods

Rank	Assessment type	Assessment name	Weighting	Minimum mark required	Qualifying set (where the minimum mark required applies across multiple assessments)
	In-Class Test/Assignment exam conditions	In-Class Test	30	40	Set
	Coursework	Coursework Report	70	40	Set

Synoptic assessment

n/a

Learning outcomes

At the end of this course, students should be able to:

L01: discuss and critically apply the basic principles to data visualisation techniques;

L02: select and justify appropriate tools for data visualisation and Dashboarding;

L03: evaluate critically data visualisation using appropriate software tools;

L04: use a design process to build interactive Dashboards;

L05: synthesise the application of raw data into meaningful visualisation results and justify the appropriate techniques.

Indicative syllabus content

Data visualisation:

- History and growth of data visualisation in recent years and its importance in making data storytelling.
- Describing the theoretical foundations of data visualisation based on real life examples including epidemiology studies, published financial accounts and demographic statistics.
- Discuss geospatial data visualisations such as maps and network graphs.
- Describe the data visualisation process and techniques for making sense of raw data.

Graphical perception and Interactivity in visualisations:

- Human-computer interaction design concepts, colour theory, brushing and linking, use of graphical perception theory such as Gestalt principles in the creation of dynamic user-driven data products.

Visualisation and Graphics with appropriate software tools:

- Introduction to software tools for data visualisation including R and Tableau.
- Familiarise with the software platforms to enable: reading, preparation and visualisation of data.
- In the case of R, learn to use various R packages such as ggplot2 with examples.

Dashboard design process:

- User requirements capture, exploratory data analysis, applied graphical perception with visual encodings, creating visually appealing static visualisations and dashboards through use of proportion and colour.

Maps and Network Graphs:

- Geospatial data concepts such as projections and geocoding data, thematic map representations and graph drawing techniques.

Real life case studies using tools such as R and Tableau:

- We will practice and discuss some real-life case studies and examples of data visualisations. This will cover different areas from raw datasets to making sense of them using tools such as R and Tableau.

Teaching and learning methods

The module will be taught using a combination of lectures, supervised computer laboratory/workshops. Lectures are a composition of online asynchronous content and synchronous live sessions with a tutor. Asynchronous content, that will typically be a pre-recorded presentation, will be followed by the timetabled synchronous online session. The asynchronous content shall be released several days before the live synchronous online session and it is expected that students will view this material in advance. The synchronous live sessions allow for further exploration and discussion of the topic. Tutorial sessions shall take place on campus and be face-to-face unless circumstances dictate otherwise.

Lectures will be used to introduce the various concepts, principles, methods, and techniques of the module's topics. With the teaching of each data visualisation and dashboard technique, tool and design process emphasis will be placed on discussing and appreciating the limitations of such methods. During the supervised computer laboratory (practical/workshop) sessions students will have the chance to work in smaller groups, revisiting material covered during lectures, to practice topics covered using appropriate exercises and/or to use software tools to apply the methodological concepts learnt during the lecture into a real world application using an appropriate software package.

Usually the supported laboratory/workshop sessions will be complemented by self-directed study material and exercises that will enhance further students understanding and which will also enable them to revisit material at their own speed. Overall, students are also expected to spend some time on unsupervised work in the computer laboratories and in private study.

Activity type	Category	Student learning and teaching hours *
Lecture	Scheduled	
Seminar	Scheduled	
Tutorial	Scheduled	
Project supervisor	Scheduled	
Demonstration	Scheduled	
Practical classes and workshops	Scheduled	16
Supervised time in studio/workshop	Scheduled	4
Fieldwork	Scheduled	
External visits	Scheduled	
Work based learning	Scheduled	
Scheduled online learning	Scheduled	16
Other learning	Scheduled	
Total scheduled		36
Placement	Placement	
Independent study	Independent	164
Total student learning and teaching hours		200

* hours per activity type are indicative and subject to change

Assessment rationale: Why has this assessment been used for this module?

The module will be assessed by a two-hour closed-book in-class test and a substantial piece of coursework.

The two-hour closed-book in-class test will be used as a summative and time constrained form of assessment that will assess students' retention, understanding, insight of theoretical issues along with their critical and integrated understanding of the techniques taught, their application and their limitations(Learning outcomes: L01, L02, L05).

It is stipulated that the coursework will allow students to enhance further their abilities to manipulate data, think critically, evaluate graphical outputs, explain the use of a coherent design process, engage in research and communicate their findings effectively in written form. Finally, the module will also allow students to develop further their time management and academic report writing skills(Learning outcomes: L01, L03, L04, L05).

The following table summarises which learning outcomes each of the assessment instruments will assess:

Assessment Instrument	Assessed Learning Outcomes
In-Class Test	L01, L02, L05
Coursework	L01, L03, L04, L05

Assessment criteria: What criteria will be used to assess my work on this module?

To achieve a passmark, students will need to demonstrate a basic understanding of the theoretical concepts and some evidence of ability to apply them to problems/data but with limited understanding of the strengths and weaknesses of data visualisation approaches.

For a mark of 60% and higher, students need to demonstrate an insight of the theoretical concepts and they should be in a position to produce a wider and more innovative variety of coherent arguments related to data analysis, model development, and interpretation of results.

For a mark of 70% and higher, students should produce high quality, innovative analysis, and data visualisation with a refined understanding of the use of theoretical approaches and how this must be balanced against user requirements and software tool limitations.

The exact assessment criteria that will apply to each assessment will be stated in the assessment specification which will also be available on Blackboard.