Cardiff Metropolitan University | Prifysgol Metropolitan Caerdydd

School of Technologies

Assessment Brief

Module Code	Module Title
CIS6008	Analytics and Business Intelligence
Academic Year	**Semester**
2025	2

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Content

Assessment Details 2
Submission Details 3
Assessment Criteria 4
Further Information 6
Who can answer questions about my assessment? 6
- Referencing 6
- Submission problems 6
- Unfair academic practice 7
- How is my work graded? 7

Assessment Details

Assessment title	Abr.	Weighting
Application of statistical and geospatial business analytics tools, techniques and methodologies to generate business intelligence essential for informed decision making in **Higher Education Sector** improvement and development in Sri Lanka.	WRIT1	80%

Pass marks are 40% for undergraduate work and 50% for postgraduate work unless stated otherwise.

Task/assessment brief:

Purpose:

This assignment is to assess student's ability to perform business analysis using Statistical and Geographic Information Systems(GIS) related tools, techniques and methodologies to find out applicable and useful intelligence for informed decision making in private and government sector institutions in the island and different parts of the countries in the world. The relevant higher level administrative officials of the those institutions can use GIS to generate maximum efficiency and benefits on informed business decision making while eliminating discrimination, ambiguity and uncertainty.

Tasks Introduction

Understand the given tasks based on **Sri Lanka Higher Education Sector**, using associated non-geospatial and geospatial data models found in Data Science domain. Apply relevant tools, techniques and methodologies found in business analytics relevant to the module scope and conduct analysis on different subject matters with the support of source data provided in shape files (.shp), raster files(.asc),comma separated (.csv),text and excel file formats. The data analysis and visual demonstration required to be done using standard software tools recommended for the module (R, R-studio, R-commander, QGIS, PostgreSQL and Google Earth etc.).

Tasks:

1 – **Report (100 Marks)**

The student required to do the following data analysis and visualizations based on datasets provided with this assignment using R, R-Studio, R-commander, QGIS, PostgreSQL, GOOGLE EARTH and other related supportive tools. All required datasets have been included within the "Data Sets" folder as separate subfolders per each question.

a) **Ministry** of **Higher Education (**MOHE) is working on various research studies to uncover new strategies to overcome ineffiencies in the higher education secter with the aid of local and global research data. It is very important to achieve improvements and developments of the country's higher education sector service quality improvements with the aid of strategic planning, informed decisions making and lessons learnt in the past. A dataset named University Quality Ranking (**UQR.**csv) and its data dictionary have been provided for you to uncover possible associations available between **University Ranking Score** and other related factors included in the dataset with the aid of suitable, most appropriate statistical and business analytics tools such as R, R-studio and R-commander.

As per the findings you are required to develop precise **statistical models** supported by graphical representations for supporting informed decision making. Your analysis should be followed by critical discussions of the findings relating to Sri Lanka's Higher Eucation Sector. **(30 Marks)**

b) Develop a Sri Lanka map that visualizes information of Sri Lanka Schools in Table 2.2: Adminstrative Structure of Education by District in Annual Scholl Sensus of Sri Lanka published by the Department of Census and Statistics.(provided as *School_Census_Report_2022.pdf*). The map should visualize information such as Administrative District Name, Number of National Schools and Provincial Schools retrieved via the newly created **.csv** file **SL_Schools-2025**. The new **.csv** file should contain only the aforesaid information. The map should be classified by the number of Total Schools. The map processing should be done using the provided vector data set with a suitable base map. The scenario exhibited by the map should be critically described with the support of all available resources. **(20 Marks)**

c) Develop a digitized informative area map with suitable information about **Ministry of Higher Education**(MOHE) support digitization with QGIS open-layer plugins/Google Earth/Google Maps. It is mandatory to do the image geo-referencing before initiation of the digitization. Every vector layer attribute table should contain suitable data in columns id, name, type, and size. By analyzing the map, discuss critically how does MOHE geo-location contributes to improve effecient and effective service to the National Education System of the country. (For map development Use coordinates reference system as EPSG:5234). **(10 Marks)**

d) Develop a Sri Lanka map contains 18 Universities belongs to the Ministry of Higher Education (MOHE) Sri Lanka. The map should visualize the information such as Location Label, District Name, Geo Location (Latitude and Longitude). The exact GPS locations information should be retrieved via Google Earth with the support of a KML/KMZ file.

Develop a **Postgres SQL Geospatial Database** named **SL_Uni_2025** and store all above associated data ,vector files and raster files in it.The required data for QGIS spatial analysis should be retrieved via the database created.

A comprehensive critical discussion with recommendations should be included about aforesaid Univerities contribution to the national higher education sector service improvements by considering their geo location, services and contribution to the economic developement in the Island and whether or not expected objectives as a country have been ahieved so far. Supported authorized information can be found from https://www.mohe.gov.lk the official web presence of MOHE.

(20 Marks)

e) Develop a map with the support of provided data set in order to find out the most suitable land for newly establishing Sri Lanka's first ever ***Research and Development Center for Space Sciences***. The research center should be located in an area **1 Km** away from the Ananda Primary School and **2 Km** away from Sri Gunananda Vidyalaya. The ideal location should be selected considering nature of the soil in the land use area and no land should be selected that has already been used for traditional export crops. The map should be followed by a critical discussion of the feasibility of the decision of establishing the aforesaid Research Center in the identified area. The discussion should be followed by the following supportive information as well.

- Geo spatially identification of the entire area shown in the map.
- Total number of buildings situated within the suitability area at present.
- Total land area occupied by the buildings within the suitability area.
- Total suitable and available land area for the construction.

(20 Marks)

Word count (or equivalent): 3200

This a reflection of the effort required for the assessment. Word counts will normally include source code, any text, tables, calculations, figures, subtitles and citations. Reference lists and contents of appendices are excluded from the word count. Contents of appendices are also considered as evidences of work when determining your final assessment grade.

Academic or technical terms explained:

ABI – Analytics and Business Intelligence
GIS – Geographical Information Systems
GPS- Global Positioninig System
GCP-Groung Controlling Points
MOHE- Ministry of Higher Education

Demonstrate –Apply knowledge subject knowledge gained in business analytics tools,techniques and methods for real worl problem solving or opportunity improving
Evaluate –; Using statistical and geo spatial processing and analysing data make and defend judgements based on internal evidence or external criteria
Explore – Findout latest tools,techniques and methods found in the field of data science / Business analytics for providing more precise and quality result for durable,effieint and effective decision making.
BA- Business Analytics dione through statistical tools, techniques and methods
BI-Busiess Intelligence generated trough BA this encompases narrative descriptions, Graphs and Formula's
Describe- Demonstrate an understanding of the facts based on previousely learned information in BA module
Hypothesis: Null and alternative hypothesis written for supporting research questions for statitistical
Use - Apply BA knowledge to actual situations to generate new knowledge
Exaplain- Demonstrate an understanding of the facts based on the BA and the scenario.

Analyse – Break down data into simpler parts and find evidence to support generalizations.
Discuss - Demonstrate an understanding of the facts f the facts based on the BA and the scenario.along with suitable real world examples.
Justify - Make and defend judgments based on internal evidence through findings of the statistical analysis
Conclude- Make and defend judgments based on internal evidence through findings of the statistical analysis

Submission Details

Submission Deadline:	This will be provided on the Moodle submission point.	**Estimated Feedback Return Date**	This will normally be 20 working days after initial submission.
Submission Time:	By 2.00pm on the deadline day.		

Moodle/Turnitin:

Any assessments submitted after the deadline will not be marked and will be recorded as a non-attempt unless you have had an extension request agreed or have approved mitigating circumstances. See the School Moodle pages for more information on extensions and mitigating circumstances.

File Format:

The assessment must be submitted as a pdf document (save the document as a pdf in your software) and submit through the Turnitin submission point in Moodle.

Your assessment should be titled with your:

student ID number, module code and assessment ID,
e.g. st12345678 CSE5013 WRIT1

Feedback

Feedback for the assessment will be provided electronically via Moodle. Feedback will be provided with comments on your strengths and the areas which you can improve. View the guidance on how to access your feedback.

All marks are provisional and are subject to quality assurance processes and confirmation at the programme Examination Board.

Assessment Criteria

Learning outcomes assessed

- Demonstrate understanding of the leading technologies relating to business intelligence, data analysis, predictive and other analytical technologies (e.g. geospatial, social), and be able to apply them appropriately in real world scenarios.
- Demonstrate understanding of and application of specialist technologies used to harvest, analyses and visualize business data in an intelligent way.
- Critically evaluate, design, prototype and implement business intelligence from data harvesting, processing visualizations to business analysis and storytelling.
- Explore the latest visualization techniques, business-IT project governance and related industry certifications.

Learning Outcomes covered from the course work.
LO2, LO3, LO4

a) LO2, LO3
c) LO2, LO3, LO4
d) LO2, LO3, LO4
e) LO2, LO3, LO4

Other skills/attributes developed

This includes elements of the Cardiff Met EDGE (Ethical, Digital, Global and Entrepreneurial skills) and other attributes developed in students through the completion of the module and assessment. These will also be highlighted in the module guidance, which should be read by all students completing the module. Assessments are not just a way of auditing student knowledge. They are a process which provides additional learning and development through the preparation for and completion of the assessment.

ETHICAL	Understanding the importance of adhering to the formal ethical practices when different sources data is extracted ,processed and dissiminate.This is achieved via university ethical guidelines and procedures.
DIGITAL	Making use of vector and raster data models for geo spatial analysis and processing. Surveyed datasets for statistical signification process.
GLOBAL	Usage of Surveyed data generated in variouse parts of the world for statistical and geo spatial analysis and processing.Localizing findings based on globally collected and analysed data.
ENTREPRENEURIAL	Involvement of business analytics and business intelleigence; motivate stiudents to inintate their own organizations for providing various services for corporate and individual customers.

Guidelines for the report format

- Paper A4
- Margins 1.5” left, 1” right, top and bottom
- Page numbers – bottom, right
- Line spacing 1.5
- Font
- Headings 14pt, Bold
- Normal 12pt
- Font face- Times New Roman
- Referencing and in-text citation should be done strictly using Harvard Referencing System.

Guidelines for the practical work

Students are strictly required to submit created all data and scripts files (Ex: .CSV, R, PostgreSQL), Database backups and include screenshots showing important and major steps of the practical work related to each task in separate appendixes. Ex: Appendix A for Task a, Appendix B for Task b etc. All Supportive materials should be labeled as per the task name. DO NOT submit the dataset provided for your practical work.

Marking/Assessment Criteria

Task	Poor	Satisfactory	Good	Very Good	Excellent

	< 40	40 - 49	50-59	60 -69	70 -100
Task a 30 marks	No or Very poor reporting and statistical testing has been done based on subject matter. **Ordinary** discussion included based on the findings. No citations or referencing included	Basic reporting with hypothesis based **normality and correlation** testing has been done for the subject matter while selecting most suitable variables. full scale of regression analysis **(simple linear and multiple linear)** has been done for the subject matter. **Basic** discussion included based on the findings. Citations and referencing included but contains some erros	Good reporting with hypothesis based **normality and correlation** testing has been done for the subject matter while selecting most suitable variables. Scatterplot graphical simulation has been supported with the findings. Basic discussion included based on the findings. full scale of regression analysis**(simple linear and multiple linear)** has been done for the subject matter. Scatter plot graphical simulation has been supported with the findings. Precise statistical model(s) has been developed. **Good** discussion included based on the findings.	Very good reporting with hypothesis based **normality and correlation** testing has been done for the subject matter while selecting most suitable variables. Scatterplot graphical simulation has been supported with the findings. Basic discussion included based on the findings. A full scale of regression analysis**(simple linear and multiple linear)** has been done for the subject matter. Scatter plot graphical simulation has been supported with the findings. Precise statistical model(s) has been developed. **Very good** discussion included based on the findings. Proper citations and referencing included.	Excellent reporting with full scale of hypothesis based **normality and correlation** tests have been done for the subject matter. Scatter plot graphical simulations have been supported with the findings. Excellent critical discussion included based on the findings. full scale of regression analysis**(simple linear and multiple linear)** has been done for the subject matter. Scatter plot graphical simulation has been supported with the findings. Precise statistical model(s) has been developed. **Excellent** discussion included based on the findings. Proper citations and referencing included.
Task b 20 marks	No or Very poor ordinary map has been included. **Ordinary** discussion included based on the findings. No citations or referencing included	Basic map with some required information has been included. No vector data layer used for the map to visualize information clearly. The CSV file created. Suitable screen shots of the work have been included in appendix. **Basic** discussion included. Citations and referencing included but contains some erros.	Good map with all required information has been included. All standard map elements (North Arrow, Map Scale-Graphic, Map Scale-numeric, Map title, Map legends) have been included to easily read the map. A vector data layer used for the map to visualize information clearly. The CSV file created. Suitable screen shots of the work have been included in appendix. **Good** discussion included. Proper citations and referencing included.	Very good map with all required information has been included. All standard map elements (North Arrow, Map Scale-Graphic, Map Scale-numeric, Map title, Map legends) have been included to easily read the map. A vector data layer used for the map to visualize information clearly. The CSV file created. Suitable screen shots of the work have been included in appendix. **Very good** discussion included. Proper citations and referencing included.	Excellent map with all required information has been included. All standard map elements (North Arrow, Map Scale-Graphic, Map Scale-numeric, Map title, Map legends) have been included to easily read the map. A suitable base map has been included. The map has been properly captioned. Suitable screen shots of the work have been included in appendix. Excellent critical discussion included. The CSV file created. Suitable screen shots of the work have been included in appendix. **Excellent** discussion included. Proper citations and referencing included.

Task c 10 marks	No or Very poor ordinary map has been included. **Ordinary** discussion included based on the findings. No citations or referencing included	Basic map with some required digitized information has been included. Suitable screen shots of the work have been included in appendix. **Basic** discussion included. Citations and referencing included but contains some erros.	Good map with all required digitized information has been included. All standard map elements (North Arrow, Map Scale-Graphic, Map Scale-numeric, Map title, Map legends) have been included to easily read the map. The areal image has been georeferenced and then digitized. A suitable base map has been included and area found. Suitable screen shots of the work have been included in appendix. **Good** discussion included Proper citations and referencing included.	Very good map with all required digitized information has been included. All standard map elements (North Arrow, Map Scale-Graphic, Map Scale-numeric, Map title, Map legends) have been included to easily read the map. The areal image has been georeferenced and then digitized. A suitable base map has been included. Suitable screen shots of the work have been included in appendix. **Very good** discussion included. Proper citations and referencing included.	Excellent map with all required digitized information has been included. All standard map elements (North Arrow, Map Scale-Graphic, Map Scale-numeric, Map title, Map legends) have been included to easily read the map. The areal image has been georeferenced and then digitized. A suitable base map has been included. The map has been properly captioned. Suitable screen shots of the work have been included in appendix. **Excellent critical** discussion included. Proper citations and referencing included.
Task d 20 Marks	No or Very poor ordinary map has been included. **Ordinary** discussion included based on the findings. No citations or referencing included	Basic map with some required information has been included. A Geo spatial database has been developed using PostgreSQL spatial DBMS and populated with required data. Suitable screen shots of the work have been included in appendix. **Basic** discussion included. Citations and referencing included but contains some erros.	Good map with all required information has been included. All standard map elements (North Arrow, Map Scale-Graphic, Map Scale-numeric, Map title, Map legends) have been included to easily read the map. A suitable base map has been included. KML/KMZ file(s) included using Google Earth. A **Geo spatial database** has been developed using PostgreSQL spatial DBMS and populated with required data. Suitable screen shots of the work have been included in appendix. **Good** discussion included. Proper citations and referencing included.	Very good map with all required information has been included. All standard map elements (North Arrow, Map Scale-Graphic, Map Scale-numeric, Map title, Map legends) have been included to easily read the map. A suitable base map has been included. KML/KMZ file(s) included using Google Earth. A **Geo spatial database** has been developed using PostgreSQL spatial DBMS and populated with required data. Suitable screen shots of the work have been included in appendix. **Very good** discussion included. Proper citations and referencing included.	Excellent map with all required information has been included. All standard map elements (North Arrow, Map Scale-Graphic, Map Scale-numeric, Map title, Map legends) have been included to easily read the map. A suitable base map has been included. The map has been properly captioned. KML/KMZ file(s) included using Google Earth. Excellent critical discussion included. A **Geo spatial database** has been developed using PostgreSQL spatial DBMS and populated with required data. Suitable screen shots of the work have been included in appendix. **Excellent** discussion included. Proper citations and referencing included.
Task e 20 marks	No or Very poor ordinary map has been included. **Ordinary** discussion	Basic map with some required information has been included. Suitable screen shots of the work have been	Good map with all required information has been included. All standard map elements (North Arrow, Map Scale-	Very good map with all required information has been included. All standard map elements (North	Excellent map with all required information has been included. All standard map elements (North Arrow, Map Scale-

	included based on the findings. No citations or referencing included	included in appendix. **Basic** discussion included. Citations and referencing included but contains some erros.	Graphic, Map Scale-numeric, Map title, Map legends) have been included to easily read the map. A suitable geo-processing tools such as buffering, clipping and intersection etc. has been used. Suitable screen shots of the work have been included in appendix. **Good** discussion included. Proper citations and referencing included.	Arrow, Map Scale-Graphic, Map Scale-numeric, Map title, Map legends) have been included to easily read the map. A suitable geo-processing tools such as buffering, clipping and intersection etc. has been used. **Sub questions have been answered correctly.** Suitable screen shots of the work have been included in appendix. **Very good** discussion included. Proper citations and referencing included.	Graphic, Map Scale-numeric, Map title, Map legends) have been included to easily read the map. A suitable geo-processing tools such as buffering, clipping and intersection etc. has been used. **Sub questions have been answered correctly**. **Excellent critical** discussion included. Suitable screen shots of the work have been included in appendix. Base map has been included. Proper citations and referencing included.

Further Information

Who can answer questions about my assessment?

Questions about the assessment should be directed to the staff member who has set the task/assessment brief. This will usually be the Module Leader. They will be happy to answer any queries you have.

Staff members can often provide feedback on an assignment plan but cannot review any drafts of your work prior to submission. The only exception to this rule is for Dissertation Supervisors to provide feedback on a draft of your dissertation.

Referencing and independent learning

Please ensure you reference a range of credible sources, with due attention to the academic literature in the area. The time spent on research and reading from good quality sources will be reflected in the quality of your submitted work.

Remember that what you get out of university depends on what you put in. Your teaching sessions typically represent between 10% and 30% of the time you are expected to study for your degree. A 20-credit module represents 200 hours of study time. The rest of your time should be taken up by self-directed study.

Unless stated otherwise you must use the **HARVARD** referencing system. Further guidance on referencing can be found in the Study Smart area on Moodle and at www.citethemrightonline.com (use your university login details to access the site). Correct referencing is an easy way to improve your marks and essential in achieving higher grades on most assessments.

Technical submission problems

It is strongly advised that you submit your work at least 24 hours before the deadline to allow time to resolve any last minute problems you might have. If you are having issues with IT or Turnitin you should contact the IT Helpdesk on (+44) 2920 417000. You may require evidence of the Helpdesk call if you are trying to demonstrate that a fault with Moodle or Turnitin was the cause of a late submission.

Extensions and mitigating circumstances

Short extensions on assessment deadlines can be requested in specific circumstances. If you are encountering particular hardship which has been affecting your studies, then you may be able to apply for mitigating circumstances. This can give the teachers on your programme more scope to adapt the assessment requirements to support your needs. Extensions and mitigating circumstances policies and procedures are regularly updated. You should refer to your degree programme or school Moodle pages for information on extensions and mitigating circumstances.

Unfair academic practice

Cardiff Met takes issues of unfair practice **extremely seriously.** The University has procedures and penalties for dealing with unfair academic practice. These are explained in full in the University's Unfair Practice regulations and procedures under Volume 1, Section 8 of the Academic Handbook. The Module Leader reserves the right to interview students regarding any aspect of their work submitted for assessment.

Types of Unfair Practice, include:

Plagiarism, which can be defined as using without acknowledgement another person's words or ideas and submitting them for assessment as though it were one's own work, for instance by copying, translating from one language to another or unacknowledged paraphrasing. Further examples include:

- Use of any quotation(s) from the published or unpublished work of other persons, whether published in textbooks, articles, the Web, or in any other format, where quotations have not been clearly identified as such by being placed in quotation marks and acknowledged.
- Use of another person's words or ideas that have been slightly changed or paraphrased to make it look different from the original.
- Summarising another person's ideas, judgments, diagrams, figures, or computer programmes without reference to that person in the text and the source in a bibliography/reference list.
- Use of assessment writing services, essay banks and/or any other similar agencies (NB. Students are commonly being blackmailed after using essay mills).
- Use of unacknowledged material downloaded from the Internet.
- Re-use of one's own material except as authorised by your degree programme.

Collusion, which can be defined as when work that that has been undertaken with others is submitted and passed off as solely the work of one person. Modules will clearly identify where joint preparation and joint submission are permitted, in all other cases they are not.

Fabrication of data, making false claims to have carried out experiments, observations, interviews or other forms of data collection and analysis, or acting dishonestly in any other way.

How is my work graded?

Assessment grading is subject to thorough quality control processes. You can view a summary of these processes on the Assessment Explained Infographic.

Grading of work at each level of Cardiff Met degree courses is benchmarked against a set of general requirements set out in Volume 1, Section 4.3 of our Academic Handbook. A simplified version of these Grade Band Descriptors (GBDs) with short videos explaining some of the academic terminology used can be accessed via the Facilitation of Learning resource page.

We would strongly recommend looking at the Study Smart area of Moodle to find out more about assessments and key academic skills which can have a significant impact on your grades. Always check your work thoroughly before submission.