

This question paper consists  
of 4 printed pages, each is identified  
by the Code Number  
LUBS5308M01

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(Semester 1 2022)

**Assessed Coursework for LUBS5308 Business Analytics  
and Decision Science  
100% Assignment**

This assignment contains two parts which are both equally weighted:

**Part 1 (50% marks - 1,500 words maximum):**

A small manufacturing company is expanding and have approached you to help them select the best way to acquire more space. They have identified 4 alternative options; either extend their current warehouse or purchase space in either the city centre, a suburb or in shared warehouses. They have also identified 5 key criteria; public transport links, ease of parking, layout of the warehouse space, security and purchase cost. They have provided you with their thoughts in the following table:

		Alternatives			
		A1 (Centre)	A2 (Suburb)	A3 (Shared)	A4 (Extend)
Criteria	C1 (public transport links)	Good bus and rail links	Good bus links but no rail links	Poor bus links but good rail links	Excellent bus and rail links
	C2 (parking)	Poor	Good	Excellent	Moderate
	C3 (warehouse space)	Poor	Excellent	Good	Good
	C4 (security)	***	****	***	*
	C5 (cost)	£900,000	£600,000	£300,000	£200,000

Using this information model this decision using AHP and TOPSIS. You will have to make assumptions based on the information provided to create the decision tables for AHP and TOPSIS.

Your report has two objectives:

1. Summarise the data used and outputs for the AHP and TOPSIS analyses, including your workings in a single Excel file.
2. Respond to the small manufacturing company on how to proceed with their decision. Provide justification for your response using your analyses.

Your (1,500 word maximum) report should use tables and figures as appropriate as well as text to present your findings. In addition to the report, you must submit all your workings/calculations in a single Excel file. This Excel file must contain no annotations, all written work should be in the report. No appendices are required, and any material provided in appendices will not contribute to the final mark. This section will be marked using the following marking scheme:

Success Criteria	Weighting
<b><u>General</u></b>	<b>15%</b>
Presentation	5%
Use of tables and graphics	10%
<b><u>Introduction</u></b>	<b>10%</b>
<b><u>AHP and TOPSIS analyses</u></b>	<b>35%</b>
Identifying and summarising the data used	15%
Providing and describing the outputs of the analyses	20%
<b><u>Response to Company</u></b>	<b>40%</b>
Summary of the way forward for the company	20%
Technical details on how you came to give this advice	20%
	<b>Total = 100%</b>

**Note:** Presentation includes structure/format of the report, clarity of expression, grammar and spelling. Your report will be rated on each success criterion using a six-point scale from 0 (very poor) to 5 (excellent). The overall mark will be a weighted average of the ratings.

**Part 2 (50% marks - 1,500 words maximum):**

Brewdog has provided you with data on 199 different beers which includes the Alcohol by volume (ABV), International Bitterness Units (IBU), Original Gravity (OG), Colour Units from the European Brewery Convention (EBC), pH (Acid & Base Scale), Attenuation Level, Fermentation temperature in

Celsius and the Yeast type used (*BrewDog.csv*). There are several missing data points and Brewdog would like the beers clustered. Brewdog will use the cluster information for marketing similar beers to their customers. Identify the missing values, use imputation to replace the missing values and then a suitable clustering algorithm to cluster the beers.

Your report has two objectives:

1. Show how you can use imputation to replace the missing values and then evaluate the imputed values.
2. Utilise a suitable clustering algorithm to cluster the beers. Provide and explain the information in a dendrogram.

Your (1,500 word maximum) report should use tables and figures as appropriate as well as text to present your findings. No appendices are required, and any material provided in appendices will not contribute to the final mark. This section will be marked using the following marking scheme:

Success Criteria	Weighting
<b><u>General</u></b>	<b>15%</b>
Presentation	5%
Use of tables and graphics	10%
<b><u>Introduction</u></b>	<b>10%</b>
<b><u>Imputation</u></b>	<b>30%</b>
Briefly discuss the various options for dealing with the missing data	10%
Correctly impute values for the missing data	20%
<b><u>Clustering</u></b>	<b>45%</b>
Correctly select and utilise a clustering algorithm on the data	30%
Provide and explain the clustering information in a dendrogram	15%
	<b>Total = 100%</b>

**Note:** Presentation includes structure/format of the report, clarity of expression, grammar and spelling. Your report will be rated on each success criterion using a six-point scale from 0 (very poor) to 5 (excellent). The overall mark will be a weighted average of the ratings.

### **Assignments should be a maximum of 3,000 words in length.**

All coursework assignments that contribute to the assessment of a module are subject to a word limit, as specified in the online module handbook in the relevant module area of the MINERVA. **The word limit is an extremely important aspect of good academic practice and must be adhered to.** Unless stated specifically otherwise in the relevant module handbook, the word count includes EVERYTHING (i.e. all text in the main body of the assignment including summaries, subtitles, contents pages, tables, supportive material whether in footnotes or in-text references) except the main title, reference list and/or bibliography and any appendices. It is not acceptable to present matters of substance, which should be included in the main body of the text, in the appendices ("appendix abuse"). It is not acceptable to attempt to hide words in graphs and diagrams; only text which is strictly necessary should be included in graphs and diagrams.

You are required to adhere to the word limit specified and state an accurate word count on the cover page of your assignment brief. Your declared word count must be accurate, and should not mislead. Making a fraudulent statement concerning the work submitted for assessment could be considered academic malpractice and investigated as such. If the amount of work submitted is higher than that specified by the word limit or that declared on your word count, this may be reflected in the mark awarded and noted through individual feedback given to you.

### **The deadline date for this assignment is 12.00 noon on Monday 9<sup>th</sup> January 2023.**

An electronic copy of the assignment must be submitted to the Assignment Submission area within the module resource on the Blackboard MINERVA website no later than 12 noon on the deadline date. Failure to meet this initial deadline will result in a reduction of marks, details of which can be found at the following place: <https://lubswww.leeds.ac.uk/TSG/coursework/>

### **SUBMISSION**

Please ensure that you leave sufficient time to complete the online submission process, as upload times can vary. Accessing the submission link before the deadline does **NOT** constitute completion of submission. You **MUST** click the '**CONFIRM**' button before 12 noon for your assignment to be classed as submitted on time, if not you will need to submit to the Late Area and your assignment will be marked as late. It is your responsibility to ensure you upload the correct file to the MINERVA, and that it has uploaded successfully.

**It is important that any file submitted follows the conventions stated below:**

**FILE NAME** - The name of the file that you upload must be your student ID only.

### **ASSIGNMENT TITLE**

During the submission process the system will ask you to enter the title of your submission. This should also be your student ID only.

### **FRONT COVER**

The first page of your assignment should always be the Assessed Coursework Coversheet (individual), which is available to download from the following location:

<http://lubswww.leeds.ac.uk/TSG/index.php?id=27>

### **STUDENT NAME**

You should **NOT** include your name anywhere on your assignment.