QUALIFI ASSESSMENT DOCUMENT

Qualification	Qualifi Level 7 Diploma in Data Science
Qualification No (RQF)	603/6693/X
Unit Name	Statistical Inference
Unit Reference	L/618/4971
No of Credits	12 Credits

Introduction

Prior to attempting this coursework assignment, Learners must familiarise themselves with the following policies:

- Centre Specification can be found at https://qualifi.net/qualifications/
- Qualifi Quality Assurance Standards
- Qualifi Quality Policy Statement

Plagiarism and Collusion

In submitting the assignment Learner's must complete a statement of authenticity confirming that the work submitted for all tasks is their own. The statement should also include the word count.

Your accredited study centre will direct you to the appropriate software that checks the level of similarity. Qualifi recommends the use of https://www.turnitin.com as a part of the assessment.

Plagiarism and collusion are treated very seriously. Plagiarism involves presenting work, excerpts, ideas or passages of another author without appropriate referencing and attribution.

Collusion occurs when two or more learners submit work which is so alike in ideas, content, wording and/or structure that the similarity goes beyond what might have been mere coincidence

Please familiarise yourself on Qualifi's Malpractice and Maladministration policy, where you can find further information

Referencing

A professional approach to work is expected from all learners. Learners must therefore identify and acknowledge ALL sources/methodologies/applications used.

The learner must use an appropriate referencing system to achieve this. Marks are not awarded for the use of English; however, the learner must express ideas clearly and ensure that appropriate terminology is used to convey accuracy in meaning.

Qualifi recommends using Harvard Style of Referencing throughout your work.

Appendices

You may include appendices to support your work, however appendices must only contain additional supporting information, and must be clearly referenced in your assignment.

You may also include tables, graphs, diagrams, Gantt chart and flowcharts that support the main report should be incorporated into the back of the assignment report that is submitted.

Any published secondary information such as annual reports and company literature, should be referenced in the main text of the assignment, in accordance of Harvard Style Referencing, and referenced at the end of the assignment.

Confidentiality

Where a Learner is using organisational information that deals with sensitive material or issues, they must seek the advice and permission from that organisation about its inclusion.

Where confidentiality is an issue, Learners are advised to anonymise their assignment report so that it cannot be attributed to that particular organisation.

Word Count Policy

Learners must comply with the required word count, within a margin of +10%. These rules exclude the index, headings, tables, images, footnotes, appendices and information contained within references and bibliographies.

When an assessment task requires learners to produce presentation slides with supporting notes, the word count applies to the supporting notes only.

Submission of Assignments

All work to be submitted on the due date as per Centre's advice.

All work must be submitted in a single electronic document (.doc file), or via Turnitin, where applicable.

This should go to the tutor and Centre Manager/Programme Director, plus one hard copy posted to the Centre Manager (if required)

Marking and grades

Qualifi uses a standard marking rubric for all assignments, and you can find the details at the end of this document.

Unless stated elsewhere, Learners must answer all questions in this document.

Assignment Question

Task 1 – 200 words

Evaluate standard discrete and standard continuous distributions.

1.1 Analyse the statistical distribution of a discrete random variable.

1.2 Calculate probabilities using R for Binomial and Poisson Distribution.

1.3 Fit Binomial and Poisson distributions to observed data

1.4 Evaluate the properties of Normal and Log Normal distributions.

1.5 Calculate probabilities using R for normal and Log normal distributions.

1.6 Fit normal, Log normal and exponential distributions to observed data.

1.7 Evaluate the concept of sampling distribution (t, F and Chi Square).

Task 2 – 125 words

Formulate research hypotheses and perform hypothesis testing.

2.1 Write R and Python programmes that evaluate appropriate hypothesis tests

2.2 Draw statistical inference using output in R

2.3 Translate research problems into statistical hypotheses

2.4 Assess the most appropriate statistical test for a hypothesis

Task 3 – 175 words

Analyse the concept of variance (ANOVA) and an select an appropriate ANOVA or ANCOVA model.

3.1 Define variable, factor and level for a given research problem.

3.2 Evaluate the sources of variation, explained variation and unexplained variation.

3.3 Define a linear model for ANOVA/ANCOVA.

3.4 Confirm the validity of assumption based on definitions and analysis of variation.

3.5 Perform analysis using R and Python programs to confirm validity of assumptions.

3.6 Draw inferences from statistical analysis of the research problem.

Assessment Criteria

1.1 Analyse the statistical distribution of a discrete random variable.

1.2 Calculate probabilities using R for Binomial and Poisson Distribution.

1.3 Fit Binomial and Poisson distributions to observed data

1.4 Evaluate the properties of Normal and Log Normal distributions.

1.5 Calculate probabilities using R for normal and Log normal distributions.

1.6 Fit normal, Log normal and exponential distributions to observed data.

1.7 Evaluate the concept of sampling distribution (t, F and Chi Square).

2.1 Write R and Python programmes that evaluate appropriate hypothesis tests

2.2 Draw statistical inference using output in R

2.3 Translate research problems into statistical hypotheses

2.4 Assess the most appropriate statistical test for a hypothesis

3.1 Define variable, factor and level for a given research problem.

3.2 Evaluate the sources of variation, explained variation and unexplained variation.

3.3 Define a linear model for ANOVA/ANCOVA.

3.4 Confirm the validity of assumption based on definitions and analysis of variation.

3.5 Perform analysis using R and Python programs to confirm validity of assumptions.

3.6 Draw inferences from statistical analysis of the research problem.

	Distinguished	Excellent	Good	Proficient	Basic	Marginal	Unacceptable
Criteria	80+	70	60	50	40	30	0
Content (alignment with assessment criteria)	Extensive evaluation and synthesis of ideas; includes substantial original thinking	Comprehensive critical evaluation and synthesis of ideas; includes coherent original thinking	Adequate evaluation and synthesis of key ideas beyond basic descriptions; includes original thinking	Describes main ideas with evidence of evaluation; includes some original thinking	Describes some of the main ideas but omits some concepts; limited evidence of evaluation; confused original thinking	Largely incomplete description of main issues; misses key concepts; no original thinking	Inadequate information or containing information not relevant to the topic
Application of Theory and Literature	In-depth, detailed and relevant application of theory; expertly integrates literature to support ideas and concept	Clear and relevant application of theory; fully integrates literature to support ideas and concepts	Appropriate application of theory; integrates literature to support ideas and concepts	Adequate application of theory; uses literature to support ideas and concepts	Limited application of theory; refers to literature but may not use it consistently	Confused application of theory; does not use literature for support	Little or no evidence of application of theory and relevant literature
Knowledge and Understanding	Extensive depth of understanding and exploration beyond key principles and concepts	Comprehensive knowledge and depth of understanding key principles and concepts	Sound understanding of principles and concepts	Basic Knowledge and understanding of key concepts and principles	Limited and superficial knowledge and understanding of key concepts and principles	Confused or inadequate knowledge and understanding of key concepts and principles	Little or no evidence of knowledge or understanding of key concepts and principles
Presentation and Writing Skills	Logical, coherent and polished presentation exceeding expectations at this level; free from errors in mechanics and syntax	Logical, coherent presentation demonstrating mastery; free from errors in mechanics and syntax	Logical structure to presentation; makes few errors in mechanics and syntax which do not prohibit meaning	Orderly presentation; minor errors in mechanics and syntax	Somewhat weak presentation; errors in mechanics and syntax may interfere with meaning	Confused presentation; errors in mechanics and syntax often interfere with meaning	Illogical presentation lacking cohesion; contains significant errors that interfere with meaning
Referencing	Advanced use of in-text citation and references	Mastery of in-text citation and referencing	Appropriate use of in-text citation and referencing	Adequate use of in-text citation and referencing	Limited use of in-text citation and referencing	Inadequate use of citation and referencing	Little or no evidence of appropriate referencing or use of sources

Instructor's Comments

Directions:

1. For each of the criteria listed in the first column, circle one box in the corresponding column to the right which best reflects the student's work on this particular assessment activity (e.g., project, presentation, essay).

2. Provide specific feedback to a student about each of the criteria scores he/she earned by writing comments and suggestions for improvement in the last row titled "Instructor's comments."

3. To arrive at a mark, total the boxes and divide by 5 to arrive at final mark.

   Example:

	Distinguished	Excellent	Good	Proficient	Basic	Marginal	Unacceptable
Range	80-100	70-79	60-69	50-59	40-49	35-39	0-34

Criteria	**Score**
Content	50
Application of Theory and Literature	40
Knowledge and Understanding	50
Presentation/Writing Skills	40
Referencing	40
Total Score	220/5 = **44, Basic**

HEAD OFFICE

7 Acorn Business Park

Commercial Gate, Nottingham

Nottinghamshire

NG18 1EX

LONDON OFFICE

Golden Cross House

8 Duncannon Street, London

WC2N 4JF

info@qualifi.net