PERFORM INFERENTIAL DATA ANALYSIS

UNIT CODE: UNIT CODE: MATH/OS/AS/CR/04/6/A

Unit description

This unit specifies the competencies required to perform inferential data analysis. It involves applying data transformation techniques, creating new variables, performing statistical model selection, obtaining parameter estimates, interpreting analysis results, preparing analysis report and preparing finding's presentation

ELEMENTS AND PERFORMANCE CRITERIA

ELEMENT These describe the key outcomes which make up workplace function.	**PERFORMANCE CRITERIA** These are assessable statements which specify the required level of performance for each of the elements. ***Bold and italicized terms are elaborated in the Range***
1. Apply data transformation techniques	1.1 Testing for ***statistical assumption*** is done as per the distribution 1.2 Data ***transformation*** is done as per the required assumptions 1.3 Transformed data is presented using a number of significant figures and decimal places.
2. Create new variables.	2.1 New variable names are created as per the data transformation 2.2 The transformed data is stored in new variable as per the transformation 2.3 The old variables are replaced as per the transformation
3. Perform statistical model selection	3.1 Independent and dependent variables are defined as per the problem statement 3.2 Run a complete statistical model with all the variables as per the problem statement 3.3 Select the variables as per the generated p-values and estimates 3.4 Select the best ***distribution/statistical model*** based on the adjusted coefficient of determination.

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4. Obtain parameter estimates.	4.1 Generate parameter estimates as per the selected model. 4.2 The ***test*** statistics to determine the significance of the test results are carried out as per the models. 4.3 The goodness of fit test is performed as per the procedure
5. Interpret analysis results.	5.1 Parameter estimates are interpreted as per the statistical model output 5.2 Predictions are made as per the model estimates 5.3 Hypothesis are tested and decisions made as per the problem statement 5.4 The confidence interval is interpreted as per the data
6. Prepare analysis report.	1.1 The analysis results are written and the report prepared as per the workplace procedures. 1.2 The conclusions and recommendations are made as per the results and problem statement. 1.3 Need for and an appropriate approach to further research is identified and recommended as per the research findings. 1.4 Research finding adherence to any legal requirements is determined as per the ethical requirements
2. Prepare findings presentation	2.1 A PowerPoint presentation is prepared and the report presented to the stakeholders as per the workplace procedures. 2.2 The analysis report is presented to the management and stakeholders as per the workplace procedures

RANGE

This section provides work environments and conditions to which the performance criteria apply. It allows for different work environments and situations that will affect performance.

Variable	Range
• Data transformation may include but is not limited to:	• Squares • Square roots • Reciprocals • Powers • Logarithms • Differences • Sums
• Testing for statistical assumption may include but is not limited to:	• Test for normality • Test for linearity • Test for equality of variance • Test for homogeneity • Test for heteroscedasticity
• Distribution may include but is not limited to:	• Normal • Poisson • Binomial
• Statistical model may include but is not limited to	• Simple Linear regression • Multiple linear regression • ANOVA

REQUIRED SKILLS AND KNOWLEDGE

This section describes the skills and knowledge required for this unit of competency.

Required Skills

The individual needs to demonstrate the following skills:

- Creative thinking
- Use of computer and software
- Analytical skills
- Communication skills
- Presentation techniques
- Reporting methods
- Problem solving
- Social trends, cultural, environmental context

Required Knowledge

The individual needs to demonstrate knowledge of:

- Variable types
- Introduction to Probability theory
- Probability distributions
- statistically analysis of data and identification of possible trends and confirmation of reliability
- Statistical models
- Test of hypothesis
- Use of statistical tables
- Use of data analysis software
- Parametric tests
- Preparation of PowerPoint presentation

EVIDENCE GUIDE

This provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge and range.

1. Critical Aspects of Competency	Assessment requires evidence that the candidate: 1.1 The data is prepared for analysis as per the transformations done 1.2 Model is selected as per the significance of the model parameters 1.3 Parameter estimates are generated based on the selected model 1.4 The parameter estimated are interpreted as per the model 1.5 Computed values are compared with critical statistical table values as per the distribution 1.6 Ability to use of a statistical software is demonstrated as per the models used 1.7 Conclusions and recommendations are made as per the problem statement and hypothesis tested. 1.8 Used communication strategies involving statistical inferences and outputs.
2. Resource Implications	The following resources should be provided: 2.1 Computer 2.2 Internet 2.3 Statistical software

	2.4 Stationery 2.5 Printer
3. Methods of Assessment	Competency may be assessed through: 3.1 Portfolio Assessment 3.2 Interview 3.3 Case Study/Situation 3.4 Oral questioning 3.5 Practical Tests
4. Context of Assessment	Competency may be assessed on the job, off the job or a combination of these. Off the job assessment must be undertaken in a closely simulated workplace environment or During Industrial Attachment.
5. Guidance information for assessment	Holistic assessment with other units relevant to the industry sector, workplace and job role is recommended.