



Australian Government

MSS405057 Design an experiment

Release: 1

MSS405057 Design an experiment

Modification History

Release 1. Unit code changed. Application changed. Performance Criteria changed. Foundation Skills populated. Range of Conditions removed. Assessment Requirements changed. Supersedes and is equivalent to MSS405052 Design an experiment.

Application

This unit describes the skills and knowledge required to design experiments to confirm viability of process improvements.

This unit applies to technical experts and similar roles who are required to identify areas for significant or breakthrough improvement and use statistical methods to design and run experiments and confirm results.

This unit applies to any organisation.

No licensing or certification requirements exist at the time of publication. Relevant legislation, industry standards and codes of practice within Australia must be applied.

Pre-requisite Unit

MSS404056 Apply statistics to operational processes

Competency Field

Competitive systems and practices

Elements and Performance Criteria

Elements	Performance Criteria
Elements describe the essential outcomes.	Performance criteria describe the performance needed to demonstrate achievement of the element.
1. Choose an improvement project	1.1 Review process or value stream map to identify areas in need of improvement 1.2 Select rea of process or value stream for analysis and improvement 1.3 Consult with relevant stakeholders to determine objective of experiment

Elements	Performance Criteria
Elements describe the essential outcomes.	Performance criteria describe the performance needed to demonstrate achievement of the element.
2. Design the experiment	2.1 Select factorial design appropriate to objective of experiment 2.2 Estimate signal to noise ratio 2.3 Determine required number of runs and factorial fraction 2.4 Determine resolution 2.5 Design sequential series of experiments 2.6 Calculate resource requirement for this design 2.7 Consult with relevant stakeholders to determine whether resource requirements are practical and/or feasible 2.8 Modify experiment, if required, to match available resources 2.9 Determine metrics relevant to experiment objective and design
3. Conduct the experiment	3.1 Conduct first run of experiment 3.2 Replicate in random order for required number of runs 3.3 Block out known sources of variation 3.4 Conduct other experiments in series 3.5 Record data or oversee recording of data to meet requirements of experiment
4. Analyse and confirm the experimental results	4.1 Identify aliases and confounding of variables and/or results 4.2 Analyse data using statistics pack 4.3 Interpret analysed data in line with objectives 4.4 Identify confidence level of analysed data 4.5 Design experiment to confirm correlations identified 4.6 Conduct confirming experiment 4.7 Analyse data from confirming experiment 4.8 Confirm results or conduct further confirming experiments

Foundation Skills

This section describes those language, literacy, numeracy and employment skills that are essential to performance but not explicit in the performance criteria.

- Reading skills to interpret workplace documents

- Writing skills to document data and results of experiments
- Oral communication skills to consult with stakeholders to determine experiment objective and confirm design
- Numeracy skills to determine metrics relevant to experiments.

Other foundation skills essential to performance are explicit in the performance criteria of this unit.

Unit Mapping Information

Release 1. Supersedes and is equivalent to MSS405052 Design an experiment.

Links

Companion Volume Implementation Guides are found in VETNet – -

<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=5b04f318-804f-4dc0-9463-c3fb9a3fe998>

Assessment Requirements for MSS405057 Design an experiment

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Performance Evidence

There must be evidence the candidate has completed the tasks outlined in the elements and performance criteria of this unit, and demonstrated the ability to:

- design, conduct and analyse and confirm results from at least one experiment.

Knowledge Evidence

There must be evidence the candidate has knowledge of:

- statistical principles and analysis including:
 - analysis of means (ANOM)
 - prediction equations
 - analysis of variance (ANOVA)/one-way ANOVA
 - desirability function
 - hit a target
 - advanced graphical data analysis
 - multi-variate planning
 - variation trees and funnelling
 - hypothesis testing
 - central limit theorem
 - statistical analysis roadmap
 - analysis for means and t-test
 - correlation and regression
- factorial analysis principles and methods
- acceptance criteria and confidence levels
- selection and use of statistics packs.

Assessment Conditions

Skills must have been demonstrated in the workplace or in a simulated environment that reflects workplace conditions and contingencies. The following conditions must be met for this unit:

- use of suitable facilities, equipment and resources

- modelling of industry operating conditions.

Assessors must satisfy the NVR/AQTF mandatory competency requirements for assessors.

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