



Australian Government

UEENEEE164A Design electrical machine drives and production layout plans

Release: 2

UEENEEE164A Design electrical machine drives and production layout plans

Modification History

Not applicable.

Unit Descriptor

Unit Descriptor

1) Scope:

1.1) Descriptor

This unit covers the design of electrical machine drives and the layout of machinery for the efficient production of goods produced by automated equipment. It encompasses working safely, applying extensive knowledge of machine drives and equipment layout arrangements, their application, gathering and analysing data, applying problem solving techniques, developing and documenting solutions and alternatives.

Note.

Typical machine drives and production layout plans are those encountered in meeting performance requirements and compliance standards, production requirements and efficient use of materials and human resources.

Application of the Unit

Application of the Unit 2)

This unit is intended to apply to any recognised development program that leads to the acquisition of a formal award at AQF level 6.

Licensing/Regulatory Information

License to practice 3)

The skills and knowledge described in this unit do not

License to practice**3)**

require a license to practice in the workplace. However, practice in this unit is subject to regulations directly related to occupational health and safety, codes of work practice and standard work procedures related to the operation of automated machinery.

Pre-Requisites**Prerequisite Unit(s)****4)****Competencies****4.1)**

Granting competency in this unit shall be made only after competency in the following unit(s) has/have been confirmed.

UEENEEE1 01A Apply Occupational Health and Safety regulations, codes and practices in the workplace

UEENEEE1 61A Analyse static and dynamic parameters of electrical equipment

UEENEEE1 62A Select drive components for electrical equipment design

UEENEEE1 63A Analyse materials for suitability in electrical equipment

UEENEEE1 26A Provide computational solutions to basic engineering problems

UEENEEE1 29A Solve electrotechnical engineering problems

OR

UEENEEE1 01A Apply Occupational Health and Safety regulations, codes and practices in the workplace

UEENEEE1 04A Solve problems in d.c. circuits

UEENEENG1 Solve problems in electromagnetic devices

Prerequisite Unit(s)**4)**

01A and related circuits

OR

UEENEEH1 Troubleshoot resonance circuits in an
14A electronic apparatusUEENEE1 Apply Occupational Health and Safety
01A regulations, codes and practices in the
workplace

AND

UEENEE1 Solve problems in d.c. circuits
04A

OR

UEENEEH1 Solve problems in basic electronic circuits
69A**Literacy and numeracy skills****4.2)**

Participants are best equipped to achieve competency in this unit if they have reading, writing and numeracy skills indicated by the following scales. Description of each scale is given in Volume 2, Part 3 'Literacy and Numeracy'

Reading	5	Writing	5	Numeracy	5
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Employability Skills Information**Employability Skills****5)**

This unit contains Employability Skills

The required outcomes described in this unit of competency contain applicable facets of Employability Skills. The Employability Skills Summary of the qualification in which this unit of competency is packaged will assist in identifying Employability Skill requirements.

Elements and Performance Criteria Pre-Content

6) Elements describe the essential outcomes of a competency standard unit
Performance Criteria describe the required performance needed to demonstrate achievement of the element.
Assessment of performance is to be consistent with the Evidence Guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1 Prepare to design machines and production layout plans.	1.1 OHS processes and procedures for a given work area are identified, obtained and understood.
	1.2 Established OHS risk control measures and procedures in preparation for the work are followed.
	1.3 The extent of the machine design and production layout plans are determined from performance specifications and situation reports and in consultation with relevant persons
	1.4 Activities are planned to meet scheduled timelines in consultation with others involved in the work.
	1.5 Strategies are identified to ensure efficient development and implementation of solution(s).
2 Design machines and production layout plans	2.1 OHS risk control measures and procedures for carrying out the work are followed.
	2.2 Knowledge of machine designs and production layout plans is applied to engineering design concepts.
	2.3 Parameters, specifications and performance requirements in relation to machine design and production layout plan are established in accordance with established procedures.
	2.4 Approaches to selecting machine designs and production layout plans are carried out so as to

ELEMENT**PERFORMANCE CRITERIA**

		provide the most effective solution.								
	2.5	Unplanned events are dealt with safely and effectively and consistent with regulatory requirements and enterprise policy.								
	2.6	Quality of work is monitored against personal performance agreement and/or established organizational or professional standards								
3	Document and report the results of the machine design and production layout plans relative to engineering design concepts.	<table><tr><td>3.1</td><td>Machine design and production layout plan is tested to determine their effectiveness and modified where necessary.</td></tr><tr><td>3.2</td><td>Design and layout is documented including details of all findings, calculations and assumptions.</td></tr><tr><td>3.3</td><td>Design and layout is reported to appropriate personnel to establish action to be taken based on findings.</td></tr><tr><td>3.4</td><td>Justification for design and layout and any actions to be undertaken in relation to the equipment is documented for inclusion in work/project or development records in accordance with professional standards.</td></tr></table>	3.1	Machine design and production layout plan is tested to determine their effectiveness and modified where necessary.	3.2	Design and layout is documented including details of all findings, calculations and assumptions.	3.3	Design and layout is reported to appropriate personnel to establish action to be taken based on findings.	3.4	Justification for design and layout and any actions to be undertaken in relation to the equipment is documented for inclusion in work/project or development records in accordance with professional standards.
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Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

8) This describes the essential skills and knowledge and their level, required for this unit.

Evidence shall show that knowledge has been acquired of safe working practices and designing machine drives and production layout plans.

All knowledge and skills detailed in this unit should be contextualised to current industry practices and technologies.

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Machine design and positioning

Evidence shall show an understanding of the design parameters of machines and their capability as well as the ability to redesign their operating performance as well as the location of machines in an assembly or manufacturing environment to maximise production efficiency to an extent indicated by the following aspects:

- T1 Materials used in machine drive shafts
- T2 Standard formulas and specifications to determine machine drive shaft sizes for power, deflection, torque, bending data, key sizes, spline size and pin size
- T3 Selection of power prime movers from manufacturers catalogues
- T4 Principles associated with systematic planning of material flow in a production process
- T5 Adaptation of systematic layout planning to a production process
- T6 Preparation of process layouts and materials flow patterns in a production process
- T7 Materials handling methods and unit load concepts
- T8 Types of materials handling systems
- T9 Design of materials handling systems and the factors that guide the final selection of a system

Evidence Guide

EVIDENCE GUIDE

9) The evidence guide provides advice on assessment and must be read in conjunction with the Performance Criteria, Required Skills and Knowledge, the Range Statement and the Assessment Guidelines for this Training Package.

The Evidence Guide forms an integral part of this unit. It must be used in conjunction with all parts of the unit and performed in accordance with the Assessment Guidelines of this Training Package.

Overview of Assessment

9.1)

Longitudinal competency development approaches to assessment, such as Profiling, require data to be reliably gathered in a form that can be consistently interpreted over time. This approach is best utilised in Apprenticeship programs and reduces assessment intervention. It is the industry-preferred model for apprenticeships. However, where summative (or final) assessment is used it is to include the application of the competency in the normal work environment or, at a minimum, the application of the competency in a realistically simulated work environment. It is recognised that, in some circumstances, assessment in part or full can occur outside the workplace. However, it must be in accordance with industry and regulatory policy.

Methods chosen for a particular assessment will be influenced by various factors. These include the extent of the assessment, the most effective locations for the assessment activities to take place, access to physical resources, additional safety measures that may be required and the critical nature of the competencies being assessed.

The critical safety nature of working with electricity, electrical equipment, gas or any other hazardous substance/material carries risk in deeming a person competent. Sources of evidence need to be 'rich' in nature to minimise error in judgment.

Activities associated with normal everyday work have a bearing on the decision as to how much and how detailed the data gathered will contribute to its 'richness'. Some skills are more critical to safety and operational requirements while the same skills may be more or less frequently practised. These points are raised for the assessors to consider when choosing an assessment method and developing assessment instruments. Sample assessment instruments are included for Assessors in the Assessment Guidelines of this Training Package.

**Critical aspects
of evidence
required to
demonstrate
competency in
this unit** 9.2)

Before the critical aspects of evidence are considered all prerequisites must be met.

Evidence for competence in this unit shall be considered holistically. Each element and associated performance criteria shall be demonstrated on at least two occasions in accordance with the 'Assessment Guidelines – UEE11'. Evidence shall also comprise:

- A representative body of work performance demonstrated within the timeframes typically expected of the discipline, work function and industrial environment. In particular this shall incorporate evidence that shows a candidate is able to:
 - Implement Occupational Health and Safety workplace procedures and practices, including the use of risk control measures as specified in the performance criteria and range statement
 - Apply sustainable energy principles and practices as specified in the performance criteria and range statement
 - Demonstrate an understanding of the essential knowledge and associated skills as described in this unit. It may be required by some jurisdictions that RTOs provide a percentile graded result for the purpose of regulatory or licensing requirements.
 - Demonstrate an appropriate level of skills enabling employment
 - Conduct work observing the relevant Anti Discrimination legislation, regulations, policies and workplace procedures
- Demonstrated consistent performance across a representative range of contexts from the prescribed items below:
 - Design machine drives and production layout plans as described in 8) and including:

A	Understanding machine design and production layout issue relative to engineering design concepts.
B	Forming effective strategies for machine designs and plant layout.
C	Obtaining parameters, specifications and performance

requirements appropriate to each situation.

- | | |
|---|--|
| D | Testing the results of the design and/or layout. |
| E | Documenting instruction for implementing any actions resulting from the design and layout that incorporate risk control measure to be followed. |
| F | Documenting justification of actions to be implemented in accordance with professional standards. |
| G | Dealing with unplanned events by drawing on essential knowledge and skills to provide appropriate solutions incorporated in a holistic assessment with the above listed items. |

Note:

Successful completion of relevant vendor training may be used to contribute to evidence on which competency is deemed. In these cases the alignment of outcomes of vendor training with performance criteria and critical aspects of evidence shall be clearly identified.

Context of and specific resources for assessment

9.3)

This unit should be assessed as it relates to normal work practice using procedures, information and resources typical of a workplace. This should include:

- OHS policy and work procedures and instructions.
- Suitable work environment, facilities, equipment and materials to undertake actual work as prescribed in this unit.

These should be used in the formal learning/assessment environment.

Note:

Where simulation is considered a suitable strategy for assessment, conditions for assessment must be authentic and as far as possible reproduce and replicate the workplace and be consistent with the approved industry simulation policy.

The resources used for assessment should reflect current industry practices in relation to designing machine drives and production layout plans.

Method of assessment**9.4)**

This unit shall be assessed by methods given in Volume 1, Part 3 'Assessment Guidelines'.

Note:

Competent performance with inherent safe working practices is expected in the Industry to which this unit applies. This requires that the specified essential knowledge and associated skills are assessed in a structured environment which is primarily intended for learning/assessment and incorporates all necessary equipment and facilities for learners to develop and demonstrate the essential knowledge and skills described in this unit.

Concurrent assessment and relationship with other units**9.5)**

There are no concurrent assessment recommendations for this unit.

Range Statement**RANGE STATEMENT**

10) This relates to the unit as a whole providing the range of contexts and conditions to which the performance criteria apply. It allows for different work environments and situations that will affect performance.

This unit shall be demonstrated in relation to selection of two different types of machine design and two different production layout plans.

Note.

Typical machine designs and production layout plans are those encountered in meeting performance requirements and compliance standards, the initial design or revising a machine operating parameters and dealing with efficient production processes.

Generic terms used throughout this Vocational Standard shall be regarded as part of the Range Statement in which competency is demonstrated. The definition of these and other terms that apply are given in Volume 2, Part 2.1.

Unit Sector(s)

Not applicable.

Competency Field

Competency Field **11)**

Electrotechnology