



Australian Government

UEENEEI140A Plan the electrical installation of integrated systems

Release: 2

UEENEEI140A Plan the electrical installation of integrated systems

Modification History

Release	Action	Core/Elective	Details	Points
2	Edit	N/A	Show full pre-req chain in the unit	
2	Edit	N/A	Replaced "essential knowledge and associated skills" with "required skills and knowledge"	

Unit Descriptor

Unit Descriptor

1) Scope:

1.1) Descriptor

This unit covers the planning and practices in installing an integrated systems. It encompasses working safely, applying knowledge bus system parameters, topology and installation requirements, bus system cables and terminations, control and dimming methods and planning and documenting integrated installation plans.

Application of the Unit

Application of the Unit 2)

This unit is intended as an elective or skill set at AQF 3 level. competencies. It is suitable for employment-based programs under an approved contract of training and may be aligned with a vendor training program that is shown to have the same competency outcomes as this unit.

Licensing/Regulatory Information

License to practice 3)

The skills and knowledge described in this unit do not require a licence to practice in the workplace. However the skills and knowledge as they apply to working directly on the associated electrical power wiring and equipment require a licence to practise in the workplace where the operating voltage is above 50 V a.c. or 120 V d.c. subject to regulations to carry out electrical work. Practice in the workplace and during training is subject to occupational health and safety regulations and codes and obligations of a 'contracts of training' such as apprenticeships.

Pre-Requisites

Prerequisite Unit(s) 4)

Competencies 4.1)

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

Where pre-requisite pathways have been identified. All competencies in the Common Unit Group must be have been completed plus all the competencies in one (1) of the identified Pathway Unit Group(s):

Electrotechnology

Electrical

Common Unit Group

Unit Code	Unit Title
UEENEEE101A	Apply Occupational Health and Safety regulations, codes and practices in the workplace
UEENEEE102A	Fabricate, assemble and dismantle utilities industry components
UEENEEE105A	Fix and secure electrotechnology equipment

Prerequisite Unit(s) 4)

UEENEEE107A Use drawings, diagrams, schedules, standards, codes and specifications

Electrotechnology Pathway Group

Unit Code Unit Title

UEENEEE108A Lay wiring/cabling and terminate accessories for ELV circuits

Electrical Pathway Group

Unit Code Unit Title

UEENEEG106A Terminate cables, cords and accessories for low voltage circuits

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 4 Writing 4 Numeracy 4

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 Establish integrated system scenario	<p>1.1 Customer requirements for scenes, events and controls in the integrated system are established from job specifications and discussion with appropriate persons</p> <p>1.2 The types and location of integrated system loads are determined from job specifications and customer requirements.</p> <p>1.3 Types and location of control (input) devices of integrated system are determining from job specifications and customer requirements.</p> <p>1.4 Budget for the integrated system is established from customer requirements and discussion with appropriate persons.</p>
2 Plan integrated system	<p>2.1 OHS procedures and risk control work measures are followed.</p> <p>2.2 Knowledge of integrated system devices and their capabilities is applied in the plan.</p> <p>2.3 Number and types of output devices to suit the established scenario are chosen for compatibility with the system loads</p> <p>2.4 Number and types of control (input) devices to suit the established system scenario are chosen.</p> <p>2.5 Integrated systems are planned to comply with bus system and supply voltage parameters.</p> <p>2.6 Other control methods are considered in planning the integrated system plan.</p>

ELEMENT**PERFORMANCE CRITERIA**

- | | | |
|---|--|--|
| | 2.7 | Integrated systems are planned within the given budget. |
| | 2.8 | Final plan is documented and submitted to an appropriate person for approval.

Note. Documentation includes explanations of how the customers' requirement will be achieved; a material list with costs and a marked up floor plan showing relationship of load groups to input devices. |
| 3 | Implement an integrated system installation plan | |
| | 3.1 | OHS risk control work measures and procedures are followed. |
| | 3.2 | Integrated systems are arranged using an acceptable topology. |
| | 3.3 | A connection chart/diagram between all device in the integrated system is developed |
| | 3.4 | Appropriate cable for the bus system is selected and connected at devices and accessories using the methods and the polarity specified by the manufacturer. |

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

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

Evidence shall show that knowledge and associated skills for planning installations of integrated systems have been acquired.

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

KS01-EI140A Integrated systems installation requirements

Evidence shall show an understanding of integrated systems installation requirements to an extent indicated by the following aspects:

T1 Bus system parameters encompassing:

- How bus systems work
- Network topology
- Voltage and current limits
- Cable type and length limits
- Network impedance
- Network and device status indication

T2 LV supply voltage parameters and quality.

- Supply sources such as UPS and inverters may adversely effect voltage parameters and waveform.

T3 Cabling encompassing:

- Insulation resistance testing precautions and prohibitions
- LV cable terminations and conductor size
- Bus cable polarity and pairing
- Bus cable termination requirements and techniques
- Field and enclosure segregation requirements (Segregation is required by both AS/NZS 3000 and AS/ACIF S009).

T4 Supply and load protection encompassing:

- Conductors and protection device co-ordination (AS/NZS 3000:2007 Clause 2.5.3.1)
- Use of residual current devices
- Protection on supply and load side of system devices (IEC 60669-2-1 protection requirements).

T5 Output devices encompassing:

- Relays connections for ELV and LV loads
- Dimmer types
- Supply and load connections for the various dimmer types

REQUIRED SKILLS AND KNOWLEDGE

T6 Installation requirements for input devices encompassing:

- Passive infrared detectors
- Light level control
- Key inputs
- Touch screens

T7 Acceptable and unacceptable topologies for a single network

T8 Devices and connections for other control methods encompassing:

- DSI (Distributed Signaling Interface) Gateway dimming and control
- Devices and connections DALI (Digital Addressable Lighting Interface) dimming and control
- Zero to 10 volts analogue control.

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 performance criteria 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 required skills and knowledge 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:
 - Planning and implementing integrated systems as described in 8) and including:

- A Establishing customer requirements for integrated system.
- B Determining system components and locations from job specifications and customer requirements.
- C Ensuring that the power source for the integrated system is suitable
- D Choosing integrated system component for compatibility with loads and established scenarios
- E Planning integrated systems to comply with bus system and supply voltage parameters
- F Considering other control methods in planning the integrated system
- G Keeping within a given budget
- H Documenting integrated system plan
- I Arranging an integrated system using an acceptable topology
- J Developing a connection chart/diagram
- K Selecting and terminating bus cable using specified methods and polarity.

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 plan the installation of integrated systems.

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 required skills and knowledge 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 required skills and knowledge 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 three integrated systems one of which has at least 4 separate scenes and 5 control requirements.

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)
	Instrumentation and Control