Australian Government

UEENEEI141A Develop electrical integrated systems

Release: 2

INDUSTRY SKILLS COUNCILS
Creating Australia's Future

UEENEEI141A Develop electrical 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 development of integrated systems. It encompasses working safely, scrutinising and adapting project specifications, applying knowledge of the application for integrated systems, system topologies and devices applications and capabilities, system programming methods, using diagnostic tools and documenting the developed systems.

Application of the Unit

Application of the Unit **2)**

This unit is intended as an elective or skill set at AQF 3 level. 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 obligation of '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
UEENEED101A	Use computer applications relevant to a workplace
UEENEEE101A	Apply Occupational Health and Safety regulations, codes and practices in the workplace
UEENEEE102A	Fabricate, assemble and dismantle utilities industry components

Prerequisite Unit(s) **4)**

UEENEEE105A	Fix and secure electrotechnology equipment
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 Prepare to develop an integrated system	1.1	The types and location of loads and control devices is determined from project specifications and customer requirements.
	1.2	The number of control bus networks and current requirements are determined from load calculations for devices on the system.
	1.3	Appropriate placement of system devices in the system scheme is determined from bus network power and load parameters and to maintain system stability.
	1.4	The integrated system is developed to comply with regulator, safety and manufacturer's requirements.
	1.5	A take-off of the number of devices and accessories required for the system is documented using manufacturer's title and ID for each.
	1.6	Programming and diagnostic tools needed for the project are down loaded to a compatible PC and checked for correct operation and safety.
2 Program integrated system devices	2.1	OHS risk control work measures and procedures are followed.
	2.2	Modes of programming are applied to developing the integrated system in accordance with manufacturers and

ELEMENT	PERFORMANCE CRITERIA	
		programming software instructions.
	2.3	Manufacturer's instructions and recommendations are followed in programming system devices to project requirements.
	2.4	Parameters for operation of loads are programmed to project requirements and within manufacturer's designated range.
	2.5	The programmed system data base is saved and backed up in accordance with manufacturer's instructions.
3 Load and test integrated system	3.1	OHS risk control work measures and procedures are followed.
	3.2	Data base of integrated system program is transferred to the network.
	3.3	All functions of the integrated system are tested for compliance with project requirements and manufacturer's specifications.
	3.4	Diagnostic tools are used to locate any system faults, defects or anomalies.
	3.5	Defects or anomalies are corrected to comply with project requirements and manufacturer's specifications.
	3.6	A copy of the documentation of integrated system is given the client or client's representative.

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 of integrated systems have been acquired.

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

KS01-EI141A Integrated systems operating parameters and programming

Evidence shall show an understanding of integrated systems operating parameters and programming to an extent indicated by the following aspects:

T1 Applications and advantages of integrated systems

T2 System components encompassing:

- Support devices for control bus supply and control
- Support devices for programming, interconnection between networks and integration with third party systems.
- Types and capabilities of output devices.
- Lighting dimmer capabilities and selection
- Controlling DSI and communicating with DALI electronic ballasts
- Types and capabilities of input devices

T3 Network specifications encompassing:

- Bus system cable type, polarity, length and acceptable topologies.
- Importance of the location of output and input devices and control bus power supplies
- Ensuring control bus stability (stability can be effected by number of units on a network, current drawn by devices in relation to current output of power supplies).
- Multiple network connectivity
- LV supply overcurrent and surge protection.

T4 Software for system and device programming, monitoring and controlling

T5 System and device programming encompassing:

- Addressing conventions for networks, devices, applications, output groups, types of control and outputs (Output include ‘on’, ‘off’, a specific level, over a specific time and the like).
- PC programming tools and methods (programming includes configuring network data base using addressing tools and objects, function objects, editing, altering and transferring the data base to network)
- Importance of project documentation and backup

T6 System fault-finding processes

REQUIRED SKILLS AND KNOWLEDGE

- Fault-finding includes the use of multimeters, oscilloscope, system analysers and diagnostic software.

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, polices and workplace procedures
- Demonstrated consistent performance across a representative range of contexts from the prescribed items below:
  - as described in 8) and including:

A	Determining the types and location of loads and control devices
B	Using load calculations to correctly determine the number of network and current requirements.
C	Placing system devices appropriately in the system scheme.
D	Checking programming and diagnostic tools
E	Applying appropriate modes of programming to develop the integrated system.
F	Following manufacturer's instruction and recommendations in programming devices and setting load operating parameters.
G	Developing integrated system to comply with regulator, safety and project requirements.
H	Down loading program to network successfully
I	Using diagnostic tools to locate and correct any system defects, faults and anomalies
K	Documenting and (backing up) integrated system at development at the preparation, programming and completion of the project.

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 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:

- Developing an integrated system including at least 6 of the following functions:
- Direct Load Control
- Two Way Switching
- Multiple Load Control
- Energy Saving On Dimmers
- Panic Button
- Scenes
- Typical Master Bedroom
- PIR Enable/Disable
- Light Level Maintenance
- Corridor Linking
- Restrike Delays
- Using more than one programming mode
- Transferring a program data base to a network and testing functionality.
- Finding at least 5 hardware and 5 software faults

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