

22682VIC
Certificate II in Electrotechnology (Pre-vocational)

Version # 1.0

06 November 2024

This course has been accredited under Part 4.4 of the *Education and Training Reform Act 2006*.

Accredited for the period: 1 January 2025 to 31 December 2029

Version History:		
Version 1	This course replaces 22499VIC - Certificate II in Electrotechnology (Pre-vocational)	1 July 2019-31 December 2024

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Section A – Copyright and course classification information

1. Copyright owner of the course	© State of Victoria 2024 (Department of Jobs, Skills, Industry and Regions)
2. Address	<p>Deputy CEO Victorian Skills Authority Department of Jobs, Skills, Industry and Regions (DJSIR) GPO Box 4509 Melbourne Vic 3001</p> <p>Organisational contact: Manager, Training and Learning Products Unit Engagement Branch Victorian Skills Authority Telephone: 131823 Email: course.enquiry@djsir.vic.gov.au</p> <p>Day-to-day contact: Curriculum Maintenance Manager (CMM) Engineering Industries Box Hill Institute Private Bag 2014 Box Hill Vic.3128 Telephone: (03) 9286 9934 Email: cmmei@boxhill.edu.au</p>
3. Type of submission	This submission is for the reaccreditation of: 22499VIC - Certificate II in Electrotechnology (Pre-vocational)
4. Copyright acknowledgement	<p>The following unit of competency:</p> <ul style="list-style-type: none"> • CPCWHS1001 Prepare to work safely in the construction industry has been imported from the CPC Construction, Plumbing and Services Training Package administered by the Commonwealth of Australia. <p>© Commonwealth of Australia</p> <p>The following unit of competency:</p> <ul style="list-style-type: none"> • HLTAID011 Provide First Aid has been imported from the HLT Health Training Package administered by the Commonwealth of Australia. <p>© Commonwealth of Australia</p> <p>The following unit of competency:</p> <ul style="list-style-type: none"> • BSBXCS301 Protect own personal online profile from cyber security threats has been imported from the BSB Business Services Training Package administered by the Commonwealth of Australia. <p>© Commonwealth of Australia</p> <p>The following units of competency:</p>



- UEECD0007 Apply work health and safety regulations, codes and practices in the workplace
- UEECD0019 Fabricate, assemble and dismantle utilities industry components
- UEECD0020 Fix and secure electrotechnology equipment
- UEECD0042 Solve problems in ELV single path circuits
- UEECD0052 Use routine equipment/plant/technologies in an energy sector environment
- UEERA0035 Establish the basic operating conditions of air conditioning systems
- UEERA0036 Establish the basic operating conditions of vapour compression systems
- UEERA0059 Prepare and connect refrigerant tubing and fittings
- UEERE0087 Provide basic sustainable energy solutions for energy management in residential premises
- UEERL0001 Attach cords and plugs to electrical equipment for connection to a single phase 230 Volt supply

have been imported from the **UEE Electrotechnology Training Package** administered by the Commonwealth of Australia.

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The following units of competency:

- VU23477 Interpret and prepare basic two- and three- dimensional engineering drawings
- VU23480 Perform intermediate engineering computations
- VU23486 Configure and program a basic robotic system
- VU23488 Use 3D printing to create products

have been imported from **22632VIC Certificate II in Engineering Studies**

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The following unit of competency:

- VU23158 Explore the Internet of Things (IoT) in industry
- has been imported from **22588VIC Certificate III in Enabling Technologies**

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Request for other use should be addressed to:

Deputy CEO

Victorian Skills Authority

Department of Jobs, Skills, Industry and Regions (DJSIR)

GPO Box 4509

Melbourne Vic 3001

Email: course.enquiry@djsir.vic.gov.au

Copies of this publication can be downloaded free of charge from the [Victorian government website](#).

6. Course accrediting body	Victorian Registration and Qualifications Authority (VRQA)
7. AVETMISS information	ANZSCO code <ul style="list-style-type: none">• 899914 - Electrical or Telecommunications Trades Assistant ASCED code <ul style="list-style-type: none">• 0313 - Electrical and Electronic Engineering and Technology National course code <ul style="list-style-type: none">• 22682VIC – Certificate II in Electrotechnology (Pre-vocational)
8. Period of accreditation	1 January 2025 to 31 December 2029



Section B – Course information

1. Nomenclature	Standard 4.1 and 5.8 AQTF 2021 Standards for Accredited Courses
1.1 Name of the qualification	Certificate II in Electrotechnology (Pre-vocational)
1.2 Nominal duration of the course	404 – 474 hours
2. Vocational or educational outcomes	Standard 5.1 AQTF 2021 Standards for Accredited Courses
2.1 Outcome(s) of the course	<p>The 22682VIC - Certificate II in Electrotechnology (Pre-vocational) course is designed to provide participants with the knowledge and skills to:</p> <ul style="list-style-type: none"> • make an informed choice regarding study pathways and employment opportunities for a career in the electrotechnology industry • demonstrate a basic theoretical knowledge of wired and wireless electrical systems including telecommunications refrigeration and air-conditioning • apply safe work practices in an electrotechnology industry work environment • safely and correctly use a range of hand tools and basic test equipment commonly used in the electrotechnology industry • apply fabrication and assembly techniques together with hard wiring, cabling for basic extra low voltage (ELV) installations • set up and program a basic wireless electrotechnology system • contribute as a team member to each build stage of an electrotechnology project • provide first aid
2.2 Course description	This pre-vocational course is intended to provide senior secondary school students (when delivered as a Victorian Certificate of Education (VCE) Vocational Education and Training (VET) program), and school leavers with preparatory knowledge and skills to apply for an apprenticeship or other entry level employment in the electrotechnology industry.
3. Development of the course	Standards 4.1, 5.1, 5.2, 5.3 and 5.4 AQTF 2021 Standards for Accredited Courses
3.1 Industry, education, legislative, enterprise or community needs	The electrotechnology industry is diverse and experiencing rapid change and growth due to the development of technology advances in the fields of data communication, domestic and industry automation and renewable/sustainable energy systems. The expansion of electrotechnology into so many areas of industry provides a range of



employment opportunities and career pathway options for those interested in this field.

The Certificate II in Electrotechnology Studies (Pre-vocational) is developed primarily as a VCE VET program. Its purpose is to provide senior secondary school students with a greater awareness of the scope of the electrotechnology industry and career opportunities available. The course also provides students with pre-employment training as a pathway into an apprenticeship/traineeship or entry-level employment in a range of areas within the industry.

The course has maintained strong enrolment numbers since its initial introduction in 2014. Its success as a VCE VET program is its structure and content which enables the VCAA to award credit at units 1 to 4 into the VCE. The program structure enables the course to provide a non-scored VCE VET Unit 3-4 credit that could act as a 5th or 6th VCE subject and may be eligible for increment towards the ATAR. This adds to the courses appeal for students preparing to undertake higher level VET or university qualifications in the electrotechnology field.

In addition, the course also attracts a considerable number of enrolments from school leavers seeking an apprenticeship or other entry-level employment in the electrotechnology industry.

Currently, fourteen (14) Registered Training Organisations (RTOs) have this course on their Scope of Registration. They consist of:

- Secondary Schools/Colleges = 4
- Tafe Institutes = 8
- Private Providers = 2

The enrolment figures for the current course over the last four and a half (4.5) years show a consistent year-on-year increase, indicating a growing demand for the course:

Year	2020	2021	2022	2023	2024
*VCE VET	878	875	959	1107	1489
**Gov. Funded	727	724	652	974	403
**Fee For Service	561	848	818	663	486
Totals =	2252	2596	2502	2744	2378

*Enrolment data supplied by VCAA

** Enrolment data supplied by DJSIR to March 2024

The review of the course for reaccreditation was guided by a Course Steering Committee consisting of representatives from industry and training organisations. This steering committee reviewed the course contents, structure and skills and knowledge requirements over a series of meetings and validated the course outcome for this reaccreditation.

Details as follows:

Name:	Position/Organisation
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Michael Cullen (CSC Chairperson)	Executive Officer, Future Energy Skills Executive Officer of the Electrotechnology Industry Advisory Group (IAG)	
Michael Weekes	Technical Manager, National Electrical and Communications Association (NECA)	
John Ingram	Education Officer, Industry Education and Guidance, Energy Safe Victoria	
Laura Steedman	Special Projects Manager, Air Conditioning & Mechanical Contractors' Association (AMCA)	
Peter Collins	Chairperson of the Vic. Electrical Senate, TAFE Teacher Electrical Renewable Energy and Engineering Skills and Education Delivery, Federation University	
Alan Penny	Manager – Electrical Trades Faculty of Trades, Technology & Transport, Box Hill Institute	
Ben Fitzgerald	VET Program Manager, Victorian Curriculum and Assessment Authority (VCAA)	
Alex Del Grosso	Trainer/OHS Coordinator Electrical Trades Union (ETU)	

In Attendance:

Steve Bryant	Supervising Executive Officer CMM - Engineering Industries
Shingie Pasi	Executive Officer CMM – Engineering Industries
Trevor Lange	Snr. Project officer CMM – Engineering Industries

This course:

- does not duplicate, by title or coverage, the outcomes of an endorsed training package qualification
- is not a subset of a single training package qualification that could be recognised through one or more statements of attainment or a skill set
- does not include units of competency additional to those in a training package qualification that could be recognised through statements of attainment in addition to the qualification
- does not comprise units that duplicate units of competency of a training package qualification.

3.2 Review for re-accreditation

This course has been reviewed three times since its' initial introduction in 2008 This most recent review has not resulted in any major change to the course structure or unit content. All imported training package units have been checked to ensure the current versions are included along with any changes to prerequisites units. Likewise, the latest versions of the four imported accredited course units are now included. One imported accredited course elective unit: VU22341 *Apply basic computer networking concepts and practices* was deleted from the parent course and also from this course due to no enrolments over the current course accreditation period. Unit VU22674 *Explore applications and operation of the Internet of Things (IoT)* has been replaced by a more up-to-date imported accredited course VU23158 *Explore the Internet of Things (IoT) in industry* unit imported from 22588VIC *Certificate III in Enabling Technologies*.

The steering committee recommended the removal of UEENEEP026A *Conduct in-service safety testing of electrical cord connected equipment and cord assemblies* and its' successor from the course. This recommendation was made as the completion of this UoC in conjunction with another UoC included in this course completed the requirements of the skill set for the testing and tagging of electrical appliance cables.

The six VU enterprise units were redrafted into the current unit template reviewed and updated to aligned with the feedback provided by members of the Course Steering Committee.

The course packaging rules have remained unchanged. A note has been added to enable course providers to import one of the two elective units from any training package or accredited course as long as it is consistent with the AQF level and outcome of this course.

The course 22682VIC Certificate II in Electrotechnology (Pre-vocational) is equivalent to 22499VIC Certificate II in Electrotechnology (Pre-vocational).

22682VIC Certificate II in Electrotechnology (Pre-vocational)	22499VIC Certificate II in Electrotechnology (Pre-vocational)	Relationship
CPCWHS1001 Prepare to work safely in the construction industry	CPCWHS1001 Prepare to work safely in the construction industry	Equivalent
HLTAID011 Provide First Aid	HLTAID003 Provide First Aid	Equivalent
UEECD0007 Apply work health and safety regulations,	UEENEEE101A Apply occupational health and safety regulations, codes	Equivalent

codes and practices in the workplace	and practices in the workplace	
UEECD0019 Fabricate, assemble and dismantle utilities industry components	UEENEEE102A Fabricate, assemble and dismantle utilities industry components	Equivalent
UEECD0042 Solve problems in ELV single path circuits	UEENEEE103A Solve problems in ELV single path circuits	Equivalent
UEECD0020 Fix and secure electrotechnology equipment	UEENEEE105A Fix and secure electrotechnology equipment	Equivalent
UEERA0035 Establish the basic operating conditions of air conditioning systems	UEENEEJ104A Establish the basic operating conditions of air conditioning systems	Equivalent
UEECD0052 Use routine equipment/plant/technologies in an energy sector environment	UEENEEE141A Use of routine equipment plant technologies in an energy sector environment	Equivalent
UEERA0059 Prepare and connect refrigerant tubing and fittings	UEENEEJ102A Prepare and connect refrigeration tubing and fittings	Equivalent
UEERA0036 Establish the basic operating conditions of vapour compression systems	UEENEEJ103A Establish the basic operating conditions of vapour compression systems	Equivalent
UEERE0087 Provide sustainable energy solutions for energy management in residential premises	UEENEEK112A Provide basic sustainable energy solutions for energy reduction in residential premises	Equivalent
UEERL0001 Attach cords and plugs to electrical equipment for connection to a single phase 230 Volt supply	UEENEEP024A Attach cords and plugs to electrical equipment for connection to a single phase 230 volt supply	Equivalent

	UEENEEP026A Conduct in-service safety testing of electrical cord connected equipment and cord assemblies	Unit removed from course
VU23735 Install a sustainable extra low voltage energy power system	VU21544 Install a sustainable extra low voltage energy power system	Equivalent
VU23480 Perform intermediate engineering computations	VU22333 Perform intermediate engineering computations	Equivalent
VU23477 Interpret and prepare basic two and three dimensional engineering drawings	VU22330 Select and interpret drawings and prepare three dimensional (3D) sketched and drawings	Equivalent
VU23486 Configure and program a basic robotic system	VU22338 Configure and program a basic robotic system	Equivalent
VU23488 Use 3D printing to create products	VU22340 Use 3D printing to create products	Equivalent
	VU22341 Apply basic computer networking concepts and practices	Unit removed from course
BSBXCS301 Protect own personal online profile from cyber security threats		Newly imported unit
VU23740 Perform energy sector installations of extra low voltage (ELV) single path circuits	VU22669 Perform energy sector installations of extra low voltage (ELV) single path circuits	Equivalent
VU23736 Prepare for work in the electrotechnology industry	VU22670 Provide an overview of the electrotechnology industry	Equivalent
VU23737 Use test instruments in the	VU22671 Use test instruments in the	Equivalent

electrotechnology industry	electrotechnology industry	
VU23738 Plan and complete a basic electrotechnology project	VU22672 Carry out basic electrotechnology project	Equivalent (Unit title changed)
VU23739 Carry out basic network cabling for extra low voltage (ELV) equipment and devices	VU22673 Carry out basic network cabling for extra low voltage (ELV) equipment and devices	Equivalent
	VU22674 Explore applications and operation of the Internet of Things (IoT)	Unit deleted
VU23158 Explore the Internet of things (IoT) in industry		Newly imported unit

4. Course outcomes

Standards 5.5, 5.6 and 5.7 AQTF 2021 Standards for Accredited Courses

4.1 Qualification level

This course is consistent with the Australian Qualifications Framework (AQF) for a Certificate II level qualification in that graduates will have the following learning attributes.

Knowledge:

Graduates of the Certificate II in Electrotechnology (Pre-vocational) will have basic factual, technical and procedural knowledge within the area of electrotechnology. For example, in the application of basic electrical principles and workshop practices to enhance their entry-level employment prospects.

Skills:

Graduates of the Certificate II will have:

- cognitive skills to access, record and act on a defined range of information from a range of sources. For example, compiling information on the range of facets and occupations in the electrotechnology industry to make an informed choice in the selection of a vocational career pathway.
- cognitive and communication skills to apply and communicate known solutions to a limited range of predictable problems. For example, solving basic problems in the set up and application of wireless electrotechnology systems.
- technical skills to use a limited range of equipment to complete tasks involving known routines and procedures with a limited range

of options. For example, installing, repairing and testing extra low voltage (ELV) equipment.

Application of knowledge and skills:

Graduates of the Certificate II in Electrotechnology (Pre-vocational) will be able to demonstrate the application of knowledge and skills:

- with some accountability for the quality of own outcomes and some responsibility for own outputs in work and learning. For example, identifying potential learning pathways for specific employment opportunities
- with limited autonomy and judgement in the completion of own defined and routine tasks in known and stable contexts. For example, completing assigned electrical tasks in a simulated workplace environment.
- with limited autonomy and judgement to complete routine but variable tasks in collaboration with others in a team environment. For example, contributing as a team member to the outcomes of a basic electrotechnology project.

Volume of learning:

The volume of learning for this qualification is typically between 0.5 to 1 year (2 years part time when delivered as a VCE VET program) and incorporates structured training and self-directed learning activities such as researching and gathering information for assignments and completing project work.

4.2 Foundation skills	Foundation skills applicable to the outcomes of this course are attached as an appendix
4.3 Recognition given to the course (if applicable)	The Certificate II in Electrotechnology (Pre-vocational) is approved by the Victorian Curriculum and Assessment Authority (VCAA) as a VCE VET Program which awards credits at units 1 to 4 into the VCE and VCE VM.
4.4 Licensing/regulatory requirements (if applicable)	N/A



5. Course rules

Standards 5.8 and 5.9 AQTF 2021 Standards for Accredited Courses

5.1 Course structure

To achieve the qualification *22682VIC Certificate II in Electrotechnology (Pre-vocational)* the learner must successfully complete a total of fifteen (15) units comprising:

- thirteen (13) core units
- two (2) elective units

Note: The elective units:

- may be chosen from the list below
- one (1) elective unit can be replaced with another training package or accredited course unit provided it is consistent with the AQF level and outcomes of this course.

Where the full qualification is not completed, a VET Statement of Attainment will be issued for each unit successfully completed.

Unit of competency code	Unit of competency title	Field of Education code (six-digit)	Pre-requisite	Nominal hours
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Core units: (all units must be completed)

CPCWHS1001	Prepare to work safely in the construction industry	061301	None	6
HLTAID011	Provide First Aid	069907	None	18
UEECD0007	Apply work health and safety regulations, codes and practices in the workplace	061301	None	20
UEECD0019	Fabricate, assemble and dismantle utilities industry components	031313	UEECD0007	40
UEECD0042	Solve problems in ELV single path circuits	031313	UEECD0007	40
UEECD0020	Fix and secure electrotechnology equipment	031317	UEECD0007	20
UEERA0035	Establish the basic operating conditions of air conditioning systems	031315	UEECD0007	20
VU23480	Perform intermediate engineering computations	030199	None	40
VU23735	Install a sustainable extra low voltage energy power system	031301	None	30
VU23736	Prepare for work in the electrotechnology industry	031399	None	30



VU23737	Use test instruments in the electrotechnology industry	031399	None	20
VU23738	Plan and complete a basic electrotechnology project	031399	None	40
VU23739	Carry out basic network cabling for extra low voltage (ELV) equipment and devices	031399	None	30
Total nominal hours for core units =				354
Elective units: (select any two (2) units)				
UEECD0052	Use routine equipment/plant/technologies in an energy sector environment	030717	UEECD0007	60
UEERA0059	Prepare and connect refrigerant tubing and fittings	031315	UEECD0007	40
UEERA0036	Establish the basic operating conditions of vapour compression systems	031315	UEECD0007	60
UEERE0087	Provide sustainable energy solutions for energy management in residential premises	031399	None	30
UEERL0001	Attach cords and plugs to electrical equipment for connection to a single phase 230 Volt supply	031313	UEECD0007	20
BSBXCS301	Protect own personal online profile from cyber security threats	029901	None	30
VU23158	Explore the Internet of Things (IoT) in industry	020113	None	30
VU23477	Interpret and prepare basic two and three dimensional engineering drawings	030199	None	30
VU23486	Configure and program a basic robotic system	030199	None	60
VU23488	Use 3D printing to create products	030199	None	40
VU23740	Perform energy sector installations of extra low voltage (ELV) single path circuits	031399	None	40
Elective unit range of hours =				50 - 120
Total nominal hours range =				404 - 474

Standard 5.11 AQTF 2021 Standards for Accredited Courses

5.2 Entry requirements

There are no essential entry requirements for this course.

It is recommended applicants have as a minimum; language, literacy and numeracy skills that are equivalent to Level 2 of the Australian Core Skill Framework (ACSF).

Full details, descriptors of the ACSF can be found on website [here](#).

Applicants who have a lower level of language and literacy will require additional support to complete the course.

6. Assessment

Standard 5.12 and 5.14 AQTF 2021 Standards for Accredited Courses

6.1 Assessment strategy

All assessment, including Recognition of Prior Learning (RPL), must be compliant with the requirements of:

- Standard 1 of the AQTF: Essential Conditions and Standards for Initial/Continuing Registration and Guidelines 4.1 and 4.2 of the VRQA Guidelines for VET Providers,

or

- the Standards for Registered Training Organisations 2015 (SRTOs),

or

- the relevant standards and Guidelines for RTOs at the time of assessment.

Assessment strategies must therefore ensure that:

- all assessments are valid, reliable, flexible and fair
- learners are informed of the context and purpose of the assessment and the assessment process
- feedback is provided to learners about the outcomes of the assessment process and guidance given for future options
- time allowance to complete a task is reasonable and specified to reflect the industry context in which the task takes place.

Assessment strategies should be designed to:

- cover a range of skills and knowledge required to demonstrate achievement of the course aim
- collect evidence on a number of occasions to suit a variety of contexts and situations
- be appropriate to the knowledge, skills, methods of delivery and needs and characteristics of learners
- assist assessors to interpret evidence consistently
- recognise prior learning
- be equitable to all groups of learners.



Assessment methods may include:

- direct observation of processes and procedures
- oral and/or written questioning
- inspection of final process outcomes
- documentary workplace evidence
- practical demonstration of required physical tasks.

A holistic approach to assessment is encouraged. This may be achieved by combining the assessment of more than one unit where it better replicates working practice and reduce the potential for over assessment.

Assessment of the imported training package and accredited course units must reflect the requirements of the assessment guidelines of the relevant training package or accredited course.

6.2 Assessor competencies

Assessment must be undertaken by a person or persons in accordance with:

- Standard 1.4 of the AQTF: Essential Conditions and Standards for Initial/Continuing Registration and Guidelines 3 of the VRQA Guidelines for VET Providers,
- or
- the Standards for Registered Training Organisations 2015 (SRTOs),
- or
- the relevant standards and Guidelines for RTOs at the time of assessment.

Assessment of units of competency imported from training packages and accredited courses must reflect the requirements for assessors specified in that training package or accredited course.

7. Delivery

Standards 5.12, 5.13 and 5.14 AQTF 2021 Standards for Accredited Courses

7.1 Delivery modes

There are no restrictions on offering this course on either a full-time or part-time basis and may include online support. Providers should endeavour to be flexible in the way the training is delivered to ensure they meet the needs of the learner cohort.

It is envisaged this course will primarily be delivered in a dedicated training environment rather than on-the-job. Therefore, it is important the facilities within the training environment reflect as close as possible, realistic workplace conditions for the benefit of the students.

Suggested delivery strategies may include but not limited to:

- classroom instruction including:
 - visits to electrotechnology industry exhibitions
 - visits to electrotechnology enterprises



- range of workshop activities including instructor demonstrations and student's hands on in workshop experience.

Although the core unit VU23738 *Plan and complete a basic electrotechnology project* has no prerequisites, it is recommended the unit is delivered and assessed in the later stage of the course or 2nd year in the case of VCE VET program. Students need to have gained sufficient background knowledge and technical skills to enable them to achieve the assessment outcomes on this unit.

Some areas of content may be common to more than one unit therefore integration of delivery may be appropriate.

For VCE VET delivery refer to the VCAA - Supplementary Advice document for Electrotechnology Studies [here](#).

7.2 Resources

For this pre-vocational course all students will require access to a training facility which simulates an electrotechnology industry work environment:

- hand tools and handheld power tools
- range of testing equipment
- ELV equipment, components and consumables
- air conditioning equipment, components and consumables
- first aid training resources
- personal protective equipment (PPE)
- relevant electrical, telecommunication and air conditioning WHS/OHS) Standards, Codes of practices, safe work practices and service installation rules

In addition, students will require access to:

- computer hardware/software and printer
- manual drafting equipment and/or CAD system

Mandated assessment resources apply to the units. Refer to the Assessment Conditions of the individual units.

Training must be undertaken by a person or persons in accordance with:

- Standard 1.4 of the AQTF: Essential Conditions and Standards for Initial/Continuing Registration and Guideline 3 of the VRQA Guidelines for VET Providers,

OR

- the Standards for Registered Training Organisations 2015 (SRTOs),

OR

- the relevant standards and Guidelines for RTOs at the time of assessment.

The units of competency imported from training packages or accredited courses must reflect the requirements for resources/trainers specified in that training package or accredited course.

8. Pathways and articulation

Standard 5.10 AQTF 2021 Standards for Accredited Courses

There are no formal arrangements for articulation to other accredited courses or the higher education sector. However, the Certificate II in Electrotechnology (Pre-vocational) provides a pathway into apprenticeship/traineeship or other entry level employment in the electrotechnology or related industries at Certificate III level. Examples are:

- UEE30820 Certificate III in Electrotechnology Electrician
- UEE32220 Certificate III in Air Conditioning and Refrigeration
- UEE30320 Certificate III in Custom Electronics Installation

When arranging articulation providers should refer to the AQF 2nd Edition, 2013 Pathway Policy.

Graduates must negotiate individual pathway arrangements directly with the training provider.

This course contains imported units drawn from three training packages and one accredited course. Participants who successfully complete any of these units will be able to gain credit into other qualifications containing these same units in any future studies. Likewise, participants who have already completed any of the imported units from previous training, will be granted a credit for the unit/s in this course.

9. Ongoing monitoring and evaluation

Standard 5.15 AQTF 2021 Standards for Accredited Courses

The Curriculum Maintenance Manager - Engineering Industries (CMM-EI) is responsible for the ongoing monitoring and maintenance of this course during its accreditation period.

The CMM-EI will undertake a review of the course midway through the accreditation period.

The review will involve consultation with:

- teaching staff from both the secondary and VET sectors
- industry and industry associations representatives
- Victorian Curriculum and Assessment Authority (VCAA)

Any significant changes to the course resulting from the ongoing monitoring and review process will be reported to the Victorian Registrations and Quality Authority (VRQA) through the formal amendment process.

Section C – Units of competency

Enterprise units:

VU23735	Install a sustainable extra low voltage energy power system
VU23740	Perform energy sector installations of extra low voltage (ELV) single path circuits
VU23736	Prepare for work in the electrotechnology industry
VU23737	Use test instruments in the electrotechnology industry
VU23738	Plan and complete a basic electrotechnology project
VU23739	Carry out basic network cabling for extra low voltage (ELV) equipment and devices

Imported Enterprise units from 22632VIC Certificate II in Engineering Studies

VU23477	Interpret and prepare basic two and three dimensional engineering drawings
VU23480	Perform intermediate engineering computations
VU23486	Configure and program a basic robotic system
VU23488	Use 3D printing to create products

Imported Enterprise unit from 22588VIC Certificate III in Enabling Technologies

VU23158	Explore the Internet of Things (IoT) in industry
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Training Package units: These can be downloaded [here](#)

BSBXCS301	Protect own personal online profile from cyber security threats
CPCWHS1001	Prepare to work safely in the construction industry
HLTAID011	Provide First Aid
UEECD0007	Apply work health and safety regulations, codes and practices in the workplace
UEECD0019	Fabricate, assemble and dismantle utilities industry components
UEECD0020	Fix and secure electrotechnology equipment
UEECD0042	Solve problems in ELV single path circuits
UEECD0052	Use routine equipment/plant/technologies in an energy sector

	environment
UEERA0035	Establish the basic operating conditions of air conditioning systems
UEERA0036	Establish the basic operating conditions of vapour compression systems
UEERA0059	Prepare and connect refrigerant tubing and fittings
UEERE0087	Provide sustainable energy solutions for energy management in residential premises
UEERL0001	Attach cords and plugs to electrical equipment for connection to a single phase 230 Volt supply

Unit code	VU23740
Unit title	Perform energy sector installations of extra low voltage (ELV) single path circuits
Application	<p>This unit describes the performance outcomes, skills and knowledge required to perform energy sector installations of extra low voltage (ELV) single path circuits. This includes ELV powered devices such as security controls, integrated systems and audio/visual systems.</p> <p>It requires the ability to wire ELV single path circuits and terminate associated accessories, apply safe working practices and follow work processes that satisfy electrical principles for safety and functionality.</p> <p>The unit applies to a person preparing for further study and/or employment such as an apprenticeship in the electrotechnology industry.</p> <p>No licensing, legislative, regulatory or certification requirements apply to this unit at the time of publication.</p>
Pre-requisite Unit(s)	Nil
Competency Field	N/A
Unit Sector	N/A

Element		Performance Criteria	
Elements describe the essential outcomes of a unit of competency.		Performance criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the assessment requirements.	
1	Determine the requirements for specific ELV job	1.1	Nature and location of the ELV work to be undertaken is clarified with the supervisor
		1.2	Operating voltage is confirmed as ELV as defined in the current version of AS/NZS 3000
		1.3	ELV installation meets the requirements of the current version of AS/NZS 3000 is established and confirmed with the supervisor
		1.3	Risks or hazards associated with the work are identified and established risk control measures are followed
		1.4	Resources required to undertake the ELV work are identified and accessed
		1.5	Tools, equipment and testing devices are checked for correct operation

		1.6	Relevant workplace health and safety/occupational health and safety (WHS/OHS) requirements for the specific tasks are identified and accommodated
2	Wire ELV circuits and connect accessories	2.1	Relevant circuits/machines/plant are confirmed to be isolated in accordance with workplace procedures
		2.2	Wiring/cablings and accessories are installed in accordance with workplace procedures
		2.3	Appropriate cable support and protection methods are applied in accordance with workplace procedures
		2.4	Any unexpected circumstances are referred to the supervisor for advice
		2.5	Accessories are installed in the required locations
		2.6	Cables and conductors are terminated at accessories in accordance with manufacturer's specifications and regulatory requirements
		2.7	Installed cables are marked for identification for future service in accordance with workplace procedures, cable identification scheme and regulatory requirements
		2.8	Sustainable work practices are employed to minimise waste and damage to the environment
3	Finalise ELV job activities	3.1	Relevant testing devices are used to confirm compliance and correct operation of the circuit/s
		3.2	Worksite is cleaned and unused materials, tools and equipment are collected and stored in accordance with workplace requirements
		3.3	Supervisor is notified of completion of the work in accordance with workplace procedures

Range of Conditions

By definition, extra low voltage (ELV) is a voltage not exceeding 50 V a.c. or 120 V ripple-free d.c.

For Performance Criteria 1.2 and 1.3:

- AS/NZS 3000 Electrical Installation – Wiring Rules is to be used to confirm that the operating voltage required is ELV, as per the definition.
- AS/NZS 3000 Electrical Installation – Wiring Rules is to be used to confirm that the circuit is compliant as being either separated ELV (SELV) or protected ELV (PELV).

Foundation Skills

Foundation skills essential to performance and not explicit in the performance criteria must be assessed.

Skill	Description
Reading skills to:	<ul style="list-style-type: none"> • interpret written work instructions, relevant standards and safety information
Oral communication skills to:	<ul style="list-style-type: none"> • seek advice and confirm task requirements
Numeracy skills to:	<ul style="list-style-type: none"> • interpret testing equipment readings and make basic calculations
Teamwork skills to:	<ul style="list-style-type: none"> • work co-operatively with others in the workplace
Technology skills to:	<ul style="list-style-type: none"> • safely use a range of hand tools commonly found in a electrotechnology workplace

Unit Mapping Information	Code and Title Current Version	Code and Title Previous Version	Comments
	VU23740 Perform energy sector installations of extra low voltage (ELV) single path circuits	VU22669 Perform energy sector installations of extra low voltage (ELV) single path circuits	Equivalent

Assessment Requirements

Title	Assessment Requirements for VU23740 Perform energy sector installations of extra low voltage (ELV) single path circuits
Performance Evidence	<p>There must be evidence the learner has completed the tasks outlined in the elements, performance criteria and foundation skills of this unit and on at least three (3) occasions in a different context:</p> <ul style="list-style-type: none"> • select and use appropriate tools, test equipment and other relevant resources and install wiring and/or cabling and terminate accessories for extra low voltage (ELV) single path circuits in accordance with job instructions • apply WHS/OHS workplace procedures and practices including the use of risk control measures for each installation.
Knowledge Evidence	<p>The learner must be able to demonstrate essential knowledge required to effectively do the task outlined in elements and performance criteria of this unit, manage the task and manage contingencies in the context of the work role. This includes knowledge of:</p> <ul style="list-style-type: none"> • ELV operating voltage and installation requirements as defined in the current version of AS/NZS 3000 • risk and hazards including control measures • safe working practices for wiring/cabling and terminating accessories for single path extra-low voltage circuits • cable protection and support methods and accessories • types of cables used in the electrotechnology industry and their application • basic cable and conductor terminations • relevant tools and testing devices • sustainability principles and practices related to electrotechnology work
Assessment Conditions	<p>Both practical skills and knowledge must be assessed. Assessment in a simulated environment must reflect the real-life working environment with access to:</p> <ul style="list-style-type: none"> • three ELV installation opportunities • job instructions/diagrams for each ELV installations • relevant tools, consumables and testing devices • personal protective equipment (PPE). <p>All assessment must be completed in accordance with relevant WHS/OHS standards/regulations and safe work procedures.</p> <p>Assessor requirements</p> <p>No specialist vocational competency requirements for assessors apply to this unit.</p>

Unit code	VU23736
Unit title	Prepare for work in the electrotechnology industry
Application	<p>This unit describes the performance outcomes, skills and knowledge required to obtain and provide an overview of the electrotechnology industry which includes the major sectors of the industry, services and products provided, application of advanced technologies, employment opportunities and training pathways for entry into the industry.</p> <p>It requires the ability to investigate the role of and training requirements to become an electrotechnology tradesperson, prepare a personal resume and participate in a face-to-face job interview.</p> <p>The unit applies to a person preparing for further study and/or employment such as an apprenticeship in the electrotechnology industry.</p> <p>No licensing, legislative, regulatory or certification requirements apply to this unit at the time of publication.</p>
Pre-requisite Unit(s)	Nil
Competency Field	N/A
Unit Sector	N/A

Element		Performance Criteria	
Elements describe the essential outcomes of a unit of competency.		Performance criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the assessment requirements.	
1	Identify and report on the diverse coverage of the electrotechnology industry	1.1	Information sources for the electrotechnology industry are identified and utilised
		1.2	Major streams/sectors of the electrotechnology industry are identified and their focus is recorded
		1.3	Services and/or products of each major stream/sector are defined and documented
		1.4	Applications of advanced technologies in the industry streams/sectors are explored and documented
2	Identify and record occupations/job roles of technical staff in the various industry streams/sectors	2.1	Roles and responsibilities of technical staff employed in each major stream/sector are identified and documented
		2.2	Qualifications for entry into the various occupations and roles are identified and recorded
		2.3	Providers that offer VET electrotechnology qualifications are identified and recorded

3	Define and record the role and training pathway for a electrotechnology tradesperson	3.1	The key tasks and responsibilities of electrotechnology tradespersons employed in different streams/sectors of the industry are identified and documented
		3.2	Training pathway to become an electrotechnology tradesperson is explored and recorded
		3.3	The purpose and requirements of licensing for tradespersons and apprentice supervision guidelines are clarified and documented
		3.4	Specialisation options for electrotechnology tradespersons are identified and recorded
		3.5	Industry award classifications for a electrotechnology tradespersons are documented
		3.6	Electrotechnology industry organisations which represent the electrical industry workers are identified and their role are recorded
4	Make an application for an apprenticeship in the electrotechnology industry	4.1	Type of apprenticeship and the relevant electrotechnology sector which requires this apprenticeship are researched and documented
		4.2	Prospective enterprises/companies/businesses are identified and contact details are confirmed and noted
		4.3	Job position information and key selection criteria including closing date for application are determined
		4.4	Personal resume with a covering letter is prepared for a prospective employer
5	Undergo an interview for an apprenticeship position	5.1	Preparation for the interview is planned and carried out
		5.2	Date, time and location of the interview is confirmed
		5.3	Personal presentation requirements for the interview are addressed
		5.4	An interview for apprenticeship position is undertaken
		5.5	Interview process is reviewed and areas for improvements are identified

Range of Conditions

The job interview (PC 5.4) will be simulated

Foundation Skills

Foundation skills essential to performance and not explicit in the performance criteria must be assessed.

Skill	Description
Reading skills to:	<ul style="list-style-type: none"> interpret and collate sourced information on the electrotechnology industry
Writing skills to:	<ul style="list-style-type: none"> prepare a personal resume to support an employment application
Oral communication skills to:	<ul style="list-style-type: none"> seek industry information from a range of sources
Learning skills to:	<ul style="list-style-type: none"> comprehend the diversity of the electrotechnology industry
Planning and organising skills to:	<ul style="list-style-type: none"> source and collate electrotechnology information
Digital literacy skills to:	<ul style="list-style-type: none"> use appropriate software to prepare and enhance personal resume

Unit Mapping Information	Code and Title Current Version	Code and Title Previous Version	Comments
	VU23736 Prepare for work in the electrotechnology industry	VU22670 Provide an overview of the electrotechnology industry	Equivalent

Assessment Requirements

Title	Assessment Requirements for VU23736 Prepare for work in the electrotechnology industry
Performance Evidence	<p>There must be evidence the learner has completed the tasks outlined in the elements, performance criteria and foundation skills of this unit and can provide evidence they have:</p> <ul style="list-style-type: none"> • researched and sourced information about the electrotechnology industry that identifies the: <ul style="list-style-type: none"> ○ diverse nature of the industry ○ services and products provided by the industry ○ applications of advanced technology ○ job role/occupations of technical staff and the required qualifications in the various industry streams/sectors • mapped a typical training pathway for an electrotechnology tradesperson • prepared a personal resume to support an employment application for an apprenticeship or entry level position in the industry • participated in a face-to-face simulated employment interview
Knowledge Evidence	<p>The learner must be able to demonstrate essential knowledge required to effectively do the task outlined in elements and performance criteria of this unit, manage the task and manage contingencies in the context of the work role. This includes knowledge of:</p> <ul style="list-style-type: none"> • sectors of the electrotechnology industry including services and products of each • application of advanced technologies in the industry • organisations which regulate and support the industry and support employees in the industry • roles of technical staff including required qualifications and experience • training pathways into and within the industry • types of apprenticeships offered by the industry • types of industry licensing requirements for trade persons • sources for accessing information on the electrotechnology industry • requirements for preparing a personal resume to support a job application • do's and don'ts in a face-to-face job interview
Assessment Conditions	<p>Both practical skills and knowledge must be assessed Student must have access to:</p> <ul style="list-style-type: none"> • internet and library • organisations which regulate and support the electrotechnology industry • employee support organisations • appropriate person/s to conduct a <i>face-to-face</i> simulated interview and provide the applicant feedback on their interview performance.

All assessment must be completed in accordance with relevant WHS/OHS standards/regulations and safe work procedures.

Assessor requirements

No specialist vocational competency requirements for assessors apply to this unit.

Unit code	VU23737
Unit title	Use test instruments in the electrotechnology industry
Application	<p>This unit describes the performance outcomes, skills and knowledge required to set up and use a range of analogue and digital test instruments commonly applied in the electrotechnology industry to test extra low voltage (ELV) components and circuits.</p> <p>It requires the ability to apply safe working habits when testing ELV components and circuits, read and interpret operating instructions for electrical testing instruments and read and interpret test results to determine serviceability of ELV components and circuits.</p> <p>The unit applies to a person preparing for further study and/or employment such as an apprenticeship in the electrotechnology industry.</p> <p>No licensing, legislative, regulatory or certification requirements apply to this unit at the time of publication.</p>
Pre-requisite Unit(s)	Nil
Competency Field	N/A
Unit Sector	N/A

Element		Performance Criteria	
Elements describe the essential outcomes of a unit of competency.		Performance criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the assessment requirements.	
1	Prepare test instrument to perform electrical test	1.1	Testing requirement is determined and the appropriate test instrument is selected for the task
		1.2	Handling and operating procedures for the test equipment are confirmed before use
		1.3	Test instrument is tested for serviceability according to manufacturer requirements
		1.4	Safety requirements for the testing task and use of the test instrument are accessed and followed
2	Conduct electrical testing task	2.1	Test instrument is connected to the ELV component or circuit in accordance with manufacturer requirements
		2.2	Testing task is conducted in accordance with workplace procedures and safety requirements

		2.3	Test result/reading is interpreted to determine the condition or serviceability of the electrical component/s and/or circuit being tested
3	Complete electrical testing task	3.1	Test results are recorded in accordance with workplace procedures
		3.2	Test equipment is disconnected, cleaned, checked for damage and stored in accordance with workplace procedures
		3.3	Damaged, faulty or inaccurate electrical test equipment is tagged and isolated for repair or replacement in accordance with workplace procedures
		3.4	Appropriate person is notified of completion of the testing task and provided with the test readings in accordance with workplace procedures

Range of Conditions

- By definition, extra low voltage (ELV) is a voltage not exceeding 50 V a.c. or 120 V ripple-free d.c.
- AS/NZS 3000 Electrical Installation – Wiring Rules is to be used to confirm that the operating voltage required is ELV, as per the definition.
- AS/NZS 3000 Electrical Installation – Wiring Rules is to be used to confirm that the circuit is compliant as being either separated ELV (SELV) or protected ELV (PELV).

Foundation Skills

Foundation skills essential to performance and not explicit in the performance criteria must be assessed.

Skill	Description
Reading skills to:	<ul style="list-style-type: none"> • interpret written work instructions, testing equipment set up and operating requirements and safety information
Writing skills to:	<ul style="list-style-type: none"> • record test results in accordance with workplace requirements
Oral communication skills to:	<ul style="list-style-type: none"> • seek advice and confirm testing requirements
Numeracy skills to:	<ul style="list-style-type: none"> • interpret analogue and digital scales and dials of test instruments
Teamwork skills to:	<ul style="list-style-type: none"> • work co-operatively with others in the workplace

Unit Mapping Information	Code and Title Current Version	Code and Title Previous Version	Comments
	VU23737 Use test instruments in the	VU22671 Use test instruments in the	Equivalent

	electrotechnology industry	electrotechnology industry	
Assessment Requirements			
Title	Assessment Requirements for VU23737 Use test instruments in the electrotechnology industry		
Performance Evidence	<p>There must be evidence the learner has completed the tasks outlined in the elements, performance criteria and foundation skills of this unit and on at least four (4) occasions using a different test instrument on each occasion:</p> <ul style="list-style-type: none"> • select, set-up and use a test instrument to test the ELV component/s and/or circuits • comply with all relevant WHS/OHS procedures and requirements for each testing task 		
Knowledge Evidence	<p>The learner must be able to demonstrate essential knowledge required to effectively do the task outlined in elements and performance criteria of this unit, manage the task and manage contingencies in the context of the work role. This includes knowledge of:</p> <ul style="list-style-type: none"> • WHS/OHS requirements applicable when working with electrical ELV components and circuits • ELV operating voltage and installation requirements as defined in the current version of AS/NZS 3000 • How to select and use appropriate personal protective equipment (PPE) required for electrical testing tasks • test instruments commonly used to test ELV components and circuits that includes but is not limited to: <ul style="list-style-type: none"> ○ voltmeter ○ ammeter ○ ohmmeter ○ multimeter ○ insulation resistance tester ○ test lights and probes ○ circuit continuity tester • ELV components or circuits that includes but is not limited to: <ul style="list-style-type: none"> ○ resistors ○ capacitors ○ cables ○ globes ○ diodes ○ batteries ○ fuses ○ motor control device ○ wiring circuit ○ coils 		

**Assessment
Conditions**

Both practical skills and knowledge must be assessed. Assessment in a simulated environment must reflect the real-life working environment with access to:

- at least four (4) types test equipment
- ELV components and circuits
- workplace safety procedures
- personal protective equipment (PPE)

All assessment must be completed in accordance with relevant WHS/OHS standards/regulations and safe work procedures.

Assessor requirements

No specialist vocational competency requirements for assessors apply to this unit.

Unit code	VU23738
Unit title	Plan and complete a basic electrotechnology project
Application	<p>This unit describes the performance outcomes, skills and knowledge required to plan, carry out and finalise a basic electrotechnology project. It requires the ability to define the scope of the project, develop an action plan, prepare design sketches/working drawings, determine and access the required resources, carry out the build process, demonstrate the final product and evaluate the process.</p> <p>The unit applies to a person preparing for further study and/or employment such as an apprenticeship in the electrotechnology industry.</p> <p>No licensing, legislative, regulatory or certification requirements apply to this unit at the time of publication.</p>
Pre-requisite Unit(s)	Nil
Competency Field	N/A
Unit Sector	N/A

Element		Performance Criteria	
Elements describe the essential outcomes of a unit of competency.		Performance criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the assessment requirements.	
1	Form work team and determine the project	1.1	Project team is formed and a team leader is appointed
		1.2	Ideas for the project are shared by team members and a short list is prepared
		1.3	Project short list is reviewed by team members and a project concept is chosen
		1.4	Project proposal is prepared and submitted to supervisor for approval
2	Develop project action plan	2.1	Project outcome is confirmed and a draft action plan with agreed timelines is developed
		2.2	Safety risks and hazards are identified and control measures determined
		2.3	Working sketches and drawing are prepared to confirm the end product and guide the build process
		2.4	Electrical components and parts required for the project are identified

		2.5	Tools, equipment and other resources required for the project are determined
		2.6	Budget for the project is calculated and approved by supervisor
		2.7	Project action plan is confirmed and work tasks are allocated for each team member
3	Conduct the project build	3.1	Components, resources, tools and equipment are sourced in line with the action plan
		3.2	Project construction stage is implemented by team members in accordance with the project action plan
		3.3	Safe work practices are applied at all times by each member of the team
		3.4	Project progress is monitored by team leader against agreed timelines in conjunction with team members
		3.5	Decisions for dealing with unexpected situations are discussed with all team members and confirmed with supervisor
		3.6	Individual components are trialled and tested before final assembly
4	Finalise and review the project	4.1	Final project is assembled and trialled and where necessary, adjustments and/or modifications are made to improve performance
		4.2	Final project is demonstrated by team to peers and submitted to supervisor for sign off
		4.3	Tools and equipment used for the project are checked for damage and returned to storage according to workplace procedures
		4.4	Project team in conjunction with the supervisor, reviews the project outcomes against the project action plan and area/s for possible improvement are identified

Range of Conditions

No range of conditions

Foundation Skills



Foundation skills essential to performance and not explicit in the performance criteria must be assessed.

Skill	Description
Reading skills to:	<ul style="list-style-type: none"> determine if components/parts are suitable for the project build
Oral communication skills to:	<ul style="list-style-type: none"> seek <i>advice</i> and confirm task requirements
Numeracy skills to:	<ul style="list-style-type: none"> interpret component specifications and make basic calculations
Problem-solving skills to:	<ul style="list-style-type: none"> achieve a pre-determine project outcome
Teamwork skills to:	<ul style="list-style-type: none"> work co-operatively with others team members to achieve a project outcome
Planning and organising skills to:	<ul style="list-style-type: none"> meet project pre-determined timelines and completion date
Technology skills to:	<ul style="list-style-type: none"> select a small range of electrotechnology components and parts for a workable project outcome prepare basic schematic sketches/diagrams to share project concepts

Unit Mapping Information	Code and Title Current Version	Code and Title Previous Version	Comments
	VU23738 Plan and complete a basic electrotechnology project	VU22672 Carry out basic electrotechnology project	Equivalent

Assessment Requirements

Title	Assessment Requirements for VU23738 Plan and complete a basic electrotechnology project
Performance Evidence	<p>There must be evidence the learner has completed the tasks outlined in the elements, performance criteria and foundation skills of this unit and worked as part of a small team to:</p> <ul style="list-style-type: none"> • plan and complete one (1) basic electrotechnology project in accordance with a prepared action plan and agreed timelines • source and assemble electrotechnology components to build a working model/prototype • apply safe work practices in an electrotechnology environment at all times
Knowledge Evidence	<p>The learner must be able to demonstrate essential knowledge required to effectively do the task outlined in elements and performance criteria of this unit, manage the task and manage contingencies in the context of the work role. This includes knowledge of:</p> <ul style="list-style-type: none"> • basic electrotechnology principles and practices • safe work practices in a electrotechnology environment • considerations for realistic project ideas include but not limited to: <ul style="list-style-type: none"> ○ access to available resources ○ sufficient time to plan, build and complete the project ○ costings ○ required technical expertise of the team ○ working within the project action plan • steps to be taken when planning and organising a project action plan • principles for effective teamwork • project review process

**Assessment
Conditions**

Both practical skills and knowledge must be assessed. Assessment in a simulated environment must simulate the real-life working environment with access to:

- project team consisting of two to three individuals
- project consumables and resources
- hand tools and Personal Protective Equipment (PPE)

All assessment must be completed in accordance with relevant WHS/OHS standards/regulations and safe work procedures.

Assessor requirements

No specialist vocational competency requirements for assessors apply to this unit.

Unit code	VU23739
Unit title	Carry out basic network cabling for extra low voltage (ELV) equipment and devices
Application	<p>This unit describes the performance outcomes, skills and knowledge required to run cabling for the connection of extra low voltage (ELV) networking equipment and devices.</p> <p>It requires the ability to identify ELV cabling, apply cabling skills including runs, connections and terminations, test circuits, use hand tools and follow work practices that satisfy electrical and telecommunication principles for safety and functionality.</p> <p>The unit applies to a person preparing for further study and/or employment such as an apprenticeship in the electrotechnology industry.</p> <p>No licensing, legislative, regulatory or certification requirements apply to this unit at the time of publication.</p>
Pre-requisite Unit(s)	Nil
Competency Field	N/A
Unit Sector	N/A

Element		Performance Criteria	
Elements describe the essential outcomes of a unit of competency.		Performance criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the assessment requirements.	
1	Prepare to connect equipment and devices	1.1	Scope of the work and/or work instruction is clarified with the supervisor
		1.2	Network cabling, testing equipment and tools needed to carry out the work are obtained and checked
		1.3	Relevant work health and safety/occupational health and safety (WHS/OHS) procedures for work area are followed
2	Make connections and terminations in-line with work instructions	2.1	Cabling is run according to work instructions without damage or distortion to itself, surrounding environment or services
		2.2	Network equipment or ELV devices are installed in-line with work practices that satisfy electrical principles for safety, functionality and manufacturer's instructions

		2.3	Cabling connections and terminations are completed in accordance with work instructions and safe work practices
		2.4	Unexpected events or conditions are referred to the supervisor for advice and directions
3	Complete cabling work task	3.1	Test equipment is connected in accordance with manufacturer's instructions and connections and termination are tested to ensure compliance and safe working order
		3.2	Work area is cleaned and made safe in accordance with established safe workplace procedure
		3.3	Tools and test equipment are cleaned, checked and returned to storage
		3.4	Supervisor is notified of the completion of the cabling work task in accordance with established procedure

Range of Conditions

- By definition, extra low voltage (ELV) is a voltage not exceeding 50 V a.c. or 120 V ripple-free d.c.
- AS/NZS 3000 Electrical Installation – Wiring Rules is to be used to confirm that the operating voltage required is ELV, as per the definition.
- AS/NZS 3000 Electrical Installation – Wiring Rules is to be used to confirm that the circuit is compliant as being either separated ELV (SELV) or protected ELV (PELV).

Foundation Skills

Foundation skills essential to performance and not explicit in the performance criteria must be assessed.

Skill	Description
Reading skills to:	<ul style="list-style-type: none"> • interpret written work instructions, relevant standards and safety information
Oral communication skills to:	<ul style="list-style-type: none"> • seek advice and confirm task requirements • co-ordinate work task with others in the work area
Numeracy skills to:	<ul style="list-style-type: none"> • interpret testing equipment readings and make basic calculations
Teamwork skills to:	<ul style="list-style-type: none"> • work co-operatively with others in the workplace
Technology skills to:	<ul style="list-style-type: none"> • use tools and test equipment to ensure required ELV cables connections and terminations comply with performance requirements and electrical practices

Unit Mapping Information	Code and Title Current Version	Code and Title Previous Version	Comments
	VU23739 Carry out basic network cabling for extra low voltage (ELV) equipment and devices	VU22673 Carry out basic network cabling for extra low voltage (ELV) equipment and devices	Equivalent

Assessment Requirements

Title	Assessment Requirements for VU23739 Carry out basic network cabling for extra low voltage (ELV) equipment and devices
Performance Evidence	<p>There must be evidence the learner has completed the tasks outlined in the elements, performance criteria and foundation skills of this unit and on at least two (2) occasions and each in a different context:</p> <ul style="list-style-type: none"> • apply ELV cabling skills in accordance to job instructions and separation requirements • connect network equipment and devices using standard cable termination techniques • connect and use test equipment to test for correct operation of cable connections and terminations • exhibit work practices that satisfy electrical principles for safety and functionality
Knowledge Evidence	<p>The learner must be able to demonstrate essential knowledge required to effectively do the task outlined in elements and performance criteria of this unit, manage the task and manage contingencies in the context of the work role. This includes knowledge of:</p> <ul style="list-style-type: none"> • WHS/OHS regulations and safe work practices in the electrotechnology environment • ELV operating voltage and installation requirements as defined in the current version of AS/NZS 3000 • types of ELV cables includes but is not limited to: <ul style="list-style-type: none"> ○ structured pair ○ figure 8 ○ co-axial ○ shielded cable ○ ribbon cables • cabling regulations, rules, principles and techniques • networking equipment and devices includes but is not limited to: <ul style="list-style-type: none"> ○ computer hardware ○ printers ○ POE lighting (Power over Ethernet) ○ ELV security devices/systems ○ renewable energy system monitoring equipment ○ audio and sound equipment ○ timed watering systems ○ router

- patch panel and patch leads
- procedures for dealing with unexpected situation when working with ELV cables
- testing equipment includes but is not limited to:
 - circuit continuity tester
 - insulation resistance tester
 - multimeter
 - voltmeter
 - Local Area Network (LAN) tester

Assessment Conditions

Both practical skills and knowledge must be assessed. Assessment in a simulated environment must simulate the real-life working environment with access to:

- network equipment and ELV devices
- different types of cabling
- tools, test equipment and consumables
- job instructions
- personal protective equipment (PPE)
- cabling and safety regulations

All assessment must be completed in accordance with relevant WHS/OHS standards/regulations and safe work procedures.

Assessor requirements

No specialist vocational competency requirements for assessors apply to this unit.

Unit code	VU23735
Unit title	Install a sustainable extra low voltage energy supply system
Application	<p>This unit describes the performance outcomes, skills and knowledge required to install a sustainable extra low voltage (ELV) energy supply system. It requires the ability to plan an installation process, carry out the installation, use diagnostic tools to troubleshoot the installation and commission the sustainable energy power system.</p> <p>The unit also includes the application of relevant work health and safety/occupational health and safety (WHS/OHS) requirements and application of risk control measures.</p> <p>The unit applies to a person preparing for further study and/or employment such as an apprenticeship in the electrotechnology industry.</p> <p>No licensing, legislative, regulatory or certification requirements apply to this unit at the time of publication.</p>
Pre-requisite Unit(s)	Nil
Competency Field	N/A
Unit Sector	N/A

Element		Performance Criteria	
Elements describe the essential outcomes of a unit of competency.		Performance criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the assessment requirements.	
1	Prepare to install a sustainable energy system	1.1	Process to install a sustainable energy system is planned
		1.2	Relevant (WHS/OHS) requirements and risk control measures and procedures are followed in the preparation of the work area
		1.3	Safety hazards, identified in the work area are documented and risk control measures devised and implemented in consultation with appropriate personnel
		1.4	Sustainable energy system requirements are determined and discussed with the supervisor
2	Install a sustainable energy system	2.1	Assembling techniques are applied to install a ELV sustainable energy system
		2.2	Decisions for dealing with unexpected situations are made from job specifications and discussion with the supervisor

		2.3	Diagnostic tools to test for functionality of the sustainable energy power system are applied in accordance with manufacturer instructions
3	Commission a sustainable energy system and complete work task	3.1	Final inspection of the sustainable energy system is completed and the system is commissioned
		3.2	Work site is made safe in accordance with enterprise procedures
		3.3	Tools and test equipment used for the installation are checked and stored in accordance to workplace procedure
		3.4	Relevant documentation relating to the work is completed in accordance to workplace procedure

Range of Conditions

- By definition, extra low voltage (ELV) is a voltage not exceeding 50 V a.c. or 120 V ripple-free d.c.
- AS/NZS 3000 Electrical Installation – Wiring Rules is to be used to confirm that the operating voltage required is ELV, as per the definition.
- AS/NZS 3000 Electrical Installation – Wiring Rules is to be used to confirm that the circuit is compliant as being either separated ELV (SELV) or protected ELV (PELV).

Foundation Skills

Foundation skills essential to performance and not explicit in the performance criteria must be assessed.

Skill	Description
Reading skills to:	<ul style="list-style-type: none"> • interpret written work instructions, relevant standards and safety information and component specifications
Oral communication skills to:	<ul style="list-style-type: none"> • seek advice to regarding ELV system installation requirements
Numeracy skills to:	<ul style="list-style-type: none"> • interpret testing equipment readings and make basic calculations
Problem solving skills to:	<ul style="list-style-type: none"> • deal with unexpected situation during the system installation process
Technology skills to:	<ul style="list-style-type: none"> • use a range of hand tools and diagnostic test equipment

Unit Mapping Information	Code and Title Current Version	Code and Title Previous Version	Comments
	VU23735 Install a sustainable extra low voltage energy supply system	VU21544 Install a sustainable extra low voltage energy supply system	Equivalent

Assessment Requirements

Title	Assessment Requirements for VU23735 Install a sustainable extra low voltage energy supply system
Performance Evidence	<p>There must be evidence the learner has completed the tasks outlined in the elements, performance criteria and foundation skills of this unit and provided evidence of the ability to:</p> <ul style="list-style-type: none"> • install, test and commission at least one (1) type of sustainable ELV energy supply system in accordance to a work plan • use relevant diagnostic tools to test functionality of the system to meet job specifications • apply risk control measures and safe work practices during the installation.
Knowledge Evidence	<p>The learner must be able to demonstrate essential knowledge required to effectively do the task outlined in elements and performance criteria of this unit, manage the task and manage contingencies in the context of the work role. This includes knowledge of:</p> <ul style="list-style-type: none"> • types and functionality of sustainable extra low voltage (ELV) energy supply system includes but is not limited to: <ul style="list-style-type: none"> ○ photovoltaic ○ solar radiation ○ micro-hydro ○ wind energy conversion • ELV operating voltage and installation requirements as defined in the current version of AS/NZS 3000 • Installation consideration of each type of system • application of diagnostic tools and test equipment to determine the energy system optimum performance • application of (WHS/OHS) requirements and safety work practices relevant to the installation of the different types of energy saving systems • managing safety hazards and risk control at the installation site
Assessment Conditions	<p>Both practical skills and knowledge must be assessed. Assessment in a simulated environment must simulate the real-life working environment with access to:</p> <ul style="list-style-type: none"> • work task instructions and specifications • personal protective equipment (PPE) • components and parts to build a ELV sustainable energy system • tools, equipment and <i>consumables</i> <p>All assessment must be completed in accordance with relevant WHS/OHS standards/regulations and safe work procedures.</p>

Assessor requirements

No specialist vocational competency requirements for assessors apply to this unit.
