22289VIC

Certificate II in Integrated Technologies

(Version 1)

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

Accredited for the period: 1st July 2015 to 30th June 2020
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### Section A: Copyright and course classification information

<table>
<thead>
<tr>
<th>1. <strong>Copyright owner of the course</strong></th>
<th>Copyright of this course is held by the Department of Education and Training, Victoria © State of Victoria (Department of Education and Training) 2018</th>
</tr>
</thead>
<tbody>
<tr>
<td>2. <strong>Address</strong></td>
<td>Department of Education and Early Childhood Development Higher Education and Skills Group Executive Director Training Participation and Facilitation Division PO Box 4367 Melbourne VIC 3001 Day to day contact: Engineering Industries Curriculum Maintenance Manager Box Hill Institute of TAFE 465 Elgar Road Box Hill Victoria 3128 Postal address: Private Bag 2014 Box Hill Victoria 3128 Email: <a href="mailto:g.adda@bhtafe.edu.au">g.adda@bhtafe.edu.au</a> Telephone: (03) 9286 9880 Facsimile: (03) 9286 9991</td>
</tr>
<tr>
<td>3. <strong>Type of submission</strong></td>
<td>The course is submitted for reaccreditation. It replaces and has equivalent outcomes to: <strong>22071VIC - Certificate II in Integrated Technologies</strong></td>
</tr>
<tr>
<td>4. <strong>Copyright acknowledgement</strong></td>
<td>Endorsed units of competency have been imported into this course from the following Training Packages and State accredited courses. Copyright of the following units of competency from nationally endorsed training packages is administered by the Commonwealth of Australia. © Commonwealth of Australia Units of competency from nationally endorsed training packages can be accessed from Training.gov at <a href="http://www.tga.gov.au">www.tga.gov.au</a> <strong>CPP07 Property Services Training Package</strong> CPPSEC2021A Install security equipment and systems CPPSEC2023A Install CCTV equipment and system CPPSEC2026A Perform routine maintenance on security equipment and system</td>
</tr>
<tr>
<td>Package</td>
<td>Code</td>
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<tr>
<td>CUF07 Screen and Media Training Package</td>
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<tr>
<td>ICA11 Information and Communications Technology Training Package</td>
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<tr>
<td>ICT10 Integrated Telecommunications Training Package</td>
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<tr>
<td>MEM05 Metal and Engineering Training Package</td>
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<td></td>
<td>VU20906</td>
</tr>
</tbody>
</table>
The following units:

- VU20177 Plan and build a system using fibre optic equipment
- VU20178 Use fibre optic equipment in engineering technology
- VU20179 Use fibre optic equipment in communication technology
- VU21352 Implement a digital circuit using a programmable logic device (PLD)
- VU21387 Test and verify correct operation of a “by-wire” control system
- VU21388 Set up and test an embedded control system
- VU21541 Maintain rechargeable battery systems
- VU21542 Identify and locate building blocks of a centralised power generation system
- VU21543 Set up an extra low voltage emergency power supply system (not exceeding 32v)
- VU21544 Install a sustainable extra low voltage energy power system
- VU21552 Operate a small power supply system
- VU21553 Assemble and connect an extra low voltage battery power source
- VU21554 Perform basic network and computer assembly
- VU21555 Perform basic network and computer maintenance
- VU21556 Install and configure basic network and computer operating systems
- VU21565 Install and test a home entertainment system
- VU21566 Install and test a wireless intercom system
- VU21567 Conduct site survey for a wireless network
- VU21568 Set up and operate a wireless communication link
- VU21569 Install communications antennae
- VU21581 Build a small wireless LAN

are from 22263VIC Certificate IV in Integrated Technologies

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<table>
<thead>
<tr>
<th>5. Licensing and franchise</th>
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</tr>
</thead>
<tbody>
<tr>
<td>6. Course accrediting body</td>
<td>Victorian Registration and Qualifications Authority</td>
</tr>
<tr>
<td>7. AVETMISS information</td>
<td>ANZSCO (OCCUPATIONAL TYPE) CODES 899914 Electrical or Telecommunications Trades Assistant ASCED (FIELD OF EDUCATION) CODE 0313 Electrical and Electronic Engineering and Technology National course code 22289VIC</td>
</tr>
</tbody>
</table>
## Section B: Course information

### 1. Nomenclature

<table>
<thead>
<tr>
<th>Standard 1 AQTF Standards for Accredited Courses</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>1.1 Name of the qualification</strong></td>
</tr>
<tr>
<td>Certificate II in Integrated Technologies</td>
</tr>
<tr>
<td><strong>1.2 Nominal duration of the course</strong></td>
</tr>
<tr>
<td>400 hours</td>
</tr>
</tbody>
</table>

### 2. Vocational or educational outcomes

<table>
<thead>
<tr>
<th>Standard 1 AQTF Standards for Accredited Courses</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>2.1 Purpose of the course</strong></td>
</tr>
<tr>
<td>This is a pre-vocational course that will provide learners with the skills required by industries, which broadly encompass electrotechnology, telecommunications, information technology and security systems to:</td>
</tr>
<tr>
<td>• continue vocational training</td>
</tr>
<tr>
<td>• gain work and further training through an apprenticeship, traineeship or cadetship</td>
</tr>
<tr>
<td>• find employment in fields such as electronics, entertainment, wireless systems, technical support for computer and electronic equipment, energy generation, sustainability, computer controlled applications, electronic equipment or computer network support</td>
</tr>
</tbody>
</table>

### 3. Development of the course

<table>
<thead>
<tr>
<th>Standards 1 and 2 AQTF Standards for Accredited Courses</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>3.1 Industry / enterprise/ community needs</strong></td>
</tr>
<tr>
<td>This course is being redeveloped on behalf of Higher Education and Skills Group (HESG), Department of Education and Early Childhood Development, and is supported by engineering, electrotechnology, information and communication technology (ICT) and security systems industries, represented by Communication &amp; Information Technology Training Ltd, Engineers Australia, Business Services Victoria (BSV) and RTOs.</td>
</tr>
<tr>
<td>These industries impact on almost every aspect of daily life. The technology ranges from traditional electronics, hardware platforms and networking automation to virtual enterprise, the internet and fibre optics. The spread of new information processing and communication technologies means that the industry is developing rapidly. The telecommunications and information technology aspects of the industry are becoming increasingly important as the speed of transferring data and the knowledge economy alters the way businesses operate. For example, the impact of the broadband and digital rollout in the telecommunications workforce is immense.</td>
</tr>
<tr>
<td>There will be a need to attract a relatively high number of new entrants into the industry over the next five to seven years. People employed in the electrotechnology and ICT industries can be found working in most industry sectors and contribute to the multi-billion dollar industry in Australia.</td>
</tr>
</tbody>
</table>
“The current rate of technological change in the industry is very high and is expected to increase. The use of ‘smart’ technology such as home automation and the integration of systems, including data, voice and video, is becoming common in many sectors of the industry.” (Electrotechnology Industry Overview, EE-Oz Standards, 2014). The importance of integrated technologies to the Australian economy is further evidenced by the funding of Trade Training Centres in schools.

Research, by the relevant Industry Skills Council, clearly indicates the growing need for highly skilled individuals in the diverse range of related industries which share technologies.

The UEE11 Electrotechnology, ICA11 Information and Communications Technology and ICT10 Integrated Telecommunications Training Packages provide a wide range of qualifications; however, the packaging rules for their qualifications limit their application to specific rather than integrated technologies and are not suitable as pre-vocational programs. There are no units of competency in these Training Packages that match the intent of the units that have been developed specifically for this course.

The existing qualification is primarily used as a VET in Schools program. Enrolment data for 22071VIC Certificate II in Integrated Technologies for the past five years is as follows:

- 2009 – 839 enrolments
- 2010 – 881 enrolments
- 2011 – 831 enrolments
- 2012 – 745 enrolments
- 2013 – 626 enrolments

The reduction in enrolment numbers since 2011 is due to an increase in study options for the electrotechnology industry in the form of the:

- 22261VIC Certificate II in Electrotechnology Studies (Pre-vocational)
- UEE22011 Certificate II in Electrotechnology (Career Start).

These qualifications attract those students who are keen to pursue an apprenticeship through the Certificate III in Electrotechnology (Electrician) training.

A course steering committee was established to advise on the redevelopment of the course. Members of the steering committee were:

- Gabriele Giofre (Chair) Telecommunications and Computing Consultant
- Dominic Schipano Communication & Information Technology Training Ltd
<table>
<thead>
<tr>
<th>Daryl Sutton</th>
<th>Victorian Curriculum &amp; Assessment Authority (VCAA)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Anna Henderson</td>
<td>Business Skills Viability</td>
</tr>
<tr>
<td>Prof. Alan Bradley</td>
<td>Engineers Australia</td>
</tr>
<tr>
<td>Noel Pierre</td>
<td>Seimens</td>
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<tr>
<td>Debra Hardy/</td>
<td></td>
</tr>
<tr>
<td>Jan Newmarch</td>
<td>Centre for ICT, Box Hill Institute of TAFE</td>
</tr>
<tr>
<td>Ian Turnbull</td>
<td>Applied Technology Training &amp; Consulting Australia</td>
</tr>
</tbody>
</table>

In attendance:
- George Adda  CMM-Engineering Industries
- Sam McCurdy  Dewhurst Consultancy Pty Ltd

The key industry representatives listed above confirmed the ongoing need for pre-employment training in Integrated Technologies.

### 3.2 Review for re-accreditation

Monitoring and evaluation of 22071VIC Certificate II in Integrated Technologies has been conducted in accordance with Section B.9 Ongoing monitoring and evaluation, and ensuring feedback have been taken into account in the revised course.

The following updates to imported endorsed units of competency have been implemented.

**ICA05 Information and Communications Technology Training Package**
- ICA3101B  Install and manage network protocols
- ICAS3024B  Provide basic system administration

**ICA11 Information and Communications Technology Training Package**
- ICANWK305A  Install and manage network protocols
- ICASAS304A  Provide basic system administration

**ICT02 Telecommunications Training Package**
- ICTTC136B  Install, maintain and modify customer premises communications cabling – ACA restricted rule
- ICTTC156A  Install digital reception equipment
- ICTTC053D  Train customers

**ICT10 Telecommunications Training Package**
- ICTCBL2136B  Install, maintain and modify customer premises communications cabling – ACMA restricted rule
- ICTDRE3156B  Install digital reception equipment
- ICTEDU3053A  Train customers in new technology
Note:

a) The outcomes of the updated units are equivalent to the replaced units.
b) Updated copyright and branding information in the course submission.
c) Updated assessor and trainer requirements to reflect the transition to AQTF 2013.
d) Inclusion of an Employability Skills Summary.

No suitable Training Package units were found to replace the existing Victorian accredited units and so these units were retained in the new course.

No further enrolments should be made into 22071VIC Certificate II in Integrated Technologies from 30 June 2015.

<table>
<thead>
<tr>
<th>Units in superseded course VIC22071VIC Certificate II in Integrated Technologies</th>
<th>Units in the re-accredited course Certificate II in Integrated Technologies</th>
<th>Relationship</th>
</tr>
</thead>
<tbody>
<tr>
<td>UEENEEE044B</td>
<td>Apply technologies and concepts to electrotechnology work activities</td>
<td>VU21701</td>
</tr>
<tr>
<td>UEENEEE048C</td>
<td>Carry out routine work activities in an electrotechnology environment</td>
<td>VU21554</td>
</tr>
<tr>
<td>UEENEEE079A</td>
<td>Identify and select components, accessories, materials for electrotechnology work activities</td>
<td>VU21555</td>
</tr>
<tr>
<td>VBP118</td>
<td>Carry out an integrated technology project</td>
<td>VU21556</td>
</tr>
<tr>
<td>VBP119</td>
<td>Perform basic network and computer maintenance</td>
<td>ICANWK305A</td>
</tr>
<tr>
<td>VBP120</td>
<td>Perform basic network and computer maintenance</td>
<td>ICASAS304A</td>
</tr>
<tr>
<td>VBP121</td>
<td>Install and configure basic network and computer operating systems</td>
<td>ICAI3101B</td>
</tr>
<tr>
<td>ICAS3024B</td>
<td>Provide network systems administration</td>
<td>ICAS3032B</td>
</tr>
<tr>
<td>VBP122</td>
<td>Install and test a home entertainment system</td>
<td>ICASAS307A</td>
</tr>
<tr>
<td>VPAU645</td>
<td>Install and configure a small office network</td>
<td>VU21565</td>
</tr>
<tr>
<td>VPAU646</td>
<td>Install and configure a small to medium business network</td>
<td></td>
</tr>
<tr>
<td>Code</td>
<td>Description</td>
<td>Code</td>
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<td>------------</td>
<td>---------------------------------------------------------------------------------------------------</td>
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</tr>
<tr>
<td>VU20177</td>
<td>Plan and build a system using fibre optic equipment</td>
<td>VU20178</td>
</tr>
<tr>
<td>VU20179</td>
<td>Use fibre optic equipment in communication technology</td>
<td>VBP128</td>
</tr>
<tr>
<td>VBP129</td>
<td>Test and verify correct operation of a &quot;by-wire&quot; control system</td>
<td>VBP130</td>
</tr>
<tr>
<td>VBP131</td>
<td>Construct and configure a basic robotic system</td>
<td>VBP132</td>
</tr>
<tr>
<td>VBP136</td>
<td>Operate a small power supply system</td>
<td>VBP137</td>
</tr>
<tr>
<td>VBP138</td>
<td>Maintain rechargeable battery systems</td>
<td>VBP139</td>
</tr>
<tr>
<td>VBP140</td>
<td>Set up an extra low voltage emergency power supply system (not exceeding 32v)</td>
<td>VBP141</td>
</tr>
<tr>
<td>ICTTC053D</td>
<td>Train customers</td>
<td>ICTEDU3053A</td>
</tr>
<tr>
<td>ICTTC136C</td>
<td>Install, maintain and modify customer premises communications cabling – ACMA restricted rule</td>
<td>ICTBL2136B</td>
</tr>
<tr>
<td>ICTTC156A</td>
<td>Install digital reception equipment</td>
<td>ICTDRE3156B</td>
</tr>
<tr>
<td>ICTTC162A</td>
<td>Install a cable lead-in</td>
<td>VBP123</td>
</tr>
<tr>
<td>VBP124</td>
<td>Install and test a wireless intercom system</td>
<td>VBP125</td>
</tr>
<tr>
<td>VBP126</td>
<td>Set up and operate a wireless communication link</td>
<td>VBP127</td>
</tr>
<tr>
<td>4. Course outcomes</td>
<td>Standards 1, 2, 3 and 4 AQTF Standards for Accredited Courses</td>
<td></td>
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<tr>
<td>-------------------</td>
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</table>
| 4.1 Qualification level | The Certificate II in Integrated Technologies is a pre-employment level course and is consistent with AQF level 2 of the Australian Qualifications Framework in that:  
**Knowledge:**  
- Graduates will have basic factual, technical and procedural knowledge in a wide range of technical activities spanning electrotechnology, telecommunications, security systems and information technology.  
**Skills:**  
Graduates will have:  
- cognitive skills to access, record and act on a defined range of technical information from a range of sources  
- cognitive and communication skills to apply and communicate known solutions to a limited range of predictable problems in the use of integrated technologies  
- technical skills to use a limited range of equipment to complete tasks involving known routines and procedures with a limited range of technology options  
**Application of knowledge and skills:**  
Graduates will be able to demonstrate the application of knowledge and skills in the use of integrated technologies:  
- with some accountability for the quality of their own outcomes and with some responsibility for their own outputs in work and learning  
- with limited autonomy and judgement in the completion of their own defined and routine tasks in known and stable integrated technology contexts  
- with limited autonomy and judgement to complete routine, but variable tasks in the use of integrated technologies, in collaboration with others in a team environment  
Specifically a graduate of this course may:  
- undertake a work-based apprenticeship or traineeship leading into a range of careers in the electrotechnology, telecommunications, security systems and information technology industries;  
- enrol directly into any of a number of qualifications leading to Certificate IIs or Certificate IVs within the electrotechnology, telecommunications, security systems and information technology industries. |
Volume of learning:
Typically the Certificate II in Integrated Technologies requires 0.5-1 year to complete. This is made up of the structured learning component of the course combined with the self-directed learning activities such as research and project work.

<table>
<thead>
<tr>
<th>4.1 Employability Skills</th>
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<tbody>
<tr>
<td>Standard 4 AQTF Standards for Accredited Courses</td>
</tr>
<tr>
<td>See Table 1 below.</td>
</tr>
</tbody>
</table>

Table 1 Employability Skills Summary for the Certificate II in Integrated Technologies

<table>
<thead>
<tr>
<th>Employability Skill</th>
<th>Industry/enterprise requirements for this qualification include the following facets:</th>
</tr>
</thead>
</table>
| Communication       | • collect, organise and understand information related to the work, such as verbal or written standard operating procedures, work related instructions, equipment specifications, safety signs and symbols.  
• communicate ideas and information to enable confirmation of work requirement  
• report outcomes and/or any problems  
• access, read and comprehend instructions and procedures  
• share information via speech and in writing  
• interact with people from diverse backgrounds |
| Teamwork            | • work with others to generate and evaluate ideas  
• work effectively as an individual and as a member of a team  
• work with others to identify work needs and review ideas against those needs  
• work cooperatively with people from diverse cultural backgrounds  
• contribute to a positive culture of compliance within an organisation  
• provide feedback to a range of stakeholders |
| Problem solving     | • take corrective action to ensure that work meets quality standards and requirements as appropriate.  
• respond to and/or report equipment failure within level of responsibility  
• seek assistance from relevant personnel when difficulties arise  
• recognise limitations, ask for help and seek clarification or information about work requirements and procedures |
<table>
<thead>
<tr>
<th>Employability Skill</th>
<th>Industry/enterprise requirements for this qualification include the following facets:</th>
</tr>
</thead>
</table>
| Initiative and enterprise | • safely shut down equipment in emergency situations  
• apply enterprise best practice and quality systems  
• ask questions of appropriate personnel to confirm unusual practice  
• report problems outside area of responsibility to designated personnel  
• identify variation in equipment performance and report maintenance requirements according to enterprise procedures |
| Planning and organisation | • manage time and priorities to complete work  
• prepare and plan daily or weekly work  
• identify and obtain equipment, materials and consumables to undertake designated tasks  
• establish clear implementation goals and deliverables  
• collect, analyse and organise work task information  
• check work requirement specifications and identify the priority in which tasks need to be undertaken and completed. |
| Self-management | • plan own work within given task parameters  
• set, monitor and satisfy personal work goals  
• accept responsibility for given tasks  
• operate within appropriate time constraints and work standards  
• seek assistance where appropriate |
| Learning | • ask questions to gain information and to ensure understanding of own work requirements  
• maintain current knowledge of tools, devices, instruments, materials, work practices and systems  
• seek learning opportunities  
• take control and manage own learning  
• adopt a open approach to new ideas and techniques  
• commit to and promote a culture of continuous learning  
• set realistic learning goals for self development  
• monitor and respond to learning process achievements |
| Technology | • use workplace technology related to the particular work tasks including tools, devices, instruments and materials  
• attain and maintain required technical accreditation/authority under the industry standards  
• attain and maintain IT skills relevant to work requirements  
• be willing to gain knowledge and skills relevant to new and emerging technologies |
4.3 Recognition given to the course

Not applicable

4.4 Licensing/regulatory requirements

All training programs should be conducted with reference to the regulatory regime of the relevant statutory authority. For example, the installation of telecommunication, data cabling and cabling products on customer premises in accordance with the Australian Communications and Media Authority (ACMA) requirements.

5. Course rules

Standards 2, 6, 7 and 9 AQTF Standards for Accredited Courses

5.1 Course structure

To be awarded the qualification, Certificate II in Integrated Technologies, participants are required to complete:

- All six (6) core units of competency
- Elective units of competency equivalent to a minimum of 170 hours from at least two (2) Streams. (Note: elective units that appear in more than one stream must not be counted as two electives.)

Learners who do not successfully complete all required units will be issued with a Statement of Attainment listing those units that they have completed.

Occupational health and safety and sustainability skills and knowledge are integrated into the units of competency.

Table 2: Certificate II in Integrated Technologies

<table>
<thead>
<tr>
<th>Unit of competency/module code</th>
<th>Field of Education code (6-digit)</th>
<th>Unit of competency title</th>
<th>Pre-requisite</th>
<th>Nominal Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>MEM13014A</td>
<td></td>
<td>Apply principles of occupational health and safety in the work environment</td>
<td>None</td>
<td>10</td>
</tr>
<tr>
<td>VU21701 031399</td>
<td>Carry out an integrated technology project</td>
<td>MEM13014A</td>
<td>60</td>
<td></td>
</tr>
<tr>
<td>VU21702 031399</td>
<td>Prepare for working in the integrated technology sector</td>
<td>None</td>
<td>20</td>
<td></td>
</tr>
<tr>
<td>VU21703 031399</td>
<td>Work in an integrated technology environment</td>
<td>MEM13014A</td>
<td>40</td>
<td></td>
</tr>
<tr>
<td>VU21704 031399</td>
<td>Use electrotechnology skills in integrated technology work</td>
<td>MEM13014A</td>
<td>80</td>
<td></td>
</tr>
<tr>
<td>VU21705 031399</td>
<td>Use software applications in integrated technology work</td>
<td>MEM13014A</td>
<td>20</td>
<td></td>
</tr>
</tbody>
</table>

Nominal hours sub-total - core hours 230
## Elective Units of Competency – Select units making up a minimum of 170 hrs

### Computer System Network Stream

<table>
<thead>
<tr>
<th>Unit Code</th>
<th>Unit Name</th>
<th>Competency</th>
<th>None</th>
<th>Hrs</th>
</tr>
</thead>
<tbody>
<tr>
<td>ICAICT302A</td>
<td>Install and optimise operating system software</td>
<td></td>
<td>None</td>
<td>20</td>
</tr>
<tr>
<td>ICAICT303A</td>
<td>Connect internal hardware components</td>
<td></td>
<td>None</td>
<td>20</td>
</tr>
<tr>
<td>ICANWK302A</td>
<td>Identify and resolve network problems</td>
<td></td>
<td>None</td>
<td>50</td>
</tr>
<tr>
<td>ICANWK305A</td>
<td>Install and manage network protocols</td>
<td></td>
<td>None</td>
<td>40</td>
</tr>
<tr>
<td>ICASAS202A</td>
<td>Apply problem-solving techniques to routine IT</td>
<td></td>
<td>None</td>
<td>20</td>
</tr>
<tr>
<td>ICASAS203A</td>
<td>Connect hardware peripherals</td>
<td></td>
<td>None</td>
<td>20</td>
</tr>
<tr>
<td>ICASAS206A</td>
<td>Detect and protect from spam and destructive software</td>
<td></td>
<td>None</td>
<td>10</td>
</tr>
<tr>
<td>ICASAS301A</td>
<td>Run standard diagnostic tests</td>
<td></td>
<td>None</td>
<td>20</td>
</tr>
<tr>
<td>ICASAS303A</td>
<td>Care for computer hardware</td>
<td></td>
<td>None</td>
<td>20</td>
</tr>
<tr>
<td>ICASAS304A</td>
<td>Provide basic system administration</td>
<td></td>
<td>None</td>
<td>20</td>
</tr>
<tr>
<td>ICASAS306A</td>
<td>Maintain equipment and software</td>
<td></td>
<td>None</td>
<td>20</td>
</tr>
<tr>
<td>ICASAS307A</td>
<td>Install, configure and secure a small office home office network</td>
<td>None</td>
<td>50</td>
<td></td>
</tr>
<tr>
<td>VU21554</td>
<td>031305 Perform basic network and computer assembly</td>
<td></td>
<td>None</td>
<td>30</td>
</tr>
<tr>
<td>VU21555</td>
<td>031305 Perform basic network and computer maintenance</td>
<td></td>
<td>None</td>
<td>30</td>
</tr>
<tr>
<td>VU21556</td>
<td>020117 Install and configure basic network and computer operating systems</td>
<td>None</td>
<td>40</td>
<td></td>
</tr>
<tr>
<td>VU21565</td>
<td>031317 Install and test a home entertainment system</td>
<td></td>
<td>None</td>
<td>30</td>
</tr>
</tbody>
</table>

### Robotics Control Systems Stream

<table>
<thead>
<tr>
<th>Unit Code</th>
<th>Unit Name</th>
<th>Competency</th>
<th>None</th>
<th>Hrs</th>
</tr>
</thead>
<tbody>
<tr>
<td>VU20906</td>
<td>030703 Configure and program a basic robotic system</td>
<td></td>
<td>None</td>
<td>60</td>
</tr>
<tr>
<td>VU21352</td>
<td>031303 Implement a digital circuit using a programmable logic device (PLD)</td>
<td>None</td>
<td>30</td>
<td></td>
</tr>
<tr>
<td>VU21387</td>
<td>031303 Test and verify correct operation of a “by-wire” control system</td>
<td>None</td>
<td>30</td>
<td></td>
</tr>
<tr>
<td>VU21388</td>
<td>031305 Set up and test an embedded control system</td>
<td></td>
<td>None</td>
<td>30</td>
</tr>
</tbody>
</table>

### Security Systems Stream

<table>
<thead>
<tr>
<th>Unit Code</th>
<th>Unit Name</th>
<th>Competency</th>
<th>None</th>
<th>Hrs</th>
</tr>
</thead>
<tbody>
<tr>
<td>CPPSEC2021A</td>
<td>Install security equipment and systems</td>
<td></td>
<td>None</td>
<td>40</td>
</tr>
<tr>
<td>CPPSEC2023A</td>
<td>Install CCTV equipment and system</td>
<td></td>
<td>None</td>
<td>20</td>
</tr>
<tr>
<td>CPPSEC2026A</td>
<td>Perform routine maintenance on security equipment and system</td>
<td>None</td>
<td>32</td>
<td></td>
</tr>
<tr>
<td>ICTCBL2136B</td>
<td>Install, maintain and modify customer premises communications cabling – ACMA restricted rule</td>
<td>None</td>
<td>60</td>
<td></td>
</tr>
</tbody>
</table>

### Sustainable Energy Systems Stream

<table>
<thead>
<tr>
<th>Unit Code</th>
<th>Unit Name</th>
<th>Competency</th>
<th>None</th>
<th>Hrs</th>
</tr>
</thead>
<tbody>
<tr>
<td>VU21541</td>
<td>031301 Maintain rechargeable battery systems</td>
<td></td>
<td>None</td>
<td>30</td>
</tr>
<tr>
<td>VU21542</td>
<td>031301 Identify and locate building blocks of a centralised power generation system</td>
<td>None</td>
<td>30</td>
<td></td>
</tr>
<tr>
<td>VU21543</td>
<td>031301 Set up an extra low voltage emergency power supply system (not exceeding 32v)</td>
<td>None</td>
<td>30</td>
<td></td>
</tr>
<tr>
<td>Course Code</td>
<td>Subject Code</td>
<td>Description</td>
<td>Level</td>
<td>Hours</td>
</tr>
<tr>
<td>------------</td>
<td>--------------</td>
<td>------------------------------------------------------------------------------</td>
<td>-------</td>
<td>-------</td>
</tr>
<tr>
<td>VU21544</td>
<td>031301</td>
<td>Install a sustainable extra low voltage energy power system</td>
<td>None</td>
<td>30</td>
</tr>
<tr>
<td>VU21552</td>
<td>031301</td>
<td>Operate a small power supply system</td>
<td>None</td>
<td>30</td>
</tr>
<tr>
<td>VU21553</td>
<td>031301</td>
<td>Assemble and connect an extra low voltage battery power source</td>
<td>None</td>
<td>30</td>
</tr>
</tbody>
</table>

**Multimedia and Games Systems Stream**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Subject Code</th>
<th>Description</th>
<th>Level</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>CUFANM301A</td>
<td></td>
<td>Create 2D digital animations</td>
<td>None</td>
<td>35</td>
</tr>
<tr>
<td>CUFANM302A</td>
<td></td>
<td>Create 3D digital animations</td>
<td>None</td>
<td>75</td>
</tr>
<tr>
<td>ICAGAM301A</td>
<td></td>
<td>Apply simple modelling techniques</td>
<td>None</td>
<td>50</td>
</tr>
<tr>
<td>ICAGAM302A</td>
<td></td>
<td>Design and apply simple textures to digital art</td>
<td>None</td>
<td>50</td>
</tr>
<tr>
<td>ICAGAM303A</td>
<td></td>
<td>Review and apply the principles of animation</td>
<td>None</td>
<td>60</td>
</tr>
<tr>
<td>ICAICT404A</td>
<td></td>
<td>Use online learning tools</td>
<td>None</td>
<td>30</td>
</tr>
<tr>
<td>ICAPRG301A</td>
<td></td>
<td>Apply introductory programming techniques</td>
<td>None</td>
<td>40</td>
</tr>
<tr>
<td>ICAPRG404A</td>
<td></td>
<td>Test applications</td>
<td>None</td>
<td>50</td>
</tr>
<tr>
<td>ICAPRG406A</td>
<td></td>
<td>Apply introductory object-oriented language skills</td>
<td>None</td>
<td>60</td>
</tr>
<tr>
<td>VU21706</td>
<td>030103</td>
<td>Create products using 3D printing</td>
<td>None</td>
<td>40</td>
</tr>
</tbody>
</table>

**Telecommunication Systems Stream**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Subject Code</th>
<th>Description</th>
<th>Level</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>ICTCBL2136B</td>
<td></td>
<td>Install, maintain and modify customer premises communications cabling – ACMA restricted rule</td>
<td>None</td>
<td>60</td>
</tr>
<tr>
<td>ICTCMP2239B</td>
<td></td>
<td>Perform restricted customer premises broadband cabling work: ACMA Restricted Rule</td>
<td>ICTCBL2136B</td>
<td>20</td>
</tr>
<tr>
<td>ICTDRE3156B</td>
<td></td>
<td>Install digital reception equipment</td>
<td>None</td>
<td>30</td>
</tr>
<tr>
<td>ICTDRE3157B</td>
<td></td>
<td>Locate and rectify digital reception equipment faults</td>
<td>None</td>
<td>40</td>
</tr>
<tr>
<td>ICTEDU3053A</td>
<td></td>
<td>Train customers in new technology</td>
<td>None</td>
<td>40</td>
</tr>
<tr>
<td>ICTTEN2219A</td>
<td></td>
<td>Install and test internet protocol devices in convergence networks</td>
<td>None</td>
<td>50</td>
</tr>
<tr>
<td>VU20177</td>
<td>031303</td>
<td>Plan and build a system using fibre optic equipment</td>
<td>None</td>
<td>30</td>
</tr>
<tr>
<td>VU20178</td>
<td>030703</td>
<td>Use fibre optic equipment in engineering technology</td>
<td>None</td>
<td>30</td>
</tr>
<tr>
<td>VU20179</td>
<td>031307</td>
<td>Use fibre optic equipment in communication technology</td>
<td>None</td>
<td>30</td>
</tr>
</tbody>
</table>

**Wireless Communications Systems Stream**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Subject Code</th>
<th>Description</th>
<th>Level</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>VU21566</td>
<td>031309</td>
<td>Install and test a wireless intercom system</td>
<td>None</td>
<td>30</td>
</tr>
<tr>
<td>VU21567</td>
<td>031307</td>
<td>Conduct site survey for a wireless network</td>
<td>None</td>
<td>30</td>
</tr>
<tr>
<td>VU21568</td>
<td>031309</td>
<td>Set up and operate a wireless communication link</td>
<td>None</td>
<td>30</td>
</tr>
<tr>
<td>VU21569</td>
<td>031309</td>
<td>Install communications antennae</td>
<td>None</td>
<td>30</td>
</tr>
<tr>
<td>VU21581</td>
<td>020113</td>
<td>Build a small wireless LAN</td>
<td>None</td>
<td>30</td>
</tr>
</tbody>
</table>

**Total nominal hours** 400
| 5.2 Entry requirements | Learners are best equipped to achieve the course outcomes if they have as a minimum language, literacy and numeracy skills that are equivalent to Level 2 of the Australian Core Skill Framework. Details can be found on website: [http://www.acsf.deewr.gov.au](http://www.acsf.deewr.gov.au)  
There are no barriers to entry on the grounds of age, gender, political or cultural background. |
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>6. Assessment</td>
<td>Standards 10 and 12 AQTF Standards for Accredited Courses</td>
</tr>
</tbody>
</table>
| 6.1 Assessment strategy | Course assessment must be consistent with the requirements of Element 1.2 and 1.5 of the AQTF: *Essential Conditions and Standards for Continuing Registration* and the Standard SNR 15.2 and 15.5 of the *Standards for NVR Registered Training Organisations*, or the relevant Standards for Registered Training Organisations in effect at the time of assessment.  
For units of competency specifically developed for this course the assessment strategy to be adopted is identified within the units.  
Assessment methods must include the demonstration of practical skills and may also may include:  
• oral or written questioning  
• presentations  
• folios  
• written reports  
• research assignments and projects  
• written/oral examinations  
Where appropriate, training providers are encouraged to take a holistic approach to assessment, by assessing more than one element concurrently, or combining the final assessment for more than one unit.  
When assessing imported units of competency, the evidence gathering and assessment must be carried out in accordance with the relevant Training Package Assessment Guidelines. The Assessment Guidelines include the necessary qualifications for those conducting assessments and provide for situations where more than one person may contribute to the assessment and where the required technical and assessment competencies may not all be held by any one person.  
All participants can seek recognition for any competencies already held and for any relevant qualifications or experience through the RPL process. |
Recognition decisions should be based on the principles of assessment and rules of evidence as defined in the AQTF or NVR Standards.

On the completion of each assessment task, students will be provided with qualitative feedback as well as a 'competent/not competent' result for the unit being assessed.

Arrangements should be made for retesting or reasonable adjustment as required.

<table>
<thead>
<tr>
<th>6.2 Assessor competencies</th>
</tr>
</thead>
</table>
| Assessor competencies for this course must be consistent with the requirements of Element 1.4 of the AQTF: *Essential Conditions and Standards for Continuing Registration* and Standard SNR 15.4 of the *Standards for NVR Registered Training Organisations*, or the relevant Standards for Registered Training Organisations in effect at the time of assessment. Currently these require that assessors:
  i. hold the TAESS00001 Assessor Skill Set, or be able to demonstrate equivalence of competencies; and
  ii. be able to demonstrate vocational competencies at least to the level being assessed; and
  iii. be able to demonstrate how they are continuing to develop their VET knowledge and skills as well as maintaining their industry currency and assessor competence.

Note:
If a person does not have all the assessment competencies as defined in (i), (ii) and (iii) then one or more persons with the combined expertise in (i), (ii) and (iii) may work together to conduct the assessment.

<table>
<thead>
<tr>
<th>7. Delivery</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>Standards 11 and 12 AQTF Standards for Accredited Courses</em></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>7.1 Delivery modes</th>
</tr>
</thead>
<tbody>
<tr>
<td>All units of competency in the courses may be delivered in a variety of modes: classroom delivery, workplace projects, practical work, self-paced learning, case studies, role plays and guest speakers.</td>
</tr>
</tbody>
</table>

It is recommended that the course be conducted using workplace project-based delivery and assessment methods to maximise opportunities for learners to have learning experiences close as possible to a real workplace environment.

Any on-the-job learning opportunities should be conducted with an experienced mentor working in the industry. The provider will coordinate the assessment of
workplace demonstration, according to the relevant unit/units requirements.

Delivery options, including grouping of learners and learning activities, should recognise the varying learning needs, educational backgrounds, preferred learning styles and constraints of the individual learner and the specific requirements of each unit.

Some areas of content may be common to more than one unit and therefore integration may be appropriate. Delivery strategies should actively involve the learner and learning should be experiential, relevant and age appropriate.

This course is available for full or part-time study. Providers should be flexible in the way the training is delivered to ensure they meet the needs of the client group.

Units of competency may be contextualised to meet the needs of different groups of students and employers. Contextualisation of imported units must be consistent with the assessment guidelines of the relevant Training Package or accredited course.

### 7.2 Resources

The minimum resources required to conduct the course includes:

- classrooms
- library
- access to electrical projects in the workplace
- case study materials
- computer and relevant software (including but not limited to Microsoft Office suite, Web search and design, CAD software)
- workplace resources, such as current legislation, regulations and codes and Australian building standards

Trainer competencies must meet the requirements of Element 1.4 of the AQTF: *Essential Conditions and Standards for Continuing Registration* and Standard SNR15.4 of the *Standards for NVR Registered Training Organisations*, or the relevant Standards for Registered Training Organisations in effect at the time of assessment.

The Registered Training Organisation is responsible for ensuring that training is delivered by trainers who:

i. hold the *TAE40110 Certificate IV in Training and Assessment* from the TAE10 Training and Education Training Package as a minimum qualification, or be
able to demonstrate equivalence of competencies; and

ii. be able to demonstrate vocational competencies at least to the level being delivered and assessed; and

iii. be able to demonstrate how they are continuing to develop their VET knowledge and skills as well as maintaining their industry currency and trainer/assessor competence.

Persons delivering training under the supervision of a trainer must:

1. work under the supervision of a trainer with the TAE40110 Certificate IV in Training and Assessment, or of a person who has demonstrated equivalence of competencies; and

2. holds either the TAESS00007 Enterprise Trainer – Presenting Skill Set, or be able to demonstrate equivalence of competencies, or the TAESS00008 Enterprise Trainer – Mentoring Skill Set, or be able to demonstrate equivalence of competencies within two years of commencing to deliver training while under supervision; and

3. be able to demonstrate vocational competencies at least to the level being delivered and assessed as well as maintaining their industry currency.

## 8. Pathways and articulation

*Standard 8 for accredited courses*

At present there are no formal articulation arrangements into other VET or higher education courses. However, graduates of the course will receive credits for any of the completed imported units of competency that may form part of any future studies in the following Training Packages:

- CUF07 Screen and Media
- CPP07 Property Services
- ICA11 Information and Communications Technology
- ICT10 Integrated Telecommunications
- MEM05 Metal and Engineering

Credits may also be available into the following State accredited course:
22263VIC-Certificate IV in Integrated Technologies, depending on the Electives selected.

Similarly, entrants to the course will receive credits for any of the imported endorsed units that they may have already achieved through previous training.

RTOs should refer to the AQF Pathways Policy when negotiating articulation to higher education qualifications.

<table>
<thead>
<tr>
<th>9. Ongoing monitoring and evaluation</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Standard 13 for accredited courses</strong></td>
</tr>
<tr>
<td>Ongoing evaluation and validation of this course is the responsibility of the Curriculum Maintenance Manager, Engineering Industries.</td>
</tr>
<tr>
<td>These courses will be monitored and maintained by an Industry Advisory Committee with representatives from:</td>
</tr>
<tr>
<td>• Engineers Australia</td>
</tr>
<tr>
<td>• Communication &amp; Information Technology Training Ltd</td>
</tr>
<tr>
<td>• Business Skills Victoria</td>
</tr>
<tr>
<td>• Enterprises</td>
</tr>
<tr>
<td>• Industry associations or peak bodies</td>
</tr>
<tr>
<td>• RTOs delivering the course.</td>
</tr>
<tr>
<td>The following methods will be used to provide data to the Industry Advisory Committee:</td>
</tr>
<tr>
<td>• student surveys</td>
</tr>
<tr>
<td>• employers surveys</td>
</tr>
<tr>
<td>• trainer/assessor feedback</td>
</tr>
<tr>
<td>The CMM - Engineering Industries will meet with the Industry Advisory Committee at least once in the middle of the accreditation period and more frequently if necessary, to:</td>
</tr>
<tr>
<td>• review the implementation of the program;</td>
</tr>
<tr>
<td>• provide advice on changing program requirements;</td>
</tr>
<tr>
<td>• monitor and evaluate course standards, delivery and assessment;</td>
</tr>
<tr>
<td>• determine whether the course should be replaced by an endorsed Training Package qualification.</td>
</tr>
<tr>
<td>Recommendations for any significant changes will be reported through the Curriculum Maintenance Manager.</td>
</tr>
<tr>
<td>Engineering Industries to the Victorian Registration and Qualification Authority (VRQA).</td>
</tr>
<tr>
<td>Course maintenance and review procedures will also indicate that the course should be expired if a suitable qualification becomes available through the endorsement of a Training Package.</td>
</tr>
</tbody>
</table>
Section C - Units of competency

Nationally accredited units are available to download from the national data base – http://training.gov.au/

Training.gov.au is the National Register on Vocational Education and Training (VET) in Australia. To download a unit of competency, enter the unit code in the Quick search window. Units that have a Unit Code commencing with the letter “V” are Victorian accredited units and are reproduced in the following pages of this document.

<table>
<thead>
<tr>
<th>Nationally endorsed units</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>CPP07 Property Services Training Package</strong></td>
<td></td>
</tr>
<tr>
<td>CPPSEC2021A</td>
<td>Install security equipment and systems</td>
</tr>
<tr>
<td>CPPSEC2023A</td>
<td>Install CCTV equipment and system</td>
</tr>
<tr>
<td>CPPSEC2026A</td>
<td>Perform routine maintenance on security equipment and system</td>
</tr>
<tr>
<td><strong>CUF07 Screen and Media Training Package</strong></td>
<td></td>
</tr>
<tr>
<td>CUFANM301A</td>
<td>Create 2D digital animations</td>
</tr>
<tr>
<td>CUFANM302A</td>
<td>Create 3D digital animations</td>
</tr>
<tr>
<td><strong>ICA11 Information and Communications Technology Training Package</strong></td>
<td></td>
</tr>
<tr>
<td>ICAICT302A</td>
<td>Install and optimise operating system software</td>
</tr>
<tr>
<td>ICAICT303A</td>
<td>Connect internal hardware components</td>
</tr>
<tr>
<td>ICAGAM301A</td>
<td>Apply simple modelling techniques</td>
</tr>
<tr>
<td>ICAGAM302A</td>
<td>Design and apply simple textures to digital art</td>
</tr>
<tr>
<td>ICAGAM303A</td>
<td>Review and apply the principles of animation</td>
</tr>
<tr>
<td>ICAICT404A</td>
<td>Use online learning tools</td>
</tr>
<tr>
<td>ICANWK302A</td>
<td>Identify and resolve network problems</td>
</tr>
<tr>
<td>ICANWK305A</td>
<td>Install and manage network protocols</td>
</tr>
<tr>
<td>ICAPRG301A</td>
<td>Apply introductory programming techniques</td>
</tr>
<tr>
<td>ICAPRG404A</td>
<td>Test applications</td>
</tr>
<tr>
<td>ICAPRG406A</td>
<td>Apply introductory object-oriented language skills</td>
</tr>
<tr>
<td>ICASAS202A</td>
<td>Apply problem-solving techniques to routine IT malfunctions</td>
</tr>
<tr>
<td>ICASAS203A</td>
<td>Connect hardware peripherals</td>
</tr>
<tr>
<td>ICASAS206A</td>
<td>Detect and protect from spam and destructive software</td>
</tr>
<tr>
<td>ICASAS301A</td>
<td>Run standard diagnostic tests</td>
</tr>
<tr>
<td>ICASAS303A</td>
<td>Care for computer hardware</td>
</tr>
<tr>
<td>ICASAS304A</td>
<td>Provide basic system administration</td>
</tr>
<tr>
<td>ICASAS306A</td>
<td>Maintain equipment and software</td>
</tr>
</tbody>
</table>
### ICASTAS307A
Install, configure and secure a small office home office network 50

### ICT10 Telecommunications Training Package

<table>
<thead>
<tr>
<th>Unit Code</th>
<th>Unit Title</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>ICTCB12136B</td>
<td>Install, maintain and modify customer premises communications cabling – ACMA restricted rule</td>
<td>60</td>
</tr>
<tr>
<td>ICTCM2239B</td>
<td>Perform restricted customer premises broadband cabling work: ACMA restricted rule</td>
<td>20</td>
</tr>
<tr>
<td>ICTDRE3156B</td>
<td>Install digital reception equipment</td>
<td>30</td>
</tr>
<tr>
<td>ICTDRE3157B</td>
<td>Locate and rectify digital reception equipment faults</td>
<td>40</td>
</tr>
<tr>
<td>ICTEDU3053A</td>
<td>Train customers in new technology</td>
<td>40</td>
</tr>
<tr>
<td>ICTTEN2219A</td>
<td>Install and test internet protocol devices in convergence networks</td>
<td>50</td>
</tr>
</tbody>
</table>

### MEM05 Metals and Engineering Training Package

<table>
<thead>
<tr>
<th>Unit Code</th>
<th>Unit Title</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>MEM13014A</td>
<td>Apply principles of occupational health and safety in the work environment</td>
<td>10</td>
</tr>
</tbody>
</table>

### Victorian Accredited curriculum units

<table>
<thead>
<tr>
<th>Unit Code</th>
<th>Unit Title</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>VU20906</td>
<td>Configure and program a basic robotic system</td>
<td>60</td>
</tr>
<tr>
<td>VU21352</td>
<td>Implement a digital circuit using a programmable logic device (PLD)</td>
<td>30</td>
</tr>
<tr>
<td>VU21387</td>
<td>Test and verify correct operation of a &quot;by-wire&quot; control system</td>
<td>30</td>
</tr>
<tr>
<td>VU21388</td>
<td>Set up and test an embedded control system</td>
<td>30</td>
</tr>
<tr>
<td>VU21541</td>
<td>Maintain rechargeable battery systems</td>
<td>30</td>
</tr>
<tr>
<td>VU21542</td>
<td>Identify and locate building blocks of a centralised power generation system</td>
<td>30</td>
</tr>
<tr>
<td>VU21543</td>
<td>Set up an extra low voltage emergency power supply system (not exceeding 32v)</td>
<td>30</td>
</tr>
<tr>
<td>VU21544</td>
<td>Install a sustainable extra low voltage energy power system</td>
<td>30</td>
</tr>
<tr>
<td>VU21552</td>
<td>Operate a small power supply system</td>
<td>30</td>
</tr>
<tr>
<td>VU21553</td>
<td>Assemble and connect an extra low voltage battery power source</td>
<td>30</td>
</tr>
<tr>
<td>VU21554</td>
<td>Perform basic network and computer assembly</td>
<td>30</td>
</tr>
<tr>
<td>VU21555</td>
<td>Perform basic network and computer maintenance</td>
<td>30</td>
</tr>
<tr>
<td>VU21556</td>
<td>Install and configure basic network and computer operating systems</td>
<td>40</td>
</tr>
<tr>
<td>VU21565</td>
<td>Install and test a home entertainment system</td>
<td>30</td>
</tr>
<tr>
<td>VU21566</td>
<td>Install and test a wireless intercom system</td>
<td>30</td>
</tr>
<tr>
<td>VU21567</td>
<td>Conduct site survey for a wireless network</td>
<td>30</td>
</tr>
<tr>
<td>VU21568</td>
<td>Set up and operate a wireless communication link</td>
<td>30</td>
</tr>
<tr>
<td>VU21569</td>
<td>Install communications antennae</td>
<td>30</td>
</tr>
<tr>
<td>VU21581</td>
<td>Build a small wireless LAN</td>
<td>30</td>
</tr>
<tr>
<td>VU21701</td>
<td>Carry out an integrated technology project</td>
<td>60</td>
</tr>
<tr>
<td>VU21702</td>
<td>Prepare for working in the integrated technology sector</td>
<td>20</td>
</tr>
<tr>
<td>VU21703</td>
<td>Work in an integrated technology environment</td>
<td>40</td>
</tr>
<tr>
<td>VU21704</td>
<td>Use electrotechnology skills in integrated technology work</td>
<td>80</td>
</tr>
<tr>
<td>VU21705</td>
<td>Use software applications in integrated technology work</td>
<td>20</td>
</tr>
<tr>
<td>VU21706</td>
<td>Create products using 3D printing</td>
<td>40</td>
</tr>
</tbody>
</table>
VU21701

Carry out an integrated technology project

Unit Descriptor

This unit of competency sets out the knowledge and skills required to carry out an integrated technology project by merging distinct electrotechnology domains to achieve an innovative and integrated technical solution. This includes the planning, preparation and conduct of a project in accordance with a project management plan. The use of appropriate mathematical techniques is required to determine system parameters.

No licensing, legislative, regulatory or certification requirements apply to this unit at the time of publication.

Employability Skills

This unit contains Employability Skills

Pre-requisite unit

MEM13014A Apply occupational health and safety principles in the work environment

Application of the Unit

This unit of competency is intended to apply to any recognised development program that leads to the acquisition of a formal award at AQF level 2 or higher. It applies in an environment where merging technologies are applied for innovative technical applications.

ELEMENT

Performance criteria describe the required performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge and/or the range statement. Assessment of performance is to be consistent with the evidence guide.

1. Plan and prepare for an integrated technology project

1.1 Determine and apply OH&S requirements, risk control measures and environmental requirements for a given work area.

1.2 Determine the scope of the integrated technology project requirements from documentation, project briefs and/or discussions with appropriate personnel.

1.3 Confirm the project outputs by calculating the relevant variables using the specifications for the project and other available data.

1.4 Plan the project and clearly specify the outcomes for approval by appropriate personnel.
### REQUIRED SKILLS AND KNOWLEDGE

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

**Required knowledge:**

- Sound working knowledge of:
  - Project specifications including: defining the project; project briefs; contracts; tenders
  - Project management plans including: timelines, resources, costs, monitoring, project teams, milestones, contingencies, budgets
- Project design including design sketches and drawing; design calculations
- Presentation methods

Required skills:
- Interact with clients
- Establish client needs
- Interpret client needs
- Negotiate with clients
- Basic project planning
- Use feedback
- Write reports
- Present information
- Use tools and equipment correctly
- Follow enterprise OHS procedures
- Read and interpret equipment manuals

RANGE STATEMENT
The Range Statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording in the Performance Criteria is detailed below. Add any essential operating conditions that may be present with training and assessment depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts.

OH&S requirements may include
- legislation
- protective equipment
- material safety management systems
- hazardous substances and dangerous goods code
- local safe operation procedures
- awards provisions

Environmental requirements may include
- liquid waste
- solid waste
- gas, fume, vapour, smoke emissions, including fugitive emissions
- excessive energy and water use
- excessive noise

Integrated technology may include
- computer network technology
- wireless technology
- robotics and embedded controller technology
- photonics technology
- energy generation

Appropriate personnel may include
- supervisor
- leading hand
- foreman
- manager
- site engineer
• trainer
• mentor
• teacher
• team member
Enterprise procedures may include:
- the use of tools and equipment
- instructions, including job sheets, plans, drawings and designs
- reporting and communication
- manufacturers’ specifications and operational procedures

**EVIDENCE GUIDE**

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 section in Section B of the accreditation submission.

**Critical aspects for assessment and evidence required to demonstrate competency in this unit**

- Assessors must be satisfied that the candidate can competently and consistently perform all elements of the unit as specified by the criteria, including required knowledge, and to be capable of applying the competency in new and different situations and contexts within the timeframes typically expected of the discipline, work function and industrial environment.
- Assessment should also reinforce the integration of the Employability Skills.
- In particular this will incorporate evidence that shows a candidate is able to:
  (i) implement occupational health and safety workplace procedures and practices including the use of risk control measures as specified in the performance criteria;
  (ii) demonstrate a representative body of performance criteria within a timeframe typically expected of the discipline, work function and industrial environment; and
  (iii) demonstrate the ability to carry out an integrated technology project by merging distinct technology fields to achieve an innovative and integrated technical solution. The project documentation must include a project management plan with specified outcomes. The assessment of the project is against these specified outcomes.

**Context of and specific resources for assessment**

- Evidence should show competency working in real or simulated work environment and a variety of conditions.
- The candidate will have access to all tools, equipment, materials and documentation required. The candidate will be permitted to refer to any relevant workplace procedures, product and manufacturing specifications, codes, standards, manuals and reference materials.
- This unit may be assessed on the job, off the job or a combination of both on and off the job. Where
assessment occurs off the job, that is the candidate is not in productive work, then an appropriate simulation must be used where the range of conditions reflects realistic workplace situations. The competencies covered by this unit would be demonstrated by an individual working alone or as part of a team. The assessment environment should not disadvantage the candidate.

Method of assessment

- Assessment must involve the demonstration of practical skills and may also include:
  ~ observation of processes and procedures;
  ~ oral and/or written questioning on required knowledge and skills;
  ~ testimony from supervisors, colleagues, clients and/or other appropriate persons;
  ~ inspection of the final product or outcome;
  ~ a portfolio of documentary evidence.

- Where performance is not directly observed and/or is required to be demonstrated over a period of time and/or in a number of locations, any evidence should be authenticated by colleagues, supervisors, clients or other appropriate persons.

- Questioning techniques should not require language, literacy and numeracy skills beyond those required in this unit of competency.
VU21702 Prepare for working in the integrated technology sector

Unit Descriptor
This unit provides the skills and knowledge to prepare participants for working in the integrated technologies industry. It provides the opportunity to investigate and identify potential career paths in the industry.

No licensing, legislative, regulatory or certification requirements apply to this unit at the time of publication.

Employability skills
This unit contains Employability Skills.

Application of the Unit
This unit of competency would be applied in a pre-vocational context to enable participants to make informed career choices.

ELEMENT
Elements describe the essential outcomes of a unit of competency.

PERFORMANCE CRITERIA
Performance criteria describe the required performance needed to demonstrate achievement of the element. Where bold/italicised text is used, further information is detailed in the required skills and knowledge and/or the range statement. Assessment of performance is to be consistent with the evidence guide.

1 Investigate personal career needs within an integrated technology context

1.1 Determine the range of career paths available in integrated technology at an entry level

1.2 Examine different job roles at various levels in the integrated technology industry

1.3 Utilise career self-assessment activities to identify personal strengths and weaknesses in relation to preferred career path

1.4 Seek expert guidance and support to align personal strengths with possible career paths in integrated technologies

1.5 Interview industry experts to clarify peak organisations, regulatory bodies, employment agencies and professional associations
2. Develop a strategy to address personal career needs

2.1 Prioritise areas of integrated technology for further investigation
2.2 Relate self-assessment outcomes to job profiles, training pathway requirements and employment opportunities
2.3 Formulate a personal development plan that will maximise the potential to achieve selected goals
2.4 Identify components of the plan that may require referral to specialist agencies or other professionals
2.5 Investigate the range of support services that are available to assist with the development and/or implementation of the strategy
2.6 Evaluate and validate the career development plan with an appropriate person

REQUIRED SKILLS AND KNOWLEDGE

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

Required skills:
- Interpersonal skills in questioning industry experts
- Communication skills in documenting a personal development plan
- Organising skills to identify sources of information and assimilating data
- Analytical skills to be able to access and interpret career information
- Problem solving skills to overcome environmental limitations

Required knowledge:
- Range of technologies involved
- Range of job roles available in the industry
- Self-assessment activities
- Relevant State/Territory Acts and Regulations
- Peak industry organisations/Associations and Regulatory bodies
- Relevant endorsed Training Packages and qualifications
- Apprenticeship requirements
- Contracts of training
- OHS/WHS workplace requirements
- Work activity policies and procedures

RANGE STATEMENT

The Range Statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance.

Integrated technology refers to:
- The use of several technologies to complete a job, such as:
  - Computer technology
Job roles may include:
- Telecommunication technician
- Computer technician
- Multimedia and Games developer
- Security technician
- Robotics technician
- Service technician

Career self-assessment activities may be:
- Paper-based
- Computer generated

Expert guidance and support may be provided by:
- Industry experts
- Industry careers exhibitions and conferences
- Supervisors
- Teachers
- Career guidance counsellors
- Attendance at Industry Events

Personal development plan may include:
- Purpose/context of the plan
- Personal goals
- Self-assessment outcomes
- Potential career paths
- Required training pathways
- Financial considerations
- Implementation strategy
- Timelines to achieve goals

Appropriate person includes, but is not limited to:
- Industry experts
- Supervisors
- Teachers
- Career guidance counsellors

EVIDENCE GUIDE
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 section in Section B of the accreditation submission.

Critical aspects for assessment and evidence required to demonstrate competency in this unit
- To be considered competent in this unit the participant must be able to demonstrate the knowledge and skills required to achieve all of the elements of competency and associated performance criteria.
- Specifically they must be able to:
  - Collect, analyse and organise information on potential career paths in the integrated technology industries
  - Seek guidance from appropriate persons on careers, training pathways and relevant qualifications
- Prepare a personal career development plan
- Validate their personal development plan with an appropriate person

**Context of and specific resources for assessment**

- The assessment of this unit should be conducted in a real or simulated workplace environment
- Resources required for the assessment of the unit include access to:
  - Computer with an Internet link
  - Job descriptions
  - Industry expert
  - Workplace documentation

**Methods of assessment**

Assessment must include the demonstration of practical skills and may also include:

- Self-assessment analysis
- Personal development plan
- Written tests
- Research assignments
### VU21703 Work in an integrated technology environment

**Unit Descriptor**
This unit provides the skills and knowledge to conduct routine work practices in the integrated technologies industry. It encompasses the safe use of hand tools, power tools, dismantling and assembling components and the use of integrated technologies. No licensing, legislative, regulatory or certification requirements apply to this unit at the time of publication.

**Employability skills**
This unit contains Employability Skills.

**Prerequisite unit**
MEM13014A Apply principles of occupational health and safety in the work environment

**Application of the Unit**
This unit of competency would be applied by those wishing to enter the integrated technology industry and may be used in school based programs under appropriate supervision.

### ELEMENT
*Elements describe the essential outcomes of a unit of competency.*

### PERFORMANCE CRITERIA
*Performance criteria describe the required performance needed to demonstrate achievement of the element. Where bold/italicised text is used, further information is detailed in the required skills and knowledge and/or the range statement. Assessment of performance is to be consistent with the evidence guide.*

1. **Select components, accessories and materials**
   - 1.1 Follow relevant OHS/WHS policies and procedures for an integrated technology work environment
   - 1.2 Identify the components, accessories and materials required for the job and collect them in compliance with the set schedule and with minimum wastage
   - 1.3 Confirm the correct selection and quality of components, accessories and materials with an appropriate person
   - 1.4 Deal with contingency problems that may arise in accordance with normal work practices

2. **Dismantle and assemble industry apparatus**
   - 2.1 Follow relevant OHS/WHS policies and procedures for carrying out work in an integrated technology environment
   - 2.2 Check that circuits/machines/plant are isolated before commencing work, in accordance with OHS/WHS requirements
   - 2.3 Select appropriate tools and use them correctly and safely in dismantling and assembling apparatus
   - 2.4 Utilise manufacturer’s apparatus dismantling and assembling guides, where applicable
VU21703 Work in an integrated technology environment

2.5 Mark or tag components during dismantling to help ensure correct and efficient re-assembly

2.6 Store dismantled components and parts carefully to protect them against loss or damage

2.7 Perform the work efficiently without waste of materials and energy, and/or damage to the apparatus or surrounding environment

2.8 Refer non-routine events to the appropriate person, in accordance with normal work procedures

3. Use technologies to carry out work

3.1 Follow relevant OHS/WHS policies and procedures and safe work practices to eliminate or minimise incidents

3.2 Select the appropriate technologies to use in order to achieve the required job outcomes

3.3 Follow the schedule for using relevant technologies to achieve the desired outcome to the required quality standard and with a minimum of waste

3.3 Refer contingencies to the appropriate person for further instructions

3.4 Monitor the quality of the work in accordance with instructions and workplace requirements

4. Evaluate the outcomes of the use of integrated technologies

4.1 Conduct final checks to ensure the use of integrated technologies complies with instructions and requirements

4.2 Notify appropriate personnel of the completion in the use of integrated technologies

4.3 Document any improvements that could be made to the work procedures to improve the quality of outcomes

5. Clean up the work area

5.1 Clean, check and store tools, equipment and any surplus materials in accordance with established procedures

5.2 Dispose of any waste in an environmentally sustainable manner

5.3 Update appropriate records in accordance with instructions and established work procedures

REQUIRED SKILLS AND KNOWLEDGE

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

Required skills:

- Basic computer skills relating to the use of integrated technologies
- Communication skills in liaising with colleagues and supervisors
- Organising skills to dismantle and assemble components
- Analytical skills to be able to access and interpret job information
- Evaluation skills to monitor outcomes and identify areas for improvement

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- Problem solving skills to overcome contingencies
- Practical skills:
  - safe use of hand tools and power tools used in dismantling and assembling components
  - soldering and brazing
  - safe handling techniques
  - dismantling and assembly of components

**Required knowledge:**
- Relevant State/Territory Acts and Regulations
- Relevant OHS/WHS requirements
- Part and component identification common to the integrated technology industries
- Information pertaining to parts and components, such as
  - Catalogues
  - Computer access
  - Manufacturer’s manuals
- Workplace procedures
- Basic tagging techniques
- Tools commonly used in integrated technology such as:
  - Holding (bench vices, multi-grips, wrenches etc.)
  - Cutting (hacksaws, chisels, pliers etc.)
  - Drills (For metallic and non-metallic drilling)
  - General hand tools (hammers, screwdrivers, spanners, sockets etc.)
  - Electric power tools (grinders, drills, jigsaws etc.)
- Tool maintenance
- Joining techniques
- Safe storage arrangements
- Range of technologies involved
- Workplace documentation requirements

**RANGE STATEMENT**

*The Range Statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance.*

**Integrated technology** may include:
- Electrotechnology
- Computer system networks
- Telecommunication systems
- Multimedia and games
- Robotics control systems
- Sustainable energy systems
- Wireless communication systems
- Security systems

**Components** may include:
- Transistors
- Resistors
- Batteries
- Transducers
Transformers
• Capacitors
• Motors
• Switches
• Diodes
• Condensers

**Appropriate person** may include:
- Teacher
- Supervisor
- Leading hand
- Team leader

**Tools** may include:
- Hand tools such as:
  - Hammer
  - Spanner
  - Pliers
  - saw
- Hand held power tools, such as:
  - Drill
  - Circular saw
  - Grinder
  - Soldering iron
  - welder

**Environmentally sustainable** refers to:
- Minimising the impact of waste disposal on our environment
- Taking action to ensure the long-term health of eco-systems

**Appropriate records** may include:
- Maintenance requisitions
- Logs
- Asset registers
- Machine handover sheets

**EVIDENCE GUIDE**
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 section in Section B of the accreditation submission.

**Critical aspects for assessment and evidence required to demonstrate competency in this unit**
- To be considered competent in this unit the participant must be able to demonstrate the knowledge and skills required to achieve all of the elements of competency and associated performance criteria.
- Specifically they must be able to:
  - Select and collect appropriate components and materials for allocated integrated technology jobs
  - Disassemble and re-assemble components effectively
  - Utilise integrated technologies as required to complete allocated jobs to achieve the quality required
  - Clean the work area in accordance with work procedures
Context of and specific resources for assessment

- The assessment of this unit should be conducted in a real or simulated workplace environment
- Resources required for the assessment of the unit include access to:
  - Computer with an Internet link
  - Job description
  - Relevant components and materials
  - Relevant tools and equipment
  - Relevant workplace documentation

Methods of assessment

Assessment must include the demonstration of practical skills and may also include:

- Verbal/written questions
- Product inspection
- Projects
- Research assignment
## VU21704 Use electrotechnology skills in integrated technology work

### Unit Descriptor
This unit provides the skills and knowledge required for an entry-level worker to use basic electrotechnology skills in integrated technology work. It encompasses the application of mathematical skills and electrical/electronic principles relevant to integrated technology work.

No licensing, legislative, regulatory or certification requirements apply to this unit at the time of publication.

### Employability skills
This unit contains Employability Skills.

### Prerequisite unit
MEM13014A  Apply principles of occupational health and safety in the work environment

### Application of the Unit
This unit of competency would be applied by those wishing to enter the integrated technology industry and may be used in school-based programs under appropriate supervision.

### ELEMENT
Elements describe the essential outcomes of a unit of competency.

### PERFORMANCE CRITERIA
Performance criteria describe the required performance needed to demonstrate achievement of the element. Where bold/italicised text is used, further information is detailed in the required skills and knowledge and/or the range statement. Assessment of performance is to be consistent with the evidence guide.

<table>
<thead>
<tr>
<th>ELEMENT</th>
<th>PERFORMANCE CRITERIA</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Determine the work requirements</td>
<td>1.1 Establish the required outcomes from the job instructions</td>
</tr>
<tr>
<td></td>
<td>1.2 Follow relevant OHS/WHS policies and procedures for the <strong>integrated technology</strong> work environment</td>
</tr>
<tr>
<td></td>
<td>1.3 Identify any hazards and/or OHS/WHS issues for the work site and notify <strong>appropriate personnel</strong></td>
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<tr>
<td></td>
<td>1.4 Determine the appropriate formulae and <strong>calculation method</strong> required for the particular application</td>
</tr>
<tr>
<td></td>
<td>1.5 Transpose the formula, if required, to facilitate the required outcome for the calculation</td>
</tr>
<tr>
<td></td>
<td>1.6 Identify and ensure that the units are consistent with those required for each term in the chosen formula, and if necessary convert given units to those required for the chosen formula</td>
</tr>
<tr>
<td></td>
<td>1.7 Use estimating and approximating techniques to check the appropriateness of calculations</td>
</tr>
<tr>
<td></td>
<td>1.8 Apply the concepts of ratio and proportion, if necessary, to the selected formula</td>
</tr>
</tbody>
</table>
2. Connect up, test and verify low voltage (LV) DC and extra low voltage (ELV) AC circuitry

2.1 Connect a series and a parallel LV DC and ELV AC circuit configuration following safe work practices

2.2 Choose the appropriate test equipment and measure the values of electrical quantities of the circuits

2.3 Utilise the correct formulae to calculate and verify the measured values of the electrical quantities in a series and in a parallel circuit configuration

2.4 Compare the measured values to the calculated values and determine the reason for any variations

2.5 Measure LV and ELV voltages to determine that the value is within equipment or power supply specifications

2.6 Use appropriate test equipment to measure AC voltage (Multimeter) in a safe manner that does not require the LV circuit to be disconnected

2.7 Employ encoding and modulation techniques and their application in relevant wired, wireless and optical communication systems.

2.8 Evaluate results and determine probable faults.

3. Produce charts and graphs from the information gathered

3.1 Compare the range of charts and/or graphs used in integrated technologies.

3.2 Transpose the data accurately to produce charts and graphs for the different circuits.

3.3 Determine the scales applicable for the axis of the charts and/or graphs to be produced.

3.4 Identify the upper and lower limits of acceptability for the charts and/or graphs to be produced.

3.5 Utilise the charts and graphs produced to verify the relationship between the electrical quantities in the circuits

3.6 Interpret trends indicated by the slope or gradient of a graph.

4. Evaluate analogue and digital signals

4.1 Compare the characteristics of an analogue signal and a digital signal
4.2 Produce a layout using the **building blocks** to represent a typical analogue and a digital circuit showing the different characteristics

4.3 Produce 4-bit binary codes with their decimal equivalent to represent output voltages of a digital to analogue converter

4.4 Choose appropriate test equipment and measure the output voltage of a digital device for “high” and “low” logic states

5. Perform cable selection

5.1 Compare basic **transmission characteristics** of different **types of cables** used in telecommunications and select the most appropriate cable type to suit the **application characteristics**

5.2 Connect two devices with a patch cable and test the connection

**REQUIRED SKILLS AND KNOWLEDGE**

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

**Required skills:**
- Communication skills to request technical information for activities
- Literacy skills to:
  - Interpret technical documentation
  - Incorporate technical language into written tasks
- Numeracy skills to:
  - Convert fractions to decimals and vice versa
  - Interpret technical data
  - Perform mathematical problem solving using electrical formulae
  - Select appropriate formula for the given application
  - Transpose formulae, as required
  - Substitute the correct values for each term in the relevant formula
  - Use appropriate mathematical operation
  - Produce simple charts or graphs from given information
  - Determine required information from appropriate graphs or charts
  - Check calculated answers for accuracy
  - Round off estimated answers
- Problem solving skills to apply AC and DC fault-finding techniques to different situations
- Safety awareness skills to:
  - Identify hazards
  - Apply relevant OHS/WHS procedures
  - Utilise relevant personal protective equipment, as required
- Technical skills to select and use appropriate test equipment and practices to perform AC and DC testing and fault finding tasks

**Required knowledge:**
- AC and DC theory
- AC and DC electrical quantities, encompassing SI units, OHS/WHS issues and application of Ohms Law
- AC and DC fault finding techniques and the use of test equipment
• Techniques for estimating approximate answers
• Sources of appropriate formulae
• Analogue and digital principles
• Application of binary to decimal conversion and vice versa
• Distinction between analogue and digital signals and devices
• Encoding techniques and their application in wired, wireless and optical communication systems
• Modulation techniques used in wired, wireless and optical communication systems
• Techniques to convert analogue to digital and vice versa
• Types of charts and/or graphs used in integrated technology
• Mathematical techniques for:
  - Estimating approximate answers
  - Ensuring that the units of each term are consistent with the formula selected
  - Converting given units to those required in the formula
  - Applying concepts of ratio and proportion
  - Determining the scales applicable to the axis of the graphs or charts
  - Identifying the upper and lower limits of acceptability applicable to data entered on a graph or chart
  - Interpreting trends indicated by the slope or gradient of a graph

RANGE STATEMENT
The Range Statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance.

**Integrated technology** may include:
- Electrotechnology
- Computer system networks
- Telecommunication systems
- Multimedia and games
- Robotics control systems
- Sustainable energy systems
- Wireless communication systems
- Security systems

**Appropriate person** may include:
- Teacher
- Supervisor
- Leading hand
- Team leader

**Calculation method** may include:
- Application of Ohm’s Law
- Power calculations
- Power consumption and efficiencies
- Voltage dividers
- Voltage, resistance and current calculations
- Gradients of graphs

**LV DC** means:
- Low voltage direct current
- Low voltage is defined by the International Electrotechnical Commission (IEC) as 120-1,500 Volts
**ELV AC** means:
- Extra low voltage alternating current
- Extra low voltage is defined by the International Electrotechnical Commission (IEC) as being <50 Volts

**Circuit configuration** may include:
- AC to DC supply
- DC circuits including:
  - Resistances
  - Single DC voltage source, such as:
    - Battery
    - DC voltage supply
    - Solar panel
  - Power loads
- AC circuit including:
  - Inductors, capacitors and resistances
  - Single AC voltage source, such as:
    - AC generator
    - AC voltage supply
    - Alternator
    - Low voltage AC source

**Safe work practices** include:
- Component tolerances are not exceeded
- Correct use of power supply and test equipment
- Identifying electrical safety hazards
- Current overloads protection
- Power isolation during set-up procedure
- Well laid out circuitry avoiding:
  - Contact with external sources
  - Shorting of components

**Test equipment** may include:
- Multimeters, including digital multimeters
- Ohmmeters
- Voltmeters

**Electrical quantities** may include:
- Current
- Power
- Voltage
- Resistance

**Probable faults** may include:
- Cracked circuit board
- Failed components
- Faulty power supply
- Intermittent faults
- Loose connections
- Open circuit
- Short circuit
- Short to ground
- Split pairs
- Water damage
Characteristics of an analogue signal may include:
- Continuously variable, infinite number of states
- Intelligence based on recreating exact waveshape
- Signal to noise ratio increase with amplification

Characteristics of a digital signal may include:
- Error detection and correction
- Finite number of discrete states
- High noise immunity
- Intelligence based on ability to discern only two states
- Regeneration
- Type of square wave (complex waveform)

Building blocks may include:
- Analogue:
  - Amplifiers
  - Attenuators
  - Displays
  - Filters
  - Oscillators
  - Transducers
- Digital:
  - ADC and DAC
  - Computers
  - Counter
  - Data routers, switches and bridges
  - Digital amplifier
  - Digital display
  - Input and output transducers
  - Multiplexer

Transmission characteristics may include:
- Attenuation
- Balanced
- Characteristic impedance (Z)
- Crosstalk
- Frequency range
- Transmission windows for glass optical fibre
- Unbalanced
- Waveguide cut-off frequency

Types of cables may include:
- Coaxial cable
- Multi-pair communications cable
- Optical fibre
- Performance data cable CAT 5 and higher
- Rack and sub-rack alarm and power distribution cables
- Shielded twisted pair (STP) communications cable
- UTP communications cable

Application characteristics may include:
- Audio
- Data
- Digital subscriber line (DSL)
- Ethernet
VU21704 Use electrotechnology skills in integrated technology work

- Microwave
- Optical/laser
- Power
- Radio frequency (RF)
- Satellite
- Video

EVIDENCE GUIDE
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 section in Section B of the accreditation submission.

Critical aspects for assessment and evidence required to demonstrate competency in this unit
- To be considered competent in this unit the participant must be able to demonstrate the knowledge and skills required to achieve all of the elements of competency and associated performance criteria.
- Specifically they must be able to:
  - Select appropriate formulae and perform simple mathematical calculations
  - Draw charts and graphs to represent technical data
  - Use Ohm’s Law and fundamental electrical principles to solve basic ELV AC and LV DC electrical problems
  - Connect and test and ELV AC and a LV DC circuit
  - Evaluate cable types and wireless devices
Context of and specific resources for assessment

- The assessment of this unit should be conducted in a real or simulated workplace environment
- Resources required for the assessment of the unit include access to:
  - Job instruction
  - Calculator
  - Components for AC and DC circuits
  - Relevant tools and equipment
  - Relevant workplace documentation

Methods of assessment

Assessment must include the demonstration of practical skills and may also include:

- Verbal/written questions
- Circuit inspection
- Projects
- Research assignments
VU21705 Unit Description

This unit provides the skills and knowledge required to safely and effectively use basic software applications in integrated technology work. It encompasses the application of software applications to produce CAD drawings etc. i.e. 2D, 3D.

No licensing, legislative, regulatory or certification requirements apply to this unit at the time of publication.

Employability skills

This unit contains Employability Skills.

Pre-requisite unit

MEM13014A Apply occupational health and safety principles in the work environment

Application of the Unit

This unit of competency would be applied by those wishing to enter the integrated technology industry and may be used in school-based programs under appropriate supervision. A person competent in this unit will be able to use software applications to create and record basic drawings.

ELEMENT

Elements describe the essential outcomes of a unit of competency.

PERFORMANCE CRITERIA

Performance criteria describe the required performance needed to demonstrate achievement of the element. Where bold/italicised text is used, further information is detailed in the required skills and knowledge and/or the range statement. Assessment of performance is to be consistent with the evidence guide.

1. Determine the job requirements

1.1 Establish the required outcomes from the job instructions

1.2 Access and interpret relevant OHS/WHS requirements and specific safety requirements for the work environment

1.3 Identify suitable software applications to meet the job specifications

1.4 Obtain and check the software needed to carry out the task

1.5 Identify the type and source of information/data required for the job
2. Use software applications

2.1 Follow the relevant OHS/WHS procedures for using software applications

2.2 Navigate the technology to access the required information/data for the job

2.3 Retrieve the information/data using organisational procedures and check it for relevance to the job

2.4 Manipulate information/data by performing **application tasks** in accordance with established procedures

2.5 Employ drawing aids to generate block diagrams, flowcharts and engineering drawings

2.6 Apply appropriate simulation techniques to confirm that job specifications have been met

2.7 Produce and save appropriate files using suitable techniques that apply to the particular software package

2.8 Apply standard conventions to meet design requirements

2.9 Access assistance from **appropriate personnel**, if required

3. Complete the software application task

3.1 Store completed files appropriately and in accordance with enterprise requirements

3.2 Follow appropriate procedures for shutting down/logging off and exiting the computing technology

3.3 Obtain job completion approval from appropriate personnel

**REQUIRED SKILLS AND KNOWLEDGE**

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

**Required skills:**

- Communication skills to consult with appropriate personnel
- Organisation skills to:
  - obtain job requirements
  - plan and sequence activities
  - apply version control
  - meet set timelines
- Computer skills to:
  - Check software tools
  - Use appropriate commands to load and run the software
  - Enter, manipulate and retrieve data
  - Identify, place and interconnect symbols as appropriate
  - Use software applications to perform drawing tasks
  - Save and store created files
- Drawing skills to produce a layout that complies with design rules and meets job specifications
- Presentation skills to present software solutions/drawings for approval

Required knowledge:
- Functions and capabilities of various types of software applications
- Hazards and control measures associated with using computing technology
- Safe work practices and procedures
- User interfaces:
  - Working with commands
  - Cartesian workspace
  - Help menu
  - Search tools
- Technical drawing interpretation
- Shapes used in technical drawings
- Dimensioning

RANGE STATEMENT
The Range Statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance.

OHS/WHS requirements may include:
- Legislation
- Protective equipment
- Material safety management systems
- Local safe operating procedures

Specific safety requirements may include:
- Standard operating procedures
- First aid
- Working safely around machinery
- Working safely with tools and equipment
- Risk and hazard recognition
- Emergency procedures
- Awareness of electrical hazards

Software applications may include:
- Visio
- AutoCAD
- Altum Design
- Network simulator
- Electronic workbench

Application tasks may include:
- Generating an electrical/electronic/computer system block diagram
- Performing calculations
- Generating flow charts as per specifications
- Performing simulations
- Generating drawings
**Appropriate personnel** may include:
- Supervisor
- Leading hand
- Foreman
- Manager
- Site engineer
- Trainer/teacher
- Mentor
- Team member

**EVIDENCE GUIDE:**

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 section in Section B of the accreditation submission.

**Critical aspects for assessment and evidence required to demonstrate competency in this unit**
- To be considered competent in this unit the participant must be able to demonstrate the knowledge and skills required to achieve all of the elements of competency and associated performance criteria.
- Specifically they must be able to:
  - Implement OHS/WHS workplace procedures and practices, including the use of risk control measures
  - Select and use software applications to complete technical drawings
  - Save and store created files to meet organisational requirements
  - Present software solutions/drawings for approval

**Context of and specific resources for assessment**
- The assessment of this unit should be conducted in a real or simulated workplace environment
- Where assessment occurs in a simulated environment, the range of conditions should reflect realistic workplace situations
- Resources required for the assessment of the unit include access to:
  - Computer with an Internet link
  - Job instructions
  - A range of engineering software applications
  - Relevant tools and equipment
- Relevant workplace documentation, such as workplace procedures, technical manuals, Codes of Practice and reference materials

**Methods of assessment**
- Assessment must include the demonstration of practical skills and may also include:
  - Verbal/written questions
  - Final product inspection
  - 3rd Party reports from appropriate persons
  - Projects
  - Portfolio
VU21706 Create products using 3D printing

Unit Descriptor
This unit provides the skills and knowledge to utilise a 3D printer to produce a range of items. It encompasses relevant safety procedures and the use of integrated technologies.

No licensing, legislative, regulatory or certification requirements apply to this unit at the time of publication.

Employability skills
This unit contains Employability Skills.

Application of the Unit
This unit of competency would be applied by those wishing to enter the integrated technology industry and may be used in school based programs under appropriate supervision.

ELEMENT
Elements describe the essential outcomes of a unit of competency.

PERFORMANCE CRITERIA
Performance criteria describe the required performance needed to demonstrate achievement of the element. Where bold/italicised text is used, further information is detailed in the required skills and knowledge and/or the range statement. Assessment of performance is to be consistent with the evidence guide.

1. Determine the job requirements

1.1 Clarify the requirements and purpose for 3D printing by referring to the job specifications

1.2 Organise work flow sequences in consultation with relevant personnel

1.3 Select computer software that best suits the type of 3D printing product that is being created

1.4 Select a 3D printer suitable for the product being created including the material used to create the product.

1.5 Access and analyse relevant reference materials to help with the visualisation of the 3D product
2. Create the 3D printing product

2.1 Use software features to block out models to determine correct proportions in relation to the reference materials

2.2 Manipulate software features to apply lighting and shading, as required

2.3 Ensure that the product’s geometry allows for appropriate deformation, as required

2.4 **Refine** and check the **integrity** of the product design until it meets the design requirements

2.5 Render and output the product design in the required **format** and within agreed timelines

3. Evaluate the 3D printing product

3.1 Test the 3D product design to identify any faults and adjust, as required

3.2 Submit final 3D product design to relevant personnel for approval and make final adjustments to the 3D printing program, if required

3.3 Produce the sample 3D product and check for faults

3.4 Save the computer files and make back-up copies in accordance with enterprise procedures

3.5 Complete workplace documentation according to enterprise procedures

**REQUIRED SKILLS AND KNOWLEDGE**

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

**Required skills:**

- Technical skills relating to:
  - The use of industry-current 3D printing software applications
  - Manipulation of hardware and software features
  - Managing files and directories using standard naming conventions and version control protocols
  - Making back-up copies of files and storing them appropriately move to organising skills

- Communication skills to:
  - Interpret and clarify written or verbal instructions
  - Work as a team members
  - Respond constructively to feedback
  - Complete workplace documentation

- Organising skills to:
  - Prioritise work tasks
  - Meet deadlines
  - Seek expert assistance when problems arise
- Initiative and creativity in the context of visualising and accurately creating 3D printing products

**Required knowledge:**
- 3D digital printing techniques
- Functions and features of a range of delivery platforms
- Stages in the production process from initial design through to finished product
- Issues and challenges in the context of creating 3D digital printing products
- OHS/WHS standards
- Geometry in relation to the creation of 3D printing products

**RANGE STATEMENT**

The Range Statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance.

**Requirements** may include:
- Assets for integration
- Collaboration with other team members
- Creative expectations
- Design specifications
- Output format
- Technical specifications
- Timelines

**Purpose** may include:
- Architectural models
- Demonstration of processes and procedures

**Relevant personnel** may include:
- Supervisor
- Trainer/teacher
- Project Manager

**3D printer** may include:
- RepRap
- Ultimaker
- Airwolf
- RoBo
- Solidoodle

**Reference materials** may include:
- Concept drawings and designs
- Real object on which the product is to be based
- Still images
- Video

**Refine** may include achieving:
- The required shape
- The required topology
- The required functionality

**Integrity** may include:
- Double faces
- Isolated vertices
- Pivot points
- Resetting transform
- Scale of product relative to other components
Format may include:

- Standard Tessellation Language (STL)
- Audio Video Interleave (AVI)
- Interchange File Format (IFF)
- Joint Photographic Experts Group (JPEG)
- Tagged Image File Format (TIFF)
- Quicktime
- Moving Pictures Experts Group (MPEG)
- Portable Network Graphics

EVIDENCE GUIDE

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 section in Section B of the accreditation submission

Critical aspects for assessment and evidence required to demonstrate competency in this unit

- To be considered competent in this unit the participant must be able to demonstrate the knowledge and skills required to achieve all of the elements of competency and associated performance criteria.
- Specifically they must be able to:
  - Design and create 3D printed products that:
    - Demonstrate efficient use of geometry and attention to detail
    - Meet design requirements

Context of and specific resources for assessment

- The assessment of this unit should be conducted in a real or simulated workplace environment
- Resources required for the assessment of the unit include access to:
  - Computer with an Internet link
  - Job instructions
  - Relevant components and materials
  - Relevant tools and equipment
  - Relevant workplace documentation

Methods of assessment

Assessment must include the demonstration of practical skills and may also include:

- Verbal/written questions
- Product inspection
- Projects
- Research assignments