



**Australian Government**

**Department of Education, Employment and Workplace Relations**

# **MEM30405 Certificate III in Engineering - Electrical/Electronic Trade**

**Release: 1**

## **MEM30405 Certificate III in Engineering - Electrical/Electronic Trade**

### **Modification History**

Not Applicable

## Description

This qualification covers the skills and knowledge required for employment as an Engineering Tradesperson - Electrical/Electronic within the metal, engineering, manufacturing and associated industries or other industries where Engineering Tradespersons - Electrical/Electronic work. The qualification has been specifically developed for apprentices in the above trade. The qualification packaging has been developed on an assumption that competency will be developed through an integrated combination of on and off-the-job learning strategies such as those delivered through a formal apprenticeship. The qualification may also be achieved through formal skills recognition assessment processes.

### *Job roles/employment outcomes*

The Certificate III in Engineering - Electrical/Electronic Trade specifies the competencies required for employment as an Engineering Tradesperson - Electrical/Electronic including the design, assembly, manufacture, installation, modification, testing, fault finding, commissioning, maintenance and service of all electrical and electronic devices systems, equipment and controls e.g. electrical wiring, motors, generators, PLCs, and other electronic controls, instruments, refrigeration, telecommunications, radio and television, communication and information processing.

Employment outcomes related to this qualification are found in a wide variety of manufacturing and engineering related sectors as well as Engineering Tradesperson - Electrical/Electronic trade related roles in other industries.

### *Application*

This qualification is designed to provide an industry recognised skills profile related to trade work as an Engineering Tradesperson - Electrical/Electronic. Skills development would usually be undertaken through an Australian Apprenticeship arrangement where the mix of on and off-the-job training would be specified in the Training Plan associated with the Contract of Training between the employer and apprentice.

Assessment of some units of competency must, where indicated, include evidence of the candidate's performance in a productive work environment where there is a sufficient range of appropriate tasks and materials to cover the scope of application of those units. All outcomes must reflect the standard of performance inherent in the job.

Occupational titles at the enterprise level covered by this qualification may vary and include engineering tradesperson - electrical/electronic, electrical fitter, electrical mechanic, electrical fitter/mechanic, electrician, refrigeration mechanic and radio tradesperson.

## Pathways Information

### *Pathways into the qualification*

While there is no qualification entry requirement, it is assumed that the learner is engaged as an apprentice under a Training Contract and that the learner is receiving appropriate structured on-the-job training while undertaking this qualification.

This qualification may be accessed by direct entry. Credit for relevant units of competency achieved should be granted towards this qualification for those who have completed MEM10105 Certificate I in Engineering, MEM10205 Certificate I in Boating Services, MEM20105 Certificate II in Engineering, MEM20205 Certificate II in Engineering - Production Technology or other relevant qualifications. Credit towards this qualification may also include units of competency contained within relevant pre-vocational and pre-apprenticeship programs and Statements of Attainment.

### ***Pathways from the qualification***

Further training pathways from this qualification include MEM40105 Certificate IV in Engineering, MSA41108 Certificate IV in Competitive Manufacturing, MSA40108 Certificate IV in Manufacturing Technology or other relevant qualifications.

### ***Additional qualification advice***

An additional descriptor may be added to this qualification title to illustrate a particular skills profile.

This could be achieved by adding a pathway descriptor or sentence *below* the formal title of the qualification. Note that no changes may be made to the qualification title and the use of one of these descriptors to a qualification does not change the qualification's formal title or unique national code.

There are no specific requirements associated with the use of these descriptors other than their use should reflect the nature of the choice of units of competency in the qualification and must be consistent with the work role of an Engineering Tradesperson - Electrical/Electronic. Reference to other occupational or functional pathways consistent with the role of an Engineering Tradesperson - Electrical/Electronic may be included on any qualification statement that is issued.

Competitive Manufacturing qualifications are available for employees at this level who already possess trade and other technical skills and who require additional manufacturing practice skills above those available in this qualification.

### ***Licensing considerations***

If appropriate electives are undertaken this qualification can be used as the basis for an application in each state and territory for a license to practise as an electrician. It can also be used to satisfy regulations regarding refrigeration and airconditioning work. Local regulations should be checked for details.

## **Licensing/Regulatory Information**

Refer to Pathways Information

## **Entry Requirements**

Not Applicable

## Employability Skills Summary

| <b>EMPLOYABILITY SKILLS QUALIFICATION SUMMARY</b> |   |
|---|---|
| <b>Employability Skill</b>                        | <b>Industry/enterprise requirements for this qualification include:</b>   |
| Communication                                     | <ul style="list-style-type: none"> <li>• Read, interpret and follow information on written job instructions, specifications, standard operating procedures, charts, lists, drawings and other applicable reference documents</li> <li>• Interpret, record and communicate information including measurements</li> <li>• Produce sketches, diagrams, charts or graphs</li> <li>• Check and clarify task-related information</li> <li>• Recognise and use common workplace terminology</li> <li>• Tag, mark or label cabling for identification</li> <li>• Interpret circuit diagrams</li> <li>• Provide advice on minimising electricity use</li> <li>• Liaise with appropriate authorities</li> </ul>   |
| Teamwork  | <ul style="list-style-type: none"> <li>• Work alone or as part of a team</li> <li>• Contribute to a group effort in order to plan and carry out work</li> <li>• Identify work roles, communicate and cooperate with others</li> </ul>   |
| Problem-solving                                   | <ul style="list-style-type: none"> <li>• Undertake numerical operations, geometry and calculations/ formulae (including addition, subtraction, multiplication, division, fractions and decimals, percentages and proportions, simple ratios and averages)</li> <li>• Use appropriate measuring techniques</li> <li>• Inspect quality of own or other employee's work</li> <li>• Analyse information according to enterprise and work requirements</li> <li>• Assess operation and condition of components against specifications or manufacturer's requirements</li> <li>• Use diagnostic skills and tests to identify and determine causes of electrical faults, including interpretation of in-built fault indicators and error codes</li> <li>• Translate designs into practical outcomes</li> </ul> |
| Initiative and enterprise                         | <ul style="list-style-type: none"> <li>• Be capable of applying the competency in new and different situations and contexts</li> <li>• Identify actual and foreseeable workplace hazards during course of work</li> <li>• Implement OHS risk management procedures</li> <li>• Modify work plan to overcome unforeseen difficulties or developments that occur as work progresses</li> <li>• Participate in improvement procedures including process,</li> </ul>   |

| <b>EMPLOYABILITY SKILLS QUALIFICATION SUMMARY</b> |  |
|---|--|
|   | quality and internal/external customer/supplier relationships  |
| Planning and organising                           | <ul style="list-style-type: none"> <li>• Plan, prioritise and sequence work operations/complete activities/scheduled production</li> <li>• Select and use planning techniques and tools</li> <li>• Organise and analyse information relevant to work</li> <li>• Set up jobs prior to commencement of work including selection of appropriate tools, equipment and materials and adjustment of equipment</li> </ul>   |
| Self-management                                   | <ul style="list-style-type: none"> <li>• Carry out work safely and in accordance with company policy and procedures, manufacturer's recommendations and legislative requirements</li> <li>• Monitor performance of operation or quality of product or service to ensure customer satisfaction</li> <li>• Take responsibility for work outcomes</li> <li>• Apply techniques, procedures, tools and equipment for compliance with site or manufacturers' specifications.</li> </ul>  |
| Learning  | <ul style="list-style-type: none"> <li>• Check and clarify task related information with appropriate personnel or technical adviser</li> <li>• Identify customers' requirements with respect to the operation or quality of the product or service</li> <li>• Assess and modify own work practices</li> <li>• Use manuals, online help and other reference materials such as catalogues/lists as required</li> <li>• Maintain current knowledge of applicable standards, legislation, codes of practice, environmental guidelines and product/process developments</li> <li>• Assist with on the job training and assessment</li> </ul>  |
| Technology  | <ul style="list-style-type: none"> <li>• Select and use appropriate tools, equipment, materials and machines</li> <li>• Select and use appropriate measuring/testing devices</li> <li>• Perform calculations using a calculator</li> <li>• Navigate technology to access /input /store/retrieve/save and produce information/data using appropriate software applications</li> <li>• Apply knowledge of appropriate engineering principles, techniques, procedures, tools and equipment to achieve the required outcome</li> <li>• Apply techniques, tools and equipment required to install/maintain electrical equipment/systems/components</li> <li>• Use tools, equipment and techniques to test the operation of electrical equipment/components/systems</li> <li>• Calibrate instrumentation equipment/components</li> </ul> |

## Packaging Rules

### Packaging Rules

The minimum requirements for achievement of the Certificate III in Engineering - Electrical/Electronic Trade are:

- completion of all core units of competency listed below, and
- completion of units from the Group A Electrical/Electronic Stream to the value of at least 40 points, and
- completion of units from Group B Certificate III Trade specialisation units listed in Appendix 1, Volume 1 of the Training Package, to bring the total value to at least 73 points

Points associated with prerequisites count towards the total (refer to units and prerequisites listing in Appendix 2, Volume 1).

Appropriate elective units to the value of 16 points may be chosen from other endorsed Training Packages and accredited courses where those units are available for inclusion at Certificate III. Note that the elective units listed below include all of the units that are approved for selection from the MEM Training Package for use in this qualification. This meets the NQC requirement that one sixth of the total units must be able to be selected from other qualifications in the same Training Package.

Registered Training Organisations must seek a determination from Manufacturing Skills Australia in respect of the allocation of points values for units of competency drawn from other Training Packages or accredited courses.

Only select units that would be suitable for Electrical/Electronic Trade occupational outcomes

### *Additional qualification descriptors*

The following additional descriptors are approved for use with this qualification: Refrigeration and Air-conditioning; Instrumentation; Maintenance; Marine Electronics.

### Core Units

- select all of the units from this list

| Unit code | Unit title   |
|-----------|--|
| MEM12023A | Perform engineering measurements   |
| MEM12024A | Perform computations   |
| MEM13014A | Apply principles of occupational health and safety in the work environment |
| MEM14004A | Plan to undertake a routine task   |

| Unit code  | Unit title  |
|------------|---|
| MEM14005A  | Plan a complete activity  |
| MEM15002A  | Apply quality systems   |
| MEM15024A  | Apply quality procedures  |
| MEM16006A  | Organise and communicate information                                    |
| MEM16007A  | Work with others in a manufacturing, engineering or related environment |
| MEM16008A  | Interact with computing technology                                      |
| MEM17003A  | Assist in the provision of on the job training                          |
| MSAENV272B | Participate in environmentally sustainable work practices               |

### Electives

#### Group A - Electrical/Electronic Trade stream units

- select units from this list to the value of at least 40 points

| Unit code | Unit title  | P  |
|-----------|---|----|
| MEM05001B | Perform manual soldering/desoldering - electrical/electronic components                   | 4  |
| MEM05002B | Perform high reliability soldering and desoldering  | 4  |
| MEM05003B | Perform soft soldering  | 2  |
| MEM05006B | Perform brazing and/or silver soldering   | 2  |
| MEM09002B | Interpret technical drawing   | 4  |
| MEM10002B | Terminate and connect electrical wiring   | 3  |
| MEM10003B | Install and test electrical wiring and circuits up to 1000 volts a.c. and 1500 volts d.c. | 12 |



| <b>Unit code</b> | <b>Unit title</b>   | <b>P</b> |
|------------------|---|----------|
| MEM12002B        | Perform electrical/electronic measurement   | 2        |
| MEM12004B        | Perform precision electrical/electronic measurement                                     | 4        |
| MEM18001C        | Use hand tools  | 2        |
| MEM18002B        | Use power tools/hand held operations  | 2        |
| MEM18045B        | Fault find/repair electrical equipment/components up to 250 volts single phase supply   | 4        |
| MEM18046B        | Fault find/repair electrical equipment/components up to 1000 volts a.c./1500 volts d.c. | 10       |
| MEM18047B        | Diagnose and maintain electronic controlling systems on mobile plant                    | 4        |
| MEM18048B        | Fault find and repair/rectify basic electrical circuits                                 | 12       |
| MEM18049C        | Disconnect/reconnect fixed wired equipment up to 1000 volts a.c./1500 volts d.c.        | 3        |
| MEM18050C        | Disconnect/reconnect fixed wired equipment over 1000 volts a.c./1500 volts d.c.         | 3        |
| MEM18051B        | Fault find and repair/rectify complex electrical circuits                               | 6        |
| MEM18052B        | Maintain fluid power systems for mobile plant   | 4        |
| MEM18054B        | Fault find, test and calibrate instrumentation systems and equipment                    | 8        |
| MEM18055B        | Dismantle, replace and assemble engineering components                                  | 3        |

| Unit code | Unit title   | P  |
|-----------|--|----|
| MEM18056B | Diagnose and repair analog equipment and components  | 10 |
| MEM18057B | Maintain/service analog/digital electronic equipment   | 6  |
| MEM18058C | Modify electronic equipment  | 4  |
| MEM18060B | Maintain, repair control instrumentation - single and multiple loop control systems              | 8  |
| MEM18062B | Install, maintain and calibrate instrumentation sensors, transmitters and final control elements | 8  |
| MEM18063B | Terminate signal and data cables   | 4  |
| MEM18064B | Maintain instrumentation system components   | 6  |
| MEM18065B | Diagnose and repair digital equipment and components   | 10 |

### Group B - Trade Specialisation units

Select units from the Certificate III Trade Specialisation units listed in Volume 1 of MEM05 to bring the total value of units to at least 73 points, including any prerequisites

**Note:** The following units of competency are required to meet the National Uniform Electrical Licensing '66 essential capabilities' for an electrician's license.

| Unit code | Unit title   | P   |
|-----------|--|-----|
| MEM12023A | Perform engineering measurements   | n/a |
| MEM12024A | Perform computations   | n/a |
| MEM13014A | Apply principles of occupational health and safety in the work environment | n/a |
| MEM14004A | Plan to undertake a routine task   | n/a |
| MEM14005A | Plan a complete activity   | n/a |

| <b>Unit code</b> | <b>Unit title</b>   | <b>P</b> |
|------------------|---|----------|
| MEM15002A        | Apply quality systems   | n/a      |
| MEM15024A        | Apply quality procedures  | n/a      |
| MEM16006A        | Organise and communicate information  | n/a      |
| MEM16007A        | Work with others in a manufacturing, engineering or related environment                   | n/a      |
| MEM16008A        | Interact with computing technology  | n/a      |
| MEM17003A        | Assist in the provision of on the job training  | n/a      |
| MEM09002B        | Interpret technical drawing   | 4        |
| MEM10002B        | Terminate and connect electrical wiring   | 3        |
| MEM10003B        | Install and test electrical wiring and circuits up to 1000 volts a.c. and 1500 volts d.c. | 12       |
| MEM10004B        | Enter and change programmable controller operational parameters                           | 2        |
| MEM10011B        | Terminate and connect specialist cables   | 3        |
| MEM12002B        | Perform electrical/electronic measurement   | 2        |
| MEM12004B        | Perform precision electrical/electronic measurement                                       | 4        |
| MEM18001C        | Use hand tools  | 2        |
| MEM18002B        | Use power tools/hand held operations  | 2        |
| MEM18046B        | Fault find/repair electrical equipment/components up to 1000 volts a.c./1500 volts d.c.   | 10       |
| MEM18048B        | Fault find and repair/rectify basic electrical circuits                                   | 12       |

| <b>Unit code</b> | <b>Unit title</b>  | <b>P</b> |
|------------------|--|----------|
| MEM18049C        | Disconnect/reconnect fixed wired equipment up to 1000 volts a.c./1500 volts d.c. | 3        |
| MEM18051B        | Fault find and repair/rectify complex electrical circuits                        | 6        |
|                  | Points total   | 65       |