Australian Government

Department of Education, Employment and Workplace Relations

MEM50211 Diploma of Engineering - Technical

Release: 3

INDUSTRY SKILLS COUNCILS

Creating Australia's Future

MEM50211 Diploma of Engineering - Technical

Modification History

Release 3 - Elective units covering skills in detail drafting have been updated and new electives included. Outcomes are equivalent.
Release 2 - This qualification supersedes MEM50205

Description

Not Applicable

Pathways Information

Not Applicable

Licensing/Regulatory Information

There are no specific licences that relate to this qualification. However, for employment at para-professional levels in the aeronautical and avionic fields in the Australian aviation industry, the Australian Defence Force (ADF) and the Civil Aviation Safety Authority (CASA) have requirements that must be met. Units designed to meet these requirements are included as electives in this qualification. Advice on the selection of electives to meet ADF and CASA requirements is given at the end of this qualification.

Entry Requirements

Not Applicable

Employability Skills Summary

Employability Skill	**Industry/enterprise requirements for this qualification include**:
Communication	• Read, interpret and analyse information on specifications, design briefs, charts, lists, drawings and other applicable reference documents • Research, organise, analyse and communicate complex information from reference texts, manufacturer's catalogues and industrial magazines, websites, use of phone, email and fax • Communicate effectively across a range of communication networks in the workplace, including attending meetings and facilitating small group discussions and meetings on relevant engineering and trade related issues, writing memos or letters, making telephone calls • Produce, interpret and analyse engineering drawings, charts and graphs • Prepare and disseminate verbal or written technical information, instructions, work plans, reports, specifications and other documentation • Identify, access, interpret and analyse trade related information in an enterprise, including quality documentation, equipment manufacturer specifications, engineering data sheets, production and maintenance records and national standards. • Use engineering terminology and language appropriate to the situation and target audience • Write technical or non-technical reports that include some level of analysis and/or research
Teamwork	• Work alone or as part of a team that may include apprentices, other tradespersons, technicians, engineers and production personnel • Provide clear and precise information to team members • Delegate and supervise work where appropriate
Problem-solving	• Analyse information and data from operations, processes, and test results including determining trends from graphical data • Develop solutions and recommendations to trade related problems based on analysis of data • Apply mathematical techniques and scientific principles to engineering situations (Including arithmetic, algebraic expressions with one independent variable, two-dimensional geometry, trigonometry, linear functions, basic quadratic functions, basic statistical methods and statistical process control) • Perform hazard and risk analysis
Initiative and enterprise	• Be capable of applying trade-Related skills and knowledge in new and different situations and contexts

	• Apply statistical processes to make recommendations solutions for equipment and and process improvements or to improve sustainability of operations • Make modifications to work plans and schedules to overcome unforeseen difficulties or developments • Initiate significant modifications to plant and equipment that lead to desired changes in performance
Planning and organising	• Organise, sort, categorise and sequence information • Select and use planning techniques and tools to plan, sequence and prioritise work operations • Prepare, monitor and review work plans, schedules, programs and budgets
Self-management	• Carry out work within given timeframe, process and quality constraints • Carry out work safely and in accordance with company policy and procedures and legislative requirements • Monitor work to ensure compliance with legislation, codes and national standards
Learning	• Use manuals, online help and other reference materials as required to research technical information and data suitable and appropriate for advanced trade and technician applications • Identify and consult appropriate personnel and technical experts or other reference sources to obtain/verify information • Provide and communicate information to other team members • Provide on the job training and monitor trainee progress • Maintain knowledge of relevant legislative requirements, codes and standards.
Technology	• Use computing technology to access, input and store information • Apply engineering knowledge and principles • Search computer databases and internet for technical information and data suitable and appropriate for advanced trade applications • Inspect engineering plant, equipment and systems for optimum operation and undertake modifications as required

Packaging Rules

The minimum requirements for achievement of the Diploma of Engineering - Technical are:

- completion of the five (5) core units of competency listed below, and
- fifteen (15) elective units, to bring the total number of units to twenty (20).

Elective units must be selected as follows:

- up to eight (8) general elective units from the list in Group A,
- at least seven (7) specialist elective units from Group B, to bring the total number of elective units to fifteen (15).

Three (3) appropriate Group B electives may be chosen from other endorsed Training Packages and accredited courses where those units are available for inclusion at Diploma level. Note that the elective units listed below include all of the units that are approved for selection from the MEM05 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.
Note that when selecting elective units any prerequisite units must also be completed. Note that prerequisites can only count towards the number of electives required if they are listed in the groups below (refer to units and prerequisites listing in Appendix 2).

Additional qualification descriptors
The following additional descriptors are approved for use with this qualification: Mechanical, Mechatronics, Manufacturing, Maintenance, Aeronautical, Avionic.

Core units

- Select all of the units from this list.

Unit code	**Unit title**
MEM16006A	Organise and communicate information
MEM16008A	Interact with computing technology
MEM30007A	Select common engineering materials
MEM30012A	Apply mathematical techniques in a manufacturing, engineering or related environment
MSAENV272B	Participate in environmentally sustainable work practices

Electives units
Group A - general electives

- Select up to eight (8) units from this list.

Unit code	Unit title	Prerequisites
MEM09002B	Interpret technical drawing	

Unit code	Unit title	Prerequisites
MEM09202A	Produce freehand sketches	
MEM09203A	Measure and sketch site information	
MEM09204A	Produce basic engineering detail drawings	*
MEM09205A	Produce electrical schematic drawings	*
MEM09206A	Produce drawings for mechanical services	*
MEM09207A	Produce drawings for reticulated services	*
MEM09208A	Detail fasteners and locking devices in mechanical drawings	*
MEM09209A	Detail bearings, seals and other componentry in mechanical drawings	*
MEM09211A	Produce drawings or models for industrial piping	*
MEM09212A	Produce detailed drawings of steel to non-steel connections	*
MEM09213A	Produce schematic drawings for hydraulic and pneumatic fluid power systems	*
MEM09216A	Interpret and produce curved 3-D shapes and patterns	
MEM09217A	Prepare plans for pipe and duct fabrication	*
MEM09218A	Participate in drafting projects for building services	*
MEM09219A	Prepare drawings for fabricated sheet metal products	*
MEM12024A	Perform computations	
MEM13013B	Work safely with ionizing radiation	
MEM15001B	Perform basic statistical quality control	
MEM16003B	Provide advanced customer service	
MEM16012A	Interpret technical specifications and manuals	
MEM16014A	Report technical information	
MEM18001C	Use hand tools	

Unit code	Unit title	Prerequisites
MEM24001B	Perform basic penetrant testing	*
MEM24003B	Perform basic magnetic particle testing	*
MEM24005B	Perform basic eddy current testing	*
MEM24007B	Perform ultrasonic thickness testing	*
MEM24009B	Perform basic radiographic testing	*
MEM30005A	Calculate force systems within simple beam structures	*
MEM30006A	Calculate stresses in simple structures	*
MEM30008A	Apply basic economic and ergonomic concepts to evaluate engineering applications	
MEM30009A	Contribute to the design of basic mechanical systems	*
MEM30010A	Set up basic hydraulic circuits	
MEM30011A	Set up basic pneumatic circuits	
MEM30013A	Assist in the preparation of a basic workplace layout	
MEM30014A	Apply basic just in time systems to the reduction of waste	
MEM30015A	Develop recommendations for basic set up time improvements	
MEM30016A	Assist in the analysis of a supply chain	
MEM30017A	Use basic preventative maintenance techniques and tools	
MEM30018A	Undertake basic process planning	
MEM30019A	Use resource planning software systems in manufacturing	
MEM30020A	Develop and manage a plan for a simple manufacturing related project	
MEM30021A	Prepare a simple production schedule	
MEM30022A	Undertake supervised procurement activities	

Unit code	Unit title	Prerequisites
MEM30023A	Prepare a simple cost estimate for a manufactured product	
MEM30024A	Participate in quality assurance techniques	*
MEM30025A	Analyse a simple electrical system circuit	*
MEM30026A	Select and test components for simple electronic switching and timing circuits	*
MEM30027A	Prepare basic programs for programmable logic controllers	
MEM30028A	Assist in sales of technical products/systems	
MEM30031A	Operate computer-aided design (CAD) system to produce basic drawing elements	
MEM30032A	Produce basic engineering drawings	
MEM30033A	Use computer-aided design (CAD) to create and display 3-D models	*
CPCCOHS1001A	Work safely in the construction industry	
MEA101B	Interpret occupational health and safety practices in aviation maintenance	
MEA105C	Apply quality standards applicable to aviation maintenance processes	*
MEA107B	Interpret and use aviation maintenance industry manuals and specifications	
MEA108B	Complete aviation maintenance industry documentation	*
MEA109B	Perform basic hand skills, standard trade practices and fundamentals in aviation maintenance	*
MEA270A	Lay out avionic systems	*
MEA271A	Lay out avionic flight management systems	*
MEA340A	Lay out and set up aircraft systems	*
MEA341A	Apply basic aircraft design characteristics	*

Unit code	Unit title	Prerequisites
MSAENV472B	Implement and monitor environmentally sustainable work practices	
MSATCS301A	Interpret architectural and engineering design specifications for structural steel detailing	*
MSATCS302A	Detail bolts and welds for structural steelwork connections	*
UEPMNT419A	Perform Civil Drafting	
Prerequisites:	Where a unit has prerequisites then those prerequisite units can only be used in the count towards the total number of units where they are listed in the table above.	

Group B - specialist electives

- Select at least seven (7) units from this list to bring the total number of elective units to fifteen (15).

Unit code	Unit title	Prerequisites
MEM09011B	Apply basic engineering design concepts	
MEM09210A	Create 3-D solid models using computer-aided design (CAD) system	*
MEM09214A	Perform advanced engineering detail drafting	*
MEM09215A	Manage detail drafting projects	*
MEM09220A	Apply surface modelling techniques to 3-D drawings	*
MEM09221A	Create 3-D model assemblies using computer-aided design (CAD) system	*
MEM09222A	Interpret and maintain or restore original drawings	*
MEM09141A	Represent mechanical engineering designs	*
MEM09142A	Represent mechatronic engineering designs	*
MEM09143A	Represent aeronautical engineering designs	*
MEM09144A	Represent avionic engineering designs	*

Unit code	Unit title	Prerequisites
MEM12005B	Calibrate measuring equipment	*
MEM12022B	Program coordinate measuring machines (advanced)	*
MEM12025A	Use graphical techniques and perform simple statistical computations	*
MEM13010A	Supervise occupational health and safety in an industrial work environment	*
MEM14001B	Schedule material deliveries	
MEM14002B	Undertake basic process planning	
MEM14003B	Undertake basic production scheduling	
MEM14081A	Apply mechanical engineering fundamentals to support design and development of projects	*
MEM14082A	Apply mechatronics fundamentals to support design and development of engineering projects	*
MEM14083A	Apply aeronautical fundamentals to support design and development of engineering projects	*
MEM14084A	Apply avionic fundamentals to support design and development of engineering projects	*
MEM15007B	Conduct product and/or process capability studies	*
MEM15008B	Perform advanced statistical quality control	*
MEM15010B	Perform laboratory procedures	
MEM15011B	Exercise external quality assurance	*
MEM15012B	Maintain/supervise the application of quality procedures	*
MEM18016B	Analyse plant and equipment condition monitoring results	*
MEM22002A	Manage self in the engineering environment	*
MEM22006A	Source and estimate materials	*
MEM22009A	Manage technical sales and promotion	*

Unit code	Unit title	Prerequisites
MEM23001A	Apply advanced mathematical techniques in a manufacturing engineering or related environment	*
MEM23002A	Apply calculus in engineering situations	*
MEM23003A	Operate and program computers and/or controllers in engineering situations	*
MEM23041A	Apply basic scientific principles and techniques in mechanical engineering situations	
MEM23051A	Apply basic electro and control scientific principles and techniques in mechanical and manufacturing engineering situations	
MEM23052A	Apply basic electro and control scientific principles and techniques in aeronautical engineering situations	
MEM23061A	Select and test mechanical engineering materials	
MEM23062A	Select and test mechatronic engineering materials	
MEM23071A	Select and apply mechanical engineering methods, processes and construction techniques	
MEM23072A	Select and apply mechatronic engineering methods, processes and construction techniques	
MEM23073A	Select and apply aeronautical engineering methods, processes and construction techniques	*
MEM23074A	Select and apply avionic engineering methods, processes and construction techniques	*
MEM24002B	Perform penetrant testing	*
MEM24004B	Perform magnetic particle testing	*
MEM24006B	Perform eddy current testing	*
MEM24008B	Perform ultrasonic testing	*
MEM24010B	Perform radiographic testing	*
MEM24011B	Establish non-destructive tests	*
MEM24012C	Apply metallurgy principles	

Unit code	Unit title	Prerequisites
CPPBDN5013A	Develop and collaborate on building information models for small-scale building design projects	
MEA272B	Apply basic scientific principles and techniques in avionic engineering situations	
MEA273A	Select and test avionic engineering materials	
MEA342A	Apply basic aircraft power plant design characteristics	*
MEA349B	Apply basic scientific principles and techniques in aeronautical engineering situations	
MEA350A	Select and test aeronautical engineering materials	
MSACMC410A	Lead change in a manufacturing environment	
MSACMC610A	Manage relationships with non-customer external organisations	
MSACMC611A	Manage people relationships	
MSACMC612A	Manage workplace learning	
MSACMS400A	Implement a competitive manufacturing system	
MSACMS401A	Ensure process improvements are sustained	
MSACMS600A	Develop a competitive manufacturing system	
MSACMS601A	Analyse and map a value chain	*
MSACMS602A	Manage a value chain	*
MSACMS603A	Develop manufacturing related business plans	
MSACMT230A	Apply cost factors to work practices	
MSACMT260A	Use planning software systems in manufacturing	
MSACMT261A	Use SCADA systems in manufacturing	
MSACMT280A	Undertake root cause analysis	
MSACMT421A	Facilitate a Just in Time (JIT) system	
MSACMT430A	Improve cost factors in work practices	

Unit code	Unit title	Prerequisites
MSACMT432A	Analyse manual handling processes	
MSACMT440A	Lead 5S in a manufacturing environment	
MSACMT450A	Undertake process capability improvements	*
MSACMT451A	Mistake proof a production process	
MSACMT452A	Apply statistics to processes in manufacturing	
MSACMT460A	Facilitate the use of planning software systems in manufacturing	*
MSACMT461A	Facilitate SCADA systems in a manufacturing team or work area	*
MSACMT481A	Undertake proactive maintenance analyses	
MSACMT482A	Assist in implementing a proactive maintenance strategy	
MSACMT620A	Develop quick changeover procedures	
MSACMT621A	Develop a Just in Time (JIT) system	*
MSACMT630A	Optimise cost of product	*
MSACMT631A	Undertake value analysis of product costs in terms of customer requirements	*
MSACMT640A	Manage 5S system in a manufacturing environment	
MSACMT650A	Determine and improve process capability	*
MSACMT660A	Develop the application of enterprise systems in manufacturing	
MSACMT661A	Determine and establish information collection requirements and processes	
MSACMT670A	Develop and manage sustainable energy practices	
MSACMT671A	Develop and manage sustainable environmental practices	
MSACMT675A	Facilitate the development of a new product	*

Unit code	Unit title	Prerequisites
MSACMT681A	Develop a proactive maintenance strategy	
MSATCS501A	Detail standardised structural connections	*
MSATCS502A	Detail structural steel members	*
MSATCS503A	Incorporate structural steel detailing into fabrication and construction project management	
MSATCS504A	Detail ancillary steelwork	*
Prerequisites:	Where a unit has prerequisites then those prerequisite units can only be used in the count towards the total number of units where they are listed in the table above.	

In addition to the above, the minimum requirements for this qualification can also be met by holders of the MEM30505 Certificate III in Engineering -Technical or equivalent subject to the completion of the specified Core units of competency as well as the additional elective units drawn from Group B.

Packaging advice to meet Australian Defence Force (ADF) and the Civil Aviation Safety Authority (CASA) requirements

In order to meet the requirements of both Regulators for employment as para-professionals in aeronautical and avionic fields in the Australian aviation industry, electives must be selected as described below for the Aeronautical and Avionic streams.

Aeronautical stream

- Select the following seven (7) units from Group A.

MEA101B	Interpret occupational health and safety practices in aviation maintenance
MEA105C	Apply quality standards applicable to aviation maintenance processes
MEA107B	Interpret and use aviation maintenance industry manuals and specifications
MEA108B	Complete aviation maintenance industry documentation
MEA109B	Perform basic hand skills, standard trade practices and fundamentals
MEA340A	Lay out and set up aircraft systems
MEA341A	Apply basic aircraft design characteristics

- Select the following seven (7) units from Group B.

MEA342A	Apply basic aircraft power plant design characteristics
MEA349B	Apply basic scientific principles and techniques in aeronautical engineering situations
MEA350A	Select and test aeronautical engineering materials
MEM09143A	Represent aeronautical engineering designs
MEM14083A	Apply aeronautical fundamentals to support design and development of engineering projects
MEM23052A	Apply basic electro and control scientific principles and techniques in aeronautical engineering situations
MEM23073A	Select and apply aeronautical engineering methods, processes and construction techniques

To bring the total number of electives to fifteen (15), one (1) additional unit can be chosen from Groups A or B, or from diploma level units in the Aeroskills Training Package.

Avionic stream

- Select the following seven (7) units from Group A

MEA101B	Interpret occupational health and safety practices in aviation maintenance
MEA105C	Apply quality standards applicable to aviation maintenance processes
MEA107B	Interpret and use aviation maintenance industry manuals and specifications
MEA108B	Complete aviation maintenance industry documentation
MEA109B	Perform basic hand skills, standard trade practices and fundamentals
MEA270A	Lay out avionic systems
MEA271A	Lay out avionic flight management systems

- Select the following five (5) units from Group B

MEA272B	Apply basic scientific principles and techniques in avionic engineering situations

MEA273A	Select and test avionic engineering materials
MEM09144A	Represent avionic engineering designs
MEM14084A	Apply avionic fundamentals to support design and development of engineering projects
MEM23074A	Select and apply avionic engineering methods, processes and construction techniques

To bring the total number of electives to fifteen (15), another three (3) units are to be selected as follows:

- a minimum of two (2) additional units must be chosen from Group B
- a maximum of one (1) additional unit can be chosen from Group A, or from Diploma level units in the Aeroskills Training Package.
-