



Australian Government

MEM50212 Diploma of Engineering - Technical

Release 3

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Modification History

Release 3 - Imported elective unit UEPMNT419A replaced by UEPMNT419B. No change in outcomes.

Release 2. ISC correction - MEM09141A and MEM09142A removed from packaging rules (units superseded and replaced in version 9)

Description

Not applicable

Pathways Information

Not Applicable

Licensing/Regulatory Information

There are no specific licences that relate to this qualification. However, for employment at paraprofessional 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	<ul style="list-style-type: none"> • 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	<ul style="list-style-type: none"> • 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	<ul style="list-style-type: none"> • 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	<ul style="list-style-type: none"> • Be capable of applying trade-related skills and knowledge in new and different situations and contexts

	<ul style="list-style-type: none"> • Apply statistical processes to make recommendations solutions for equipment 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	<ul style="list-style-type: none"> • 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	<ul style="list-style-type: none"> • 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	<ul style="list-style-type: none"> • 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	<ul style="list-style-type: none"> • 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 MEM50212 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 NSSC 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 for details).

Additional qualification descriptors

The following additional descriptors are approved for use with this qualification: Mechanical, Mechatronics, Manufacturing, Maintenance, Aeronautical and 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
MSAENV272 B	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	*
UEPMNT419B	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	Supervise 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	*
MEM09143A	Represent aeronautical engineering designs	*
MEM09144A	Represent avionic engineering designs	*
MEM09155A	Prepare mechanical models for computer-aided engineering (CAE)	*

Unit code	Unit title	Prerequisites
MEM09156A	Prepare mechatronic models for computer-aided engineering (CAE)	*
MEM09157A	Perform mechanical engineering design drafting	
MEM09158A	Perform mechatronics engineering design drafting	
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	*
MEM14085A	Apply mechanical engineering analysis techniques	
MEM14086A	Apply mechatronic engineering analysis techniques	
MEM14087A	Apply manufactured product design techniques	*
MEM14088A	Apply maintenance engineering techniques to equipment and component repairs and modifications	*
MEM14089A	Integrate mechanical fundamentals into an engineering task	*

Unit code	Unit title	Prerequisites
MEM14090A	Integrate mechatronic fundamentals into an engineering task	*
MEM14091A	Integrate manufacturing fundamentals into an engineering task	*
MEM14092A	Integrate maintenance fundamentals into an engineering task	*
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	*
MEM22012A	Coordinate resources for an engineering project or operation	
MEM22013A	Coordinate engineering projects	
MEM22014A	Coordinate engineering-related manufacturing operations	*
MEM22015A	Source and estimate engineering materials requirements	
MEM22017A	Coordinate continuous improvement and technical development	
MEM22018A	Coordinate sales and promotion of engineering-related products or services	
MEM23003A	Operate and program computers and/or controllers in engineering situations	*
MEM23004A	Apply technical mathematics	
MEM23006A	Apply fluid and thermodynamics principles in engineering	*
MEM23007A	Apply calculus to engineering tasks	*

Unit code	Unit title	Prerequisites
MEM23052A	Apply basic electro and control scientific principles and techniques in aeronautical engineering situations	
MEM23063A	Select and test mechanical engineering materials	*
MEM23064A	Select and test mechatronic engineering materials	*
MEM23073A	Select and apply aeronautical engineering methods, processes and construction techniques	*
MEM23074A	Select and apply avionic engineering methods, processes and construction techniques	*
MEM23109A	Apply engineering mechanic principles	*
MEM23111A	Select electrical equipment and components for engineering applications	*
MEM23112A	Investigate electrical and electronic controllers in engineering applications	*
MEM23139A	Design a basic single zone duct distribution system	*
MEM23140A	Determine operational parameters for building HVAC hydronic systems	*
MEM23142A	Determine psychrometric processes and system performance	*
MEM23143A	Apply energy management principles	*
MEM23145A	Apply codes and regulations to air conditioning designs	*
MEM23148A	Develop energy management solutions	*
MEM23151A	Commission and optimise performance of HVAC/R systems	*
MEM23152A	Apply principles of refrigeration food storage technology	
MEM23154A	Analyse and service HVAC/R control systems	*
MEM24002B	Perform penetrant testing	*
MEM24004B	Perform magnetic particle testing	*

Unit code	Unit title	Prerequisites
MEM24006B	Perform eddy current testing	*
MEM24008B	Perform ultrasonic testing	*
MEM24010B	Perform radiographic testing	*
MEM24011B	Establish non-destructive tests	*
MEM24012C	Apply metallurgy principles	
MEM30029A	Use workshop equipment and processes to complete an engineering project	
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	
MSS403010A	Facilitate change in an organisation implementing competitive systems and practices	
MSS405010A	Manage relationships with non-customer external organisations	
MSS405011A	Manage people relationships	
MSS405012A	Manage workplace learning	
MSS403001A	Implement competitive systems and practices	
MSS403002A	Ensure process improvements are sustained	
MSS405001A	Develop competitive systems and practices for an organisation	
MSS405002A	Analyse and map a value stream	

Unit code	Unit title	Prerequisites
MSS405003A	Manage a value stream	
MSS405004A	Develop business plans in an organisation implementing competitive systems and practices	
MSS402030A	Apply cost factors to work practices	
MSS402060A	Use planning software systems in operations	
MSS402061A	Use SCADA systems in operations	
MSS402080A	Undertake root cause analysis	
MSS403021A	Facilitate a Just in Time system	
MSS403030A	Improve cost factors in work practices	
MSS403032A	Analyse manual handling processes	
MSS403040A	Facilitate and improve implementation of 5S	
MSS404050A	Undertake process capability improvements	*
MSS403051A	Mistake proof an operational process	
MSS404052A	Apply statistics to operational processes	
MSS404060A	Facilitate the use of planning software systems in a work area or team	
MSS404061A	Facilitate the use of SCADA systems in a team or work area	
MSS404081A	Undertake proactive maintenance analyses	
MSS404082A	Assist in implementing a proactive maintenance strategy	
MSS405020A	Develop quick changeover procedures	
MSS405021A	Develop a Just in Time system	
MSS405030A	Optimise cost of product or service	
MSS405031A	Undertake value analysis of a product or process costs in terms of customer requirements	

Unit code	Unit title	Prerequisites
MSS405040A	Manage 5S system in an organisation	
MSS405050A	Determine and improve process capability	*
MSS405060A	Develop the application of enterprise control systems in an organisation	
MSS405061A	Determine and establish information collection requirements and processes	
MSS405070A	Develop and manage sustainable energy practices	
MSS405075A	Facilitate the development of a new product	*
MSS405081A	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 MEA11 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 MEA11 Aeroskills Training Package.
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