Australian Government

Department of Education, Employment and Workplace Relations

MEM60111 Advanced Diploma of Advanced Diploma of Engineering

Release: 4

INDUSTRY SKILLS COUNCILS

Creating Australia's Future

MEM60111 Advanced Diploma of Engineering

Modification History

Release 4 - Elective units covering detail drafting replaced by new CAD units. MEA elective unit version codes updated.
Release 3 - Correction of training.gov.au transfer to include missing qualification descriptors - Aeronautical and Avionics.
This qualification supersedes MEM60105

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 SKILLS QUALIFICATION SUMMARY	
Employability Skill	**Industry/enterprise requirements for this qualification include**:
Communication	• Read, interpret and follow information on legislative and regulatory requirements, codes of practice, specifications, design briefs, charts, lists, drawings and other applicable reference documents • Access, organise and communicate information from reference texts, manufacturer's catalogues and industrial magazines, websites, use of phone, email and fax • Negotiate, develop, implement and document work instructions, outcomes and performance measures • Communicate complex ideas through presentations, meetings and one on one communication • Prepare reports, graphics, specifications and other documentation • Use standard engineering drawing symbols, references, terminology and scientific notation • Consult and advise internal and external clients to ensure clarification of requirements for projects or operations • Liaise with internal and external stakeholders and others to confirm specifications and discuss alternatives • Research, evaluate and report information on systems, techniques, requirements, options and solutions.
Teamwork	• Work alone or as part of single and multi-disciplinary teams that includes other para-professionals, professionals, trades and production personnel • Provide clear and precise information to team members • Negotiate and communicate with stakeholders • Continually monitor and review team performance • Delegate and supervise work where appropriate
Problem-solving	• Analyse and evaluate information to determine requirements, strategies and solutions (including benefit/cost analysis) • Apply and manipulate 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, significant figures) • Evaluate and rank engineering options • Evaluate environmental and sustainability performance of

EMPLOYABILITY SKILLS QUALIFICATION SUMMARY	
	equipment and processes and make recommendations for improvements • Perform hazard and risk analysis • Identify and select common engineering materials by their principal properties • Diagnose performance and process problems
Initiative and enterprise	• Be capable of applying skils and knowledge in new and different situations and contexts • Use judgement and discretion • Facilitate and capitalise on change and innovation • Generate innovative and creative ideas, approaches and solutions
Planning and organising	• Design and plan documentation for particular applications • Plan and sequence work operations • Manage work priorities and resources • Prepare, monitor and review work plans, programs and budgets • Identify requirements and manage processes to ensure adequate resourcing, programming, maintenance and training for operations
Self-management	• Manage own time and own processes • Complete tasks in a competent and timely manner • Set personal goals and plans • Gain and use feedback to improve personal performance • Address all legislation, codes and standards related to safety, environmental impact and sustainability issues
Learning	• Undertake research by consulting appropriate personnel, technical experts, manuals, online help and other reference materials as required • Evaluate career options and develop career path strategy • Review and maintain academic development, work experience, ethical practice, indemnity, negotiation, consultation and human relations with respect to the practice of engineering • Manage learning opportunities in and outside the workplace • Mentor others • Identify options for professional development opportunities
Technology	• Apply engineering knowledge and principles • Select and apply engineering techniques and associated technologies, software and hardware • Use technology appropriately to manage work priorities and commitments • Use a CAD program, computer and peripherals

Packaging Rules

The minimum requirements for achievement of the Advanced Diploma of Engineering are:

- completion of the seven core units of competency listed below, and
- completion of 23 elective units, to bring the total number of units to 30.

Group A and Group B elective units must be selected as follows:

- up to eight general elective units from the list in Group A
- at least 15 specialist elective units from Group B, to bring the total number of elective units to 23.

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

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

Core units

- Select all of the units from this list.

Unit code	Unit title
MEM16006A	Organise and communicate information
MEM16008A	Interact with computing technology
MEM22001A	Perform engineering activities
MEM22002A	Manage self in the engineering environment
MEM30007A	Select common engineering materials
MEM30012A	Apply mathematical techniques in a manufacturing, engineering or related environment
MSAENV272B	Participate in environmentally sustainable work practices

Elective units

Group A - general

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

Unit code	Unit title	Prerequisites
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	*
MEM12024A	Perform computations	
MEM13013B	Work safely with ionising radiation	
MEM15001B	Perform basic statistical quality control	
MEM18001C	Use hand tools	
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	

Unit code	Unit title	Prerequisites
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	
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) system to create and display 3-D models	*
MSAENV472B	Implement and monitor environmentally sustainable work practices	
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

- Select at least fifteen (15) units from this list to bring the total number of elective units to twenty three (23).

Unit code	Unit title	Prerequisites
MEA272B	Apply basic scientific principles and techniques in avionic	

Unit code	Unit title	Prerequisites
	engineering situations	

Unit code	Unit title	Prerequisites
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	*
MEM09141A	Represent mechanical engineering designs	*
MEM09142A	Represent mechatronic engineering designs	*
MEM09143A	Represent aeronautical engineering designs	*
MEM09144A	Represent avionic engineering designs	*
MEM09151A	Apply computer aided modelling and data management techniques to mechanical engineering designs	*
MEM09152A	Apply computer aided modelling and data management techniques to mechatronic engineering designs	*
MEM09153A	Apply computer aided modelling and data management techniques to aeronautical engineering designs	*
MEM09154A	Apply computer aided modelling and data management techniques to avionic engineering designs	*
MEM09204A	Produce basic engineering detail drawings	*
MEM09205A	Produce electrical schematic drawings	*
MEM12005B	Calibrate measuring equipment	*
MEM12022B	Program coordinate measuring machine (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	
MEM14061A	Plan and design mechanical engineering projects	*
MEM14062A	Plan and design mechatronic engineering projects	*
MEM14063A	Plan and design manufacturing engineering projects	*
MEM14064A	Plan and design maintenance engineering projects	*
MEM14065A	Plan and design aeronautical engineering projects	*

Unit code	Unit title	Prerequisites
MEM14066A	Plan and design avionic engineering projects	*
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 engineering fundamentals to support design and development of engineering projects	*
MEM14084A	Apply avionic engineering 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 application of quality procedures	*
MEM18016B	Analyse plant/equipment condition monitoring results	*
MEM22003A	Manage engineering resources	*
MEM22004A	Manage engineering projects	*
MEM22005A	Manage engineering operations	*
MEM22006A	Source and estimate materials	*
MEM22007A	Manage environmental effects of engineering activities	*
MEM22008A	Manage change and technical development	*
MEM22009A	Manage technical sales and promotion	*
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	

Unit code	Unit title	Prerequisites
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	*
MEM23081A	Apply scientific principles and techniques in mechanical engineering situations	*
MEM23082A	Apply scientific principles and techniques in mechatronic engineering situations	*
MEM23083A	Apply industrial engineering principles and techniques in manufacturing engineering situations	*
MEM23084A	Apply scientific principles and techniques in aeronautical engineering situations	*
MEM23085A	Apply scientific principles and techniques in avionic engineering situations	*
MEM23091A	Apply mechanical system design principles and techniques in mechanical engineering situations	*
MEM23092A	Apply automated systems principles and techniques in engineering situations	*
MEM23093A	Apply plant and process design principles and techniques in engineering situations	*
MEM23094A	Apply maintenance systems principles and techniques in engineering situations	*
MEM23095A	Apply aeronautical system design principles and techniques in aeronautical engineering situations	*
MEM23096A	Apply avionic system design principles and techniques in avionic engineering situations	*
MEM23097A	Apply automated systems principles and techniques in aeronautical engineering situations	*
MEM23098A	Apply automated systems principles and techniques in avionic engineering situations	*

Unit code	Unit title	Prerequisites
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	
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	
MSACMS604A	Manage competitive manufacturing processes in a jobbing shop environment	
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	
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	

Unit code	Unit title	Prerequisites
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	*
MSACMT622A	Design a process layout	
MSACMT623A	Develop a levelled pull system of manufacturing	
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	*
MSACMT652A	Design an experiment	
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	*
MSACMT681A	Develop a proactive maintenance strategy	
MSACMT683A	Adapt a proactive maintenance strategy for a seasonal or cyclical manufacturing operation	
MSAENV672B	Develop workplace policy and procedures for sustainability	
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 the MEM50205 Diploma of 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 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 12 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*
MEM09153A	Apply computer aided modelling and data management techniques to aeronautical engineering designs*
MEM14065A	Plan and design aeronautical engineering projects*
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*

MEM23084A	Apply scientific principles and techniques in aeronautical engineering situations*
MEM23095A	Apply aeronautical system design principles and techniques in aeronautical engineering situations*
MEM23097A	Apply automated systems principles and techniques in aeronautical engineering situations*

To bring the total number of electives to 23, another four units are to be selected as follows:

- a minimum of three additional units must be chosen from Group B
- a maximum of one additional unit can be chosen from Group A, or from the advanced diploma level units in the Aeroskills Training Package.

Avionic stream

- Select the following seven 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 10 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*
MEM09154A	Apply computer aided modelling and data management techniques to avionic engineering designs*
MEM14066A	Plan and design avionic engineering projects*
MEM14084A	Apply avionic fundamentals to support design and development of engineering projects*
MEM23074A	Select and apply avionic engineering methods, processes and construction techniques*
MEM23085A	Apply scientific principles and techniques in avionic engineering situations*

MEM23096A	Apply avionic system design principles and techniques in avionic engineering situations*
MEM23098A	Apply automated systems principles and techniques in avionic engineering situations*

To bring the total number of electives to 23, another six units are to be selected as follows:

- a minimum of five additional units must be chosen from Group B
- a maximum of one additional unit can be chosen from Group A, or from advanced diploma level units in the Aeroskills Training Package.
-