



Australian Government

MEM60122 Advanced Diploma of Engineering

Release: 1

MEM60122 Advanced Diploma of Engineering

Modification History

Release 1. Supersedes and is equivalent to MEM60112 Advanced Diploma of Engineering.

Qualification Description

This qualification defines skills and knowledge required to undertake para-professional and advanced technician work across a range of discipline areas including mechanical, mechatronics, manufacturing, maintenance, engineering drafting and heating ventilation air-conditioning and refrigeration in manufacturing and engineering. The qualification provides the opportunity to develop theoretical knowledge and technical skills in either a specific discipline area or across a broad field of para-professional and technical work and learning.

This qualification should not be used for VET in Schools unless the students are formally engaged in a traineeship in accordance with the Australian Apprenticeships policy.

In some jurisdictions, units in this qualification may relate to licensing or regulatory requirements. Licensing and regulatory information is included in the relevant units of competency.

No licensing, legislative or certification requirements apply to this qualification at the time of publication. Local regulations should be checked.

Entry Requirements

There are no entry requirements for this qualification.

Packaging Rules

The requirement for achievement of the MEM60122 Advanced Diploma of Engineering is the achievement of competence in thirty (30) units of competency made up of:

- all seven (7) core units of competency listed below, and
- up to eight (8) general elective units from Group A
- at least fifteen (15) specialist elective units from Group B to bring the total number of elective units to twenty-three (23)

A maximum of five (5) Group B elective units, that are relevant to work as engineering para-professional and advanced technician within metal, engineering, manufacturing and associated industries and do not duplicate skills and knowledge already available in units within this qualification, may be chosen from other Advanced Diploma qualifications in this Training Package or from other endorsed Training Packages and accredited courses where those units are available for inclusion in Advanced Diploma qualifications. Only select units that would be suitable for occupational outcomes in an advanced technical engineering environment.

The following additional descriptors are approved for use with this qualification:

MEM60122 Advanced Diploma of Engineering (Mechanical)
 MEM60122 Advanced Diploma of Engineering (Mechatronics)
 MEM60122 Advanced Diploma of Engineering (Manufacturing)
 MEM60122 Advanced Diploma of Engineering (Maintenance)
 MEM60122 Advanced Diploma of Engineering (Drafting)
 MEM60122 Advanced Diploma of Engineering (Aeronautical)
 MEM60122 Advanced Diploma of Engineering (Avionic)
 No other descriptor can be used.

Prerequisites

Prerequisite units count towards the total number of units. Units with prerequisite requirements are marked with an asterisk (refer to the individual units for details). All prerequisites are included in the qualification.

Core units of competency

Unit code	Unit title	Prereq
MEM16006	Organise and communicate information	*
MEM16008	Interact with computing technology	*
MEM22001	Perform engineering activities	*
MEM22002	Manage self in the engineering environment	*
MEM30007	Select common engineering materials	
MEM30012	Apply mathematical techniques in a manufacturing engineering or related environment	
MSMENV272	Participate in environmentally sustainable work practices	

Elective units of competency

Group A

Select a maximum of eight (8) units of competency from this list.

Unit code	Unit title	Prereq
CPCWHS1001	Prepare to work safely in the construction industry	
MEM09002	Interpret technical drawing	*
MEM09223	Interpret design specifications for structural steel detailing	*
MEM09224	Detail bolts and welds for structural steelwork connections	*

MEM09229	Read and interpret technical engineering drawings	
MEM11011	Undertake manual handling	*
MEM12002	Perform electrical/electronic measurement	*
MEM12003	Perform precision mechanical measurement	*
MEM12023	Perform engineering measurements	*
MEM12024	Perform computations	*
MEM13015	Work safely and effectively in manufacturing and engineering	
MEM13018	Work safely with ionizing radiation	
MEM13019	Undertake work health and safety activities in the workplace	
MEM15001	Perform basic statistical quality control	*
MEM15004	Perform inspection	*
MEM15005	Select and control inspection processes and procedures	*
MEM18001	Use hand tools	*
MEM24001	Perform basic penetrant testing	*
MEM24003	Perform basic magnetic particle testing	*
MEM24005	Perform basic eddy current testing	*
MEM24007	Perform ultrasonic thickness testing	*
MEM24009	Perform basic radiographic testing	*
MEM30005	Calculate force systems within simple beam structures	*
MEM30006	Calculate stresses in simple structures	*
MEM30008	Apply basic economic and ergonomic concepts to evaluate engineering applications	
MEM30009	Contribute to the design of basic mechanical systems	*
MEM30010	Set up basic hydraulic circuits	
MEM30011	Set up basic pneumatic circuits	

MEM30013	Assist in the preparation of a basic workplace layout	
MEM30014	Apply basic just in time systems to the reduction of waste	
MEM30015	Develop recommendations for basic set up time improvements	
MEM30016	Assist in the analysis of a supply chain	
MEM30017	Use basic preventative maintenance techniques and tools	
MEM30018	Undertake basic process planning	
MEM30019	Use resource planning software systems in manufacturing	*
MEM30020	Develop and manage a plan for a simple manufacturing related project	
MEM30021	Prepare a simple production schedule	
MEM30022	Undertake supervised procurement activities	
MEM30023	Prepare a simple cost estimate for a manufactured product	
MEM30024	Participate in quality assurance techniques	*
MEM30025	Analyse a simple electrical system circuit	*
MEM30026	Select and test components for simple electronic switching and timing circuits	*
MEM30027	Prepare basic programs for programmable logic controllers	
MEM30028	Assist in sales of technical products	
MEM30031	Operate computer-aided design (CAD) system to produce basic drawing elements	
MEM30032	Produce basic engineering drawings	
MEM30033	Use computer-aided design (CAD) to create and display 3D models	*
MEM48003	Monitor nonferrous melting and casting processes	
MEM48004	Interpret basic binary phase diagrams	
MEM48005	Apply basic knowledge of casting operations	
MSMENV472	Implement and monitor environmentally sustainable work practices	

MMSUP390	Use structured problem-solving tools	
MSS402062	Use SCADA systems in operations	
MSS402084	Undertake root cause analysis	
MSS402086	Use planning software systems in operations	
MSS402087	Apply cost factors to work practices	
MSS403003	Contribute to improvements in competitive systems and practices	
MSS403012	Facilitate change in a competitive systems and practices environment	
MSS403022	Facilitate a Just in Time system	
MSS403025	Monitor a levelled pull system of operations	
MSS403031	Analyse and improve manual handling processes	
MSS403045	Facilitate and improve 5S	
MSS403081	Ensure process improvements are sustained	
MSS403082	Improve cost factors in work practices	
MSS404051	Mistake proof a process	
MSS404056	Apply statistics to operational processes	
MSS404062	Facilitate the use of planning software systems in a work area or team	
MSS404063	Facilitate the use of SCADA systems in a team or work area	
MSS404080	Undertake process capability improvements	
MSS404088	Undertake proactive maintenance analyses	
MSS404089	Assist in implementing a proactive maintenance strategy	
MSS405000	Develop competitive systems and practices for operational objectives	
MSS405017	Develop business plans in an organisation implementing competitive systems and practices	
MSS405018	Implement competitive systems and practices in a one-off or small	

	batch environment	
MSS405025	Analyse and map a value stream	
MSS405026	Manage a value stream	
MSS405034	Develop a Just in Time system	
MSS405035	Design a process layout	
MSS405038	Optimise cost of a product or service	
MSS405039	Implement and optimise levelled pull system	
MSS405042	Manage 5S system in an organisation	
MSS405045	Manage relationships with non-customer external organisations	
MSS405046	Manage workplace learning	
MSS405047	Undertake analysis of cost and waste in terms of customer value	
MSS405057	Design an experiment	*
MSS405065	Develop the application of enterprise control systems in an organisation	
MSS405078	Lead and manage people within competitive systems and practices	
MSS405091	Adapt a proactive maintenance strategy for a seasonal or cyclical business	
UEECD0007	Apply work health and safety regulations, codes and practices in the workplace	
UEECD0051	Use drawings, diagrams, schedules, standards, codes and specifications	*
UEPMNT419	Perform civil drafting	*

Group B (General Electives)

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

Unit code	Unit title	Prereq
CPPBDN6106	Produce building information modelling for building design	

	projects	
MEAENG0002	Apply basic scientific principles and techniques in avionic engineering situations	*
MEM09011	Apply basic engineering design concepts	*
MEM09155	Prepare mechanical models for computer-aided engineering (CAE)	*
MEM09156	Prepare mechatronic models for computer-aided engineering (CAE)	*
MEM09157	Perform mechanical engineering design drafting	
MEM09158	Perform mechatronics engineering design drafting	
MEM09204	Produce basic engineering detail drawings	*
MEM09205	Produce electrical schematic drawings	*
MEM12025	Use graphical techniques and perform simple statistical computations	*
MEM13015	Work safely and effectively in manufacturing and engineering	
MEM13020	Supervise work health and safety in an industrial work environment	*
MEM14001	Schedule material deliveries	*
MEM14002	Undertake basic process planning	*
MEM14003	Undertake production scheduling	*
MEM14006	Plan work activities	*
MEM14085	Apply mechanical engineering analysis techniques	*
MEM14086	Apply mechatronic engineering analysis techniques	*
MEM14087	Apply manufactured product design techniques	*
MEM14088	Apply maintenance engineering techniques to equipment and component repairs and modifications	*
MEM14089	Integrate mechanical fundamentals into an engineering task	*
MEM14090	Integrate mechatronic fundamentals into an engineering task	*

MEM14091	Integrate manufacturing fundamentals into an engineering task	*
MEM14092	Integrate maintenance fundamentals into an engineering task	*
MEM15007	Conduct product and/or process capability studies	*
MEM15008	Perform advanced statistical quality control	*
MEM15010	Perform laboratory procedures	*
MEM15011	Exercise external quality assurance	*
MEM15012	Maintain/supervise the application of quality procedures	*
MEM16010	Write reports	*
MEM22007	Manage environmental effects of engineering activities	*
MEM22012	Coordinate resources for an engineering project or operation	*
MEM22013	Coordinate engineering projects	*
MEM22014	Coordinate engineering-related manufacturing operations	*
MEM22015	Source and estimate engineering materials requirements	*
MEM22017	Coordinate continuous improvement and technical development	*
MEM22018	Coordinate sales and promotion of engineering-related products or services	*
MEM23003	Operate and program computers and/or controllers in engineering situations	*
MEM23004	Apply technical mathematics	
MEM23005	Apply statistics and probability techniques to engineering tasks	
MEM23006	Apply fluid and thermodynamics principles in engineering	*
MEM23007	Apply calculus to engineering tasks	*
MEM23008	Apply advanced algebra and numerical methods to engineering tasks	*
MEM23052	Apply basic electro and control scientific principles and techniques in aeronautical engineering	
MEM23063	Select and organise mechanical engineering material tests	*

MEM23064	Select and organise mechatronic engineering material tests	*
MEM23086	Apply scientific principles and techniques in avionic engineering situations	*
MEM23109	Apply engineering mechanics principles	*
MEM23111	Select electrical equipment and components for engineering applications	*
MEM23112	Investigate electrical and electronic controllers in engineering applications	*
MEM23113	Evaluate hydrodynamic systems and system components	*
MEM23114	Evaluate thermodynamic systems and components	*
MEM23115	Evaluate fluid power systems	*
MEM23116	Evaluate programmable logic controller and related control system component applications	*
MEM23117	Evaluate microcontroller applications	*
MEM23118	Apply production and service control techniques	*
MEM23119	Evaluate continuous improvement processes	*
MEM23120	Select mechanical machine and equipment components	*
MEM23121	Analyse loads on frames and mechanisms	*
MEM23122	Evaluate computer integrated manufacturing systems	*
MEM23123	Evaluate manufacturing processes	
MEM23124	Measure and analyse noise and vibration	*
MEM23125	Evaluate maintenance systems	*
MEM23126	Evaluate industrial robotic applications	*
MEM23129	Evaluate thermal loads for heating, ventilation, air conditioning and refrigeration	*
MEM23130	Coordinate servicing and fault-finding of HVACR control systems	*
MEM23131	Evaluate rapid prototyping applications	*

MEM23132	Evaluate rapid manufacturing processes	*
MEM23133	Evaluate rapid tooling applications	*
MEM23134	Evaluate jigs and fixtures	*
MEM23135	Evaluate moulding tools and processes	*
MEM23136	Evaluate stamping and forging tools	*
MEM23137	Evaluate rolling tools and processes	*
MEM23138	Evaluate suitability of materials for engineering-related applications	*
MEM23140	Determine operational parameters for building HVAC hydronic systems	*
MEM23141	Complete a building thermal performance survey	*
MEM23142	Determine psychrometric processes and system performance	*
MEM23144	Contribute to the design of a commercial refrigeration system	*
MEM23146	Contribute to the design of industrial refrigeration systems	*
MEM23147	Contribute to the design of hydronic systems	*
MEM23149	Contribute to the design of commercial and industrial exhaust systems	*
MEM23150	Contribute to the design of heating systems	*
MEM23153	Contribute to the design of heat exchanger systems	*
MEM234028	Produce and manage technical documentation	
MEM234029	Produce and manage technical publications	
MEM234036	Apply configuration management procedures in engineering project management	*
MEM234037	Perform maintenance-related integrated logistic support management activities	*
MEM234038	Apply systems engineering procedures to engineering design project management	
MEM24002	Perform penetrant testing	*

MEM24004	Perform magnetic particle testing	*
MEM24006	Perform eddy current testing	*
MEM24008	Perform ultrasonic testing	*
MEM24010	Perform radiographic testing	*
MEM24011	Establish non-destructive tests	*
MEM24012	Apply metallurgical principles	*
MEM30029	Use workshop equipment and processes to complete an engineering project	*
MEM48011	Apply basic chemical principles to metallurgy	
MEM48012	Calculate and predict chemical outcomes in metallurgical situations	*
MEM48015	Select metal forming process	*
MEM48016	Select metal joining process	*
MEM48020	Recommend ferrous and nonferrous metals or alloys for an application	*
MSMENV672	Develop workplace policy and procedures for environmental sustainability	
MSS405029	Develop quick changeover procedures	*
MSS405056	Use three or six sigma processes to determine and improve process capability	*
MSS405066	Establish data collection and processing protocols	
MSS405076	Facilitate the development of a new product	*
MSS405077	Develop a proactive maintenance strategy	
MSS405088	Plan, implement and monitor energy management	

To meet the requirements for employment as paraprofessionals 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

Group A

Select all seven (7) units from this list.

Unit code	Unit title	Prereq
MEA107	Interpret and use aviation maintenance industry manuals and specifications	
MEA154	Apply work health and safety practices in aviation maintenance	
MEA156	Apply quality standards during aviation maintenance activities	*
MEA157	Complete aviation maintenance industry documentation	
MEA158	Perform basic hand skills, standard trade practices and fundamentals in aviation maintenance	
MEA399	Lay out and set up aircraft systems	*
MEAMEC0032	Apply basic aircraft design characteristics	*

Group B

Select a minimum of fourteen (14) units from this list.

Unit code	Unit title	Prereq
MEA701	Produce aeronautical engineering related graphics	*
MEA703	Apply aeronautical modelling for computer-aided engineering	*
MEA709	Apply aeronautical structure design techniques	*
MEA710	Apply aeronautical system design techniques	*
MEA713	Integrate aeronautical fundamentals into an engineering task	*
MEA715	Evaluate aeroplane flight control systems	*
MEA718	Evaluate rotorcraft flight control systems	*
MEA720	Evaluate aircraft gas turbine engine power plants	*
MEA721	Evaluate aircraft hydro-mechanical systems	*
MEA722	Evaluate aircraft piston engine power plants	*
MEA723	Evaluate aircraft pneumatic systems	*
MEA724	Evaluate aircraft structure	*

MEACOM0041	Write aviation technical publications	
MEAENG0001	Apply basic scientific principles and techniques in aeronautical engineering situations	*
MEAENG0003	Select and test aviation engineering materials	
MEAMEC0033	Apply basic aircraft power plant design characteristics	*
MEM23004	Apply technical mathematics	
MEM23007	Apply calculus to engineering tasks	*
MEM23052	Apply basic electro and control scientific principles and techniques in aeronautical engineering	
MEM234019	Apply finite element analysis in engineering design	
MEM234022	Apply advanced calculus to technology problems	

To bring the total number of electives to twenty-three (23), another two units can be selected from Group B General Electives.

Avionic stream

Group A

Select all seven (7) units from this list.

Unit code	Unit title	Prereq
MEA107	Interpret and use aviation maintenance industry manuals and specifications	
MEA154	Apply work health and safety practices in aviation maintenance	
MEA156	Apply quality standards during aviation maintenance activities	*
MEA157	Complete aviation maintenance industry documentation	
MEA158	Perform basic hand skills, standard trade practices and fundamentals in aviation maintenance	
MEA270	Lay out avionic systems	*
MEA271	Lay out avionic flight management systems	*

Group B

Select a minimum of fourteen (14) units from this list.

Unit code	Unit title	Prereq
MEA702	Produce avionics engineering related graphics	*
MEA704	Apply avionic modelling for computer-aided engineering	*
MEA711	Apply avionic analogue design techniques	*
MEA712	Apply avionic digital design techniques	*
MEA714	Integrate avionic fundamentals into an engineering task	*
MEA716	Evaluate avionic analogue systems	*
MEA717	Evaluate avionic digital systems	*
MEA719	Evaluate aircraft electrical systems	*
MEA725	Apply advanced scientific principles and techniques in avionic engineering situations	*
MEA726	Apply aircraft electrical system design techniques	*
MEA727	Apply calculus in avionic engineering situations	*
MEACOM0041	Write aviation technical publications	
MEAENG0002	Apply basic scientific principles and techniques in avionic engineering situations	*
MEAENG0003	Select and test aviation engineering materials	
MEM23004	Apply technical mathematics	
MEM23007	Apply calculus to engineering tasks	*
MEM23086	Apply scientific principles and techniques in avionic engineering situations	*

To bring the total number of electives to twenty-three (23), another two 2 units can be selected from Group B General Electives.

Qualification Mapping Information

Release 1. Supersedes and is equivalent to MEM60112 Advanced Diploma of Engineering.

Links

Companion Volume implementation guides are found in VETNet -

<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=b7050d37-5fd0-4740-8f7d-3b7a49c10bb2>