Australian Government

MSA60108 Advanced Diploma of Manufacturing Technology

Release 5

INDUSTRY SKILLS COUNCILS
Creating Australia's Future

MSA60108 Advanced Diploma of Manufacturing Technology

Modification History

Release 5: unit codes corrected in Group B electives:

- MEM14091A Integrate manufacturing fundamentals into an engineering task
- MEM14092A Integrate maintenance fundamentals into an engineering task

Release 4 - MEM imported elective units replaced by current version. Equivalent.
Release 3 - MSACM units replaced by MSS units from MSS11v2 Sustainability Training Package.
Release 2 - Imported unit codes updated.

Description

This qualification is suitable for delivery part time over a four year period. There are two specialist streams available:

- Metallurgy
- Polymer Technology.

Each stream offers an opportunity for significant choice in electives and each stream requires the same core units to be completed.

Pathways Information

Not applicable.

Licensing/Regulatory Information

Not applicable.

Entry Requirements

Not applicable.

Employability Skills Summary

EMPLOYABILITY SKILLS QUALIFICATION SUMMARY	
MSA60108 Advanced Diploma of Manufacturing Technology The following table contains a summary of the Employability Skills as identified by the manufacturing technology related industries for this qualification. This table should be interpreted in conjunction with the detailed requirements of each unit of competency packaged in this qualification. The outcomes described here are broad industry requirements that reflect skill requirements for this level.	
Employability Skill	**Industry/enterprise requirements for this qualification include**:
Communication	• Communicate with members of supply chain • Use information and communication technology to interpret and analyse market and supply chain information and research new processes and products • Calculate costs • Use a range of communication and marketing tools to present concepts to a variety of audiences • Negotiate contracts with national and international networks • Complete documentation and maintain records
Teamwork	• Network with clients, industry professionals, supply chain personnel and all levels of internal management • Provide product information to others in the team
Problem-solving	• Interpret and evaluate market information for use in current and future practices • Determine cost effective supply of materials and resources through the supply chain • Analyse consumer behaviour to inform marketing processes and identify market opportunities • Calculate cost estimates • Map and establish supply chain processes • Evaluate designs and identify opportunities for improvement
Initiative and enterprise	• Secure new networks with industry professionals and clients • Implement new product development processes • Participate in product improvement processes • Implement sales and marketing plans
Planning and organising	• Undertake effective planning of own and others' work to achieve desired outcomes within agreed time-frames • Schedule meetings and correspondences with networks • Monitor quality processes and analyse outcomes • Plan and implement contingency plans to respond to incidents

EMPLOYABILITY SKILLS QUALIFICATION SUMMARY	
	and problems • Coordinate quality assurance • Coordinate people and processes to achieve desired goals • Define roles and responsibilities of others
Self-management	• Manage work plans and priorities and define responsibilities • Manage client and industry relationships and networks • Manage data flows and record keeping • Monitor own work against industry standards
Learning	• Develop or adjust processes based on new information • Conduct research to increase knowledge of industry practices and opportunities • Develop contacts and networks to support work activity
Technology	• Use information and communication technology to acquire, manage and share data and maintain communication networks. • Use computer-aided design technology to develop new products

Packaging Rules

Packaging Rules

To be awarded an Advanced Diploma of Manufacturing Technology competency must be achieved in **thirty one** (**31**) units of competency:

- **six** (**6**) core units of competency
- **twenty five** (**25**) elective units of competency chosen as described below.

Core units

The following **six** (**6**) units must be chosen:

Unit code	Unit title
MEM16006A	Organise and communicate information
MEM16008A	Interact with computing technology
MEM23001A	Apply advanced mathematical techniques in a manufacturing, engineering or related environment
MEM30012A	Apply mathematical techniques in a manufacturing, engineering or related environment

Unit code	Unit title
MSS402051A	Apply quality standards
MSAENV272B	Participate in environmentally sustainable work practices

Prerequisites
Units marked with an asterisk have one or more prerequisite requirements. The prerequisites for these units are to be counted in the total number of units required in the elective group. Please refer to the individual units for details.

Elective units
Choose **twenty five (25)** units as specified below for each specialist stream.

Group A - specialist streams
Choose **twenty five** (**25**) elective units as specified to achieve a specialist stream.

Note:

- All units from each specialist stream are available in Group B as General Electives.
- Five elective units may also be chosen from other qualifications in this Training Package, other endorsed Training Packages and accredited courses, as specified below.
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Metallurgy specialist stream
Select **twenty five** (**25**) elective units:

- a minimum of **fourteen** (**14**) from the list below
- the balance may be chosen from Group B

Note:

- at least six of the 14 metallurgy elective units must be coded MSATCM5---
- the unit *MSATCM406A Apply basic chemistry principles to metallurgy* must also be selected if it has not already been completed as part of a lower qualification

Unit code	Unit title	Prerequisites
MEM22001A	Perform engineering activities	
MEM22002A	Manage self in the engineering environment	*
MEM23004A	Apply technical mathematics	
MEM23063A	Select and test mechanical engineering materials	*
MEM23109A	Apply engineering mechanic principles	*

Unit code	Unit title	Prerequisites
MEM24012C	Apply metallurgy principles	
MEM30007A	Select common engineering materials	
MSATCM401A	Prepare and examine metallographic samples	
MSATCM402A	Monitor and test sands, cores and moulds	
MSATCM403A	Evaluate mould design and gating	
MSATCM404A	Undertake and interpret results of chemical analysis on metal samples	
MSATCM405A	Determine and supervise heat treatment of metal	*
MSATCM406A	Apply basic chemistry principles to metallurgy	
MSATCM501A	Calculate and predict chemical outcomes in metallurgical situations	*
MSATCM502A	Identify and describe equipment for mineral and chemical processing plants	*
MSATCM503A	Recommend a refractory for an application	
MSATCM504A	Select metal forming process	*
MSATCM505A	Select metal joining process	*
MSATCM506A	Monitor blast furnace operations	*
MSATCM507A	Monitor primary steel making process	*
MSATCM508A	Monitor secondary steelmaking operations	*
MSATCM509A	Recommend ferrous and non ferrous metals or alloys for an application	*
MSATCM510A	Apply metallurgical principles and techniques in welding and other thermal processes	*
MSATCM511A	Apply metallurgy principles and practice to determine metal forming and shaping processes	
MSATCM512A	Apply metallurgy principles and practice to optimise furnace operation	

Unit code	Unit title	Prerequisites
MSATCM513A	Plan and complete metallurgical projects	*
MSATCM514A	Select surface treatment methods for metallic components or products	
MSATCM515A	Analyse metallurgical failures of components and recommend preventative measures	*
MSATCM516A	Select non metallic materials for engineering applications manufacturing, engineering and structural	
MSATCM517A	Determine corrosion prevention strategies for metal and alloys	
MSATCM518A	Interpret complex binary phase diagrams	*

Polymer technology specialist stream
Select **twenty five** (**25**) elective units:

- a minimum of **ten** (**10**) from the two groups below
- the balance may be chosen from Group B

Polymer technology group 1
Choose at least one of the following units:

Unit code	Unit title	Prerequisites
PMBTECH601B	Develop a new product	*
PMBTECH602B	Develop a new die or tool	*
PMBTECH603B	Design structural/mechanical polymeric components	*

Polymer technology group 2
Choose up to nine of the following units:

Unit code	Unit title	Prerequisites
MSS405075A	Facilitate the development of a new product	*

Unit code	Unit title	Prerequisites
PMAOPS550B	Develop a colour formulation	
PMAOPS600C	Modify plant	
PMBTECH501B	Analyse equipment performance	*
PMBTECH502B	Review and analyse production trials and specify re-trials	*
PMBTECH503B	Determine rheology and output of plastics materials from processing equipment	*
PMBTECH504B	Determine heat transfer loads for processing equipment	*
PMBTECH505B	Choose polymer materials for an application	*
PMBTECH506B	Analyse the design of products and tools	*
PMBTECH507B	Develop fibre composite products using cored laminate techniques	*
PMBTECH508A	Develop a new compound	
PMBTECH509A	Modify an existing product	
PMBTECH510A	Analyse failure in polymeric materials	

Group B - General electives

The balance of units for each specialist stream may be chosen from this list as specified below:

Metallurgy specialist stream Up to 11 units

Polymer technology specialist stream Up to 15 units

Unit code	Unit title	Prerequisites
AUM4003A	Interpret customer requirements	
FDFOP2005A	Work in a socially diverse environment	

Unit code	Unit title	Prerequisites
LMTGN4016A	Contribute to the development of products or processes	
LMTGN5004A	Manage installation and commissioning of equipment and systems	
MEM06003C	Carry out heat treatment	
MEM09002B	Interpret technical drawing	
MEM09204A	Produce basic engineering detail drawings	*
MEM09205A	Produce electrical schematic drawings	*
MEM09005B	Perform basic engineering detail drafting	*
MEM09157A	Represent mechanical engineering design drafting	
MEM09158A	Represent mechatronic engineering design drafting	
MEM09155A	Prepare mechanical models for computer-aided engineering (CAE)	*
MEM09156A	Prepare mechatronic models for computer-aided engineering (CAE)	*
MEM12003B	Perform precision mechanical measurement	
MEM12005B	Calibrate measuring equipment	*
MEM12022B	Program coordinate measuring machine (advanced)	
MEM12023A	Perform engineering measurements	
MEM12024A	Perform computations	
MEM12025A	Use graphical techniques and perform simple statistical computations	
MEM13002B	Undertake occupational health and safety activities in the workplace	
MEM13010A	Supervise occupational health and safety in an industrial work environment	*

Unit code	Unit title	Prerequisites
MEM13013B	Work safely with ionising radiation	
MEM14001B	Schedule material deliveries	
MEM14002B	Undertake basic process planning	
MEM14003B	Undertake basic production scheduling	
MEM14005A	Plan a complete activity	
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	*
MEM14090A	Integrate mechatronic fundamentals into an engineering task	*
MEM14091A	Integrate manufacturing fundamentals into an engineering task	*
MEM14092A	Integrate maintenance fundamentals into an engineering task	*
MEM15001B	Perform basic statistical quality control	
MEM15004B	Perform inspection	
MEM15005B	Select and control inspection processes and procedures	*
MEM15007B	Conduct product and/or process capability studies	*
MEM15008B	Perform advanced statistical quality control	*
MEM15010B	Perform laboratory procedures	

Unit code	Unit title	Prerequisites
MEM15011B	Exercise external quality assurance	*
MEM15012B	Maintain/supervise application of quality procedures	*
MEM16010A	Write reports	*
MEM18001C	Use hand tools	
MEM18002B	Use power tools/hand held operations	
MEM18003C	Use tools for precision work	
MEM18006C	Repair and fit engineering components	
MEM18010C	Perform equipment condition monitoring and recording	
MEM18016B	Analyse plant/equipment condition monitoring results	*
MEM18055B	Dismantle, replace and assemble engineering components	
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	
MEM22007A	Manage environmental effects of engineering activities	*
MEM22017A	Coordinate continuous improvement and technical development in an engineering-related project or operation	
MEM22018A	Coordinate sales and promotion of engineering-related products or services	

Unit code	Unit title	Prerequisites
MEM23007A	Apply calculus to engineering tasks	*
MEM23003A	Operate and program computers and/or controllers in engineering situations	*
MEM23004A	Apply technical mathematics	
MEM23006A	Apply fluid and thermodynamics principles in engineering	*
MEM23041A	Apply basic scientific principles and techniques in mechanical engineering situations	*
MEM23109A	Apply engineering mechanics principles	*
MEM23111A	Select electrical equipment and components for engineering applications	*
MEM23112A	Investigate electrical and electronic controllers in engineering applications	
MEM23063A	Select and test mechanical engineering materials	*
MEM23064A	Select and test mechatronic engineering materials	*
MEM23113A	Evaluate hydrodynamic systems and system components	*
MEM23114A	Evaluate thermodynamic systems and components	*
MEM23115A	Evaluate fluid power systems	*
MEM23116A	Evaluate programmable logic controller and related control system component applications	*
MEM23117A	Evaluate microcontroller applications	*
MEM23118A	Apply production and service control techniques	*
MEM23119A	Evaluate continuous improvement processes	*
MEM23120A	Select mechanical machine and equipment components	*
MEM23121A	Analyse loads on frames and mechanisms	*

Unit code	Unit title	Prerequisites
MEM23122A	Evaluate computer integrated manufacturing systems	*
MEM23123A	Evaluate manufacturing processes	
MEM23124A	Measure and analyse noise and vibration	*
MEM23125A	Evaluate maintenance systems	
MEM24002B	Perform penetrant testing	*
MEM24003B	Perform basic magnetic particle testing	*
MEM24004B	Perform magnetic particle testing	*
MEM24005B	Perform basic eddy current testing	*
MEM24006B	Perform eddy current testing	*
MEM24007B	Perform ultrasonic thickness testing	*
MEM24008B	Perform ultrasonic testing	*
MEM24009B	Perform basic radiographic testing	*
MEM24010B	Perform radiographic testing	*
MEM24011B	Establish non destructive tests	*
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	*
MEM30005A	Calculate force systems within simple beam structures	*
MEM30006A	Calculate stresses in simple structures	*
MEM30007A	Select common engineering materials	*
MEM30008A	Apply basic economic and ergonomic concepts to evaluate engineering applications	

Unit code	Unit title	Prerequisites
MEM30009A	Contribute to the design of basic mechanical systems	*
MEM30012A	Apply mathematical techniques in a manufacturing engineering or related environment	
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	
MEM30023A	Prepare a simple cost estimate for a manufactured product	
MEM30024A	Participate in quality assurance techniques	*
MEM30027A	Prepare basic programs for programmable logic controllers	
MEM30028A	Assist in sales of technical products/systems	
MSS015002A	Develop strategies for more sustainable use of resources	
MSS402001A	Develop competitive systems and practices	

Unit code	Unit title	Prerequisites
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	
MSS403002A	Ensure process improvements are sustained	
MSS403010A	Facilitate change in an organisation implementing competitive systems and practices	
MSS403030A	Improve cost factors in work practices	
MSS403040A	Facilitate and improve implementation of 5S	
MSS403051A	Mistake proof a production process	
MSS404050A	Undertake process capability improvements	*
MSS404052A	Apply statistics to operational processes	
MSS404081A	Undertake proactive maintenance analyses	
MSS404082A	Assist in implementing a proactive maintenance strategy	
MSS405002A	Analyse and map a value stream	
MSS405003A	Manage a value stream	
MSS405004A	Develop business plans in an organisation implementing competitive systems and practices	
MSS405005A	Manage competitive systems and processes responding to individual and unique customer requirements	
MSS405010A	Manage relationships with non-customer external organisations	
MSS405011A	Manage people relationships	
MSS405012A	Manage workplace learning	

Unit code	Unit title	Prerequisites
MSS405020A	Develop quick changeover procedures	
MSS405021A	Develop a Just in Time system	
MSS405022A	Design a process layout	
MSS405023A	Develop a levelled pull system for operations and processes	
MSS405030A	Optimise cost of product or service	
MSS405031A	Undertake value analysis of product costs in terms of customer requirements	
MSS405040A	Manage 5S system in an organisation	
MSS405050A	Determine and improve process capability	*
MSS405052A	Design an experiment	*
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	
MSS405083A	Adapt a proactive maintenance strategy for a seasonal or cyclical business	*
MSAENV472B	Implement and monitor environmentally sustainable work practices	
MSAENV672B	Develop workplace policy and procedures for environmental sustainability	
MSAPMOHS300A	Facilitate the implementation of OHS for a work group	
MSAPMOHS400A	Contribute to workplace OHS management system	

Unit code	Unit title	Prerequisites
MSAPMOHS401A	Assess risk	
MSAPMOHS510A	Manage risk	
MSAPMOPS400A	Optimise process/plant area	
MSAPMOPS401A	Trial new process or product	
MSAPMOPS601A	Design equipment and system modifications	
MSAPMSUP303A	Identify equipment faults	
MSAPMSUP390A	Use structured problem solving tools	
MSATCM301A	Test the mechanical properties of materials	
MSATCM302A	Monitor basic ferrous melting and casting processes	
MSATCM303A	Monitor basic non-ferrous melting and casting processes	
MSATCM304A	Interpret basic binary phase diagrams	
MSATCM305A	Demonstrate basic knowledge of casting operations	
MSL973001A	Perform basic tests	
MSL973006A	Prepare trial batches for evaluation	
MSL973007A	Perform microscopic examination	
MSL974001A	Prepare, standardise and use solutions	
MSL974003A	Perform chemical tests and procedures	
MSL974005A	Perform physical tests	
MSL974010A	Perform mechanical tests	
MSL975016A	Perform complex tests to measure engineering properties of materials	
PMAOHS310B	Investigate incidents	

Unit code	Unit title	Prerequisites
PMAOPS350B	Match and adjust colour	
PMAOPS450B	Solve colour problems	
PMAOPS550B	Develop a colour formulation	*
PMASUP420B	Minimise environmental impact of process	
PMASUP520B	Review procedures to minimise environmental impact of processes	
PMASUP540B	Analyse equipment performance	
PMBPREP304C	Set a die	
PMBPREP305B	Change extrusion die and calibration setup	
PMBPROD235C	Use materials and process knowledge to complete work operations	
PMBPROD430B	Trial a new die/tool	
PMBPROD431B	Trial a new, advanced or complex mould	
PMBTECH301B	Use material and process knowledge to solve problems	*
PMBTECH302A	Modify existing compounds	
PMBTECH303A	Make minor modifications to products	
PMBTECH401B	Predict polymer properties and characteristics	*
PMBTECH402B	Set up and remove complex dies	*
PMBTECH406A	Diagnose production equipment problems	
PMBTECH501B	Analyse equipment performance	*
PMBTECH502B	Review and analyse production trials and specify re-trials	*
PMBTECH503B	Determine rheology and output of plastics materials from processing equipment	*
PMBTECH504B	Determine heat transfer loads for processing	*

Unit code	Unit title	Prerequisites
	equipment	
PMBTECH505B	Choose polymer materials for an application	
PMBTECH506B	Analyse the design of products and tools	*
PMBTECH507B	Develop fibre composite products using cored laminate techniques	
PMBTECH508A	Develop a new compound	*
PMBTECH509A	Modify an existing product	
PMBTECH510A	Analyse failure in polymeric materials	

A maximum of **five** (**5**) units can be selected from this Training Package, other endorsed Training Packages and accredited courses where those units are available for inclusion at Diploma or Advanced Diploma level.