



Australian Government

Department of Education, Employment and Workplace Relations

MEM234035A Maintain and apply technical and engineering skills

Release: 1

MEM234035A Maintain and apply technical and engineering skills

Modification History

New unit

Unit Descriptor

This unit of competency covers the skills and knowledge required by a Principal Technical Officer, or someone in an equivalent position, to plan and manage their own technical role and development in their field of engineering for the benefit of themselves and their organisation. It covers the technical, analytical, communication and system skills to ensure effective performance in complex technical and engineering environments.

Application of the Unit

This unit applies to Principal Technical Officers and others in equivalent engineering and engineering-related positions in an organisation. The unit covers the skills required for an individual to manage their engineering role and provides the core underpinning skills for an individual to appropriately apply technical skills gained from other units of competency in the MEM80111 Vocational Graduate Diploma of Engineering. This unit applies to an individual performing high level engineering-related work whether in a project management, supervisory or technical specialist role in an organisation. The unit covers skills associated with ensuring that the individual's skills and knowledge in their chosen discipline or area of responsibility are up to date and appropriate for their work.

The unit applies across all forms of manufacturing and engineering. The unit covers high level technical, analytical, communication and system thinking skills.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Not applicable.

Employability Skills Information

This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.

Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

1	Develop, apply and maintain capacity for analysis	1.1	Demonstrate a systematic approach to investigation, analysis and solution of broadly defined engineering and related problems
		1.2	Analyse causes and effects of non-conformances
		1.3	Identify issues which require specialist assistance or have implications beyond personal expertise
		1.4	Use modelling, prototyping, tests and/or experiments to support problem solving
		1.5	Interpret, apply and verify compliance with relevant legislation, standards and codes of practice
		1.6	Determine properties, performance, safe working limits, failure modes, and/or other inherent parameters of materials, components and systems relevant to specialist area of expertise
		1.7	Apply research and communication techniques to access external reference material and assistance
		1.8	Report results of analysis and propose solutions that are appropriate to the needs of the organisation
		1.9	Share and encourage review of work by others in organisation
2	Communicate in a manner appropriate for content and audience	2.1	Actively communicate with others, as appropriate, including listening to, and critically and fairly comprehending, the viewpoints of others
		2.2	Express information effectively and succinctly
		2.3	Communicate formally and informally, as required, with

- technically competent and non-technically competent individuals and groups in a manner appropriate to their level of knowledge and competency
- 2.4 Present clear arguments and justification for recommendations
 - 2.5 Use textual, diagrammatic, pictorial and graphical media, as required, and as appropriate to the context
 - 2.6 Prepare relevant and comprehensive engineering-related documents and reports, as required
- 3 Work within the quality systems and management practices that apply to the organisation
- 3.1 Apply principles of safety engineering
 - 3.2 Understand the role of quality management systems
 - 3.3 Work effectively on engineering-related project activity
 - 3.4 Respect and accommodate the broader context of engineering work within the organisation
- 4 Maintain and apply technical and engineering skills in a professional manner
- 4.1 Identify own area of expertise and responsibility in the organisation and relate to one or more engineering disciplines
 - 4.2 Show familiarity with current state of development and recent applications in area of specialist knowledge or discipline
 - 4.3 Demonstrate a knowledge of the key scientific and engineering principles relevant to own area of specialist knowledge or discipline
 - 4.4 Apply, adapt and manage engineering knowledge and practice in a variety of contexts and applications
 - 4.5 Work from first principles, when appropriate
 - 4.6 Identify and select relevant materials, components, devices, systems, processes, resources, plant and equipment using appropriate reference materials and own knowledge to meet briefs
 - 4.7 Demonstrate commitment to sustainable engineering practices and the achievement of sustainable outcomes in all facets of technological project work

- 4.8 Monitor and suggest improvements to the technical framework of the organisation through monitoring of developments in own discipline

Required Skills and Knowledge

This section describes the skills and knowledge required for this unit.

Required skills

Required skills include:

- communicating, negotiating and reviewing complex technical information and processes with a variety of stakeholders and across different levels of technical understanding
- managing resources
- managing budgets
- scheduling and prioritising engineering and related activities
- complying with OHS and regulatory requirement
- performing work requiring mature technical knowledge involving a high degree of autonomy, and independent judgment, and without requiring detailed instructions
- identifying need for professional development and further education and training when reviewing own capability to undertake designated work
- providing specialised technical guidance to other employees performing work within the same technical field
- preparing engineering and related documentation
- preparing specifications, graphics and reports, as required

Required knowledge

Required knowledge includes:

- the nature of the work of professions and occupations within the organisation and the impact their work may have on relevant engineering and related activities
- methods and opportunities for professional development, including knowledge or means of identifying relevant journals, short courses and seminars, and industry and technical associations
- context and limitations associated with delegated responsibilities within the organisation, including role and responsibilities for subordinates and others working in own technical field who may not have equivalent technical knowledge
- context and limitations associated with delegated responsibilities related to OHS and regulatory requirements, organisation business plan and budgets and financial objectives
- organisation management and operations control systems
- document management systems operation
- sustainability issues relevant to own engineering activities, including, where relevant:
 - environmental (e.g. water, land, air pollution, recycling, life cycle design and waste minimisation)

- efficient use of materials and energy
- methods of formal and informal communication, including all forms of verbal and electronic means required to maintain information flow and perform functions

Evidence Guide

The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.

Critical aspects for assessment and evidence required to demonstrate competency in this unit	Assessors must be satisfied that the candidate can competently and consistently: • determine the scope of their technical skills and identify when they should seek assistance • follow a planned and systematic approach to technical tasks and own professional development • provide detailed technical advice in own area of expertise to others • communicate complex technical information effectively to a variety of audiences.
Context of and specific resources for assessment	• This unit should be assessed may be assessed in conjunction with technical focused units in the MEM80111 Vocational Graduate Diploma of Engineering. • Assessment may be conducted on the job, off the job or a combination of both on and off the job. Where assessment occurs off the job, that is, the candidate is not in productive work, then a simulated working environment must be used where the range of conditions reflects realistic workplace situations. The competencies covered by this unit would be demonstrated by an individual working alone or as part of a team. • Where applicable, reasonable adjustment must be made to work environments and training situations to accommodate ethnicity, age, gender, demographics and disability. • Access must be provided to appropriate learning and/or assessment support when required. Where applicable, physical resources should include equipment modified for people with disabilities.
Method of assessment	• Assessment must satisfy the endorsed Assessment Guidelines of the MEM05 Metal and Engineering

	Training Package. • Assessment methods must confirm consistency and accuracy of performance (over time and in a range of workplace relevant contexts) together with application of underpinning knowledge. • Assessment methods must be by direct observation of tasks and include questioning on underpinning knowledge to ensure its correct interpretation and application. • Assessment may be applied under project-related conditions (real or simulated) and require evidence of process. • Assessment must confirm a reasonable inference that competency is able not only to be satisfied under the particular circumstance, but is able to be transferred to other circumstances. • Assessment may be in conjunction with assessment of other units of competency where required.
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Guidance information for assessment	Assessment processes and techniques must be culturally appropriate and appropriate to the language and literacy capacity of the candidate and the work being performed.
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Range Statement

The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.

Stakeholders	Stakeholders may include: • internal and external customers • own team members • other employees, including professional engineers, technicians, tradespersons and operators • support services and departments, such as maintenance, accounts and logistics • regulators • the general community
Non-conformance	A non-conformance is an occurrence in a process, operation, design or product that is outside planned specifications. Examples of non-conformances include: • equipment breakdowns and faults • product returns and warranty claims • software errors • cost overruns • design faults • non-compliance to a customer brief • breaches of statutory requirements
Working from first principles	Occasionally an individual will be required to work from first principles in their chosen area of engineering. The term first principles is used to indicate: • that in solving a particular issue or problem the individual will be required to start their work directly at the level of established laws of physics and science, including fundamental calculations in their technological area of expertise
Documentation and reports	Documentation and reports covers those that must be

	produced by the individual and those that must be read and/or followed by the individual in the course of their engineering work. Examples of documentation and reports include: • progress reports • project plans • technical investigations and feasibility studies • proposals • manufacturer specifications and workshop manuals • operating procedures • customer instructions • design records, • engineering drawings
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OHS requirements	OHS requirements may include: • OHS Acts and regulations • relevant standards • industry codes of practice • risk assessments • registration requirements • safe work practices • state and territory regulatory requirements
Non-engineering related objectives	Particular engineering tasks and projects may require working to achieve objectives or within constraints that are not directly related to an engineering discipline. These may include objectives relating to: • budgets and other financial management • sales and marketing • environment • human resources (HR) • relationship with the broader community
Sustainability	Sustainability includes consideration of economic, social, ecological and resources implications of activities. Sustainability issues may include: • resources and energy: • sources, access, processing and consumption • food security and agriculture, health, education and shelter • land, energy and water • social and economic factors affecting design of machines and equipment: • life cycle design of product (manufacture to re-manufacture or recycle) • raw material, solids and hazardous waste, and production by-products • contamination of land, air and stormwater pollutants, and discharge to sewerage • climate change
Legislation, standards and codes of practice	Legislation, standards and codes of practice refer to all relevant Australian and international standards and codes applicable to a particular engineering-related task. Examples include: • AS 4024.1-2006 Series Safety of machinery • AS/NZS ISO 31000:2009 Risk management – Principles and guidelines

	• NOHSC:1010 National standard for plant • NOHSC:1014 National standard for the control of major hazard facilities • OHS legislation and regulations • industrial law and awards • trade practices • environmental protection • workers compensation • equality and antidiscrimination • contract law • Australian and international standards
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Unit Sector(s)

Engineering practice

Custom Content Section

Not applicable.