



Australian Government

MEM234035 Maintain and apply technical and engineering skills

Release: 1

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Modification History

Release 1. Supersedes and is equivalent to MEM234035A Maintain and apply technical and engineering skills.

Application

This unit of competency defines 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 individual development in their field of engineering for the benefit of themselves and their organisation. It covers the high-level technical, analytical, communication and system thinking skills to ensure effective performance in complex technical and engineering environments across all forms of manufacturing and engineering.

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 MEM80122 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.

No licensing, legislative or certification requirements apply to this unit at the time of publication.

Pre-requisite Unit

Nil

Competency Field

Engineering science

Elements and Performance Criteria

Elements	Performance Criteria
<i>Elements describe the essential outcomes.</i>	<i>Performance criteria describe the performance needed to demonstrate achievement of the element.</i>
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

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	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, 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 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 appropriate to the context 2.6 Prepare relevant and comprehensive engineering-related documents and reports
3. Work within organisational quality systems and management practices	3.1 Apply principles of safety engineering 3.2 Identify the role of quality management systems and manage work accordingly 3.3 Respect and accommodate the broader context of engineering work within the organisation
4. Maintain and apply technical and engineering skills	4.1 Identify own area of expertise and responsibility in the organisation and relate to one or more engineering disciplines 4.2 Identify current state of development and recent applications in area of specialist knowledge or discipline 4.3 Determine 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

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	different work contexts and applications 4.5 Use approaches that work from first principles 4.6 Identify and select materials, components, devices, systems, processes, resources, plant and equipment using appropriate reference materials and own knowledge to meet briefs 4.7 Follow processes to maximise use of 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

Foundation Skills

This section describes those language, literacy, numeracy and employment skills that are essential to performance.

Foundation skills essential to performance are explicit in the performance criteria of this unit of competency.

Range of Conditions

This field allows for different work environments and conditions that may affect performance. Essential operating conditions that may be present (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) are included.

Stakeholders include:	• internal and external customers • own team members • other employees, including professional engineers, technicians, tradespersons and operators • support services and departments including maintenance, accounts and logistics • regulators • general community.
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.
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.
WHS requirements include:	• WHS acts and regulations and relevant standards • industry codes of practice • risk assessments • registration requirements • safe work practices • state and territory regulatory requirements.
Non-engineering related objectives include:	• budgets and other financial management • sales and marketing • environment • human resources (HR) • relationship with the broader community.
Sustainability includes:	• resources and energy • 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 include:	• AS/NZS 4024.1 Safety of machinery • AS/NZS ISO 31000 Risk management – Principles and guidelines • NOHSC:1010 National standard for Plant • NOHSC:1014 National standard for the Control of Major Hazard Facilities • WHS 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 Mapping Information

Release 1. Supersedes and is equivalent to MEM234035A Maintain and apply technical and engineering skills.

Links

Companion Volume implementation guides are found in VETNet -

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

Assessment Requirements for MEM234035 Maintain and apply technical and engineering skills

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Performance Evidence

Evidence required to demonstrate competence in this unit must be relevant to and satisfy the requirements of the elements and performance criteria and include:

- determining the scope of own technical skills and identifying when to seek assistance
- following a planned and systematic approach to technical tasks and own professional development on at least two occasions
- providing detailed technical advice in own area of expertise to others
- communicating complex technical information effectively to multiple audiences including preparing engineering and related documentation, specifications, graphics and reports.

Note: Where a volume and/or frequency is not specified, demonstration must be provided at least once.

Knowledge Evidence

Evidence required to demonstrate the required knowledge for this unit must be relevant to and satisfy the requirements of the elements and performance criteria and include knowledge of:

- 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, 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 work health and safety (WHS) and regulatory requirements, organisational business plan and budgets and financial objectives
- stakeholders for engineering activities on own discipline
- non-conformances and required actions
- organisation, management and operations control systems
- documents and reports
- document management systems operation
- non-engineering objectives

- sustainability issues relevant to own engineering activities
- methods of formal and informal communication including all forms of verbal and electronic means required to maintain information flow and perform functions.

Assessment Conditions

- Assessors must:
 - have vocational competency in maintaining and applying technical and engineering skills at least to the level being assessed with relevant industry knowledge and experience
 - satisfy the assessor requirements in the *Standards for Registered Training Organisations 2015 or its replacement* and comply with the *National Vocational Education and Training Regulator Act 2011*, its replacement or equivalent legislation covering VET regulation in a non-referring state/territory as the case requires.
- Where possible assessment must occur in operational workplace situations. Where this is not possible or where personal safety or environmental damage are limiting factors, assessment must occur in a sufficiently rigorous simulated environment that reflects realistic operational workplace conditions that cover all aspects of workplace performance, including environment, task skills, task management skills, contingency management skills and job role environment skills.
- Conditions for assessment must include access to all tools, equipment, materials and documentation required including relevant workplace procedures, product and manufacturing specifications.
- Assessment processes and techniques must be appropriate to the language, literacy and numeracy requirements of the work being performed and the needs of the candidate.
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