



Australian Government

MEM234002 Integrate engineering technologies

Release: 1

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Modification History

Release 1. Supersedes and is equivalent to MEM234002A Integrate engineering technologies.

Application

This unit of competency defines the skills and knowledge required to integrate technologies, processes, components or equipment for engineering projects or operations. Apart from engineering considerations, the unit encompasses sustainability, work health and safety (WHS) and regulatory requirements and implications of the project.

This unit applies to individuals working as a Principal Technical Officer or in an equivalent engineering-related position who are required to integrate different technologies, processes, components or equipment.

Individuals completing this work either already have or are developing skills and experience in the application of scientific principles, mathematics, materials, manufacturing processes, computer software for computer-aided design (CAD), system analysis, modelling and simulation, project work and risk management, and experience in the technologies to be integrated.

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. Clarify the scope of the integration design task and elaborate the specification	1.1 Identify processes, machine, equipment, components and technologies covered by the integration task 1.2 Determine other parameters to the integration task 1.3 Determine stakeholders to be consulted 1.4 Determine if and when input and advice should be obtained from

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	<p>experts in other technical fields and disciplines</p> <p>1.5 Assess WHS, regulatory, sustainability or environmental issues relevant to the integration task</p> <p>1.6 Confirm brief, including budget and schedule, and provide preliminary advice on feasibility</p>
2. Prepare integration analysis and concept proposal for designs or operational changes	<p>2.1 Carry out initial investigations into technologies and equipment to be integrated</p> <p>2.2 Identify any existing or pre-designed integration</p> <p>2.3 Determine any special features of machines, equipment or processes that need to be considered</p> <p>2.4 Carry out required analysis, modelling and calculations using appropriate software and validation techniques</p> <p>2.5 Obtain design or advice from experts in other technical fields and disciplines</p> <p>2.6 Generate integration solutions that respond to the brief</p> <p>2.7 Check feasibility and evaluate solutions against design criteria, project brief or operating specifications, ensuring conformity to technical, economic and WHS requirements</p> <p>2.8 Determine social and sustainability implications of solutions</p> <p>2.9 Present integration concept proposals to client or supervisors</p>
3. Finalise integration strategy	<p>3.1 Evaluate concept proposals with client and select preferred solution</p> <p>3.2 Finalise selected integration strategy, including design elements or modifications and implementation strategy, ensuring preparation of all required documentation, drawings, specifications and instructions</p> <p>3.3 Consult with client and stakeholders to obtain sign-off on integration strategy and documentation</p>
4. Implement integrated engineering technologies strategy	<p>4.1 Monitor and support prototyping or testing of machine, process or technology using selected integrated engineering strategy</p> <p>4.2 Analyse performance against strategy and internal or external client specifications</p> <p>4.3 Adjust strategy as required based on performance analysis</p> <p>4.4 Obtain sign-off and oversight production of adjusted documentation, drawings, specifications and instructions</p> <p>4.5 Communicate and negotiate with stakeholders to address issues</p>

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<i>Elements describe the essential outcomes.</i>	<i>Performance criteria describe the performance needed to demonstrate achievement of the element.</i>
	associated with design and resources adjustments 4.6 Ensure design and implementation documentation and records are maintained in accordance with organisational requirements

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.

Integration tasks include:	<ul style="list-style-type: none"> the application of engineering skill and knowledge across engineering technologies and systems partial or full design of the integration integration across one or more processes, machines and sets of equipment integration of mechanical, fluid power and electrical systems with control technologies, structural support, and other engineering-related systems as found in automated applications.
Parameters of the integration brief include:	<ul style="list-style-type: none"> technology and process limits capital and design budgets product cost limits and budgets anticipated post-integration performance specifications equipment availability, capacities and restrictions specified administrative, communication and approval procedures other special features and limits in the integration brief.
Stakeholders include:	<ul style="list-style-type: none"> clients financier project or operations team support services including accounts and legal professionals, technical experts, suppliers and transporters

	<ul style="list-style-type: none"> those responsible for implementation plan activities including installation, commissioning and process improvement.
WHS, regulatory, sustainability and environmental issues include:	<ul style="list-style-type: none"> WHS acts, regulations and relevant standards industry codes of practice risk assessments registration requirements safe work practices state and territory regulatory requirements.
Software and validation techniques include:	<ul style="list-style-type: none"> the use of failure effects analysis (FEA) and numerical methods within object-oriented modelling techniques comparison of traditional solutions for simple design problems with software solutions to the same design problems review of previously implemented design challenges which were completed using the software.
Sustainability includes:	<ul style="list-style-type: none"> resources and energy: <ul style="list-style-type: none"> 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 ecological and resources implications of activities 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.
Monitor and support the implementation includes:	<ul style="list-style-type: none"> provision of assistance with hardware procurement and system assembly and arrangements to suit design assisting installation and commissioning provision of advice on adjustments, revisions and required documentation.
Systems thinking includes:	<ul style="list-style-type: none"> process of developing solutions within the context of an entire system recognising that an improvement in one subsystem can adversely affect another subsystem.
Planning and scheduling techniques include	<ul style="list-style-type: none"> critical path or Pert network plans Gantt charts.

Unit Mapping Information

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Links

Companion Volume Implementation Guides are available on VETNet -

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