



Australian Government

MEM09155 Prepare mechanical models for computer-aided engineering (CAE)

Release: 1

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Modification History

Release 1. Supersedes and is equivalent to MEM09155A Prepare mechanical models for computer-aided engineering (CAE).

Application

This unit of competency defines the skills and knowledge required to apply mechanical modelling techniques to computer-aided engineering (CAE). It includes model creation for purposes such as computer-aided manufacturing (CAM) and computer numerical control (CNC) applications, rapid prototyping and stress analysis. It is also used as a basis for generating orthogonal drawings.

This unit is suitable for people working in design drafting and those pursuing technical qualifications and careers at engineering technician level.

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

Pre-requisite Unit

MEM23004 Apply technical mathematics

MEM23109 Apply engineering mechanics principles

Competency Field

Drawing, drafting and design

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. Determine job requirements	1.1 Follow standard operating procedures (SOPs) 1.2 Comply with work health and safety (WHS) requirements at all times 1.3 Identify job requirements from specifications
2. Identify model parameters	2.1 Identify the engineering context of computer modelling from job requirements

Elements	Performance Criteria
<i>Elements describe the essential outcomes.</i>	<i>Performance criteria describe the performance needed to demonstrate achievement of the element.</i>
	2.2 Determine sustainability issues related to required models 2.3 Determine the virtual or physical model parameters, form, function and features 2.4 Determine required model generation processes and any required graphics generation, post-processing and physical modelling 2.5 Identify licensed technical and professional assistance required
3. Develop model	3.1 Generate initial graphical model using identified processes 3.2 Consult with model stakeholders and make agreed adjustments 3.3 Prepare and trial model for intended purpose 3.4 Complete investigative analysis or produce physical model 3.5 Evaluate model against design criteria in consultation with stakeholders and make agreed adjustments 3.6 Engage appropriate licensed technical and professional assistance for advice
4. Finalise modelling	4.1 Prepare final model as agreed 4.2 Report and demonstrate result 4.3 Provide documentation, instructions, models and files, and obtain sign-off in accordance with SOPs

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.

Specifications include one or more of the following:	• job sheets • work instructions.
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Stakeholders include one or more of the following:	• team members • cross-function support groups • experts • appropriate licensed technicians and professionals.
Context for mechanical designs includes one or more of the following:	• function • aesthetics • manufacturability and maintainability • marketability • sustainability • cost constraints • ergonomics, anthropometrics and physiology • facilities, plant and skills available • safety and risk.
Model creation techniques include:	• creating dimensioned orthographic projections from models Plus one or more of the following: • using and manipulating coordinate systems • creating 3D entities, ruled and revolved surfaces • creating solids • editing and combining solids • manipulating entities and solids • manipulating library files • creating 3D graphics from models, including rotated views and sections.
Typical modelling processes include one or more of the following:	• computer modelling • post-processing • prototyping • model manufacture.
Appropriate licensed technical and professional assistance includes one or more of the following:	• technical support and advice relating to elements which have intrinsic dangers • professional support for technologies.
Modelling and related software includes one or more of the following:	• lumped parameter model • empirical, random data tested model • finite element analysis (FEA) software • model-based design.

Unit Mapping Information

Release 1. Supersedes and is equivalent to MEM09155A Prepare mechanical models for computer-aided engineering (CAE).

Links

Companion Volume implementation guides are found in VETNet -

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