



Australian Government

MEM09156 Prepare mechatronic models for computer-aided engineering (CAE)

Release: 1

MEM09156 Prepare mechatronic models for computer-aided engineering (CAE)

Modification History

Release 1. Supersedes and is equivalent to MEM09156A Prepare mechatronic models for computer-aided engineering (CAE).

Application

This unit of competency defines the skills and knowledge required to apply mechatronic modelling techniques using computer-aided engineering (CAE). It includes model creation for automated mechanisms, robots or system control and data acquisition (SCADA) environments, printed circuit board manufacture and assembly, and as a basis for generating orthogonal drawings. Models covered by this unit include mechanical, maintenance, manufactured engineering products, plant and systems.

This unit is suitable for people working in design drafting and those pursuing careers and qualifications in mechatronics, automated systems or systems maintenance 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

MEM23111 Select electrical equipment and components for engineering applications

MEM23112 Investigate electrical and electronic controllers in engineering applications

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

Elements	Performance Criteria
<i>Elements describe the essential outcomes.</i>	<i>Performance criteria describe the performance needed to demonstrate achievement of the element.</i>
	1.3 Identify job requirements from specifications
2. Identify model parameters	2.1 Investigate applications for modelling in mechatronics from job requirements 2.2 Determine the virtual parameters, form, function and features 2.3 Determine the required model generation processes, and required graphics generation and post-processing 2.4 Identify licensed technical and professional assistance for advice 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 Evaluate model against design criteria in consultation with stakeholders and make agreed adjustments 3.5 Engage appropriate licensed technical and professional assistance for advice
4. Finalise model	4.1 Prepare final model as agreed 4.2 Report and demonstrate results 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.
Stakeholders include one or more of the following:	• team members • cross-function support groups • experts • appropriate licensed technicians and professionals.
Mechatronic components, assemblies and layouts include one or more of the following:	• electrical motors and fluid power actuators • printed circuit boards • electrical, electronic and electro fluid controls • chain drives, gear sets, pulley and belt drives • structural sections • mechatronic assembly models, including robots, automated mechanisms and machines • materials handling equipment, including belt conveyors, augers and pneumatic conveyors • manufacturing plant and process layouts • manufactured product with embedded controller.
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 solids and library files • creating 3D graphics from models, including rotated views and sections.
Virtual model options include one or more of the following:	• automated systems simulation of motions • post-processing to create numeric control (NC) data files to computer numeric control (CNC) circuit board assembly • gantry robot assembly of boards • rapid prototyping options • finite element analysis (FEA).
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	• lumped parameter model • empirical, random data tested model

more of the following:	• FEA software • model-based design.
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Unit Mapping Information

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Links

Companion Volume implementation guides are found in VETNet -

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