



Australian Government

MEM23008 Apply advanced algebra and numerical methods to engineering tasks

Release: 1

MEM23008 Apply advanced algebra and numerical methods to engineering tasks

Modification History

Release 1. Supersedes and is equivalent to MEM23008A Apply advanced algebra and numerical methods to engineering tasks.

Application

This unit of competency defines the skills and knowledge required to apply advanced mathematical and numerical method techniques to engineering situations.

Engineering applications requiring advanced mathematics and numerical methods may include those related to assisting decision making by analysis of data, assisting in presentation of data by use of advanced graphical techniques, solution of problems involving rectilinear and rotation motion, solution of problems involving work, energy and power and solution of problems in electrostatics and wave propagation.

The unit applies to engineering or related activities and is suitable for people giving technical support to design, operations or maintenance activities and those pursuing technical qualifications and careers at paraprofessional or technician level.

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

Pre-requisite Unit

MEM23004 Apply technical mathematics

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. Determine scope of advanced mathematics and numerical methods required for an engineering application	1.1 Analyse an engineering application for required advanced mathematics or numerical methods tasks 1.2 Develop systematic methods for layout and solution validation, including any required sign-off of solution 1.3 Identify advanced mathematics or numerical methods and any software required for analysis and resolution of identified engineering

Elements	Performance Criteria
<i>Elements describe the essential outcomes.</i>	<i>Performance criteria describe the performance needed to demonstrate achievement of the element.</i>
	application tasks
2. Apply advanced mathematics techniques to engineering applications	2.1 Apply advanced mathematics concepts and models to solve engineering or manufacturing problems 2.2 Check answer by appropriate means 2.3 Interpret answer to determine information required by problem definition 2.4 Report results and document calculations, graphs and analysis
3. Apply numerical methods to engineering applications	3.1 Apply numerical methods concepts and models to solve engineering problems 3.2 Check solution is laid out in a correct manner and is error free 3.3 Review solution to ensure it provides information relevant to resolution of engineering application task 3.4 Report results and document calculations, graphs and analysis

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.

Advanced mathematics and numerical methods techniques include one or more of the following:	<ul style="list-style-type: none"> • vectors in 3D including i, j, k notation, scalar and vector products • dynamics, including Newton's Laws of Motion, energy, work and power and work-energy theorem • analytical geometry • graphing techniques, including coordinate geometry, polar coordinates and polar graphs • complex numbers, including Cartesian, trigonometric and polar
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	<p>form</p> <ul style="list-style-type: none">• linear algebra, including matrix algebra• numerical solutions, including finite difference techniques• errors and propagation of errors• interpolation and approximation.
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Unit Mapping Information

Release 1. Supersedes and is equivalent to MEM23008A Apply advanced algebra and numerical methods to engineering tasks.

Links

Companion Volume implementation guides are found in VETNet -

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