



Australian Government

Department of Education, Employment and Workplace Relations

MEM23051A Apply basic electro and control scientific principles and techniques in mechanical and manufacturing engineering situations

Release: 1

MEM23051A Apply basic electro and control scientific principles and techniques in mechanical and manufacturing engineering situations

Modification History

Not Applicable

Unit Descriptor

Unit descriptor	This unit covers applying basic electro and control scientific principles and techniques to mechanical and manufacturing engineering situations.
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Application of the Unit

Application of the unit	Applications of this unit include applying basic electro and control scientific principles and techniques as a member of a design and development team in support of the design and development of engineering applications; identifying a significant range of basic electro and control scientific principles and techniques relevant to mechanical and manufacturing engineering; selecting electro and control principles and techniques for particular mechanical and manufacturing applications; applying electro and control principles and techniques appropriately to mechanical and manufacturing engineering tasks. This unit only has application in qualifications that are not points based. Band: 0 Unit Weight: 0
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Licensing/Regulatory Information

Not Applicable

Pre-Requisites

Prerequisite units		

Employability Skills Information

Employability skills	This unit contains employability skills.
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Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.
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Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1. Research and identify the range of basic electro and control scientific principles and techniques relevant to mechanical and manufacturing engineering	1.1.The basic electro and control scientific principles relating to mechanical and manufacturing engineering , researched and reported on from appropriate sources of information and examination of applications. 1.2.The basic electro and control techniques and associated technologies, software and hardware required to implement scientific principles relating to mechanical and manufacturing engineering situations and reported.
2. Select basic electro and control scientific principles and techniques relevant to particular mechanical and manufacturing engineering applications	2.1.For particular mechanical and manufacturing engineering situations, the relevant basic electro and control scientific principles can be selected. 2.2.For particular mechanical and manufacturing engineering situations, the relevant basic electro and control techniques and associated technologies, software and hardware can be selected.
3. Apply the relevant basic electro and control scientific principles and techniques appropriately	3.1.The basic electro and control scientific principles are applied in a consistent and appropriate manner to obtain any required solution. 3.2.Appropriate calculations and coherent units are used in the solution of engineering calculations. 3.3.Significant figures are used in engineering calculations. 3.4.The basic electro and control techniques and associated technologies, software and hardware are applied in a consistent and appropriate manner to obtain required solutions.
4. Quote the results of the application of the basic electro and control scientific principles and techniques correctly	4.1.For applications involving engineering calculations the solution is quoted in an appropriate style. 4.2.For applications not involving engineering calculations the solution is quoted in an appropriate style.

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

REQUIRED SKILLS AND KNOWLEDGE

This section describes the skills and knowledge required for this unit.

Required skills

Look for evidence that confirms skills in:

- selecting appropriate basic electro and control scientific principles to suit specified applications.
- appropriate basic electro and control techniques and associated technologies, software and hardware have been chosen to suit specified applications.
- applying basic electro and control scientific principles to particular mechanical or manufacturing engineering situations
- applying and manipulating appropriate formulas for applications involving engineering calculations
- applying appropriate calculations to engineering situations.
- checking the validity of equations using dimensional analysis
- applying basic electro and control techniques and associated technologies, software and hardware in a manner appropriate to the application and identified scientific principles
- referring solutions to the original aim of the application.
- quoting solutions in appropriate units, using appropriate significant figures.
- quoting limitations of solutions, due to assumptions, scientific principles and techniques used

Required knowledge

Look for evidence that confirms knowledge of:

- electro and control scientific principles
- limitations of selected basic scientific principles
- basic electro and control techniques and related technologies, software and hardware associated with implementing scientific principles in mechanical and manufacturing engineering solutions
- the limitations of basic techniques and associated technologies, software and hardware
- the applicability and limitations of basic electro and control scientific principles
- the applicability and limitations of basic electro and control and associated technologies, software and hardware
- appropriateness of calculations
- fundamental and derived quantities
- common systems of units
- the procedure for converting between systems of units
- common prefixes used with units and their values
- the procedure for carrying out dimensional analysis

REQUIRED SKILLS AND KNOWLEDGE
• the concept of significant figures • the uncertainty of computations based on experimental data • the procedures for determining the significance of figures in calculations • the procedures for estimating errors in derived quantities

Evidence Guide

EVIDENCE GUIDE

The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.

Overview of assessment

A person who demonstrates competency in this unit must be able to apply basic electro and control scientific principles and techniques in mechanical and manufacturing engineering situations.

Critical aspects for assessment and evidence required to demonstrate competency in this unit

Assessors must be satisfied that the candidate can competently and consistently perform all elements of the unit as specified by the criteria, including required knowledge, and be capable of applying the competency in new and different situations and contexts.

Context of and specific resources for assessment

This unit may be assessed on the job, off the job or a combination of both on and off the job. Where assessment occurs off the job, that is the candidate is not in productive work, then an appropriate simulation must be used where the range of conditions reflects realistic workplace situations. The competencies covered by this unit would be demonstrated by an individual working alone or as part of a team. The assessment environment should not disadvantage the candidate.

This unit could be assessed in conjunction with any other units addressing the safety, quality, communication, materials handling, recording and reporting associated with applying basic electro and control scientific principles and techniques in mechanical and manufacturing engineering situations or other units requiring the exercise of the skills and knowledge covered by this unit.

Method of assessment

Assessors should gather a range of evidence that is valid, sufficient, current and authentic. Evidence can be gathered through a variety of ways including direct observation, supervisor's reports, project work, samples and questioning. Questioning techniques should not require language, literacy and numeracy skills beyond those required in this unit of competency. The candidate must have access to all tools, equipment, materials and documentation required. The candidate must be permitted to refer to any relevant workplace procedures, product and manufacturing specifications, codes,

EVIDENCE GUIDE	
	standards, manuals and reference materials.
Guidance information for assessment	

Range Statement

RANGE STATEMENT	
The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.	
Sources of information	Reference texts, manufacturer's catalogues and industrial magazines, websites, use of phone, email and fax information gathering.
Mechanical engineering	The engineering discipline concerned with the conceptual development, research, design, manufacture, implementation, installation, commissioning and maintenance of mechanical products, processes, systems or services for converting energy into power and motion, materials into product and components into machines and systems for domestic, industrial, public or private services, entertainment and military applications.
Manufacturing engineering	Manufacturing engineering will include conceptual development, design, manufacture, construction, implementation, installation, optimisation, commissioning and maintenance of resources and processes employed for the manufacture of product and components, machines and systems for domestic, commercial, industrial, entertainment, civil, medical or military applications
Basic scientific techniques and principles	Requires the application of underpinning knowledge of measurement, quantities and errors, significant figures in calculations and

RANGE STATEMENT

	the use of coherent units in the completion of tasks Basic techniques include basic hand and power tool operations, machining, fitting, welding, moulding, fabricating, wiring and programming techniques.
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Unit Sector(s)

Unit sector	
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Co-requisite units

Co-requisite units		

Competency field

Competency field	Engineering science
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