



Australian Government

Department of Education, Employment and Workplace Relations

MEM23097A Apply automated systems principles and techniques in aeronautical engineering situations

Release: 1

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Modification History

Not applicable.

Unit Descriptor

This unit of competency covers applying scientific principles and techniques to automated systems in aeronautical engineering situations.

Application of the Unit

This unit applies to selecting and applying automated systems principles and techniques. It includes identifying automated systems and related principles and techniques, selecting principles and techniques for particular applications, applying principles and techniques to automated systems, quoting results.

Applications may include participation in aeronautical system design, development of modifications, development of fault tree and fault diagnosis guides, and test equipment development or modification.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

MEM23052A	Apply basic electro and control scientific principles and techniques in aeronautical engineering situations
MEA349A	Apply basic scientific principles and techniques in aeronautical engineering

Employability Skills Information

This unit contains employability skills

Elements and Performance Criteria Pre-Content

Not applicable.

Elements and Performance Criteria

1	Identify the range of principles and techniques relevant to automated systems	1.1	Research and report on automated systems engineering associated technologies, software and hardware associated implementing scientific principles relating to automated systems using appropriate sources of information
		1.2	Identify regulatory requirements associated with automated systems
2	Select principles and techniques relevant to automated systems applications	2.1	Select the relevant principles for particular automated systems relevant principles
		2.2	Select the relevant techniques and associated technologies and hardware for particular automated systems situations
3	Apply the relevant automated systems principles and techniques appropriately	3.1	Apply the principles in a consistent and appropriate manner to obtain required solution
		3.2	Use appropriate calculations and correct units to establish solutions
		3.3	Use coherent units in equations in a systematic manner to obtain solutions
		3.4	Use significant figures in engineering calculations
		3.5	Apply the techniques and associated technologies, software and hardware in a consistent and appropriate manner to obtain required solution
4	Quote the results of the application of automated systems principles and techniques correctly	4.1	Quote solutions for applications involving engineering calculations in appropriate style
		4.2	Quote solutions for applications not involving engineering calculations in appropriate style

Required Skills and Knowledge

Required knowledge includes:

- aeronautical systems techniques and related technologies, software and hardware associated with implementing principles in engineering solutions and related to appropriate engineering applications
- the limitations of aeronautical systems techniques and associated technologies, software and hardware
- the relevance of scientific principles to aeronautical systems engineering
- applicability and limitations of an extensive range of aeronautical systems techniques and associated technologies and hardware
- the choice of aeronautical systems scientific principles for particular applications
- applicability of particular aeronautical systems techniques and associated technologies, software and hardware to applications
- the choice of aeronautical systems techniques and associated technologies, software and hardware for particular applications
- the method of application of the scientific principles
- 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 ensuring coherent units for meaningful solutions to equations
- the concept of significant figures
- the uncertainty of computations based on experimental data
- procedures for determining the significance of figures in calculations
- procedures for estimating errors in derived quantities
- the method of application of the aeronautical systems techniques and associated technologies, software and hardware to applications
- the significance of the calculation solution style in relation to the original task
- the significance of the non-calculation solution style in relation to the original task

Required skills include:

- applying aeronautical systems principles relevant to engineering
- analysing the given situation to determine what is required in the manner of a solution
- analysing the given situation to determine which aeronautical systems principles are selected
- selecting appropriate aeronautical systems interfacing techniques and associated technologies, software and hardware to applications
- applying appropriate aeronautical systems principles in determining the required solution
- applying and manipulating formulas and calculations for engineering applications
- using the correct units to solve engineering calculations
- checking the validity of equations using a systematic method for ensuring coherent units
- applying aeronautical systems interfacing techniques and associated technologies, software and hardware appropriate to the application and identified scientific principles
- referring solutions to the original aim of the application
- quoting solutions in appropriate units and using appropriate significant figures
- presenting solutions referring to the original aim of the application

Evidence Guide

<p>Overview of assessment</p>	<p>A person who demonstrates competency in this unit must be able to apply automated systems principles and techniques in aeronautical engineering situations. Competency in this unit cannot be claimed until all prerequisites have been satisfied.</p>
<p>Critical aspects for assessment and evidence required to demonstrate competency in this unit</p>	<p>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. 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.</p>
<p>Context of and specific resources for assessment</p>	<p>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. 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, standards, manuals and reference materials.</p>
<p>Method of assessment</p>	<p>This unit could be assessed in conjunction with any other units addressing the safety, quality, communication, materials handling, recording and reporting associated with applying automated systems principles and techniques in engineering situations or other units requiring the exercise of the skills and knowledge covered by this unit.</p>
<p>Guidance information for assessment</p>	

Range Statement

<p>Automated systems</p>	<p>Automated systems refer to:</p> <ul style="list-style-type: none"> the engineering discipline concerned with the conceptual development, research, design, manufacture and/or implementation and/or installation, commissioning and maintenance of automated processes, systems or services for converting energy into power and motion, materials into product and components into machines and systems for domestic, commercial, industrial, civil, entertainment, medical or military applications <p>Automated systems may incorporate:</p> <ul style="list-style-type: none"> mechanical, electronics, programming, electrical and fluid power elements in a system designed to achieve a desired output in response to a variety of inputs, disturbances and variables
<p>Automated systems engineering techniques</p>	<p>Automated systems engineering techniques includes:</p> <ul style="list-style-type: none"> the use of system analysis, mechanical and electro, programming and software skills for design, installation, commissioning, troubleshooting and maintenance of systems, processes and services <p>Automated systems technique may be enhanced by:</p> <ul style="list-style-type: none"> the development of basic capabilities with hand and power tools, experience of processes and materials properties
<p>Automated systems applications</p>	<p>In general, principles and techniques for automated systems will include:</p> <ul style="list-style-type: none"> mechanical, structural, hydraulic, pneumatic, fluid pumping, electrical and electronic control principles and techniques <p>The control systems will typically include:</p> <ul style="list-style-type: none"> sensory elements, such as position, level, pressure, temperature, flow rate, pH sensors, computer, PLC or dedicated microprocessor control together with appropriate signal conditioning and actuator interfacing. Emergency stop and failsafe design should be incorporated as required <p>Communications may be:</p> <ul style="list-style-type: none"> hard-wired, telemetric, radio or phone linked <p>Specific aeronautical applications include:</p> <ul style="list-style-type: none"> the interface between powered flying controls and automatic flight control systems the interface between engine components and full

	<p>authority digital engine control systems</p> <ul style="list-style-type: none">• the interface between engine systems and components and engine indicating and crew alerting systems
Sources of information	<p>Sources of information include:</p> <ul style="list-style-type: none">• reference texts• relevant standards• manufacturer catalogues and industrial magazines• websites• use of phone, email and fax information gathering
Regulatory requirements	<p>Regulatory requirements may be found in:</p> <ul style="list-style-type: none">• Civil Aviation Regulations or Civil Aviation Safety Regulations• Technical Airworthiness Maintenance Manual (AAP 7001.053)• Federal Aviation Regulations (United States)• European Aviation Safety Regulations• Transport Canada CTA Rules

Unit Sector(s)

Engineering science

Custom Content Section

Not applicable.