



Australian Government

Department of Education, Employment and Workplace Relations

MEM23095A Apply aeronautical system design principles and techniques in aeronautical engineering situations

Release: 1

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Modification History

Not applicable.

Unit Descriptor

This unit of competency covers aeronautical system design principles in aeronautical engineering situations.

Application of the Unit

This unit applies to selecting and applying aeronautical system design principles and techniques appropriate to engineering applications.

Computer techniques, graphical methods and mathematical calculations should complement scientific principles. Unit analysis, appropriate precision and accuracy, and use conservative estimations.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

MEA349A	Apply basic scientific principles and techniques in aeronautical engineering
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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 aeronautical system design principles and techniques relevant to aeronautical engineering	1.1	Research and report on aeronautical system design principles from appropriate sources of information
		1.2	Identify the aeronautical system design principles relating to aeronautical engineering applications
		1.3	Research and report on aeronautical system design technologies, software and hardware associated with the principles relating to aeronautical engineering applications from appropriate sources of information
2	Select aeronautical system design principles and techniques relevant to aeronautical engineering applications	2.1	Select the relevant aeronautical system design principles for aeronautical engineering situations
		2.2	Select the relevant aeronautical system design technologies, software and hardware for particular aeronautical engineering situations
3	Apply the relevant aeronautical system design principles and techniques appropriately	3.1	Apply the aeronautical system design principles in a consistent and appropriate manner to obtain any 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 establish solutions
		3.4	Use significant figures as used in engineering calculations
		3.5	Apply the aeronautical system design techniques and associated software and hardware in a consistent and appropriate manner to obtain any required solutions
4	Quote the results of the application of the aeronautical system design principles and techniques correctly	4.1	Quote solutions for applications involving engineering calculations in an appropriate style
		4.2	Quote solutions for applications not involving engineering calculations in an appropriate style

Required Skills and Knowledge

Required knowledge includes:

- aeronautical engineering techniques and related technologies, software and hardware associated with important principles in engineering solutions and related to appropriate engineering applications
- the limitations of aeronautical engineering techniques and associated technologies, software and hardware
- the relevance of scientific principles to aeronautical engineering
- the applicability and limitations of an extensive range of aeronautical engineering techniques and associated software and hardware
- the choice of aeronautical engineering scientific principles for particular applications
- the applicability of particular aeronautical engineering techniques and associated technologies, software and hardware for applications
- the choice of aeronautical engineering techniques and associated technologies, software and hardware for 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 engineering techniques and associated technologies, software and hardware
- 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 advanced scientific principles relevant to aeronautical engineering
- analysing the given situation to determine what is required in the manner of a solution
- analysing the given situation to determine which aeronautical engineering scientific principles are selected
- selecting appropriate aeronautical engineering techniques and associated technologies, software and hardware for application/s
- applying appropriate aeronautical engineering 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 engineering techniques and associated technologies, software and hardware in a manner of 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

Overview of assessment	A person who demonstrates competency in this unit must be able to apply aeronautical system design principles and techniques in mechanical engineering situations. Competency in this unit cannot be claimed until all prerequisites have been satisfied.
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. 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.
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. 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.
Method of assessment	This unit could be assessed in conjunction with any other units addressing the safety, quality, communication, materials handling, recording and reporting associated with applying aeronautical system design principles and techniques in aeronautical engineering situations or other units requiring the exercise of the skills and knowledge covered by this unit.
Guidance information for assessment	

Range Statement

Aeronautical systems	Aeronautical systems may include: <ul style="list-style-type: none">• hydraulic systems (utility and flight control)• pneumatic systems• mechanical systems• air and vapour cycle air conditioning systems• pressurisation systems• fuel storage and distribution systems• fire extinguishing systems
Sources of information	Sources of information include: <ul style="list-style-type: none">• reference texts• manufacturer catalogues and industrial magazines• websites• use of phone, email and fax information gathering
Aeronautical engineering	Aeronautical engineering refers to: <ul style="list-style-type: none">• the engineering discipline concerned with the conceptual development, research, design, manufacture, implementation, installation, commissioning and maintenance of aerospace mechanical, hydraulic, pneumatic, fuel and fire products, processes, systems or services for civil and military applications
Aeronautical engineering situations	Aeronautical engineering situations may include: <ul style="list-style-type: none">• working as a member of a design team• developing repair schemes• developing modifications• designing test equipment• developing fault trees/diagnosis guides

Unit Sector(s)

Engineering science

Custom Content Section

Not applicable.