



Australian Government

Department of Education, Employment and Workplace Relations

MEM14065A Plan and design aeronautical engineering projects

Release: 1

MEM14065A Plan and design aeronautical engineering projects

Modification History

Not applicable.

Unit Descriptor

This unit of competency covers systematically planning and designing within an aeronautical engineering context.

Application of the Unit

Competency in this unit includes significant contribution to the planning, design and acceptance process for aeronautical engineering applications. Planning and design should be implemented systematically within the context of market or customer requirements and prevailing industrial environment, in accordance with planning and design parameters, such as performance, financial, legal, resource and scheduling.

Applications of planning and design in aeronautical engineering may include the conceptual development, management, design, manufacture, implementation, installation, commissioning and maintenance of aerospace structures, structural components, systems and system components for civil or military applications.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

MEA349A	Apply basic scientific principles and techniques in aeronautical engineering situations
MEA350A	Select and test aeronautical engineering materials
MEM14083A	Apply aeronautical engineering fundamentals to support design and development of projects
MEM16008A	Interact with computing technology
MEM23052A	Apply basic electro and control scientific principles and techniques in aeronautical engineering situations
MEM23073A	Select and apply aeronautical engineering methods, processes and construction techniques
MEM23084A	Apply scientific principles and techniques in aeronautical engineering situations
MEM23095A	Apply aeronautical system design principles and techniques in engineering situations
MEM30012A	Apply mathematical techniques in manufacturing, engineering or related situations

Employability Skills Information

This unit contains employability skills

Elements and Performance Criteria Pre-Content

Not applicable.

Elements and Performance Criteria

- | | |
|--|---|
| <p>1 Research and report the context and parameters of the planning and design process for aeronautical engineering applications</p> | <p>1.1 Research and report on the context and parameters of the planning and design process for aeronautical engineering applications</p> <p>1.2 Identify and report on the market and industrial context and parameters of the planning and design process for a significant and particular aeronautical engineering application</p> |
|--|---|

- | | |
|---|--|
| 2 Interpret the brief and clarify client requirements | 2.1 Interpret client requirements for an application in an engineering environment |
| | 2.2 Develop the design requirements and parameters with client |
| 3 Prepare concept proposal | 3.1 Generate a range of different, innovative and creative approaches to achieve design requirements |
| | 3.2 Check feasibility of a range of design solutions against design parameters |
| | 3.3 Assess opportunities for concurrent design activities |
| | 3.4 Assess design solutions for conformity to occupational health and safety (OHS), environment and regulatory requirements |
| | 3.5 Seek opinions of colleagues and a range of creative and technical experts/specialists |
| | 3.6 Prepare plan and design concept proposal that includes results of feasibility study consideration of expert opinion, initial calculations and modelling and the use of judgment and discretion |
| | 3.7 Review concept proposal with client to improve outcomes and overcome possible problems |
| 4 Implement the planning and design process for particular applications | 4.1 Select and manage resources and processes to develop the plan or design |
| | 4.2 Document management processes |
| | 4.3 Incorporate appropriate components and systems in the planning and design process |
| | 4.4 Perform engineering activities and manage self to implement the planning and design process |
| | 4.5 Apply appropriate calculations and assumptions in implementing the planning and design process |
| | 4.6 Implement appropriate computing hardware and software and programming techniques in the planning and design process |
| | 4.7 Apply appropriate scientific principles to implement planning and design process |

- 4.8 Implement appropriate materials properties knowledge in the planning and design process
 - 4.9 Implement appropriate engineering methods and processes knowledge in the planning and design process
 - 4.10 Ensure implementation is appropriate and efficiently carried out in the planning and design process
- 5 Review the design and implementation plan
 - 5.1 Review the design and implementation plan to ensure conformity with current specification, contract and organisational procedures, OHS and regulatory standards, that it addresses feedback from stakeholders and meets client expectations
 - 5.2 Achieve and document client acceptance of the design
- 6 Maintain design documentation
 - 6.1 Complete all design documentation in accordance with organisational requirements
 - 6.2 Confirm planning charts are current, resource and costing records complete
- 7 Review design outcomes
 - 7.1 Review design outcomes in terms of the intended and actual use

Required Skills and Knowledge

Required knowledge includes:

- context and parameters of the planning and design process for a comprehensive range of engineering applications
- market and industrial context and parameters, such as financial, legal, resource and scheduling of the planning and design process for a significant and particular engineering application the procedures for documenting and confirming client requirements
- client requirements
- appropriate codes, standards, specifications and legislative and regulatory requirements
- implications for sustainability and options for improved environmental outcomes
- issues of sustainability and environmental impact
- constraints and risks associated with the development and implementation of the design
- the scope of the design
- sources of information on standard and innovative or creative project solutions
- issues of sustainability, environmental and/or community impact
- design parameters or constraints
- process of analysis, comparison and contrasting
- sequential and concurrent design activities
- input and effects of advice from colleagues, experts and specialists
- features of concept proposal in the context of design brief, feasibility study and expert opinion
- concept proposal review process
- human and physical resources available to carry out the design task
- the most appropriate process to develop the plan and design to meet the agreed outcomes and cost structure
- reasons for establishing and maintaining a document management process
- engineering fundamentals affecting selection of components and systems
- relevance of defined engineering activities to successful project completion and career enhancement
- reasons for using particular design approach, calculations and assumptions
- reasons for using particular hardware and software and programming technique
- reasons for considering or using particular scientific principles
- reasons for providing for particular materials properties knowledge in the implementation of the planning and design process
- reasons for providing for particular methods and processes in the implementation of the planning and design process
- graphical and documentary options
- rationale for graphics and documents raised in the context of application, project and contractual requirements
- reasons for use of elective competencies in the implementation of the planning and design process
- key aspects of the design and implementation plan in the context of current specification,

- contract and organisational procedures, OHS and regulatory standards
- effect of design team, expert input and client feedback on design and implementation plan
- procedures for gaining client endorsement and documenting client acceptance of the design solution and implementation plan
- significance of the document control process
- procedures for initiating and gaining approval for design changes
- procedures for updating issued documents
- appropriate tests and testing schedules to monitor the outcomes or performance of the project
- reasons for selecting the chosen tests and schedules
- variations in measured performance from design specifications
- corrective action to return the design outcome or project performance to specification

Required skills include:

- researching and reporting context and parameters of the planning and design process for a comprehensive range of engineering applications
- planning and designing a significant and particular engineering application within the market and industrial context and in conformance with project parameters, such as financial, legal, resource and scheduling
- documenting and confirming client requirements in accordance with organisational procedures and practices
- informing client of known OHS, regulatory, ethical, environmental, physical and cost limitations
- identifying design parameters
- establishing scope of design brief
- writing specifications to meet design requirements
- documenting and agreeing on acceptance criteria with the client
- reviewing different approaches of technical feasibility, innovation, creativity, and acceptance to client
- documenting possible design concepts
- analysing, comparing and contrasting the relative merits of possible design concepts
- documenting an objective analysis of each approach (e.g. weighted 'trade-off' table)
- organising design activities into sequential and concurrent design activities
- discussing proposals with colleagues and specialists
- clarifying creative and technical aspects of the proposals
- documenting concept proposal in accordance with organisational procedures
- establishing the design and planning team in accordance with organisational procedures
- identifying resources and establishing management procedures
- controlling documentation in accordance with established procedures
- selecting components and systems
- addressing professional indemnity and ethical issues
- negotiating, documenting and monitoring outcomes and performance measures
- developing work instructions

- monitoring and correcting project progress
- performing risk analysis and corrective action
- assumptions and calculations for implementation of the planning and design process
- preparing design diagrams and calculations
- applying scientific principles in the implementation of the planning and design process
- selecting materials
- selecting engineering methods and processes
- creating demonstration models
- confirming the design solution and plan
- authorising modifications to the engineering specification in accordance with organisational procedures
- incorporating corrections and improvements to the design
- applying OHS, environment and regulatory standards
- completing design documentation
- documenting changes to the design and implementation plan
- obtaining and reviewing feedback from the commissioning process
- monitoring the project outcomes or performance in the user's environment
- addressing deficiencies in project outcomes or performance as measured against current specifications

Evidence Guide

Overview of assessment	A person who demonstrates competency in this unit must be able to plan and design aeronautical engineering projects for a range of engineering applications. 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. 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.
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.
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 planning and design of aeronautical engineering projects or other units requiring the exercise of the skills and knowledge covered by this unit.
Guidance information for assessment	

Range Statement

Design process	Design process refers to: the consideration and identification of a problem or opportunity to improve an existing design. The conceptual process used to bring together innovation, aesthetics and functionality to plan and create an artefact, a product, a process or a system including programming and scheduling to meet an artistic or industrial requirement of an individual or group
Aeronautical engineering	Aeronautical engineering refers to: 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
Parameters	Parameters may include: - competitiveness - performance - financial - legal - resource - scheduling
Concurrent design activities	Concurrent design activities refer to: the process of involvement of all stakeholders from initial planning and design to implementation and commissioning, and may include product or project data management system with graded access privileges
OHS and environment requirements	OHS and environment requirements recognise that stakeholders in workplace activities include the workforce exposed to worksite conditions, materials and processes of the activity and the broader community exposed to environmental effects of the activity. These apply in accordance with organisational policies and statutory and regulatory requirements
Regulatory requirements	Regulatory requirements may be specified in: - Civil Aviation Regulations or Civil Aviation Safety Regulations - Australian Defence Force AAP7001.053 Technical Airworthiness Maintenance Manual - United States Federal Aviation Regulations

	• European Aviation Safety Regulations • Transport Canada CTA Rules
--	---

Unit Sector(s)

Planning

Custom Content Section

Not applicable.