



Australian Government

**Assessment Requirements for
MEAENG0001 Apply basic scientific
principles and techniques in aeronautical
engineering situations**

Release: 1

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Modification History

Release 1. Application changed. Elements and Performance Criteria changed. Foundation Skills made explicit. Range of Conditions removed, and relevant information moved to Assessment Requirements. Assessment Requirements clarified. Supersedes and is equivalent to MEA705 Apply basic scientific principles and techniques in aeronautical engineering situations.

Performance Evidence

There must be evidence the candidate has completed all the tasks outlined in the elements and performance criteria of this unit, and demonstrated the ability to apply basic scientific principles and techniques in at least two aeronautical engineering situations using any of the following relevant basic aeronautical scientific techniques and principles:

- basic hand and power tool operations
- machining
- fitting
- welding
- moulding
- fabricating
- wiring
- programming techniques.

Knowledge Evidence

There must be evidence the candidate has knowledge of:

- basic aeronautical scientific principles including applicability and limitations
- statics, including analysis and application of:
 - forces and moments of forces
 - systems of concurrent and non-concurrent forces
 - dry sliding friction
- sources of information
- quotation style requirements
- basic techniques of avionic engineering, including:
 - basic hand and power tool operations
 - machining
 - fitting
 - soldering

- welding
- moulding
- fabricating
- wiring
- programming techniques
- dynamics, including analysis and application of:
 - Newton's Laws
 - kinematics and kinetics of uniformly accelerated linear motion
 - kinematics and kinetics of uniformly accelerated rotation
 - curvilinear motion and centrifugal force
 - work, energy, power and torque
 - mechanical advantage and efficiency
- strength of materials:
 - axial tension and compression
 - direct shear
 - bolted, riveted, bonded and welded connections
 - shear in beams
 - bending stresses and bending deflections (by standard formulas only)
 - torsion
- aerodynamics:
 - Bernoulli's Theorem
 - the atmosphere
 - aerodynamic forces (lift, drag, weight and thrust)
 - stability and control (to a level not requiring the application of calculus)
 - propellers and propulsion (to a level not requiring the application of calculus)
 - aircraft performance (to a level not requiring the application of calculus)
- fluid mechanics:
 - properties of fluids, including mineral and synthetic hydraulic fluids
 - fluid statics, Archimedes' Principle and Pascal's Principle
 - fluid flow – continuity and energy conservation
 - fluid power – pumps
- thermodynamics:
 - heat transfer principles (conduction, convection and radiation)
 - perfect gas laws
 - kinetic theory of gases
 - laws of thermodynamics
- control concepts including closed and open loop control
- electricity and electronics:
 - basic electrical concepts
 - Ohm's Law

- Kirchoff's Current and Voltage Laws
- basic direct current (DC) circuits
- basic power supply, transformer, rectifier, filter and regulator
- programmable logic controller (PLC) concepts – I/O, timing, counting, programming
- electronic devices (discrete) – resistors, diodes, capacitors, inductors, transistors and rectifiers
- microprocessor concepts
- light, sound and vibration:
 - wave behaviour – standing vs travelling waves, transverse and longitudinal
 - light – reflection, absorption, refraction, diffraction, spectrum, infrared, visible, ultraviolet, transmission medium and engineering applications
 - sound – pitch, frequency, intensity (power), decibel scale, 'noise dose', spectrum, infrasound, audible, ultrasound, speed, natural frequency, resonance, transmission medium and engineering applications
 - vibration – sources, balancing, shaft alignment, measurement, damping and engineering applications
- basic aeronautical techniques and related technologies, software and hardware associated with implementing scientific principles in aeronautical engineering solutions
- the applicability and limitations of basic aeronautical techniques and associated technologies, software and hardware
- calculations, including when to use
- fundamental and derived quantities
- common systems of units
- common prefixes used with units and their values
- the concept of significant figures
- the uncertainty of computations based on experimental data
- procedures for:
 - researching and reporting
 - converting between systems of units
 - carrying out dimensional analysis
 - determining the significance of figures in calculations
 - for estimating errors in derived quantities.

Assessment Conditions

The following conditions of assessment represent the requirements of the regulators Defence Aviation Safety Authority (DASA) and Civil Aviation Safety Authority (CASA) and maintenance stakeholders and must be rigorously observed.

Skills must have been demonstrated under routine supervision in the workplace or in a simulated environment that reflects workplace conditions and contingencies encountered in aeronautical engineering situations. The following conditions must be met for this unit:

- use of suitable facilities, equipment and resources, including workplace procedures, manufacturing specifications, codes, standards, manuals, and reference materials relevant to aeronautical engineering situations.

Evidence of tasks demonstrating competency must be recorded in a log of industrial experience and achievement.

Assessors must satisfy the NVR/AQTF mandatory competency requirements for assessors.

Links

Companion Volume Implementation Guides are found in VETNet -

<https://vetnet.education.gov.au/Pages/TrainingDocs.aspx?q=ce216c9c-04d5-4b3b-9bcf-4e81d0950371>