



Australian Government

**Assessment Requirements for
MEAENG0002 Apply basic scientific
principles and techniques in avionic
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 MEA706 Apply basic scientific principles and techniques in avionic engineering situations.

Performance Evidence

There must be evidence the candidate has completed the tasks outlined in the elements and performance criteria of this unit and demonstrated the ability to apply basic scientific principles and techniques in design, manufacturing, commissioning and maintenance-related tasks and projects on at least one of the following avionic systems and equipment:

- electrical systems and related wiring and components (power generation, distribution, control interfaces with hydraulic and pneumatic systems, and caution and warning systems)
- mechanical and electro-mechanical flight instruments and indication systems (quantity, pressure, temperature and position) and components
- electronic systems and components (communications, radio navigation, pulse, display, automatic flight control, flight management and engine management)
- automatic test stations, adapters and software
- apply and manipulate appropriate formulas for applications involving engineering calculations
- apply appropriate calculations to engineering situations
- check the validity of equations using dimensional analysis
- quoting solutions in appropriate units, using appropriate significant figures
- quoting limitations of solutions, due to assumptions, scientific principles and techniques used
- presenting solutions referring to the original aim of the application.

Knowledge Evidence

There must be evidence the candidate has knowledge of:

- sources of information, including:
 - reference texts
 - manufacturer catalogues and industry magazines
 - international aerospace organisation publications
 - websites
 - use of phone, email and fax information gathering

- quotation style requirements
- basic techniques of avionic engineering, including:
 - basic hand and power tool operations
 - machining
 - fitting
 - soldering
 - welding
 - moulding
 - fabricating
 - wiring
 - programming techniques
- physics for electronics:
 - units and measurements
 - magnetic force
 - vectors
 - electric fields and potential
 - electric current and resistance
 - capacitance
 - work, power and energy
- analogue electronics:
 - negative feedback amplifiers
 - differential amplifiers
 - operational amplifiers
 - amplifier frequency response
 - thermal circuits/heat exchangers
 - active filters
 - fault-finding
- digital electronics:
 - characteristics of digital systems
 - number systems
 - Boolean algebra
 - logic circuits
 - logic families
 - construction and testing techniques
 - flip flop circuits
 - analogue to digital conversion
 - digital to analogue conversion
 - timing and control
 - combinational logic circuits
- circuit theory:

- Kirchhoff's Current and Voltage Laws
- Thevenin's Network Theorem
- Norton's Network Theorem
- Superposition Network Theorem
- inductance, capacitance and resistance (LCR) series circuit analysis
- LCR parallel circuit analysis
- series and parallel resonance
- electrical systems:
 - direct current (DC) and alternating current (AC) circuit design principles
 - generators and motors
 - inverters
 - power supply, transformer, rectifier, filter and regulator
 - solenoids
 - circuit protection
 - wiring cables and looms
- 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)
- thermodynamics – heat transfer principles (conduction, convection and radiation)
- instruments:
 - airspeed measurement
 - altitude measurement
 - attitude indication
 - measurement of quantity, flow, temperature, pressure and position
- control concepts and data communications:
 - servo and synchronous systems and components
 - data communication definitions and terminology
- communications:
 - radio transmission and modulation
 - radio reception
 - microphones, amplifiers and speakers
 - transmission lines and antennas
- pulse:
 - antennas
 - waveguides
 - transmitters/receivers
 - displays
- light, sound and vibration:

- wave behaviour – standing versus travelling waves, transverse and longitudinal
- light – reflection, absorption, refraction, diffraction, spectrum, infrared, visible, ultraviolet (UV), 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
- calculations, including when to use
- fundamental and derived quantities
- the concept of significant figures
- the uncertainty of computations based on experimental data
- procedures for:
 - carrying out dimensional analysis
 - determining the significance of figures in calculations
 - estimating errors in derived quantities
 - researching and reporting.

Assessment Conditions

The following conditions of assessment represent the requirements of the regulators (DASA and 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 avionic engineering situations. The following conditions must be met for this unit:

- use of suitable facilities, equipment and resources.

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>