



**Australian Government**

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

**Release: 1**

# Assessment Requirements for MEA706 Apply basic scientific principles and techniques in avionic engineering situations

## Modification History

Release 1 - New unit of competency

## Performance Evidence

Evidence required to demonstrate competency in this unit must be relevant to and satisfy all of the requirements of the elements and performance criteria under the specified conditions of assessment, and must include:

- selecting appropriate basic avionic scientific principles to suit specific applications
- selecting appropriate basic avionic techniques and associated technologies, software and hardware to suit specific applications
- applying basic avionic scientific principles to particular engineering situations
- applying and manipulating appropriate formulas for applications involving engineering calculations
- applying appropriate calculations to engineering situations
- checking the validity of equations using dimensional analysis
- applying basic avionic techniques and associated technologies, software and hardware in a manner appropriate to the application and identified scientific principles
- referring solutions to the original aim of the application
- 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

Evidence required to demonstrate competency in this unit must be relevant to and satisfy all of the requirements of the elements and performance criteria and include knowledge of:

- 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:
  - DC and 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 vs 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
- appropriateness of calculations
- fundamental and derived quantities
- the procedure for carrying out dimensional analysis
- the concept of significant figures
- the uncertainty of computations based on experimental data
- the procedures for determining the significance of figures in calculations
- the procedures for estimating errors in derived quantities.

## **Assessment Conditions**

- 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 a simulated working environment must be used that reflects realistic workplace situations and conditions.

- The competencies covered by this unit would be demonstrated by an individual working alone or as part of a team.
- Where applicable, reasonable adjustment must be made to work environments and training situations to accommodate ethnicity, age, gender, demographics and disability.
- Assessment methods must be by direct observation of tasks and include questioning on underpinning knowledge to ensure its correct interpretation and application.
- Assessment may be applied under project related conditions (real or simulated) and require evidence of process.
- Assessment must confirm a reasonable inference that competency is able not only to be satisfied under the particular circumstance, but is able to be transferred to other circumstances.
- Assessors must be satisfied that the candidate can competently and consistently:
  - identify and explain the application of basic scientific principles and engineering techniques to avionic engineering situations
  - for given avionic engineering situations, identify and apply the relevant basic scientific principles and techniques
  - perform necessary calculations using appropriate applications and evaluate solutions
  - document appropriately the outcome of application of basic scientific principles and techniques to given avionic engineering situations.
- Assessment may be in conjunction with assessment of other units of competency where required.
- Assessors must satisfy the requirements of the National Vocational Education and Training Regulator (Australian Skills Quality Authority, or its successors).

## Links

Companion Volume implementation guides are found in VETNet -

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