



**Australian Government**

**Assessment Requirements for UEERA0019  
Design complex control systems for  
refrigeration or heating, ventilation, air  
conditioning systems**

**Release: 1**

# Assessment Requirements for UEERA0019 Design complex control systems for refrigeration or heating, ventilation, air conditioning systems

## Modification History

Release 1. This is the first release of this unit of competency in the UEE Electrotechnology Training Package.

## Performance Evidence

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements, performance criteria and range of conditions on at least one occasion and include:

- developing outlines of alternative designs
- developing the design within the safety, regulatory, functional requirements and budget limitations
- documenting and presenting design effectively
- negotiating design alteration requests successfully
- obtaining approval for final design
- dealing with unplanned events
- applying relevant work health and safety (WHS)/occupational health and safety (WHS/OHS) requirements, including using risk control measures
- designing complex heating, ventilation and air conditioning/refrigeration (HVAC/R) control systems
- preparing to design complex HVAC/R control systems.

## Knowledge Evidence

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

- complex HVAC/R control system design, safe working practices and relevant standards, codes and regulations, including:
  - advanced HVAC/R control system design:
    - control diagrams:
      - Australian standard and non-standard symbols as used in a variety of typical HVAC/R systems
      - control diagrams
      - electric/electronic control diagrams
      - electrical installation documents

- pneumatic diagrams
- direct digital control (DDC) diagrams
- controls/electrical power circuit interface
- nomographs
- extraction of specific information relating to the operation and control of plant from a variety of typical HVAC/R control diagrams
- development of control diagrams to required standards given specific system operating parameters
- control design requirements:
  - standard and statutory requirements
  - economy of operation (energy management)
  - the desired or most appropriate system operating logic for a specified HVAC/R system
  - appropriate mode of control for a specified HVAC/R system
  - control system type selection for specific applications with due regard to plant size, application, operating environment, available control power supply options, economy and computability to existing or proposed plant and control system
  - components required to assemble and operate the control system of a specified HVAC/R system
- HVAC/R system energy conservation methods:
  - HVAC/R system control:
    - night cycle
    - optimum stop/start
    - purge cycles
    - chiller/boiler/cooling tower sequencing
    - economy cycles (based on temperature or enthalpy)
    - supply air reset
    - condenser water temperature reset
  - electrical load control:
    - power demand control
    - load limiting
    - load shedding
    - set point relaxation
    - ventilation cycles
- building management systems:
  - functions of a building management system:
    - autonomous functions
    - input/output (I/O)
    - general I/O
    - installation management items
    - energy management

- risk management
- information processing
- objectives
- building running costs
- smoke control as per AS 1668.1 The use of ventilation and air conditioning in buildings - Fire and smoke control in buildings
- building management system hardware:
  - system architecture
  - communication devices
  - substations
  - personal computers
  - interfaces with other systems
- I/O functions:
  - digital - I/O
  - digital output with status feedback
  - analogue input/output
  - sensors
  - alarms
- control sequences
- problem-solving techniques
- relevant job safety assessments or risk mitigation processes
- relevant manufacturer specifications
- relevant WHS/OHS legislated requirements
- relevant workplace budget, quality, policies and procedures
- relevant workplace documentation.

## Assessment Conditions

Assessors must hold credentials specified within the Standards for Registered Training Organisations current at the time of assessment.

Assessment must satisfy the Principles of Assessment and Rules of Evidence and all regulatory requirements included within the Standards for Registered Training Organisations current at the time of assessment.

Assessment must occur in suitable workplace operational situations where it is appropriate to do so; where this is not appropriate, assessment must occur in simulated suitable workplace operational situations that replicate workplace conditions.

Assessment processes and techniques must be appropriate to the language, literacy and numeracy requirements of the work being performed and the needs of the candidate.

Resources for assessment must include access to:

- a range of relevant exercises, case studies and/or simulations
- relevant and appropriate materials, tools, facilities and equipment currently used in industry

- applicable documentation, including workplace procedures, equipment specifications, regulations, codes of practice and operation manuals.

## **Links**

Companion Volume implementation guides are found in VETNet - -

<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=b8a8f136-5421-4ce1-92e0-2b50341431b6>