



Australian Government

UEEIC0007 Design and use advanced programming tools, PC networks and HMI Interfacing

Release: 1

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Modification History

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

Application

This unit involves the skills and knowledge required to design and use advanced programming tools, personal computer (PC) networks and human-machine interface (HMI) in the design of computer applications for control processes.

It includes preparing, developing and obtaining design approval for computer applications by designing control systems, programmable logic controllers (PLCs), and supervisory control and data acquisition (SCADA) systems.

It also includes control programming methods, developing alternative design schemes based on design brief and customer relations and documenting design.

No licensing, legislative or certification requirements apply to this unit at the time of publication.

Pre-requisite Unit

Not applicable

Competency Field

Instrumentation & Control

Unit Sector

Electrotechnology

Elements and Performance Criteria

ELEMENTS

Elements describe the essential outcomes.

1 Prepare to design

PERFORMANCE CRITERIA

Performance criteria describe the performance needed to demonstrate achievement of the element.

- 1.1** Work health and safety (WHS)/occupational health and safety (OHS) processes and workplace procedures for a

computer applications	given work area are identified, obtained and applied
	1.2 Hazards are identified, WHS/OHS risks assessed, and control measures and workplace procedures are implemented in preparation for work
	1.3 Scope of proposed control system is determined from the design brief and in consultation with relevant person/s
	1.4 Design development work is planned to meet scheduled design brief timelines in consultation with person/s involved on the worksite
2 Develop computer applications design for control process	2.1 Control devices, control systems and control programming methods are applied to the computer applications design
	2.2 Alternative concepts for the design are tested in accordance with the requirements outlined in the design brief
	2.3 Safety specifications and budget constraints are considered in the design process
	2.4 System design draft is checked for compliance with the design brief, relevant industry standards and regulatory requirements
	2.5 System design is documented for submission to relevant person/s for approval
	2.6 Solutions to unplanned situation are dealt with in a manner that minimises risk to personnel and equipment in accordance with workplace policies and procedures
3 Obtain design approval for computer applications	3.1 System design is presented and explained to client representative and/or relevant person/s
	3.2 Requests for alterations to design are negotiated with relevant person/s in accordance with workplace policy
	3.3 Final design is documented and approval obtained from relevant person/s
	3.4 Quality of work is monitored in accordance with performance agreement/specifications and/or workplace procedures or industry standards

Foundation Skills

Foundation skills essential to performance are explicit in the performance criteria of this unit of competency.

Range of Conditions

Range is restricted to essential operating conditions and any other variables essential to the work environment.

Non-essential conditions may be found in the Companion Volume Implementation Guide.

Designing a computer-based control system must include at least two of the following:

- configure and test a PLC peer to peer network
- configure and test a PLC hierarchical network
- configure and test a PLC field bus style network
- develop PLC code using a structured text programming tool
- develop PLC code using a sequential function chart programming tool
- design a simple HMI interface using a typical touch screen device
- use system diagnostics to fault find hardware/software issues
- program and test a proportional integral derivative (PID) functional control/program block

Unit Mapping Information

This unit replaces and is equivalent to UEENEEI154A Design and use advanced programming tools PC networks and HMI Interfacing.

Links

Companion Volume implementation guides are found in VETNet - -

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

Assessment Requirements for UEEIC0007 Design and use advanced programming tools, PC networks and HMI Interfacing

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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 two separate occasions and include:

- applying relevant work health and safety (WHS)/occupational health and safety (OHS) requirements
- designing a programmable logic controller (PLC) computer-based control system
- dealing with unplanned situations in accordance with workplace procedures in a manner that minimises risk to personnel and equipment
- developing computer applications design
- obtaining design approval for computer applications
- planning and preparing to design of computer application for control processes
- testing design concepts by real or virtual prototyping, where it cannot be shown easily by other means, and confirming that particular aspects of the design meet specified requirements.

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:

- alternative/enhancing programming methods
- bus monitor, including capturing and filtering
- communications methods and requirements, including:
 - common protocols and interface standards
 - communication mediums
 - network types and topologies
 - peer to peer networks
 - remote input/output (I/O)
 - requirements when networking/interfacing PLCs
- high-speed ethernet specification/requirements
- intelligent terminals/graphic interfaces installation and communication requirements

- proportional integral derivative (PID) computer-based control system and system applications
- relevant manufacturer specifications
- relevant job safety assessments or risk mitigation processes
- relevant specialist instructions, including interrupt driven applications, high-speed counters and positional encoders
- relevant WHS/OHS legislated requirements
- relevant workplace documentation
- relevant workplace policies and procedures
- system diagnostics techniques.

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
- resources that reflect current industry practices in relation to design a computer-based control system
- applicable documentation, including workplace procedures, equipment specifications, regulations, codes of practice and operation manuals.

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