

<b>Title</b>	<b>Demonstrate and apply intermediate knowledge of programming techniques for electrotechnology</b>		
<b>Level</b>	<b>5</b>	<b>Credits</b>	<b>15</b>

<b>Purpose</b>	<p>This unit standard covers intermediate programming knowledge which forms the basis for further in-depth study of computer related disciplines for electrotechnology engineering.</p> <p>People credited with this unit standard are able to:</p> <ul style="list-style-type: none"> <li>– use a modern IDE for program development;</li> <li>– evaluate and use software development tools and techniques; and</li> <li>– develop a software solution for an engineering application using software programming techniques.</li> </ul>
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<b>Classification</b>	Electronic Engineering > Computer Engineering
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<b>Available grade</b>	Achieved
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<b>Prerequisites</b>	Unit 22715, <i>Use personal computer software to demonstrate computer programming concepts for electrotechnology</i> ; or demonstrate equivalent knowledge and skills.
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### Guidance Information

- 1 This unit standard is intended for use in engineering courses at diploma level.
- 2 This unit standard is one of three designed to cover skill and knowledge of programming techniques for electrotechnology engineering, the others being Unit 22715, *Use personal computer software to demonstrate computer programming concepts for electrotechnology*; and Unit 16981, *Demonstrate and apply advanced knowledge of programming techniques for electrotechnology*.
- 3 References  
 IEEE STD 1016-2009 - *IEEE Standard for Information Technology--Systems Design--Software Design Descriptions*;  
 ISO/IEC 8631:1989 *Information technology – Program constructs and conventions for their representation*;  
 and all subsequent amendments and replacements.
- 4 Definitions  
*IDE* – integrated development environment.  
*Industry practice* – practice used and recommended by organisations involved in the electrotechnology industry.

*Intermediate knowledge* – means employing a broad knowledge base, with substantial depth in some areas of the subject matter, to analyse and interpret a wide range of information.

- 5 Applications may include but are not limited to an electrotechnology engineering task specific calculator so designed that when an operator inputs at least three parameters the programme calculates and displays the result, and logs the parameters and result to a file on a disk. It should also include a simple input and display from a sensor via serial port or USB with upper and lower alarms.
- 6 All measurements are to be expressed in Système International (SI) units, and, where required, converted from Imperial units into SI units.
- 7 All activities must comply with: any policies, procedures, and requirements of the organisations involved; the standards of relevant professional bodies; and any relevant legislative and/or regulatory requirements.
- 8 Range
  - a performance in relation to the outcomes of this unit standard must comply with the Health and Safety at Work Act 2015;
  - b laboratory and workshop safety practices are to be observed at all times.

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## Outcomes and performance criteria

### Outcome 1

Use a modern IDE for program development.

#### Performance criteria

- 1.1 Program constructs are identified in existing design documents.

Range any commonly recognised method or standard that may include but is not limited to – ISO/IEC 8631:1989, ANSI/IEEE Std 1016-2009.
- 1.2 Software design documents for an engineering application are created from written specifications.

Range functions, input and output requirements, subroutines.

### Outcome 2

Evaluate and use software development tools and techniques.

#### Performance criteria

- 2.1 Software development tools and techniques are evaluated and used to produce a software application to a given specification in accordance with industry practice.

Range may include but is not limited to – loops, interrupts, control flow, lookup tables;  
specification to include at least three of – loops, interrupts, control flow, lookup tables.

### Outcome 3

Develop a software solution for an engineering application using software programming techniques.

Range software programming techniques – use of data structures, pointers, parameter passing methods, text files, interrupts.

### Performance criteria

3.1 Techniques are applied to a given software specification in accordance with industry practice.

Range object orientated, structured.

3.2 Software design is coded in accordance with industry practice to produce an executable program, debugged, and verified to meet given specification.

3.3 The software is documented in accordance with industry practice.

Range may include but is not limited to – in-line comments, subroutine descriptions, program flow.

**This unit standard is expiring. Assessment against this standard must take place by the last date for assessment set out below.**

### Status information and last date for assessment for superseded versions

Process	Version	Date	Last Date for Assessment
Registration	1	18 December 2006	31 December 2021
Rollover and Revision	2	28 June 2018	31 December 2021
Review	3	28 January 2021	31 December 2021

### Consent and Moderation Requirements (CMR) reference

0003

This CMR can be accessed at <http://www.nzqa.govt.nz/framework/search/index.do>.