

Title	Demonstrate and apply intermediate knowledge of electronic engineering		
Level	5	Credits	15

Purpose	<p>This unit standard covers knowledge of the analysis of analogue circuits and the use of simulation programs to determine circuit performance.</p> <p>People credited with this unit standard are able to:</p> <ul style="list-style-type: none"> - demonstrate knowledge of first order single resistor RC low and high pass filters; - demonstrate knowledge of the principles of operational amplifiers as applied to the design of practical circuits; - demonstrate knowledge of DAC and ADC circuits; - explain the principles of switching regulators; and - demonstrate knowledge of active filters.
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Classification	Electronic Engineering > Core Electronics
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Available grade	Achieved
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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 knowledge of electronic engineering, the others being Unit 22726, *Demonstrate and apply introductory knowledge of electronic engineering*, and Unit 11572, *Demonstrate and apply knowledge of electronic signal technology engineering*. It is recommended that competency in unit standard 22726 be achieved before assessment against this unit standard is attempted, or equivalent knowledge and skills demonstrated. It is also recommended that competency in this unit standard be achieved before assessment against unit standard 11572 is attempted.
- 3 Reference
Health and Safety in Employment Act 1992;
and all subsequent amendments and replacements.
- 4 Definitions
ADC – analogue-to-digital converter.
C – capacitance.
DAC – digital-to-analogue converter.
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.

R – resistance.

- 5 All measurements are to be expressed in Système International (SI) units, and, where required, converted from Imperial units into SI units.
- 6 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.
- 7 Range
 - a performance in relation to the elements of this unit standard must comply with the Health and Safety in Employment Act 1992;
 - b laboratory and workshop safety practices are to be observed at all times.

Outcomes and performance criteria

Outcome 1

Demonstrate knowledge of first order single resistor RC low and high pass filters.

Performance criteria

- 1.1 First order RC low and high pass filters are identified, analysed, and component calculations are performed in accordance with industry practice.

Outcome 2

Demonstrate knowledge of the principles of operational amplifiers as applied to the design of practical circuits.

Performance criteria

- 2.1 Open loop operational amplifier parameters and associated errors are explained in accordance with industry practice.
- 2.2 Practical operational amplifier circuits are analysed and designed in accordance with industry practice.

Range evidence of at least three operational amplifiers is required.

Outcome 3

Demonstrate knowledge of DAC and ADC circuits.

Performance criteria

3.1 DAC and ADC operation and applications are described in accordance with industry practice.

Range evidence of at least one DAC and three ADCs is required.

Outcome 4

Explain the principles of switching regulators.

Performance criteria

4.1 Step-up and step-down switching regulator concepts, operation, and applications are explained in accordance with industry practice.

Range evidence of at least three applications is required.

Outcome 5

Demonstrate knowledge of active filters.

Performance criteria

5.1 Active filter concepts, operation, and applications are described in accordance with industry practice.

This unit standard is expiring. Assessment against the 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	27 April 2000	31 December 2024
Review	2	18 December 2006	31 December 2024
Review	3	24 August 2023	31 December 2024

Consent and Moderation Requirements (CMR) reference

0003

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