

# Draft National Unit Specification



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**Unit title:** Circuit Design (National 5)

**SCQF:** level 5 (6 SCQF credit points)

**Unit code:** to be advised

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## Unit outline

The general aim of this Unit is to develop a basic understanding of key electrical and electronic components, and how they can be combined into simple electronic circuits. Learners will analyse electronic problems and design solutions to these problems. In addition, learners will explore some aspects of the impact of electronics on society and the environment.

Learners who complete this Unit will be able to:

- 1 Design a range of digital electronic circuits
- 2 Design a range of analogue electronic circuits
- 3 Describe aspects of the impact of electronics

This Unit is a mandatory Unit of the Practical Electronics (National 5) Course and is also available as a free-standing Unit. The Unit Specification should be read in conjunction with the *Unit Support Notes*, which provides advice and guidance on delivery, assessment approaches and development of skills for learning, skills for life and skills for work. Exemplification of the standards in this Unit is given in the *National Assessment Resource*.

## Recommended entry

Entry to this Unit is at the discretion of the centre. However, learners would normally be expected to have attained the skills, knowledge and understanding required by one or more of the following or equivalent qualifications and/or experience:

- ◆ Circuit Design (National 4)
- ◆ Numeracy (SCQF level 3)

In terms of prior learning and experience, relevant experiences and outcomes may also provide an appropriate basis for doing this Unit. Further information on relevant experiences and outcomes will be given in the *Unit Support Notes*.

## Equality and inclusion

This Unit Specification has been designed to ensure that there are no unnecessary barriers to learning or assessment. The individual needs of learners should be taken into account

when planning learning experiences, selecting assessment methods or considering alternative evidence. For further information please refer to the *Unit Support Notes*.

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# Standards

## Outcomes and assessment standards

### Outcome 1

The learner will:

#### 1 Design a range of digital electronic circuits by:

- 1.1 Analysing problems requiring electronic solutions
- 1.2 Using multi-input combinational logic involving AND, OR, NOT, NAND, XOR and NOR
- 1.3 Combining components and/or sub-systems into complete circuit designs
- 1.4 Describing accurately how a range of familiar and less familiar digital circuits work, using appropriate terminology

### Outcome 2

The learner will:

#### 2 Design a range of analogue electronic circuits by:

- 2.1 Analysing problems requiring electronic solutions
- 2.2 Identifying required common input, process and output devices and their symbols
- 2.3 Combining components and/or sub-systems into complete simple circuit designs
- 2.4 Describing how a range of familiar and less familiar analogue circuits work, using terminology, including current, voltage, resistance, power and capacitance appropriately
- 2.5 Carrying out using simple calculations involving given formulae

For Outcomes 1 and 2, devices should include resistors, LEDs, diodes, capacitors, transistors, switches and some integrated circuits. Typical circuits should involve a power supply, multiple input devices, processing and more than one output devices.

### Outcome 3

The learner will:

#### 3 Describe aspects of the impact of electronics by:

- 3.1 Describing recycling pathways for electronic devices
- 3.2 Investigating and reporting on the social, environmental and economic impact of the increasing use and miniaturisation of electronic devices

## Evidence Requirements for the Unit

Assessors should use their professional judgement, subject knowledge and experience, and understanding of their learners, to determine the most appropriate ways to generate evidence and the conditions and contexts in which they are used.

For this Unit, learners will be required to demonstrate technological skills, knowledge and understanding in the context of designing electronic circuits. Evidence of Outcomes may take many forms, including oral or written evidence, or may be demonstrated by carrying out practical tasks which require relevant knowledge and understanding.

Exemplification of assessment will be provided in the *National Assessment Resource*. Advice and guidance on possible approaches to assessment is provided in the *Unit Support Notes*.

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## Development of skills for learning, skills for life and skills for work

It is expected that learners will develop broad, generic skills through this Unit. The skills that learners will be expected to improve on and develop through the Unit are based on SQA's *Skills Framework: Skills for Learning, Skills for Life and Skills for Work* and drawn from the main skills areas listed below. These must be built into the Unit where there are appropriate opportunities.

### 2 Numeracy

2.3 Information handling

### 5 Thinking skills

5.2 Understanding

5.3 Applying

Amplification of these is given in SQA's *Skills Framework: Skills for Learning, Skills for Life and Skills for Work*. The level of these skills should be at the same SCQF level of the Unit and be consistent with the SCQF level descriptor. Further information on building in skills for learning, skills for life and skills for work is given in the *Unit Support Notes*.

## Administrative information



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**Published:** August 2011 (draft version 1.0)

**Superclass:** to be advised

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### History of changes

Version	Description of change	Authorised by	Date

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Note: readers are advised to check SQA's website: [www.sqa.org.uk](http://www.sqa.org.uk) to ensure they are using the most up-to-date version of the Unit Specification.