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## Developing an Electronic Solution (National 4)

**SCQF:** level 4 (6 SCQF credit points)

**Unit code:** H25N 74

### Unit outline

This is the Added Value Unit in the Practical Electronics (National 4) Course. The general aim of this Unit is to enable the learner to provide evidence of added value for the Practical Electronics (National 4) Course through the successful completion of a practical activity which will allow the learner to demonstrate challenge and application.

Learners who complete this Unit will be able to:

- 1 Develop, with guidance, an electronic solution which will draw on and apply skills and knowledge of designing, simulating and constructing electronic circuits

This Unit is a mandatory Unit of the Practical Electronics (National 4) Course and is also available as a free-standing Unit. The Unit Specification should be read in conjunction with the *Course Support Notes*, which provide advice and guidance on delivery and assessment approaches. Exemplification of the standards in this Unit is given in *Unit Assessment Support*.

### Recommended entry

Entry to this Unit is at the discretion of the centre. It is recommended that the learner should be in the process of completing, or have completed, the Units of the Practical Electronics (National 4) Course:

- ◆ Practical Electronics: Circuit Design (National 4)
- ◆ Practical Electronics: Circuit Simulation (National 4)
- ◆ Practical Electronics: Circuit Construction (National 4)

## **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 *Course Support Notes*.

# Standards

## Outcomes and assessment standards

### Outcome 1

The learner will:

- 1 Develop, with guidance, an electronic solution which will draw on and apply skills and knowledge of designing, simulating and constructing electronic circuits by:**
  - 1.1 Analysing a straightforward problem specification
  - 1.2 Designing an electronic solution to the problem
  - 1.3 Constructing an electronic solution to the problem
  - 1.4 Applying safe working practices
  - 1.5 Testing and reporting on the solution to the problem

### Evidence Requirements for the Unit

This Unit will be assessed through controlled assessment which meets the Evidence Requirements below.

The assessment method for this Unit will be a practical activity in which the learner will draw on and apply skills and knowledge related to designing, simulating and constructing electronic circuits.

The practical activity will assess learners' skills in analysing a problem, designing a solution to the problem, simulating or constructing a solution to the problem, and testing and reporting on that solution.

The practical activity is:

- ◆ set by centres within the SQA guidelines described below
- ◆ conducted under some supervision and control

Evidence will be internally marked by centre staff in line with SQA guidelines.

All assessment is subject to quality assurance SQA.

#### Setting the assessment

The practical activity will be set by centres within the following guidelines:

- ◆ The specification for the practical activity will be agreed between the learner and the teacher/lecturer.
- ◆ The practical activity should clearly demonstrate application of knowledge and skills, at an appropriate level, related to designing, simulating and constructing electronic circuits (as defined in the 'Further mandatory information on Course coverage' section of this document).
- ◆ The teacher/lecturer will provide overall guidelines for the activity and a list of questions/tasks/prompts which will lead learners through the activity in clear stages.

## **Conducting the assessment**

The practical activity will be conducted under some supervision and control. This will take the form of the following:

- ◆ The activity will be carried out under supervised open book conditions.
- ◆ The teacher/lecturer may also give learners some support and guidance, as appropriate to National 4 level, to help them progress through each stage of the assignment. The amount of support provided should be reflected in the assessment judgement.

## **Judging the evidence**

Evidence will be internally marked and verified by centre staff in line with SQA guidelines.

All assessment is subject to quality assurance by SQA.

Evidence should include:

- ◆ the completed solution
- ◆ a record of progress through the assignment (such as an informal log or blog produced by the learner)
- ◆ a short report on the testing of the solution (in written, electronic and/or oral form)

## **Re-assessment**

In relation to Unit assessment, SQA's guidance on reassessment for Units applies.

Further information is provided in the exemplification of assessment in *Unit Assessment Support*. Advice and guidance on possible approaches to assessment is provided in the *Course Support Notes*.

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

Please refer to the *Course Specification* for information about skills for learning, skills for life and skills for work.

## Further mandatory information on Course coverage for the Practical Electronics (National 4) Course

The following gives details of mandatory skills, knowledge and understanding for the Practical Electronics (National 4) Course. Assessment of this Added Value Unit will involve selecting appropriate skills, knowledge and understanding from those listed below, in line with the Evidence Requirements above. This list of skills, knowledge and understanding also provides the basis for the assessment of all the Units in the Course.

<b>Components and concepts</b>	
Concepts	current, voltage and resistance analogue/digital
Components	power supplies resistors (including variable) LEDs, diodes, lamps capacitors, transistors, switches connectors and wires ICs (logic gates, 555 timer)
Combinational logic	AND, OR and NOT
Devices	<b>Input devices</b> , including LDR, thermistor and switch <b>Process devices</b> , including transistor switch and logic gates <b>Output devices</b> , including lamp, LED, motor and buzzer Voltage dividers
Circuit complexity	<b>Minimum of two inputs, one output</b>

<b>Circuit Construction</b>	
Construction methods	use of prototype board, strip board and PCB
Wiring and assembly techniques	crimp connections, terminal block heat shrink, spiral wrap cable ties, markers stripping and connecting bundling and fixing
Safe working practices	safe use of tools including soldering irons eye protection

# Administrative information

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**Superclass:** XL

## 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.

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