

Practical Electronics: Circuit Design

SCQF: level 5 (6 SCQF credit points)

Unit code: J2CM 75

Unit outline

The general aim of this Unit is to develop an understanding of key electrical and electronic components, and how they can be combined into 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 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 Unit Assessment Support..

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:

- ◆ Practical Electronics: Circuit Design (National 4)
- ◆ Numeracy (National 3)

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.

Standards

Outcomes and assessment standards

Outcome 1

The learner will:

- 1 Design a range of digital electronic circuits by:**
 - 1.1 Analysing problems requiring digital 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 analogue 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 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 some social, environmental and economic impacts 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 is provided in the Unit Assessment Support. Advice and guidance on possible approaches to assessment is provided in the Unit Support Notes.

Assessment standard thresholds

If a candidate successfully meets the requirements of the specified number of Assessment Standards they will be judged to have passed the Unit overall and no further re-assessment will be required.

The specific requirements for this Unit is as follows:

- ◆ 8 out of 11 Assessment Standards must be achieved.

It should be noted that there will still be the requirement for candidates to be given the opportunity to meet all Assessment Standards. The above threshold has been put in place to reduce the volume of re-assessment where that is required.

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

Published: July 2019 (version 2.0)

Superclass: XL

History of changes to National Unit Specification

Version	Description of change	Authorised by	Date
2.0	Unit code updated	Qualifications Manager	July 2019

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