Draft
National Unit Specification

Unit title: Engineering: Contexts and Challenges (National 4)

SCQF: level 4 (6 SCQF credit points)

Unit code: to be advised

Unit outline

The general aim of this Unit is to develop a basic understanding of engineering, and its role and impact on our society and environment. Learners will, with guidance, analyse and explore straightforward engineering problems and solutions, involving some existing and emerging technologies, and consider implications relating to the environment, sustainable development, and to ethical, economic and social issues.

Learners who complete this Unit will be able to:

1 Investigate straightforward engineering systems, problems and solutions
2 Investigate engineering challenges and relate these to key engineering facts and ideas
3 Describe, in simple terms, some aspects of the benefits of engineering

This Unit is a mandatory Unit of the Engineering Science (National 4) 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*.

The Added Value Unit Specification for the Engineering Science (National 4) Course gives further mandatory information on Course coverage for learners taking this Unit as part of the Engineering Science (National 4) Course.

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:

- Access 3 Numeracy

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.*

Draft

Standards

Outcomes and assessment standards

Outcome 1

The learner will:

1 Investigate straightforward engineering systems, problems and solutions by:

1.1 Describing, using the systems approach, how some simple engineered objects work
1.2 Identifying main sub-systems of engineered objects
1.3 Producing system diagrams to show main sub-systems
1.4 Identifying basic energy transfers related to engineered objects

Outcome 2

The learner will:

2 Investigate engineering challenges and relate these to key engineering facts and ideas by:

2.1 Describing examples of applications of environmental, civil, structural, mechanical, electrical and electronic engineering
2.2 Describing, in simple terms, examples of the varied roles of engineers in designing, implementing, testing and controlling complex systems
2.3 Modelling some aspect of a simple engineering system

Outcome 3

The learner will:

3 Describe, in simple terms, some aspects of the benefits of engineering by:

3.1 Describing examples of social and economic benefits of engineering
3.2 Describing examples of environmental benefits of engineering
3.3 Describing simply some ways in which engineering solutions contribute to tackling climate change

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 a range of appropriate engineering contexts and challenges.

Evidence of Outcomes may take many forms, including oral or written evidence, or may be demonstrated by carrying out practical tasks. Evidence of Outcomes and assessment standards may be generated during one or more activities.

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.*

Draft

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

4 Employability, enterprise and citizenship

4.2 Information and communication technology (ICT)

5 Thinking skills

5.1 Remembering
5.2 Understanding

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.*

Draft

Administrative information

Published: August 2011 (draft version 1.0)

Superclass: to be advised

History of changes

Version	Description of change	Authorised by	Date

© Scottish Qualifications Authority 2011

This specification may be reproduced in whole or in part for educational purposes provided that no profit is derived from reproduction and that, if reproduced in part, the source is acknowledged. Additional copies of this Unit can be downloaded from SQA's website at www.sqa.org.uk.

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

Draft