



**Arrangements for:**  
**National Certificate in Engineering Practice**  
**at SCQF level 5**

**Group Award Code: GD27 45**

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## **Acknowledgement**

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# 1 Introduction

This is the Arrangements Document for the National Certificate in Engineering Practice, at SCQF level 5, which was validated in June 2011. This document includes: background information on the development of the Group Award, its aims, guidance on access, details of the Group Award structure, and guidance on delivery.

The primary focus of this Group Award is to provide candidates with a range of engineering practical skills supported by relevant theory where appropriate. As such this award is suitable for those candidates who wish to become skilled crafts persons/trades persons in a wide range of engineering disciplines. The mandatory Units of this Group Award encompass the Core Skills of *Communication* and *Numeracy* with specific engineering Units in 'Using IT' and 'Health and Safety', allowing the core engineering skills to be related to a chosen engineering discipline as shown in the option groupings.

The restricted core Units focus on generic engineering skills required at this level:

- ◆ Engineering materials
- ◆ Graphical engineering communication
- ◆ Dimensional Control
- ◆ CAD

This Group Award has been developed to address the needs of a range of potential full-time, Workbased/Employed learners and adult returners who wish to consider entering or progressing within the Engineering Sector. The National Certificate in Engineering Practice at SCQF level 5 will be maintained alongside the existing suite of NQGA Engineering awards.

This Group Award sits alongside the other Engineering Group Awards at SCQF level 5 sharing common Units and a similar structure, and can be potentially used to articulate onto the current suite of NQGA Group Awards in Engineering at SCQF level 6 and the HNC Engineering Practice (see Appendix 1).

## 2 Rationale for the development of the Group Award

The Arrangements Documents for the suite of NQGA engineering awards refer to the old National Certificate in Engineering Practice (G587 04) as being replaced by two new awards; Mechanical Maintenance Engineering as well as Manufacturing Engineering both at SCQF level 5.

After these awards were created, the Engineering Systems SCQF level 6 award was developed and the subsequent Arrangements Document refers to this as replacing the old award in Multi-Discipline Engineering as well as serving engineering systems.

The SCQF level 5 awards as indicated in the titles, are each specific to engineering disciplines:

- NC Fabrication and Welding
- NC Manufacturing
- NC Electrical Engineering
- NC Electronic Engineering
- NC Mechanical Maintenance

While these awards evidently meet identified market needs, there was a gap with regards to multi-discipline aspects of the sector. The National Certificate in Engineering Systems (SCQF level 5) has been developed as part of this suite of NQGA engineering Group Awards. Though the framework of this award lends itself to a degree of multi-discipline it remains too narrow to meet the needs of the engineering sector within some geographical regions within Scotland, and some large employers.

As well as addressing the identified gap in the provision at SCQF level 5, it was felt that an Engineering Practice Group Award would make a valuable contribution to addressing the skills gaps identified in the Sector Skills Council for Science Engineering and Manufacturing Technologies (SEMTA) Scotland report (March 2010), particularly in respect of providing some of the underpinning knowledge required of a modern apprenticeship programme in engineering and employee development.

Following the perceived gap in the provision of Group Awards at SCQF level 5 in engineering, labour market information was pulled together from various sources including the Sector Skills Council (SEMTA) and Future Skills Scotland (see Table 1). This, in conjunction with information on existing provision, indicated that the original hypothesis was correct.

Brief details of the ways in which these three types of market research were conducted are shown below in Table 1:

Type of research	Nature of research
Desk based research	<ul style="list-style-type: none"> <li>◆ Analysis of trends in engineering as revealed in Futureskills Scotland/Sector Skills Council reports</li> <li>◆ Consultation report prepared by an SQA consultant on an educational view of the engineering landscape up to and beyond 2010</li> </ul>
Consultations with Further Education and Training Providers	<ul style="list-style-type: none"> <li>◆ Initial consultation with FE college members of HN Engineering Systems QST</li> <li>◆ Initial questionnaire survey with FE colleges</li> <li>◆ Consultation with the Scottish Association for Engineering Education (SAFEED)</li> </ul>
Consultation with Employers	<ul style="list-style-type: none"> <li>◆ Initial questionnaire survey and consultation with local and national employers</li> <li>◆ Discussions led by developing partner colleges with their respective employer companies</li> </ul>

**Table 1: Types of market research used to support National Certificate in Engineering developments**

Further analysis and market research has identified that the Group Award will provide existing and new markets with opportunities to:

- ◆ widen participation, providing an opportunity to enter into a career pathway in engineering for full-time learners and adult returners.
- ◆ provide a range of transferable skills.
- ◆ provide for 16–19 age groups (recruitment data highlighting significant interest from school leavers in the discipline).
- ◆ offer re-training opportunities for adult returners.
- ◆ engage employers.
- ◆ employment opportunities, at craft level, within a wide range of specific disciplines such as:
  - Fabrication and Welding
  - Electrical and Electronics
  - Mechanics
  - Manufacturing

This award is designed to provide an opportunity to develop a wide range of skills and knowledge that will meet the needs of the increasing demand for multi-skilled employees within the various engineering sectors.

Potential customer needs have been identified and Table 2 provides a summary of the benefits of this award for potential learners under:

- ◆ Skills for Life
- ◆ Employability and Progression Opportunities
- ◆ Career Opportunities

Customer need	Present method of satisfying the need
Skills for Life	<ul style="list-style-type: none"> <li>◆ Provide candidates with general skills and knowledge of an ever increasing technology</li> <li>◆ Provide candidates with a range of learning, teaching and assessment styles which motivate them to achieve their full potential</li> <li>◆ Provide opportunities to develop candidates' individual Core Skills including <i>Communication, Working with Others, Problem Solving, Numeracy</i> and <i>ICT</i> in a realistic working environment</li> <li>◆ Encourage candidates to develop a positive attitude to their own learning</li> </ul>
Increasing employability and progression opportunities	<ul style="list-style-type: none"> <li>◆ Provide candidates with the knowledge and understanding required for employment within the engineering Sector</li> <li>◆ Allow candidates to develop skills and attitudes required for progression within the sector</li> <li>◆ Facilitate progression to further FE and HE training</li> </ul>

Customer need	Present method of satisfying the need
Career Opportunities — further options	<ul style="list-style-type: none"> <li>◆ The new framework will provide opportunities to further develop candidates' practical skills improving their employability to meet current and future industry needs</li> <li>◆ Provide candidates with an understanding of the different operational areas within the sector</li> </ul>

**Table 2: Identified customers needs — mapping**

This Group Award also strongly supports the Skills for Scotland agenda, particularly in respect of providing some of the underpinning knowledge required within a modern apprenticeship programme in engineering.

The framework within this Group Award contains Units which will provide an opportunity to develop a candidate's ability to be flexible and to work co-operatively with others thus addressing the priorities contained with Curriculum for Excellence (CfE) and the qualities of good citizenship.

### 3 Aims of the Group Award

The main aim of the NC Engineering Practice at SCQF level 5 is to provide a practical, flexible framework that will enable candidates to acquire and develop the skills and knowledge needed to access a higher SCQF level of study in Engineering, or to move into the employment market in the industry.

#### 3.1 Principal aims of the Group Award

The principal aims of the National Certificate are to:

- 3.1.1 provide candidates with the necessary skills to work at craft level in an engineering environment.
- 3.1.2 contribute towards a series of awards that create a route towards meeting the academic requirements to support Modern Apprenticeships and full-time programmes.
- 3.1.3 provide an award that gives candidates progression routes to an NC Engineering (SCQF level 6) and HNC Engineering Practice.
- 3.1.4 allow candidates to develop knowledge, understanding and Core Skills in *Communication, Numeracy and Information and Communication Technology (ICT)* that underpin and support their studies in engineering.
- 3.1.5 allow candidates a degree of specialisation relevant to the area of engineering covered by the framework options.
- 3.1.6 address the gap in provision at SCQF level 5, identified by colleges and industrial partners.



### 3.2 Other aims of the Group Award

Other aims of the proposed new National Certificate are to:

- 3.2.1 enhance candidates' employment prospects.
- 3.2.2 support candidates' career development and Continuing Professional Development.
- 3.2.3 enable progression within the SCQF (Scottish Credit and Qualifications Framework).
- 3.2.4 develop learning and transferable skills.

Table 3 highlights how both the principal and other aims are mapped against the mandatory and restricted core Units, and collectively the optional Units.

Unit title	Code	3.1.1	3.1.2	3.1.3	3.1.4	3.1.5	3.1.6	3.2.1	3.2.2	3.2.3	3.2.4
<b>Mandatory</b>											
Communication	F3GB 11	✓	✓	✓	✓		✓	✓	✓	✓	✓
Mathematics: Craft 1	F3HV 11	✓	✓	✓	✓		✓	✓	✓	✓	✓
Engineering: Using Information Technology	F5D6 11	✓	✓	✓	✓		✓	✓	✓	✓	✓
Health and Safety: Engineering	F5DG 11	✓	✓	✓			✓	✓	✓		✓
<b>Restricted core candidates must complete two out of four restricted core Units</b>											
Engineering Materials	F5W9 11	✓	✓	✓		✓	✓	✓	✓	✓	
Graphical Engineering Communication	F5FP 11	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Engineering Dimensional Control	F5W7 11	✓	✓	✓	✓	✓	✓	✓	✓	✓	
Computer Aided Draughting (CAD) for Engineers	F5H4 11	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
<b>Optional section</b> <i>Candidates must complete between 4 and 6 optional credits</i>											
Optional Units		✓	✓	✓	✓	✓	✓	✓	✓	✓	

**Table 3: Mapping of framework against aims**

### 3.3 Target groups

The National Certificate in Engineering Practice at SCQF level 5 is intended for school leavers, adult returners and those in employment. However, the primary focus is different from other engineering level 5 awards in that it has been designed to provide a balance of relevant practical applications and technological principles.

The NC can be delivered by full-time, day-release or other part-time modes of delivery (eg block-release, evening class, etc). For example, it may be delivered on a full-time basis to school leavers and adult returners where the delivery may be combined with a suitable SVQ/NVQ, such as Performing Engineering Operations at level 1 and 2 (SCQF level 4 and 5), to provide candidates with opportunities to acquire a wide range of skills and knowledge as part of a pre-apprenticeship programme. The Engineering Practice NC may also be delivered to candidates in employment to provide underpinning knowledge and skills for a related SVQ/NVQ that they may have embarked upon.

### **3.4 Employment opportunities**

The National Certificate in Engineering Practice at SCQF level 5 has been developed to provide the knowledge, understanding and skills for those seeking employment now, or in the future, as engineers. Such employment opportunities arise frequently in both private business and in the public sector.

It has been devised to allow centres flexibility, with regard to options offered, which will allow candidate progression to a level 6 award or to an HNC/HND. This flexibility also allows certification through either single discipline topics or along a cross-discipline route, as individual single options can be taken from any option stream. The framework is given in section 5 and is flexible for centres to enable meeting needs of both local employers and other individual clients.

## **4 Access to the Group Award**

### **4.1 Access requirements**

Access is similar to that applying to other engineering Group Awards at SCQF level 5 and should be based on a broad approach to candidate selection. At the same time it is essential that candidates have the potential and ability to complete this award successfully.

Some experience of working in an engineering environment and a basic knowledge of graphical communication would be advantageous.

While entry to the award is at the discretion of the centre, the following are given as recommendations and should not be seen as a definitive or prescriptive list of entry requirements. The purpose is simply to give guidance on the selection of suitable candidates.

## 4.2 Core Skills Entry Profile

The recommended minimum Core Skills entry profile for the National Certificate in Engineering Systems at SCQF level 5:

<i>Communication</i>	SCQF level 4
<i>Numeracy</i>	SCQF level 4
<i>Information and Communication Technology (ICT)</i>	SCQF level 4
<i>Problem Solving</i>	SCQF level 4
<i>Working with Others</i>	SCQF level 3

## 4.3 Alternative access arrangements

Centres may operate alternative access arrangements in cases where the candidate has the required competences in a given area. These arrangements are as follows:

- ◆ Assessment on demand
- ◆ Credit transfer
- ◆ Accreditation of prior learning
- ◆ Relevant work experience

## 5 Group Award structure

### National Certificate in Engineering Practice at SCQF level 5

The National Certificate in Engineering Practice (SCQF level 5) contains 12 credits all at SCQF level 5. The structure of the award (refer to Section 5.1), is split into the following sections:

- ◆ Mandatory Core: 4 credits
- ◆ Restricted Core: 2 credits (from a choice of 4)
- ◆ Optional: 6 credits (from a wide range of engineering related Units)

Both the mandatory and restricted core sections are designed in accordance with the Design Principles for National Certificates. The restricted core contributes to building a degree of flexibility, in line with the optional section, that is aimed at meeting the complex needs of a wide range of employers and engineering sectors.

## 5.1 Structure

### NC Engineering Practice at SCQF level 5: 12 credits (72 SCQF points)

#### Mandatory section — candidates must complete all 4 credits

Unit title	Code	SCQF credit points	SCQF level	SQA credit value
<b>Mandatory</b>				
Communication OR *Literacy	F3GB 11 H23W 75	6	5	1
Mathematics: Craft 1	F3HV 11	6	5	1
Engineering: Using Information Technology	F5D6 11	6	5	1
Health and Safety: Engineering	F5DG 11	6	5	1
Total		24		4

\*Refer to history of changes for revision details

#### Restricted core section — candidates must complete a minimum of 2 further credits (all 4 credits may be selected)

Unit title	Code	SCQF credit points	SCQF level	SQA credit value
<b>Restricted core</b>				
Engineering Materials	F5W9 11	6	5	1
Graphical Engineering Communication	F5FP 11	6	5	1
Engineering Dimensional Control	F5W7 11	6	5	1
Computer Aided Draughting (CAD) for Engineers	F5H4 11	6	5	1
Total – Min.		12		2
Total – Max.		24		4

#### Optional section — candidates must complete between 4 and 6 credits

Unit title	Code	SCQF credit points	SCQF level	SQA credit value
<b>Optional section</b>				
Engineering Project	F5DE 11	6	5	1
Metal Inert Gas (MIG) Metal Active Gas (MAG) Welding Skills	F5F7 12	6	6	1
Pattern Development	F5EX11	6	5	1
Thermal Cutting Skills	F5F1 11	6	5	1
Fabrication Skills	F5FG 11	12	5	2
Mathematics: Craft 2	F3HW 11	6	5	1
Manual Metal Arc (MMA) Welding Skills	F5F6 12	6	6	1
Pipework Skills	F5EY 11	6	5	1
Ship Construction Skills	F5F0 11	6	5	1
Thermal Joining Skills	F5F2 11	6	5	1
Tungsten Inert Gas (TIG) Welding Skills	F5FC 12	6	6	1

Weld Procedure Specification and Testing	F5F4 11	6	5	1
Engineering Assembly Skills	F5W6 11	6	5	1
Engineering Manufacturing Processes	F5W8 11	6	5	1

### Optional section (cont)

Unit title	Code	SCQF credit points	SCQF level	SQA credit value
<b>Optional section</b>				
Engineering Workshop Skills	F5WA 11	6	5	1
Industrial CNC Machining	F5D9 11	6	5	1
Engineering Material Removal Principles	F5WD 11	6	5	1
Material Removal Practice: Milling	F5WB 11	6	5	1
Material Removal Practice: Turning	F5WC 11	6	5	1
Robotic and Automated Systems	F5H6 12	6	6	1
Engineering Quality: An Introduction	F5FM 12	6	6	1
Electrical Wiring Skills	F5HP 11	6	5	1
Electrical testing and Measurement	F5HM 11	6	5	1
Electrical Plant Safety and Maintenance	F5HH 11	6	5	1
Electronic Test Equipment and Measurement	F5DC 11	6	5	1
Maintenance Safety	F5J4 11	6	5	1
Plant Installation	F5J2 11	6	5	1
Plant Maintenance Practice	F5J3 11	6	5	1
Pneumatics and Hydraulics	F5K2 11	6	5	1
Power Drives	F5K3 11	6	5	1
Engineering Prime Movers	F5K4 11	6	5	1
Fabrication Processes	F5EW 11	6	5	1
Welding Processes	F5F3 11	6	5	1
Electrical Principles	F5HK 11	6	5	1
Mechanical Engineering Principles	F5K1 11	6	5	1
	Total – Min.			<b>4</b>
	Total - Max			<b>6</b>

## 5.2 Mapping to National Occupational Standards

The Sector Skills Council (SSC), SEMTA, have published the National Occupational Standards for the various disciplines in Engineering. The main aim of this award is to complement the existing suite of qualifications that supports these disciplines, and the nature of this award is to provide flexibility to address the gap of provision at this level. This award has been mapped against selected vocational qualifications in Engineering:

- ◆ Performing Engineering Operations: SVQ level 2
- ◆ Engineering Maintenance: SVQ level 3 — Mechanical
- ◆ Engineering Maintenance: SVQ level 3 — Electrical
- ◆ Engineering Maintenance: SVQ level 3 — Electronic
- ◆ Engineering Maintenance: SVQ level 3 — Engineering Systems

Appendix 2 provides specific details of the mapping against the above National Occupational Standards, and the following Table 4 is a summary of this mapping exercise:

Unit title	NOS	PEO: SCQ Level 2	SVQ Level 3: Mechanical	SVQ Level 3: Electrical	SVQ Level 3: Electronic	SVQ Level 3: Engineering Systems
<b>Mandatory</b>	<b>Code</b>					
Communication	F3GB 11	✓	✓	✓	✓	
Mathematics: Craft 1	F3HV 11	✓	✓	✓	✓	
Engineering: Using Information Technology	F5D6 11	✓	✓	✓	✓	
Health and Safety: Engineering	F5DG 11	✓	✓	✓		
<b>Restricted core candidates must complete two out of four restricted core Units</b>						
Engineering Materials	F5W9 11	✓	✓	✓		✓
Graphical Engineering Communication	F5FP 11	✓	✓	✓	✓	✓
Engineering Dimensional Control	F5W7 11	✓	✓	✓	✓	✓
Computer Aided Draughting (CAD) for Engineers	F5H4 11	✓	✓	✓	✓	✓
<b>Optional Section</b> <i>Candidates must complete between 4 and 6 optional credits</i>						
Optional Units		✓	✓	✓	✓	✓

**Table 4: Summary: Mapping to National Occupational Standards**

### 5.3 Opportunities to achieve Core Skills

Opportunities to develop aspects of the Core Skills within the Group Award at SCQF level 5 are identified in the table in Appendix 3. In addition to the Core Skill and Core Skill components identified in the table, there are opportunities to develop all 5 of the Core Skills within this award. Progress in development will be dependent on the delivery centre resources and the approaches taken to learning and teaching.

More information regarding the development of Core Skills can be found in the support notes of the individual Units which make up this award.

Table 6 provides details of the recommended entry and exit SCQF levels for this Group Award.

Core Skill	Recommended Entry Level (SCQF level)	Exit Level (Minimum)
Communication	4	5
Information and Communication Technology (ICT)	4	5
Numeracy	4	5*
Problem Solving	3	4
Working with others	3	4

**Table 6: Recommended Core Skills Entry/Exit Level**

### Core Skills Exit Profile

The minimum Core Skills exit profile for this award is in line with all National Certificates in Engineering at SCQF level 5 and is as follows:

**Communication at SCQF level 5** — F3GB 11: the *Communication Core Skills Unit* at SCQF level 5 is one of the six Units in the mandatory core section.

**Using Number Core Skill component at SCQF level 5** is partly embedded in the mandatory Unit F3HV 11 *Mathematics: Craft 1*.

\*Only fully embedded if centres choose the specific options of Graphical Engineering Communication and Engineering Dimensional Control within the restricted core section.

**Information and Communication Technology (ICT) at SCQF level 5** is embedded in the mandatory Unit F5D6 11 *Engineering: Using Information Technology*.

In addition, the following guidelines indicate where *Problem Solving* and *Working with Others* can be integrated into Course delivery.

### Problem Solving

All elements of the Core Skill of *Problem Solving* underpin the technical competencies developed in the award. As each Unit is undertaken candidates learn to identify, consider and take into account a range of factors impacting on practical engineering work. Specifications are interpreted, and decisions are made on techniques, tools and materials which comply with regulatory and safety requirements. Implementing these effectively includes the ability to adapt and modify approaches as necessary.

### ***Working with Others***

Small group investigative and experimental activities as part of formative work will support candidates particularly those with no industrial experience. All practical learning and assessment tasks can develop team working skills and support the ability to form working relationships in practical vocational contexts. Feedback from assessors on good practise will be on-going. Organised site visits can involve contributing and co-operating in group activities and observation of industry practice.

Further Core Skills development opportunities are identified in each of the individual NQ Unit specifications.

## **5.4 Articulation, professional recognition and credit transfer**

Entry to this award can be from the Skills for Work Engineering Skills award. Lateral articulation within the engineering frameworks at SCQF level 5 will present no major problems as there are many common Units.

Progression from this award can be to any related engineering award at SCQF level 6 or directly to the HNC Engineering Practice. The diagram in Appendix 1 illustrates the progression routes within the current provision of NC and HNC/HND awards.

The NC Engineering Practice will sit alongside the suite of SCQF level 5 engineering awards and can be used by full-time and employed learners to progress laterally within other equivalent awards and onto HN programme of study.

## **6 Approaches to delivery and assessment**

This award, like other SCQF level 5 engineering awards, has been designed with the following three sections:

- ◆ Mandatory core
- ◆ Restricted core
- ◆ Optional

Engineering market research evidence pointed clearly to the inclusion of three common mandatory Units in communication, numeracy/mathematics and information technology within each National Certificate. It is important that these mandatory core Units are not delivered in isolation but rather their delivery and assessment is integrated fully with the engineering Units in the award. For example, experience shows that teaching mathematics within an engineering context helps candidates to grasp more effectively important numerical and mathematical concepts, formulae and problem solving approaches. Likewise Information Technology has more relevance to candidates when it is set within an engineering context. For this reason, the Unit *Engineering: Using Information Technology* at SCQF level 5 has an Outcome where candidates have to use and apply engineering software.



Experience has shown that centres have faced many challenges when delivering and assessing Communication within engineering programmes of study. Candidates struggle to see the relevance of Communication when it is taught in isolation to the rest of an engineering course. This issue has been addressed in the new awards by including the Core Skill *Communication* Unit at SCQF level 5 in all National Certificates in Engineering at level 5. In doing this it is hoped that centres will try to deliver and assess the Core Skills in *Communication* as part of the delivery and assessment of engineering Units. For example, an activity within an engineering Unit which requires candidates to engage in group discussions provides lecturers with opportunities not only to develop candidate's technical skills but also their oral communication skills. Likewise report writing in engineering Units should provide opportunities to develop important written communication skills.

### **Content and context**

The mandatory core section of this award has been designed to provide a degree of standardisation, as indicated in the design principles. Also with a focus on the development of the learners Core Skills in *Communication*, *Numeracy* and *ICT*, and an understanding of the Health and Safety aspects of engineering.

The restricted core section, where a minimum of two credits are required, allows centres to design their course with a level of selected flexibility within essential elements of the engineering sector. Some centres may wish to deliver all four Units in the restricted core, and the collective structure of the restricted/optional sections allows for this approach.

The optional section of the National Certificate in Engineering Practice is designed to allow some degree of flexibility in the choice of Units studied as part of the National Certificate programme. This will allow centres to focus on specific areas of engineering if they so wish or to adopt a cross discipline approach.

The Group Award is designed to accommodate Units mainly in the practical environment allowing the candidates to build their skills over the timeframe of delivery. The underpinning knowledge in the theoretical Units should be completely contextualised in order that the candidates can then incorporate the learning into their practical application.

This Group Award is also designed to allow candidates to progress from level 5 to level 6 and further progression onto HNC/HND and degree, and/or employment within the engineering sector. Appendix 1 provides suggested progression pathways.

### **Delivery and assessment**

The award has been developed to facilitate flexible delivery and assessment, which is intended to be of a practical nature wherever possible, reflecting the practical nature of the engineering industry. Delivery models will be dependent on the centre and the client group. For example, they could be offered to part-time candidates working full-time in industry and attending college day-release.

Delivery of Units within the award should not necessarily be done in isolation as each Unit links directly with the knowledge, skills and experiences developed in each of the others. Therefore it would be beneficial for an individual within the centre to assign the responsibility for delivery to ensure that all of those involved in delivering different areas of the particular award communicate with each other about their intended delivery and timings.

This approach will enable a coherent and best value experience for candidates who will be able to understand the links between Units, which should be reinforced by all staff involved in delivery. There are opportunities for integrated learning and assessment across the award and where possible a holistic approach should be taken to delivery and assessment.

A candidate-centred, practical and interactive approach to delivery and learning should be adopted throughout. The range of methods used in delivering the award should ensure that experiential learning opportunities are available to candidates.

The delivery of the award is at the discretion of the individual centre. The NC in Engineering Practice at SCQF level 5 has been designed to be compatible with the arrangements for both full-time and part-time funded programmes. It would be expected, therefore, that centres would continue to offer a programme of Units, but that this will include for the award at level 5: 6 mandatory Units (6 credits) and at least 6 optional credits from the NC Engineering Practice framework (SCQF level 5), supported by additional Units to aid learners' development.

Appendix 4 provides an example of an integrated approach with the NC Engineering Practice and SVQ level 2 — Performing Engineering Operations, identifying complementary elements of each award that will jointly provide the underpinning knowledge and skill development.

### Core Skills

Tutors/Lecturers should also seek opportunities to integrate Core Skills within their teaching and learning programmes as shown in Appendix 3.

Such opportunities may include, but not be limited to, the following:

<b>Communication</b>	<ul style="list-style-type: none"> <li>◆ Provide candidates with opportunities to develop their oral skills by allowing them to give full answers to questions asked by the lecturer and by giving an oral presentation as part of Unit delivery</li> <li>◆ Encourage candidates to read extensively on various technical subjects. Discuss reading with candidates to check understanding of subject matter</li> <li>◆ Develop report writing skills in a number of Units</li> <li>◆ Allow candidates to develop their communication skills in group work activities</li> </ul>
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<b>Numeracy</b>	<ul style="list-style-type: none"> <li>◆ Reinforce numeracy and mathematical skills when teaching engineering Units</li> <li>◆ Reinforce using graphical information skills by using and comparing a range of engineering graphical representations (eg in such Units as <i>Graphical Engineering Communication, Pneumatics and Hydraulics, Combinational Logic, and Applications of Programmable Logic Controllers</i>)</li> </ul>
<b>Information and Communication Technology (ICT)</b>	<ul style="list-style-type: none"> <li>◆ Develop information technology skills through the application of IT within engineering (eg in the Units <i>Engineering: Using Information Technology, or Engineering: Applying Information Technology, Computer Aided Draughting, etc.</i>)</li> </ul>
<b>Problem Solving Skills</b>	<ul style="list-style-type: none"> <li>◆ Develop problem solving skills by, for example, exploring different solutions to problems; planning and organising appropriately prior to undertaking practical and project work; reviewing and evaluating different solutions to engineering problems and evaluating the quality of own work</li> </ul>
<b>Working with Others</b>	<ul style="list-style-type: none"> <li>◆ Develop skills through such activities as group discussion about an engineering problem/issue, sharing resources in engineering workshop areas etc</li> </ul>

### Assessment

The assessment strategy adopted for this award should be in line with that used for all other engineering SCQF level 5 awards.

### Aims

The aims of the strategy are to ensure that:

- ◆ consistent, rigorous and efficient approaches are adopted to the development and administration of NQ Engineering assessment instruments, which satisfy nationally agreed standards.
- ◆ the assessment load on candidates and staff is sensible and that assessment does not unduly detract from teaching and learning.
- ◆ as far as possible reliable and rigorous moderation processes are put in place in order to ensure that consistent national standards are achieved for all NQ Engineering Unit assessments.

### Assessment Support Packs

Assessment Support Packs are available for some of the Units included in this award and can be found on the secure part of the SQA website.

## **Formative assessment**

Formative assessment should be used throughout the delivery of NQ Units to reinforce learning, build candidate's confidence and prepare candidates for summative assessment.

## **7 General information for centres**

### **Disabled candidates and/or those with additional support needs**

The additional support needs of individual candidates should be taken into account when planning learning experiences, selecting assessment instruments, or considering whether any reasonable adjustments may be required. Further advice can be found on our website [www.sqa.org.uk/assessmentarrangements](http://www.sqa.org.uk/assessmentarrangements).

### **Internal and external verification**

All instruments of assessment used within this/these Group Award(s) should be internally verified, using the appropriate policy within the centre and the guidelines set by SQA.

External verification will be carried out by SQA to ensure that internal assessment is within the national guidelines for these qualifications.

Further information on internal and external verification can be found in *SQA's Guide to Assessment* ([www.sqa.org.uk](http://www.sqa.org.uk)).

### **Open learning**

Advice on the use of on-line and open and distance learning materials is given in individual NQ Unit specifications where it is considered that these modes of delivery are appropriate. However, where such modes of delivery are used due regard must be paid to assessment. Planning would be required by centres to ensure the sufficiency and authenticity of candidate evidence.

Arrangements would be required to be put in place to ensure that the assessment or assessments were conducted under the conditions specified in the Unit specification. For example, in the case of a Unit which involved a test(s) a centre would have to make arrangements for the test(s) to be conducted under controlled, supervised conditions. Likewise, where a Unit involves a practical based assessment, a centre would have to make arrangements for candidates to come into the centre (or other appropriate venue) to undertake the assessment under the conditions specified in the NQ Unit specification.

## 8 General information for candidates

The National Certificate in Engineering Practice at SCQF level 5 is a collection of Units designed to provide candidates with a broad range of engineering practical skills, reinforced with some relevant theory.

This award differs from other Engineering awards at SCQF level 5 in that it is less specific to a particular skill set, and can be tailored to meet the operational and maintenance requirements of a range of employers, and for candidates who wish to be engaged in diverse engineering activities.

### Structure of the award:

In common with all Engineering NC awards at SCQF level 5, there are *mandatory* Units and *restricted core* Units which must be attained by all candidates which underpin and reinforce the remaining optional Units and Core Skill development.

There are a wide range of *optional* Units that include skill areas in: fabrication; welding; machining; electrical/mechanical maintenance; related principles. Choices are normally made to give a broad skill based qualification to match the requirements of individual employers.

Depending on the chosen attendance pattern for this award, ie day/block release or full-time, the delivery methods will vary.

**Full-time and block release** candidates will be able to study this award in conjunction with the SVQ Level 2 (SCQF level 5) in 'Performing Engineering Operations' where all the Units with a practical, workshop based content can be studied concurrently with the equivalent SVQ Units (Appendix 4). It is intended that you will experience a variety of learning experiences within a wide range of learning environments including: Workshop activities and site visits; IT suites, Classrooms, Laboratories.

Opportunities will be available in some **block release** courses, allowing candidates to carry out practical tasks in their place of employment by prior agreement, and under the supervision of an employer's representative or on-site assessor.

Assessment will be conducted on a continuous basis throughout coursework, and there will be a combination of project work and closed-book exams.

The content of each Unit will be delivered through a series of tutorials, site visits and activities. Tutor/ candidates guidance sessions will be set up to support you through the programme to build your confidence and monitor progress.

**Day release** candidates will be able to study this award over a two year period if attending one day per week.

Opportunities will be available for candidates to carry out practical tasks in their place of employment by prior agreement, and under the supervision of employer's representative or on-site assessor.

Candidates will experience a variety of learning experiences within a wide range of learning environments including: Workshop activities and site visits (where necessary); IT suites, Classrooms, Laboratories.

Assessment will be conducted on a continuous basis throughout coursework, and there will be a combination of project work and closed-book exams.

The content of each Unit will be delivered through a series of tutorials, site visits and activities. Tutor/ candidates guidance sessions will be set up to support you through the programme to build your confidence and monitor progress.

In all course formats, opportunities to develop Core Skills up to SCQF level 5 have been identified and can be integrated with coursework or studied as stand-alone Units.

During the learning process your skills in the following areas will be developed:

- ◆ Organising
- ◆ Communicating
- ◆ Researching
- ◆ Problem solving
- ◆ Working and co-operating with others
- ◆ Information Technology

The main topics of study are:

- ◆ *Practical skills in a range of occupational disciplines*
- ◆ *Engineering Materials*
- ◆ *Engineering Communication*
- ◆ *Health and Safety*
- ◆ *Engineering Measurement*
- ◆ *Craft Mathematics*

Achievement of this award will be by attainment of all four mandatory Units; between two and four restricted core Units, and between four and six optional credits from the framework. Obtaining a minimum of 12 SQA credits equivalent to 72 SCQF credit points at SCQF level 5.

## 9 Glossary of terms

**SCQF:** This stands for the Scottish Credit and Qualification Framework, which is a new way of speaking about qualifications and how they inter-relate. We use SCQF terminology throughout this guide to refer to credits and levels. For further information on the SCQF visit the SCQF website at [www.scqf.org.uk](http://www.scqf.org.uk)

**SCQF credit points:** One SCQF credit point equates to 10 hours of learning. NQ Units at SCQF levels 2–6 are worth 6 SCQF credit points, NQ Units at level 7 are worth 8 SCQF points.

**SCQF levels:** The SCQF covers 12 levels of learning. National Qualification Group Awards are available at SCQF levels 2–6 and will normally be made up of National Units which are available from SCQF levels 2–7.

**Dedicated Unit to cover Core Skills:** This is a non-subject Unit that is written to cover one or more particular Core Skills.

**Embedded Core Skills:** This is where the development of a Core Skill is incorporated into the Unit and where the Unit assessment also covers the requirements of Core Skill assessment at a particular level.

**Signposted Core Skills:** This refers to the opportunities to develop a particular Core Skill at a specified level that lie outwith automatic certification.

**Qualification Design Team:** The QDT works in conjunction with a Qualification Manager/Development Manager to steer the development of the National Certificate/National Progression Award from its inception/revision through to validation. The group is made up of key stakeholders representing the interests of centres, employers, universities and other relevant organisations.

**Consortium-devised National Certificates/National Progression Awards** are those developments or revisions undertaken by a group of centres in partnership with SQA.

## 10 Appendices

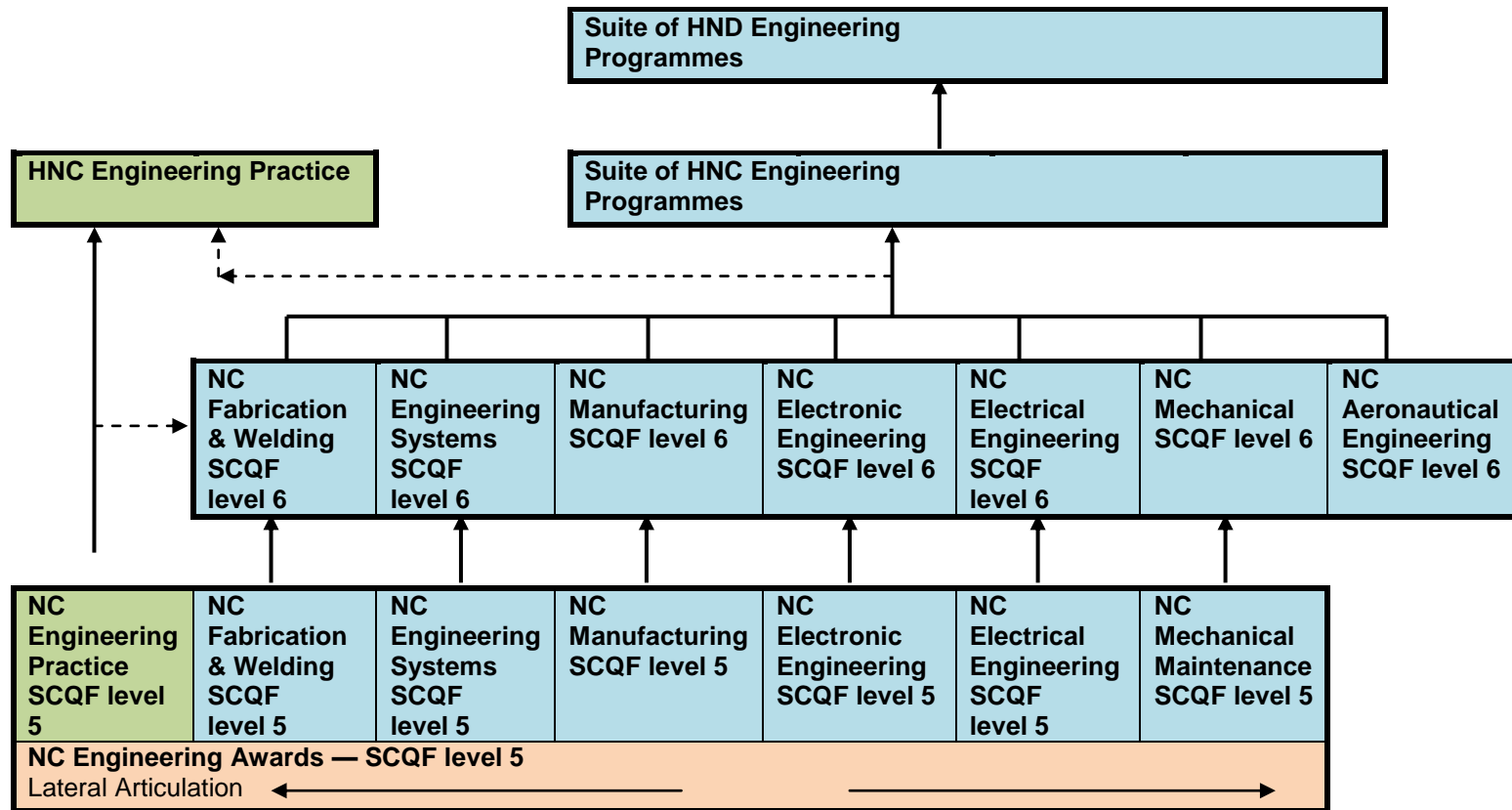
Appendix 1: Progression and Articulation within the suite of Engineering Group Awards

Appendix 2: Mapping to National Occupational Standards and Vocational Qualifications

Appendix 3: Mapping of Core Skills

Appendix 4: Integration with SVQ level 2 — PEO

# Appendix 1: Progression and articulation within the suite of Engineering Group Awards





## Appendix 2: Mapping of National Occupational Standards and Vocational Qualifications

The mapping process involved a selection of Vocational Qualifications and the details for each are presented in two parts for each:

- ◆ Table providing a list of the Units per qualification
- ◆ Table providing a mapping between the mandatory and restricted core Units against the above, also a summary of the optional Units.

The following Vocational Qualification were selected:

- ◆ **Performing Engineering Operations: SVQ level 2 (Tables 1a and 1b)**
- ◆ **Engineering Maintenance SVQ level 3:Mechanical (Table 2)**
- ◆ **Engineering Maintenance SVQ level 3:Electrical (Table 3)**
- ◆ **Engineering Maintenance SVQ level 3:Electronic (Table 4)**
- ◆ **Engineering Maintenance SVQ level 3:Engineered Systems (Table 5)**

## Performing Engineering Operations SVQ level 2 — Engineering Practices

<b>Table 1a: NOS — Performing Engineering Operations level 2 — Engineering Practices</b>		
	<b>NOS Reference</b>	<b>NOS Unit title</b>
<b>1</b>	045NPEO2-01	Working Safely in an Engineering Environment
<b>2</b>	045NPEO2-02	Working Efficiently and Effectively in Engineering
<b>3</b>	045NPEO2-03	Using and Communicating Technical Information
<b>4</b>	045NPEO2-04	Producing mechanical Engineering Drawings using a CAD System
<b>5</b>	045NPEO2-05	Producing Components Using Hand Fitting Techniques
<b>6</b>	045NPEO2-06	Producing Mechanical Assemblies
<b>7</b>	045NPEO2-11	Preparing and Using Lathes for Turning Operations
<b>8</b>	045NPEO2-12	Preparing & Using Milling Machines
<b>9</b>	045NPEO2-15	Preparing and Proving CNC Turning Machines
<b>10</b>	045NPEO2-16	Preparing and Proving CNC Milling Machines
<b>11</b>	045NPEO2-19	Maintaining Mechanical Devices and Equipment

## Performing Engineering Operations SVQ level 2 — Engineering Practices

Group Award title: National Certificate in Engineering Practice (SCQF level 5)

Unit code	Unit title	NOS Title: Performing Engineering Operations level 2 — Engineering Practices										
		045NPEO2-01	045NPEO2-02	045NPEO2-03	045NPEO2-04	045NPEO2-05	045NPEO2-06	045NPEO2-11	045NPEO2-12	045NPEO2-15	045NPEO2-16	045NPEO2-19
<b>Mandatory Units:</b>												
F3GB 11	Communication	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
F3HV 11	Mathematics: Craft 1			✓		✓	✓			✓	✓	
F5D6 11	Engineering: Using Information Technology	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
F5DG 11	Health and Safety: Engineering	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
<b>Restricted core Units: 2 from 4</b>												
F5W9 11	Engineering Materials	✓	✓	✓	✓	✓	✓	✓	✓		✓	✓
F5FP 11	Graphical Engineering Communication		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
F5W7 11	Engineering Dimensional Control		✓	✓	✓	✓	✓	✓	✓		✓	✓
F5H4 11	Computer Aided Draughting (CAD) for Engineers		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
<b>Optional: 6 from 39</b>												
There are 39 Optional Units. The table indicates how many match each NOS.		<b>36</b>	<b>39</b>	<b>39</b>	<b>7</b>	<b>8</b>	<b>10</b>	<b>8</b>	<b>8</b>	<b>8</b>	<b>8</b>	<b>13</b>

## Performing Engineering Operations SVQ level 2 — Engineering Practices

<b>Table 1b: NOS — Performing Engineering Operations level 3 — Engineering Practices</b>		
	<b>NOS Reference</b>	<b>NOS Unit title</b>
<b>12</b>	045NPEO2-20	Assembling & Testing Fluid Power Systems
<b>13</b>	045NPEO2-21	Maintaining Fluid Power Equipment
<b>14</b>	045NPEO2-22	Producing Sheet Metal Components and Assemblies
<b>15</b>	045NPEO2-27	Preparing and Using Manual Metal Arc Welding Equipment
<b>16</b>	045NPEO2-29	Preparing and Using MIG, MAG and other Continuous Wire Welding Equipment
<b>17</b>	045NPEO2-30	Preparing and Using Manual Gas Welding Equipment
<b>18</b>	045NPEO2-33	Wiring and Testing Electrical Equipment and Systems
<b>19</b>	045NPEO2-37	Maintaining Electrical Equipment and Systems
<b>20</b>	045NPEO2-38	Maintaining Electronic Equipment and Systems
<b>21</b>	045NPEO2-39	Maintaining and Testing Process Instrumentation and Control Devices

## Performing Engineering Operations SVQ level 2 — Engineering Practices

Group Award title: National Certificate in Engineering Practice (SCQF level 5)

Unit code	Unit title	NOS Title: Performing Engineering Operations level 2 — Engineering Practices										
		045NPEO2-20	045NPEO2-21	045NPEO2-22	045NPEO2-27	045NPEO2-29	045NPEO2-30	045NPEO2-33	045NPEO2-37	045NPEO2-38	045NPEO2-39	
<b>Mandatory Units:</b>												
F3GB 11	Communication	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
F3HV 11	Mathematics: Craft 1		✓						✓	✓	✓	
F5D6 11	Engineering: Using Information Technology	✓	✓	✓					✓	✓	✓	
F5DG 11	Health and Safety: Engineering	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
<b>Restricted core Units: 2 from 4</b>												
F5W9 11	Engineering Materials	✓	✓	✓	✓	✓	✓	✓	✓		✓	
F5FP 11	Graphical Engineering Communication	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
F5W7 11	Engineering Dimensional Control	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
F5H4 11	Computer Aided Draughting (CAD) for Engineers	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
<b>Optional: 6 from 39</b>												
There are 39 Optional Units. The table indicates how many match each NOS.		14	14	15	8	8	6	13	12	10	12	

## Engineering Maintenance SVQ level 3 — Mechanical

<b>Table 2: NOS — Engineering Maintenance level 3 — Mechanical</b>		
	<b>NOS Reference</b>	<b>NOS Unit title</b>
<b>1</b>	045NEM3-01	Complying with Statutory Regulations and Organisational Safety
<b>2</b>	045NEM3-02	Using Engineering Drawings and Documents in Maintenance Activities
<b>3</b>	045NEM3-03	Working Efficiently and Effectively in Engineering
<b>4</b>	045NEM3-04	Handing Over and Confirming Completion of Maintenance
<b>5</b>	045NEM3-05	Carrying Out Fault Diagnosis on Mechanical Equipment
<b>6</b>	045NEM3-06	Maintaining Mechanical Equipment
<b>7</b>	045NEM3-07	Restoring Mechanical Components to Usable Condition by Repair
<b>8</b>	045NEM3-08	Producing Replacement Components for Maintenance Activities
<b>9</b>	045NEM3-09	Carrying Out Preventative Planned Maintenance on Mechanical Equipment
<b>10</b>	045NEM3-10	Carry Out Condition Monitoring of Plant & Equipment
<b>11</b>	045NEM3-80	Assisting in the Installation of Mechanical Equipment

## Engineering Maintenance SVQ level 3 — Mechanical

Group Award title: National Certificate in Engineering Practice (SCQF level 5)

Unit code	Unit title	NOS Title: Engineering Maintenance level 3 — Mechanical										
		045NEM3-01	045NEM3-02	045NEM3-03	045NEM3-04	045NEM3-05	045NEM3-06	045NEM3-07	045NEM3-08	045NEM3-09	045NEM3-10	045NEM3-80
<b>Mandatory Units:</b>												
F3GB 11	Communication	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
F3HV 11	Mathematics: Craft 1			✓		✓		✓	✓		✓	✓
F5D6 11	Engineering: Using Information Technology	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
F5DG 11	Health and Safety: Engineering	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
<b>Restricted core Units: 2 from 4</b>												
F5W9 11	Engineering Materials	✓	✓	✓		✓	✓	✓	✓	✓	✓	✓
F5FP 11	Graphical Engineering Communication		✓	✓	✓	✓	✓	✓	✓	✓		✓
F5W7 11	Engineering Dimensional Control		✓	✓		✓	✓	✓	✓	✓	✓	✓
F5H4 11	Computer Aided Draughting (CAD) for Engineers		✓	✓	✓	✓	✓	✓	✓	✓		✓
<b>Optional: 6 from 39</b>												
There are 39 Optional Units. The table indicates how many match each NOS.		<b>36</b>	<b>35</b>	<b>39</b>	<b>31</b>	<b>11</b>	<b>14</b>	<b>28</b>	<b>21</b>	<b>7</b>	<b>13</b>	<b>15</b>

## Engineering Maintenance SVQ level 3 — Electrical

<b>Table 3: NOS — Engineering Maintenance level 3 — Electrical</b>		
	<b>NOS Reference</b>	<b>NOS Unit title</b>
<b>1</b>	045NEM3-01	Complying with Statutory Regulations and Organisational Safety
<b>2</b>	045NEM3-02	Using Engineering Drawings and Documents in Maintenance Activities
<b>3</b>	045NEM-03	Working Efficiently and Effectively in Engineering
<b>4</b>	045NEM3-04	Handing Over and Confirming Completion of Maintenance
<b>5</b>	045NEM3-10	Carry Out Condition Monitoring of Plant & Equipment
<b>6</b>	045NEM3-11	Carrying Out Fault Diagnosis on Electrical Equipment and Circuits
<b>7</b>	045NEM3-12	Maintaining Electrical Equipment
<b>8</b>	045NEM3-13	Modifying or Rewiring Electrical Circuits
<b>9</b>	045NEM3-14	Testing Electrical Equipment and Circuits
<b>10</b>	045NEM3-15	Carrying Out Preventative Planned Maintenance on Electrical Equipment
<b>11</b>	045NEM3-81	Assisting in the Installation of Electrical/Electronic Equipment



## Engineering Maintenance SVQ level 3 — Electrical

Group Award title: National Certificate in Engineering Practice (SCQF level 5)

Unit code	Unit title	NOS Title: Engineering Maintenance level 3 — Electrical										
		045NEM3-01	045NEM3-02	045NEM3-03	045NEM3-04	045NEM3-10	045NEM3-11	045NEM3-12	045NEM3-13	045NEM3-14	045NEM3-15	045NEM3-81
<b>Mandatory Units:</b>												
F3GB 11	Communication	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
F3HV 11	Mathematics: Craft 1			✓		✓	✓		✓	✓		✓
F5D6 11	Engineering: Using Information Technology	✓	✓	✓	✓	✓		✓		✓	✓	✓
F5DG 11	Health and Safety: Engineering	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
<b>Restricted core Units: 2 from 4</b>												
F5W9 11	Engineering Materials	✓	✓	✓			✓	✓	✓	✓		✓
F5FP 11	Graphical Engineering Communication		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
F5W7 11	Engineering Dimensional Control		✓	✓		✓			✓			✓
F5H4 11	Computer Aided Draughting (CAD) for Engineers		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
<b>Optional: 6 from 39</b>												
There are 39 Optional Units. The table indicates how many match each NOS.		<b>36</b>	<b>35</b>	<b>39</b>	<b>31</b>	<b>13</b>	<b>11</b>	<b>13</b>	<b>10</b>	<b>7</b>	<b>7</b>	<b>15</b>

## Engineering Maintenance SVQ level 3 — Electronic

Table 4: NOS — Engineering Maintenance level 3 — Electronic		
	NOS Reference	NOS Unit title
1	045NEM3-01	Complying with Statutory Regulations and Organisational Safety
2	045NEM3-02	Using Engineering Drawings and Documents in Maintenance Activities
3	045NEM3-03	Working Efficiently and Effectively in Engineering
4	045NEM3-04	Handing Over and Confirming Completion of Maintenance
5	045NEM3-16	Carrying Out Fault Diagnosis on Electronic Equipment and Circuits
6	045NEM3-17	Testing Electronic Equipment and Circuits
7	045NEM3-18	Repairing Electronic Equipment

## Engineering Maintenance SVQ level 3 — Electronic

Group Award title: National Certificate in Engineering Practice (SCQF level 5)

Unit code	Unit title	NOS Title: Engineering Maintenance level 3 — Electronic							
		045NEM3-01	045NEM3-02	045NEM3-03	045NEM3-04	045NEM3-16	045NEM3-17	045NEM3-18	
<b>Mandatory Units:</b>									
F3GB 11	Communication	✓	✓	✓	✓	✓	✓	✓	✓
F3HV 11	Mathematics: Craft 1			✓		✓	✓		
F5D6 11	Engineering: Using Information Technology	✓	✓	✓	✓	✓	✓	✓	✓
F5DG 11	Health and Safety: Engineering	✓	✓	✓	✓	✓	✓	✓	✓
<b>Restricted core Units: 2 from 4</b>									
F5W9 11	Engineering Materials	✓	✓	✓			✓	✓	
F5FP 11	Graphical Engineering Communication		✓	✓	✓	✓	✓	✓	
F5W7 11	Engineering Dimensional Control		✓	✓		✓			
F5H4 11	Computer Aided Draughting (CAD) for Engineers		✓	✓	✓	✓	✓	✓	✓
<b>Optional: 6 from 39</b>									
There are 39 Optional Units. The table indicates how many match each NOS.		<b>36</b>	<b>35</b>	<b>39</b>	<b>31</b>	<b>7</b>	<b>6</b>	<b>7</b>	

## Engineering Maintenance SVQ level 3 — Engineered Systems

<b>Table 5: NOS — Engineering Maintenance level 3 — Engineered Systems</b>		
	<b>NOS Reference</b>	<b>NOS Unit title</b>
<b>1</b>	045NEM3-01	Complying with Statutory Regulations and Organisational Safety
<b>2</b>	045NEM3-02	Using Engineering Drawings and Documents in Maintenance Activities
<b>3</b>	045NEM-03	Working Efficiently and Effectively in Engineering
<b>4</b>	045NEM3-04	Handing Over and Confirming Completion of Maintenance
<b>5</b>	045NEM3-23	Carrying Out Fault Diagnosis on Engineered Systems
<b>6</b>	045NEM3-24	Maintaining Mechanical Equipment within an Engineered System
<b>7</b>	045NEM3-25	Maintaining Electrical Equipment within an Engineered System
<b>8</b>	045NEM3-26	Maintaining Fluid Power Equipment within an Engineered System
<b>9</b>	045NEM3-27	Maintaining Process Controller Equipment within an Engineered System
<b>10</b>	045NEM3-28	Carrying Out Preventative Planned Maintenance on Engineered Systems
<b>11</b>	045NEM3-83	Assisting in the Installation of Equipment to Produce an Engineered System

## Engineering Maintenance SVQ level 3 — Engineered Systems

Group Award title: National Certificate in Engineering Practice (SCQF level 5)

Unit code	Unit title	NOS Title: Engineering Maintenance level 3 — Engineered Systems										
		045NEM3-01	045NEM3-02	045NEM3-03	045NEM3-04	045NEM3-23	045NEM3-24	045NEM3-25	045NEM3-26	045NEM3-27	045NEM3-28	045NEM3-83
<b>Mandatory Units:</b>												
F3GB 11	Communication	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
F3HV 11	Mathematics: Craft 1			✓		✓	✓			✓		✓
F5D6 11	Engineering: Using Information Technology	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
F5DG 11	Health and Safety: Engineering	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
<b>Restricted core Units: 2 from 4</b>												
F5W9 11	Engineering Materials	✓	✓	✓			✓	✓			✓	✓
F5FP 11	Graphical Engineering Communication		✓	✓	✓	✓	✓	✓	✓	✓	✓	
F5W7 11	Engineering Dimensional Control		✓	✓		✓	✓	✓	✓		✓	✓
F5H4 11	Computer Aided Draughting (CAD) for Engineers		✓	✓	✓	✓	✓	✓	✓	✓	✓	
<b>Optional: 6 from 39</b>												
There are 39 Optional Units. The table indicates how many match each NOS.		36	35	39	31	13	16	16	16	16	7	19

## Appendix 3: Core Skills mapping of the Group Award

Group Award title: National Certificate in Engineering Practice (SCQF level 5)

Key S( )= signposted (level), E( ) = embedded (level)

Unit code	Unit title	Communication		ICT	Numeracy		Problem Solving			Working with Others
		Oral	Written		Using Graphical Information	Using Number	Critical Thinking	Planning and Organising	Reviewing and Evaluating	
<b>Mandatory Units: all 4</b>										
F3GB 11	Communication	E(5)	E(5)	S(5)					S(5)	
F3HV 11	Mathematics: Craft 1			S(5)	S(5)	E(5)				
F5D6 11	Engineering: Using Information Technology	S(5)	S(5)	E(5)					S(5)	
F5DG 11	Health and Safety: Engineering			S(5)			S(5)	S(5)	S(5)	S(5)
<b>Restricted core Units: 2 from 4</b>										
F5W9 11	Engineering Materials			S(5)			S(5)		S(5)	
F5FP 11	Graphical Engineering Communication			S(5)	E(5)	S(5)				
F5W7 11	Engineering Dimensional Control					S(5)				
F5H4 11	Computer Aided Draughting (CAD) for Engineers			S(5)	S(5)	S(5)				
<b>Optional Units: 6 from 39</b>										
F5DE 11	Engineering project	S(5)	S(5)	S(5)	S(5)	S(5)	S(5)	E(5)	S(5)	S(5)
F5F7 12	Metal Inert Gas (MIG) Metal Active Gas (MAG) Welding Skills	S(6)	S(6)				S(6)	S(6)	S(6)	S(6)
F5EX 11	Pattern Development			S(5)	S(5)	S(5)				
F5F1 11	Thermal Cutting Skills				S(5)	S(5)	S(5)	S(5)	S(5)	
F5FG 11	Fabrication Skills				S(5)	S(5)	S(5)	S(5)	S(5)	
F3HW 11	Mathematics: Craft 2				S(6)	E(6)				
F5F6 12	Manual Metal arc (MMA) Welding Skills						S(6)	S(6)	S(6)	S(6)

Unit code	Unit title	Communication		ICT	Numeracy		Problem Solving			Working with Others
		Oral	Written		Using Graphical Information	Using Number	Critical Thinking	Planning and Organising	Reviewing and Evaluating	
F5EY 11	Pipework Skills				S(5)	S(5)	S(5)	S(5)	S(5)	S(5)
F5F0 11	Ship Construction Skills				S(5)	S(5)	S(5)	S(5)	S(5)	S(5)
F5F2 11	Thermal Joining Skills				S(5)	S(5)	S(5)	S(5)	S(5)	
F5FC 12	Tungsten Inert Gas (TIG) Welding Skills	S(6)	S(6)				S(6)	S(6)	S(6)	S(6)
F5F4 11	Welding Procedure Specification and Testing			S(5)		S(5)				
F5W6 11	Engineering Assembly skills	S(5)					S(5)	S(5)		S(5)
F5W8 11	Engineering Manufacturing Processes	S(5)								
F5WA 11	Engineering Workshop Skills				S(5)	S(5)	S(5)	S(5)		S(5)
F5D9 11	Industrial CNC Machining			S(5)			S(5)	S(5)	S(5)	S(4)
F5WD 11	Engineering Material Removal Principles		S(5)			S(5)	S(5)			
F5WB11	Material Removal Practice: Milling				S(5)	S(5)	S(5)	S(5)		
F5WC 11	Material Removal Practice: Turning				S(5)	S(5)	S(5)	S(5)		
F5H6 12	Robotic and Automated systems		S(5)	S(5)			S(5)		S(5)	
F5FM 12	Engineering Quality: An Introduction						S(6)	S(6)	S(6)	S(5)
F5HP 11	Electrical Wiring Skills				S(5)	S(5)	S(5)	S(5)	S(5)	
F5HM 11	Electrical Testing and Measurement				S(5)	S(5)	S(5)	S(5)	S(5)	S(5)
F5HH 11	Electrical Plant Safety and Maintenance		S(5)	S(5)			S(5)	S(5)		S(5)

Unit code	Unit title	Communication		ICT	Numeracy		Problem Solving			Working with Others
		Oral	Written		Using Graphical Information	Using Number	Critical Thinking	Planning and Organising	Reviewing and Evaluating	
<b>Optional Units: (cont)</b>										
F5DC 11	Electronic Test Equipment and Measurement						S(5)	S(5)		S(5)
F5J4 11	Maintenance Safety	S(5)	S(5)	S(5)						S(4)
F5J2 11	Plant Installation	S(5)			S(5)		S(5)	S(5)		S(4)
F5J3 11	Plant Maintenance Practice	S(5)					S(5)			S(4)
F5K2 11	Pneumatics and Hydraulics			S(5)	S(5)		S(5)	S(5)		S(4)
F5K3 11	Power Drives	S(5)	S(5)				S(5)	S(5)	S(5)	
F5EW 11	Fabrication Processes			S(5)			S(5)			
F5F3 11	Welding Processes	S(5)	S(5)	S(5)			S(5)			
F5HK 11	Electrical Principles				S(5)	S(5)	S(5)	S(5)	S(5)	
F5K1 11	Mechanical Engineering Principles				S(5)	S(5)	S(5)	S(5)		
F5K4 11	Engineering Prime movers		S(5)				S(5)			S(4)
F5W9 11	Engineering Materials			S(5)			S(5)		S(5)	
F5FP 11	Graphical Engineering Communication			S(5)	<b>E(5)</b>	S(5)				
F5W7 11	Engineering Dimensional Control					S(5)				
F5H4 11	Computer Aided Draughting (CAD) for Engineers			S(5)	S(5)	S(5)				



## Appendix 4: Example of integration with SVQ level 2: PEO

### National Certificate in Engineering Practice (SCQF level 5) — Mechanical Bias

Unit code	Unit title	Delivery
F3GB 11	Communication	Service out
F3HV 11	Mathematics: Craft 1	✓
F5D6 11	Engineering: Using Information Technology	✓
F5DG 11	Health and Safety: Engineering	✓
F5W9 11	Engineering Materials	✓
F5FP 11	Graphical Engineering Communication	✓
F5W7 11	Engineering Dimensional Control	✓
F5J3 11	Plant Maintenance Practice	✓
F5WC 11	Material Removal Practice: Turning	✓
F5WA 11	Engineering Workshop Skills	✓
F5K2 11	Pneumatics and Hydraulics	✓
F5K3 11	Power Drives	✓

### Performing Engineering Operations (SVQ level 2) — Mechanical Bias

Unit code	Unit title	Delivery
PEO2/001	Working safely in an engineering environment	✓
PEO2/002	Working efficiently and effectively in engineering	✓
PEO2/003	Using and communicating technical information.	✓
PEO2/005	Producing components using hand fitting techniques	✓
PEO2/011	Preparing and using lathes for turning operations	✓
PEO2/012	Preparing and using milling machines	✓
PEO2/019	Maintaining mechanical devices and equipment	✓
PEO2/029	Preparing and using MIG/MAG and other continuous wire welding equipment	✓