National Unit Specification: general information

UNIT Land-based Engineering: Health, Safety and the Environment (SCQF level 6)

CODE F91D 12

SUMMARY

This Unit is intended to be delivered and assessed in conjunction with other units in the National Qualification Group Award in Land-based Engineering. It may however be offered on a free standing basis.

The Unit is designed to provide candidates with knowledge and understanding of safety, health and environmental aspects of land-based engineering situations. During the delivery of the Unit candidates will develop knowledge of the Health, Safety and Environment pertinent to their sphere of activity. The Unit is designed to be delivered and assessed in parallel with other units in the National Qualification Group Award in Land-based Engineering. Candidates will develop safe working practices whilst in practical situations in the land-based engineering sector.

The Unit is suitable for candidates training to be Land-based Service Engineering technicians.

OUTCOMES

1 Describe current Health and Safety legislation, which embraces land-based engineering employers, employees and customers.
2 Apply current Health and Safety legislation to land-based engineering workplace situations.
3 Apply Health and Safety legislation to the movement of loads and components.
4 State and apply the environmental responsibilities of the land-based engineering industry.

Administrative Information

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National Unit Specification: general information (cont)

UNIT Land-based Engineering: Health, Safety and the Environment (SCQF level 6)

RECOMMENDED ENTRY

While entry is at the discretion of the centre, candidates would normally be expected to have attained at least one of the following, or equivalent:

- Communication at SCQF level 4
- Numeracy at SCQF level 4
- ICT at SCQF level 4

CREDIT VALUE

1 credit at SCQF level 6 (6 SCQF credit points at SCQF level 6*).

**SCQF credit points are used to allocate credit to qualifications in the Scottish Credit and Qualifications Framework (SCQF). Each qualification in the Framework is allocated a number of SCQF credit points at an SCQF level. There are 12 SCQF levels, ranging from Access 1 to Doctorates.*

CORE SKILLS

There is no automatic certification of Core Skills in this Unit. This Unit provides opportunities for candidates to develop aspects of the following Core Skills:

- ICT (SCQF level 5)
- Numeracy (SCQF level 4)
- Communication (SCQF level 5)
- Problem Solving (SCQF level 5)
- Working with Others (SCQF level 5)

These opportunities are highlighted in the Support Notes of this Unit Specification.

National Unit Specification: statement of standards

UNIT Land-based Engineering: Health, Safety and the Environment (SCQF level 6)

Acceptable performance in this Unit will be the satisfactory achievement of the standards set out in this part of the Unit Specification. All sections of the statement of standards are mandatory and cannot be altered without reference to SQA.

OUTCOME 1

Describe current Health and Safety legislation, which embraces land-based engineering employers, employees and customers.

Performance Criteria

(a) Describe correctly the responsibilities of land-based engineering employers and employees in relation to current legislation.
(b) Describe correctly the responsibilities of land-based engineering employers and employees to customers and the general public in relation to current legislation.
(c) Identify and describe correctly sources of potential hazard in the workplace.

OUTCOME 2

Apply current Health and Safety legislation to land-based engineering workplace situations.

Performance Criteria

(a) Risk assessments are carried out correctly in terms of identifying hazards, risks, control measures and the documentation is completed accurately.
(b) The procedures in the event of workplace incidents and accidents are applied correctly.
(c) The correct procedures in the event of a workplace injury are applied.
(d) Demonstrate correct adherence to health and safety practices in the working environment.
(e) The procedures to be followed in the event of a fire are demonstrated correctly.

OUTCOME 3

Apply Health and Safety legislation to the movement of loads and components

Performance Criteria

(a) The weight, size, moving equipment and planned route of the load are correctly established.
(b) The restraint, movement, control, and final positioning of loads are completed correctly.
(c) Recognise potential problems and find an effective solution

OUTCOME 4

State and apply the environmental responsibilities of the land-based engineering industry.

National Unit Specification: statement of standards (cont)

UNIT Land-based Engineering: Health, Safety and the Environment (SCQF level 6)

Performance Criteria

(a) Identify correctly the legislation which controls the environmental impact of land-based engineering.
(b) Demonstrate correct storage, handling, use and disposal of surplus environmentally sensitive materials.
(c) Observe the correct procedures for working on contaminated machinery.
(d) Describe correctly, energy saving activities and applications for the land-based engineering sector.

EVIDENCE REQUIREMENTS FOR THIS UNIT

Evidence is required to demonstrate that the candidates have achieved all of the Outcomes and Performance Criteria.

Outcome 1 — will be assessed by written and/or recorded oral evidence at assessment events under supervised conditions lasting no more than 60 minutes in total and must include:

- The correct identification of FOUR health and safety responsibilities of an EMPLOYER and SIX health and safety responsibilities of an EMPLOYEE from the following list below with NINE correct responses required:
  — Health and Safety at Work; COSHH; Electricity at Work; LOLER; Control of Noise at Work; Management of Health and Safety at Work; Supply of Machinery; Safety Signs, Manual Handling; Fire Precautions, First Aid; Reporting of Injuries; PPE; Provision and Use of Work Equipment; Training; Vibration at Work; Working at Height

- The correct identification of FOUR health and safety responsibilities of EMPLOYERS and EMPLOYEES in the LBSE industry to their customers and the general public from the following list below with THREE correct responses required:
  — Health and Safety at Work; COSHH; Electricity at Work; LOLER; Control of Noise at Work; Management of Health and Safety at Work; Supply of Machinery; Safety Signs, Fire Precautions; Reporting of Injuries; Provision and Use of Work Equipment

- the correct identification of 20 sources of potential health and safety hazards within the immediate work area including at least ONE of each arising from:
  — the use of tools, equipment and components
  — working on chemically and/or biologically contaminated machinery
  — working with substances hazardous to health
  — removal, replacement and absence of guards
  — removal of fire, slip and trip hazards
  — securing objects in danger of falling
  — removal of fumes, dust, hazardous gases and vapours
  — release of stored pressure
  — working in elevated and/or confined conditions
  — handling pressured gas cylinders and stored gases
  — welding
  — working with electricity
  — lone working
  — lifting and access equipment

National Unit Specification: statement of standards (cont)

UNIT Land-based Engineering: Health, Safety and the Environment (SCQF level 6)

Outcome 2 — will be assessed by performance evidence generated under supervised conditions throughout the other Units within the ***Land-based Engineering Award*** supported by assessor checklists covering the Outcome and all PCs. It is envisaged that evidence will be generated from the following ***Land-based Engineering Units*** by performance evidence with assessments conducted under supervised conditions in which the:

- Candidates must for a given item of plant, working environment or process, correctly identify the Health and Safety Act associated with each of TWELVE hazards and SIX risks and their relevant control measures and record these on pro-forma documentation

LBE units **Health and Safety topic**	**1/2**	**3**	**4**	**5**	**6/7**	**8/9**	**10/ 11**	**12/ 13**	**14/ 15**	**16**	**17**	**18**	**19**	**20**
Health and Safety at Work Act 1974				**X**										
Management of Health and Safety at Work Regulations 1999				**X**										
Workplace (Health, Safety and Welfare) Regulations 1992,		**X**	**X**											
Health and Safety (Safety Signs and Signals) regulations 1996,		**X**	**X**						**X**				**X**	
Control of Substances Hazardous to Health Regulations 2002 (as amended 2004)	**X**		**X**		**X**	**X**	**X**	**X**					**X**	**X**
Lifting Operations and Lifting Equipment Regs1998	**X**				**X**	**X**	**X**	**X**	**X**	**X**	**X**		**X**	**X**
Control of Noise at Work Regulations 2005	**X**		**X**						**X**					
Manual Handling Operations Regulations 1992	**X**				**X**	**X**	**X**	**X**		**X**	**X**		**X**	
Electricity at Work Regulations 1989,		**X**										**X**		
Fire (Scotland) Act 2005	**X**			**X**			**X**		**X**					
Reporting of Injuries, Diseases and Dangerous Occurrences Regulations 1995,				**X**										
Health and Safety (First Aid) Regulations 1981				**X**									**X**	
Provision and Use of Work Equipment Regulations 1998			**X**				**X**		**X**					
Personal Protective Equipment Regulations 1992			**X**						**X**					

Key to Land-based Engineering Units

Mandatory Section

1 Landbased Engineering: Engine Technology
2 Landbased Engineering: Piston Engine Repair skills
3 Landbased Engineering: Electrics: Introduction
4 Landbased Engineering: Workshop Processes

National Unit Specification: statement of standards (cont)

UNIT Land-based Engineering: Health, Safety and the Environment (SCQF level 6)

Specialist Section:

Agricultural

6 Landbased Engineering: Agricultural Machinery — Cultivation and Plant Establishment
7 Landbased Engineering: Crop Harvesting Machines

Forestry

8 Landbased Engineering: Timber Harvesting Heads
9 Landbased Engineering: Forestry Machinery Maintenance

Ground care

10 Landbased Engineering: General Ground Care Machinery
11 Landbased Engineering: Grass Maintenance Machinery

Construction

12 Landbased Engineering: Heavy Construction Plant
13 Landbased Engineering: Small Construction Plant

OPTIONAL SECTION

14 Landbased Engineering: Welding 1 (1 credit at SCQF level 6)
15 Landbased Engineering: Welding 2 (1 credit at SCQF level 6)
16 Landbased Engineering: Mechanical Transmission Systems (1 credit at SCQF level 6)
17 Landbased Engineering: Powershift, Hydrostatic and Stepless Transmission Systems (1 credit at SCQF level 6)
18 Landbased Engineering: Electronic Control and Monitoring Systems (1 credit at SCQF level 6)
19 Landbased Engineering: Brakes, Steering and Traction (1 credit at SCQF level 6)
20 Landbased Engineering: Hydraulics (1 credit at SCQF level 6)

- Candidates must correctly identify their health and safety responsibilities and the procedural stages to be followed in the event of a workplace incident
- Candidates must correctly identify their health and safety responsibilities and the procedural stages to be followed in the event of a workplace accident.
- Candidates must correctly identify the HSE and organisational procedures to be followed in the event of an HSE reportable accident in the workplace under RIDDOR.
- Candidates must demonstrate correct adherence to health and safety practices in the working environment.
- Candidates must correctly identify the procedures to be followed in the event of a fire or fire evacuation drill in a workplace situation.

Outcome 3 — candidates must, in accordance with health and safety recommendations and legislation, be assessed by a series of assignments designed to generate evidence of candidates' abilities to move various loads by performance evidence gathered at a series of assessment events conducted under supervised conditions. It is anticipated these assessments will be integrated with work undertaken in other practical units.

National Unit Specification: statement of standards (cont)

UNIT Land-based Engineering: Health, Safety and the Environment (SCQF level 6)

With regard to Outcome 3

- Candidates must determine a method of safely moving FOUR given loads of differing weight and size in various working environments, direction and distance along with any relevant control measures (this should include ONE manual handling exercise).
- Candidates must use appropriate lifting and slinging equipment/tools conforming to convention in their use.
- Observation checklist to be produced by the centre as evidence of the candidate's ability to follow instructions, correct use of lifting equipment, observe relevant/set safety requirements for the given tasks and carry out the procedures correctly.
- Candidates must identify at least ONE potential problem and suggest an effective solution.

Outcome 4 — will be assessed by written and/or recorded oral and performance evidence at a single assessment event lasting no more than 30 minutes conducted under supervised conditions or may be considered for Eassessment or a project based assignment.

With regard to Outcome 4

- Candidates must correctly identify TWO aspects of legislation governing the environmental impact of land-based engineering operations.
- Candidates must correctly state for FIVE substances the storage, handling, use and disposal of surplus materials, which are environmentally sensitive.
- Candidates must demonstrate the correct procedures when working on machinery contaminated by chemical and biological materials.
- Candidates must describe correctly FIVE energy saving activities and applications relevant to the land-based engineering sector.

National Unit Specification: support notes

UNIT Land-based Engineering: Health, Safety and the Environment (SCQF level 6)

This part of the Unit Specification is offered as guidance. The support notes are not mandatory. While the exact time allocated to this Unit is at the discretion of the centre, the notional design length is 40 hours.

GUIDANCE ON THE CONTENT AND CONTEXT FOR THIS UNIT

This Unit forms part of the National Qualification Group Award in Land-based Engineering.

The Unit is designed to be **incorporated and integrated with the content of other Units** within the ***Land-based Engineering Award***. It is envisaged that it will be mainly taught in tandem with other appropriate ***Land-based Engineering units*** as required rather than as a completely separate standalone Unit. Evidence will be gathered over the period of delivery of the relevant units with assessments conducted under supervised conditions at that time.

The content of this Unit is designed to allow the candidate to work safely within a land-based engineering workplace and on site. This is underpinned by the candidate gaining knowledge of the relevant legislation, roles and responsibilities and the requirements of Common Law in the interpretation of current legislation. Candidates will also be required to carry out a risk assessment and complete pro-forma documentation.

The study of legislation should include an awareness of the purpose, application and relevance of currently:

The Health and Safety at Work Act 1974, the Management of Health and Safety at Work Regulations 1999, the Workplace (Health, Safety and Welfare) Regulations 1992, the Health and Safety (Safety Signs and Signals) regulations 1996, the Control of Substances Hazardous to Health Regulations 2002 (as amended 2004), Lifting Operations and Lifting Equipment Regulations 1998, the Control of Noise at Work Regulations 2005, the Manual Handling Operations Regulations 1992, the Electricity at Work Regulations 1989, the Fire (Scotland) Act 2005, the Reporting of Injuries, Diseases and Dangerous Occurrences Regulations 1995, the Health and Safety (First Aid) Regulations 1981, the Provision and Use of Work Equipment Regulations 1998, the Personal Protective Equipment Regulations 1992, Vibration at Work Regulations 2005; Working at Height Regulations 2005.

The duties of employers to take reasonable care in their work towards employees and third parties with regard to: safe systems of work; safe plant and equipment; information, instruction and training of employees; provision and maintenance of a healthy and safe working environment. The duties of employees to take reasonable care in their work with regard to: themselves and others who may be affected by their acts or omissions; co-operating with their employers where safe systems of work and plant and equipment are used; not misusing anything provided in the interests of health, safety and welfare.

Specific issues in the LBE industry: Working at farm locations, Working at height, Injury from moving vehicles and equipment, Workplace transport, Vehicle exhaust emissions, Farm recovery of tractors and equipment, Noise, Harmful dusts, Slips and trips, Carcinogen materials, Livestock, Pesticides and veterinary medicines, Manual handling, Vibration. Welfare issues.

National Unit Specification: support notes (cont)

UNIT Land-based Engineering: Health, Safety and the Environment (SCQF level 6)

Preventing fire: good housekeeping, combustible materials stored correctly, flammable liquids and gases stored in designated areas along with the repair of components including fuel tanks. General fire procedures should include raising the alarm; turning off all machinery and power; closing all doors and windows; when to deal with the fire if safe and how to do so safely; evacuation using emergency exits; going to the assembly point. Nature of fire: fuel, heat, oxygen. Extinguishing fire: starving, smothering, cooling. Combustible materials and their flashpoints, oil soaked materials; paint and spirits, wood, paper, rags etc

Causes of electrical fires: overloaded circuits, over heated fuses; damaged equipment; worn cables and flexes; heating appliances.

Types of fire extinguishers: water; foam; dry powder; CO_2; BCF and fire blanket. Colour coding of extinguishers. Methods of extinguishing fires involving wood, paper, cloth etc; flammable liquids and gases; electrical equipment; burning clothing. Use of fire reports.

Accidents: the responsibilities of the employer and employee when an accident occurs, the correct procedures on the result of an accident and the correct procedures for reporting the accident in line with RIDDOR.

Injuries: procedures, location of First Aiders and First Aid equipment, electric shock, immediate response situations.

Incidents: importance of reporting incidents or ‘near misses’.

Use of protective equipment to include: safety helmet, eye protection, ear protection, protective footwear, aprons, respiratory protection, protective creams and gloves.

Identification of the dangers inherent in manual handling operations, awareness of assessing the risks in manual handling.

Importance of Health and Safety training including fitting of grinding wheels/discs, lift track operation, legislation to the movement of loads and components.

The environmental obligations of Land-based Engineering should cover the basic environmental responsibilities in a land-based engineering context, including an awareness of the environmental issues and how to reduce their impact during work activities. Emphasis should be placed on work practices, which reduce the risk of environmental damage, including the cleaning of chemical application machinery, recovery of oils, and fuels, liquid ballast, selection of non-toxic substances and recovery of refrigerants. The handling and storage of environmentally sensitive materials, chemical cleaners, fuels, gases, lubricants, paints, thinners, battery acid, coolants and the disposal of different types of potentially harmful substances and gases. Candidates should be able to differentiate between toxic and non-toxic waste and recyclable materials and non-recyclable materials methods of disposal.

It is a key aspect of the induction period in the centre that candidates are fully informed both of the regulations and that they are bound by these regulations. Candidates should be made aware when they are employed in the industry they have clear rights and duties with regard to health and safety.

National Unit Specification: support notes (cont)

UNIT Land-based Engineering: Health, Safety and the Environment (SCQF level 6)

A framework of health and safety and environmental policies, practices and procedures should be devised and adopted by the centre. Use may be made of ICT facilities in researching the sources of information of current legislation and could be partly integrated with the Core Unit for ICT on the course. The practical aspects should be emphasised and integrated into award practical units.

GUIDANCE ON LEARNING AND TEACHING APPROACHES FOR THIS UNIT

The legislation covered should be an overview and not an in-depth study of each piece of legislation.

The HSE and Service Engineering bodies publish a useful selection of guidelines and pro-forma, as well as picture-quiz materials where access to an actual workplace is impractical. These could be made readily available to candidates for both delivery and assessment purposes. It is important to ensure that the documentation used is current. Candidates should have the opportunity to access and research the Internet on the current legislation and any amendments with respect to European Directives.

This Unit should be delivered by a combination of teaching and learning approaches which could include:

- lecturing
- case studies
- practical activities incorporated and integrated with the content of other Units
- group discussions
- tutorials
- directed study
- investigation including the use of ICT
- site visits
- audio visual
- guest speaker

OPPORTUNITIES FOR CORE SKILL DEVELOPMENT

The Core Skill *ICT* at SCQF level 5 may be developed in Outcomes 1 and 4 where candidates may access, research and identify information pertinent to land-based engineering applications. The Core Skill may be further developed in Outcomes 2 and 3 where forms and reports may be produced to demonstrate understanding of the application of health and safety legislation.

Elements of the Core Skill *Communication* at SCQF level 5 may be developed in Outcomes 1, 2 and 4 where detailed and complex written and oral communications are required. In interpreting information provided from reference sources especially for Outcomes 1 and 4, apply it to techniques and communicating detailed written decisions on safety health and the environment.

Elements of *Numeracy* at SCQF level 4 may be developed in Outcome 3 where various aspects of lifting and handling techniques require numerical skills particularly carrying out calculations. The use of Graphical Information at SCQF level 5 may be developed in Outcomes 2 and 3 where candidates are given graphical information to interpret as part of these Outcomes.

National Unit Specification: support notes (cont)

UNIT Land-based Engineering: Health, Safety and the Environment (SCQF level 6)

Elements of the Core Skill of *Problem Solving* at SCQF level 5 — Critical Thinking, Planning and Organising, will be naturally developed in this Unit, which requires the application of knowledge to practical situations as candidates undertake activities in Outcomes 2 and 3. Here they develop knowledge and skills pertinent to health and safety in land-based engineering applications. Group discussion of risk control and measures for promoting and implementing safe working practices could reinforce analytical evaluation of any proposed approaches to working practice. Awareness of the importance and relevance of a range of factors is essential to efficient risk assessment. The Planning and Organisation component will be developed in Outcome 3 where a candidate moves loads through a series of routes. Candidates are required to Review and Evaluate the effectiveness of their work and recognise potential problems. In Outcome 4 candidates have the opportunity to demonstrate understanding of good environmental practices in working environments. Discussion of case studies during formative work would be particularly beneficial to candidates with no industrial experience and could enhance the ability to work with others. In Outcome 2 hazardous situations could be discussed and considered and the nature and scope of team goals, roles and responsibilities in industrial safety identified. Practical elements in other Units could provide additional opportunities for applying and reinforcing skills. Candidates should be given constructive feedback to encourage review and evaluation of their potential contribution to workplace safety.

Elements of *Working with Others* Core Skill at SCQF level 5 may be developed in Outcomes 2 and 3 in practical situations where team working is required while sharing service engineering workshop space, tools and equipment. These practical activities are incorporated and integrated with the content of other Units as prescribed in the Evidence Requirements for the Unit on pages 5 — 7. In other Units although candidates have to demonstrate practical skills independently, formative group activities could enhance the skills of working with others. Good practice in using and sharing service engineering workshop areas, tools and equipment in these Units could be discussed in terms of the nature and scope of team goals, roles and responsibilities. Candidates could be given constructive feedback to encourage review and evaluation of their approaches to practical work including their contribution to team working.

GUIDANCE ON APPROACHES TO ASSESSMENT FOR THIS UNIT

It is recommended that in this Unit the assessment evidence for Outcomes 2 and 3 should be generated as part of a programme or group of units, which are practical in nature. This would help to ensure that theoretical content can be more readily related to the application of current Health and Safety legislation in the workplace.

The evidence for Outcome 3 may be recorded on a centre-devised risk assessment pro-forma.

Assessment evidence may be generated as naturally occurring in conjunction with the execution of other tasks and activities or by simulation.

The assessment for Outcome 1 will require the candidate to demonstrate knowledge of the relevant Health and Safety legislation current at the time. The assessment paper may take the form of a multi-choice question paper consisting of 26 questions.

National Unit Specification: support notes (cont)

UNIT Land-based Engineering: Health, Safety and the Environment (SCQF level 6)

Opportunities for the use of e-assessment

Evidence for this Unit may be suitable for generation using e-assessment.

E-assessment may be appropriate for some assessments in this Unit. By e-assessment we mean assessment which is supported by information and communications technology (ICT), such as e-testing or the use of e-portfolios or e-checklists. Centres which wish to use e-assessment must ensure that the national standard is applied to all candidate evidence and that conditions of assessment as specified in the Evidence Requirements are met, regardless of the mode of gathering evidence. Further advice is available in *SQA Guidelines on Online Assessment for Further Education (AA1641, March 2003), SQA Guidelines on e-assessment for Schools (BD2625, June 2005).*

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**