Higher National Unit specification

General information for centres

Unit title: Crop and Livestock Mechanisation

Unit code: F1Y5 35

Unit purpose: This Unit is designed to enable candidates to develop the Knowledge and Skills to enable effective management and use of feeding and dairy equipment for livestock, and to develop their understanding of crop-environment inter-relationships to better manage crop facilities such as crop driers and stores. Candidates will identify the factors influencing the selection and performance of both crop and livestock equipment to enable a wide ranging but detailed appreciation of the issues involved in mechanised systems development and in particular to identify areas for improvement of existing systems.

On completion of the Unit the candidate should be able to:

1 Evaluate the layout, performance and management of dairy parlour systems.
2 Evaluate mechanised systems for the feeding and watering of ruminant livestock.
3 Evaluate the options for the storage of cereal, root and vegetable crops.

Credit points and level: 1 HN credit at SCQF level 8: (8 SCQF credit points at SCQF level 8*)

**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.*

Recommended prior knowledge and skills: It is recommended that candidates have an appreciation of crop and livestock production systems and in particular are aware of the dietary requirements of livestock and the harvest conditions of agricultural crops. This may be evidenced by possession of F2E8 34 *Livestock Growth, Health and Welfare,* and F1Y6 34 *Crop Protection and Harvesting Mechanisation.*

Core Skills: There are opportunities to develop the Core Skill of *Communication* — Written Communication — to SCQF level 6 in this Unit, although there is no automatic certification of Core Skills or Core Skills components.

General information for centres (cont)

Context for delivery: If this Unit is delivered as part of a Group Award, it is recommended that it should be taught and assessed within the subject area of the Group Award to which it contributes.

Assessment: There are three assessments for this Unit each associated with an Outcome. Outcome 1 and Outcome 3 can both be assessed by means of extended response and short answer questions. Outcome 2 may be assessed by means of a report based on a short investigation of a real system.

Higher National Unit specification: statement of standards

Unit title: Crop and Livestock Mechanisation

Unit code: F1Y5 35

The sections of the Unit stating the Outcomes, Knowledge and/or Skills, and Evidence Requirements are mandatory.

Where evidence for Outcomes is assessed on a sample basis, the whole of the content listed in the Knowledge and/or Skills section must be taught and available for assessment. Candidates should not know in advance the items on which they will be assessed and different items should be sampled on each assessment occasion.

Outcome 1

Evaluate the layout, performance and management of dairy parlour systems

Knowledge and/or Skills

- Milking installations
- Dairy installations
- Dairy system performance
- Operating Requirements
- Hygiene and safety

Evidence Requirements

Candidates will need to provide evidence to demonstrate their Knowledge and/or Skills by showing that they can:

- evaluate two contrasting milking installations for their relative merits
- explain the function and mode of operation of the vacuum and milk-line components of a dairy installation
- evaluate the impact of four significant factors on dairy system performance
- evaluate the procedural and equipment measures that impact on the hygiene, safety and environmental aspects associated with milk production

Assessment Guidelines

This Outcome may be assessed by means of an assessment composed of short answer or extended response questions. It is recommended that the test consists of approximately fifteen such questions to cover the Evidence Requirements. The questions could be based on a site visit.

Higher National Unit specification: statement of standards (cont)

Unit title: Crop and Livestock Mechanisation

Outcome 2

Evaluate mechanised systems for the feeding and watering of ruminant livestock

Knowledge and/or Skills

- Stock requirements
- Feed preparation
- Feed distribution
- Stock welfare
- Water supply systems
- Health and Safety Requirements

Evidence Requirements

Candidates will need to provide evidence to demonstrate their Knowledge and/or Skills by showing that they can:

- detail a suitable and safe feed preparation method appropriate to feed composition and stock requirements
- evaluate the layout, mode of operation and the operational performance of the feed distribution mechanism for a given livestock system
- evaluate the influence of building and feeder (or feed barrier) design on the performance of a given feeding system
- specify a water supply system for the provision of water to selected livestock to meet welfare and production requirements

Assessment Guidelines

This Outcome could be assessed by means of a report that presents a detailed review of the feeding and watering arrangements on a selected enterprise. It is recommended that the report is based on a site visit supported by research of alternative applicable systems. The report could be about 1,000 words with supporting diagrammatic material.

Higher National Unit specification: statement of standards (cont)

Unit title: Crop and Livestock Mechanisation

Outcome 3

Evaluate the options for the storage of cereal, root and vegetable crops

Knowledge and/or Skills

- Crop deterioration
- Crop conditioning
- Crop storage
- Store types
- Crop store management
- Health and Safety Requirements

Evidence Requirements

Candidates will need to provide evidence to demonstrate their Knowledge and/or Skills by showing that they can:

- evaluate the relationship between the rate and mechanism of deterioration of crop quality and the handling and storage environments of two contrasting crops
- evaluate the pre-storage conditioning applicable to two contrasting crops to manage crop quality during storage
- evaluate the impact of the layout and operation of two alternative crop stores for a specified crop on their ability to minimise the loss of crop quality
- explain the responsibility of store managers with regard to safety, hygiene and environmental issues appropriate to a given crop store

Assessment Guidelines

This Outcome may be assessed by means of short answer and extended response questions. It is suggested that approximately 20 questions are used to cover the Evidence Requirements.

Administrative Information

Unit code: F1Y5 35

Unit title: Crop and Livestock Mechanisation

Superclass category: SK

Original date of publication: August 2008

Version: 01

History of changes:

Version	Description of change	Date

Source: SQA

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Higher National Unit specification: support notes

Unit title: Crop and Livestock Mechanisation

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

The intended context for this Unit is UK agriculture. There are three main areas of study dairy, feed mechanisation and crop conditioning and storage. The object is to consider in detail the mechanisation aspects of UK livestock production particularly as it relates to the dominant ruminant stock. The Unit does not consider systems for non-ruminant or avian stock which is covered in specialist Units.

Outcome 1 explores in detail the mechanisation associated with dairy production. Hence it considers the principles of operation of milking equipment, milk cooling, on-farm milk storage, and ancillary parlour specific equipment. This could include cow identification systems. The study should include investigation of the significant equipment and system performance factors such as milking rate and parlour operation issues such as udder hygiene, disease control, pipeline cleaning/disinfection, electrical safety and disposal of milk washings. The range of parlour designs including robotic systems and their influence on parlour throughput, operator environment and manpower requirement should be examined and the relative merits established.

Outcome 2 continues the exploration of livestock engineering issues by examining the feeding and watering of livestock. Again this is predominantly related to ruminant stock. Candidates should consider feed preparation methods appropriate to grains, roots and forage and handling, proportioning and mixing techniques. This should be followed by consideration of feed distribution arrangements. This may include forage boxes, mixer wagons and complete diet feeders and bale feeders as well as feed pass and stance arrangements and trough and barrier details. In all cases the impact of the method on the welfare of the livestock must be explored.

Outcome 3 examines the storage of cereal, root and vegetable crops. As stored crops are frequently used for animal feed it may be considered logical to consider this Outcome first in a teaching programme. An appropriate approach for the Outcome would be to consider the mechanisms of post-harvest deterioration in crops, the relationships between the storage environment and pests/diseases, and the processes of moisture loss and equilibria. This would then lead the processes of cleaning, grading, additives, driers (and the different types) and the methods of crop handling. In turn this should lead to consideration of store (bulk and box) construction and management.

Higher National Unit specification: support notes (cont)

Unit title: Crop and Livestock Mechanisation

Guidance on the delivery and assessment of this Unit

The delivery of the Unit could consist of a variety of delivery methods using varied media. Good diagrammatic material will be essential to support the learning. It would be beneficial to support class room time with visits to see and discuss the attributes of the installations in question.

The assessment for the Unit may consist of extended response and short answer questions for Outcomes 1 and 3 and a report for Outcome 2. The report can be based on an on-farm investigation where the candidate reviews the feed and water preparation and distribution systems that exist and prepare a report that considers the advantages and disadvantages of the arrangements and provides reasons for the systems in place. This way the candidate may consider alternative approaches and therefore their knowledge base and their ability to rationally review information will be enhanced.

Opportunities for developing Core Skills

There are opportunities for the candidate to develop Written Communication at SCQF level 6 in the assessment of all Outcomes. If candidates complete written work for all Outcomes they will an opportunity to develop the general skill 'produce well structured written communication on complex topics'. Candidates when completing their assessment material will have to present essential ideas/information on feed and water arrangements and supporting detail in a logical and effective order.

Open learning

This Unit would be suitable for delivery on an open learning (distance learning) basis. However, it should be noted that good access may be required to the facilities explored in the Unit such as dairy, livestock feeding and crop storage installations.

Candidates with disabilities and/or additional support needs

The additional support needs of individual candidates should be taken into account when planning learning experiences, selecting assessment instruments, or considering alternative Outcomes for Units. Further advice can be found in the SQA document *Guidance on Assessment Arrangements for Candidates with Disabilities and/or Additional Support Needs* **(www.sqa.org.uk)**.

General information for candidates

Unit title: Crop and Livestock Mechanisation

In this Unit you will learn about three important areas for British agriculture. The main function of agriculture is to provide food, it does this by growing crops to capture solar energy. However, crops only grow for a short period, to have them available all year they require to be stored. This Unit considers in detail why crops deteriorate after harvest, and how we can slow these processes and successfully store cereal and other crops for extended periods. Some crops are fed to livestock to produce meat and milk and this Unit also looks at how crops need to be prepared for feeding, the delivery of feed to the stock and how the other essential for life, water, can be delivered to stock. Finally for the livestock that are kept for milk production there is a need to milk this stock. So the Unit also considers the many types of dairy parlour installations that can be found including robotic systems and examines how they function and their relative merits. Each of these three areas crop storage, livestock feeding equipment and milking equipment uses increasingly sophisticated mechanisation and this Unit provides the opportunity to critically review the options.

Your assessment for Outcome 1 and Outcome 3 may be a mix of short answer and extended response questions. Outcome 2 may be assessed by means of a report based on a short investigation of a real system.