

# Next Generation Higher National Unit Specification

## Principles of Crop Production (SCQF level 7)

**Unit code:** J6FD 47

**SCQF level:** 7 (32 SCQF credit points)

**Valid from:** session 2024–25

### **Prototype unit specification for use in pilot delivery only (version 2.0) August 2024**

This unit specification provides detailed information about the unit to ensure consistent and transparent assessment year on year.

This unit specification is for teachers and lecturers and contains all the mandatory information required to deliver and assess the unit.

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## **Unit purpose**

This SCQF level 7 unit is suitable for learners studying agriculture or similar subject areas. It is a mandatory component of the Higher National Certificate (HNC) Agriculture. Largely theory-based, it provides learners with the skills and knowledge required to sow, grow, protect and harvest arable, fodder and forage crops. It examines the theory underpinning the practical skills associated with field tasks, as well as the legislative and environmental considerations of crop production.

Learners do not need any prior knowledge or experience to study the unit.

## Unit outcomes

Learners who complete this unit can:

- 1 identify a range of crops, pests, weeds, diseases and crop disorders
- 2 describe the application of principles of crop production to stipulated crops
- 3 explain the effect of crop production on the environment and develop mitigation strategies — making reference to sustainability principles (social, economic and environmental) and at least two of the United Nations (UN) Sustainable Development Goals (SDGs)
- 4 describe the application of precision technology in a crop-production system

## Evidence requirements

The unit is designed to be assessed through a portfolio of evidence generated across all learning outcomes.

To successfully achieve these outcomes, learners must provide the following evidence:

### Outcome 1

- ◆ Identify a range of relevant crop species at different growth stages.
- ◆ Identify a range of weeds, pests and diseases for relevant crop species.

Note that the relevant species must include arable, grass and fodder crops.

### Outcomes 2 and 3

- ◆ Apply the principles of crop production to produce annual cropping plans for both an arable and a grass or a fodder crop. These must include:
  - crop establishment, production, protection, harvesting and storage
  - an explanation of both environmental risks and climate change relevance
  - an explanation on growing an arable, grass or fodder crop using sustainable principles and how this relates to at least two of the UN SDGs

You do not need to assess all sections for both cropping plans, but you should assess all sections for at least one crop.

### Outcome 4

- ◆ Identify representative crop or field data.
- ◆ Analyse data in the context of precision agriculture.
- ◆ Apply the findings to a cropping or field-management scenario.
- ◆ Describe how to apply a precision technology in this scenario.

Learners acquire most of their knowledge for this unit in outcomes 1 and 3. For outcomes 2 and 4, they focus on applying this acquired knowledge.

## Knowledge and skills

The following table shows the knowledge and skills covered by the unit outcomes:

| Knowledge   | Skills   |
|---|--|
| <p><b>Outcome 1</b><br/>Learners should understand:</p> <ul style="list-style-type: none"> <li>◆ the scientific principles behind crop establishment, production, protection and harvesting including:               <ul style="list-style-type: none"> <li>— the characteristics of arable, fodder and grass species</li> <li>— the growth stages of arable, grass and fodder crops</li> <li>— how to identify pests, weeds and diseases in arable, grass and fodder crops (epidemiology)</li> </ul> </li> </ul>   | <p><b>Outcome 1</b><br/>Learners can:</p> <ul style="list-style-type: none"> <li>◆ identify crop species and growth stages for arable, fodder and grass crops and list their characteristics</li> <li>◆ identify pests, weeds and diseases of arable, fodder and grass crops</li> <li>◆ identify the main plant nutrients</li> </ul>   |
| <p><b>Outcome 2</b><br/>Learners should understand:</p> <ul style="list-style-type: none"> <li>◆ how to plan farming activities to successfully produce a crop in a given scenario</li> <li>◆ how to justify decisions made in an agricultural setting, in scenarios that include descriptions of the following:               <ul style="list-style-type: none"> <li>— characteristics of varieties and mixtures</li> <li>— main nutrients and their purposes</li> <li>— soil characteristics in terms of physical and chemical properties</li> <li>— crop-protection methods, including precision techniques</li> <li>— crop-establishment techniques</li> <li>— crop storage, including precision methods (including grain, fodder and grass)</li> </ul> </li> </ul> | <p><b>Outcome 2</b><br/>Learners can apply this knowledge to both an arable crop and or fodder crop by:</p> <ul style="list-style-type: none"> <li>◆ selecting appropriate varieties or species</li> <li>◆ selecting and justifying appropriate cultivation methods including:               <ul style="list-style-type: none"> <li>— making an appropriate fertiliser recommendation</li> <li>— selecting appropriate control measures for pest, weeds and disease</li> <li>— choosing suitable harvest and storage conditions</li> </ul> </li> </ul> |

| Knowledge  | Skills   |
|--|--|
| <p><b>Outcome 3</b><br/>Learners should understand:</p> <ul style="list-style-type: none"> <li>◆ the impact of crop production on the wider environment</li> <li>◆ how to develop mitigation strategies for environmental harms caused by crop production including: <ul style="list-style-type: none"> <li>— the effect of cultivation: soil degradation</li> <li>— the effect of fertilisers: soil degradation, eutrophication, biodiversity</li> <li>— the effect of pesticides: biodiversity, soil degradation</li> <li>— climate change: links between farm activities and climate change, and the impact of changing climate on farms and crop production</li> </ul> </li> </ul> | <p><b>Outcome 3</b><br/>Learners can:</p> <ul style="list-style-type: none"> <li>◆ identify soil degradation caused by cultivation, including erosion</li> <li>◆ identify the effect of fertilisers on soil degradation, eutrophication and biodiversity</li> <li>◆ identify the effect of pesticides on biodiversity, water courses and soil degradation</li> <li>◆ identify and discuss the links between farm activities and climate change, and the impact of changing climate on farms and crop production</li> </ul> |
| <p><b>Outcome 4</b><br/>Learners should understand:</p> <ul style="list-style-type: none"> <li>◆ the potential and actual impact of precision technology in a crop-production system</li> </ul>  | <p><b>Outcome 4</b><br/>Learners can:</p> <ul style="list-style-type: none"> <li>◆ identify crop and field data in a representative manner</li> <li>◆ interpret data using ideas around precision agriculture</li> <li>◆ apply findings from data collection and interpretation in a cropping scenario</li> </ul>  |

## Meta-skills

Throughout the unit, learners develop meta-skills to enhance their employability in the agriculture sector.

Where possible you should deliver and assess the unit holistically, in accordance with the integrated nature of agriculture, so that learners have the opportunity to gain and develop meta-skills throughout the course.

## Self-management

This meta-skill includes:

- ◆ focusing: developing strategies to maintain focus in different classroom situations, including traditional lecture sections, individual study time and group work, as well as during self-directed study to achieve desired results and meet deadlines
- ◆ adapting: being flexible while working with others, learning about best practice or new systems, understanding how agricultural environments and decisions connect with and influence the wider world
- ◆ initiative: justifying decisions and developing new strategies or mitigations during formative and assessed work, showing these skills during class and group discussions

## Social intelligence

This meta-skill includes:

- ◆ communicating: developing communication skills, both written and oral; putting forward ideas during assessments and class work; communicating professionally with staff and peers to arrange meetings, explain absences and ask questions
- ◆ collaborating and leading: participating in group activities facilitating strong peer-to-peer relationships

## Innovation

This meta-skill includes:

- ◆ curiosity: exploring further research topics of interest; developing new interests through participation in class exercises, both practical and theoretical
- ◆ creativity: exploring innovative and creative use of resources; reflecting on scenarios and considering how they might have done things differently compared with the presented solution, and thinking about whether this would have improved the outcome
- ◆ sense-making: participating in activities throughout the year, involving data gathering and analysis, and using collected or provided information to apply learned concepts to real-world situations
- ◆ critical thinking: decision-making aspects through classroom-based activities, formative exercises and group work

## **Literacies**

Learners develop core skills in the following literacies:

### **Numeracy**

Learners develop numeracy skills by:

- ◆ working through necessary calculations prior to carrying out many agricultural activities, including sowing, fertilising, spraying and calculating yields
- ◆ analysing data they have collected or been given to draw conclusions and develop plans

### **Communication**

Learners develop communication skills by:

- ◆ developing their writing, oral presentation and interpersonal skills during formative and assessed work, class exercises and group work

### **Digital**

Learners develop digital skills and computer literacy by:

- ◆ producing work in different formats, including written work, video and audio files submitted to online platforms
- ◆ using digital platforms to carry out research and learning to select reliable and verifiable sources
- ◆ using widely-used programmes, such as word processing, spreadsheets and presentation software to produce evidence for assessment

## **Delivery of unit**

If the unit is delivered as part of the HNC Agriculture there may be opportunities to integrate delivery and assessment with that of the Professional Practice and Skills at SCQF level 7 unit.



## **Additional guidance**

The guidance in this section is not mandatory.

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

#### **Identify a range of crops, pests, weeds diseases and disorders (outcome 1)**

##### **Suggested content**

- ◆ characteristics of arable, fodder and grass species
- ◆ growth stages of arable, grass and fodder crops
- ◆ identification of pests, weeds and diseases in arable, grass and fodder crops: epidemiology

##### **Suggested evidence**

You can assess identification aspects using short tests, which can include multiple-choice and short-answer questions.

#### **Describe the application of principles of crop production to stipulated crops (outcome 2)**

##### **Suggested content**

- ◆ main nutrients and their purposes
- ◆ soils: characterisation of physical and chemical properties
- ◆ crop-protection chemicals and nutrition techniques, including precision methods
- ◆ crop storage, including precision methods: grain, fodder and grass

##### **Suggested evidence**

You can use crop-production plans (portfolios) to assess learners' ability to use knowledge gained from outcomes 1 and 3 to address outcome 2.

#### **Explain the effect of crop production on the environment and develop mitigation strategies (outcome 3)**

##### **Suggested content**

- ◆ effect of cultivation: soil degradation
- ◆ effect of fertilisers: soil degradation, eutrophication, biodiversity
- ◆ effect of pesticides: biodiversity, soil degradation
- ◆ global change: links between farm activities and climate change, the impact of changing climate on farms and crop production

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### **Suggested evidence**

You can use crop-production plans (portfolios) to assess learners' ability to apply the knowledge they gain from outcomes 1 and 3 to address outcome 2. You can combine assessment for outcomes 2 and 3 by asking learners to produce crop production plans for both an arable and grass or fodder crop.

### **Describe the application of precision technology in a crop production system (outcome 4)**

#### **Suggested content**

- ◆ importance of data for crop-production systems
- ◆ data-collection methods
- ◆ application and use of data

#### **Suggested evidence**

You can assess outcome 4 through a project where learners collect farm data, input the data into a spreadsheet, and then interpret it and make suggestions. They can present this as a poster, oral presentation, video, podcast or suitable equivalent. Alternatively, they can produce a written assessment in the form of a 1,500-word report, or suitable equivalent.

You can assess this outcome alongside outcome 4 of the Principles of Livestock Production at SCQF level 7 unit.

## **Equality and inclusion**

This unit is designed to be as fair and as accessible as possible with no unnecessary barriers to learning or assessment.

You should take into account the needs of individual learners when planning learning experiences, selecting assessment methods or considering alternative evidence.

Guidance on assessment arrangements for disabled learners and/or those with additional support needs is available on the assessment arrangements web page:

[www.sqa.org.uk/assessmentarrangements](http://www.sqa.org.uk/assessmentarrangements).

## Information for learners

### Principles of Crop Production (SCQF level 7)

This information explains:

- ◆ what the unit is about
- ◆ what you should know or be able to do before you start
- ◆ what you need to do during the unit
- ◆ opportunities for further learning and employment

### Unit information

This unit gives you the knowledge and skills to allow you to sow, grow, protect and harvest arable, fodder and forage crops. You learn the theory underpinning practical skills associated with field tasks, and develop an understanding of the legislative and environmental considerations associated with crop production.

Specifically, you learn to:

- 1 explain the scientific principles behind crop establishment, production, protection and harvesting
- 2 apply the principles of crop production to stipulated crops and scenarios, and record the reasons for their decisions
- 3 explain the effect of crop production on the environment and develop mitigation strategies — making reference to sustainability principles (social, economic and environmental) and at least two United Nations (UN) Sustainable Development Goals (SDGs)
- 4 describe the application of precision technology in a crop-production system

You do not need any prior experience or understanding of crop-production systems to do the unit. If you study the Professional Practice and Skills at SCQF level 7 unit at the same time, you can put much of the theory in this unit into practice.

You can be assessed in a variety of ways. For outcome 1, it might be in the form of short tests, including short-answer or multiple-choice questions. For outcomes 2 and 3, you create a portfolio of annual crop-production plans for arable, grass and fodder crops. For outcome 4, you carry out a project, which involves collecting real farm data, analysing that data and then making suggestions based on your findings.

The unit gives you the knowledge you need to work as part of a cropping enterprise on a farm, and is complemented by the Professional Practice and Skills at SCQF level 7 unit, through which you can gain the associated practical crop skills. Together, the units give you specialist knowledge of cropping systems, which is invaluable on a working farm.

# Administrative information

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**Superclass:** SD

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## History of changes

| Version | Description of change   | Date      |
|---------|---|-----------|
| 2.0     | Added UN SDGs to Unit Outcomes and Unit Information sections. Removed content on mechanisation. | June 2024 |
|         |   |           |
|         |   |           |
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Note: please check [SQA's website](#) to ensure you are using the most up-to-date version of this document.