

Next Generation Higher National Unit Specification

Advanced Production Horticulture (SCQF level 8)

Unit code: J7A4 48
SCQF level: 8 (24 SCQF credit points)
Valid from: session 2023–24

Prototype unit specification for use in pilot delivery only (version 1.0) September 2023

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 unit provides learners with advanced knowledge of production horticulture and emphasises the application of practical skills and crop maintenance techniques. It champions authentic skills for industry, including:

- ◆ financial planning
- ◆ risk assessment
- ◆ managerial skills, such as digital skills for stock planning and crop management

As learners build their knowledge and application of UK law, and industry regulations and standards, they deepen their understanding of the responsibilities of crop production in commercial practice. Learners develop their knowledge and understanding of crop production, crop maintenance and pest control in relation to environmental responsibility, informed by UK law and standards for water, land, the natural environment and society.

Before starting the unit, learners would benefit from having a foundation knowledge of production horticulture, ideally having completed Production Horticulture at SCQF level 7, on which this unit expands.

You can integrate topics according to your centre's facilities and resources.

Unit outcomes

Learners who complete this unit can:

- 1 appraise sustainability and environmental implications of commercial horticultural crop production systems
- 2 produce a financially suitable integrated crop management plan for a commercial horticultural crop production enterprise
- 3 demonstrate advanced understanding and application of crop production within a commercial environment
- 4 implement and manage a crop management plan and reflect on the process of raising crops to a commercial UK standard

Evidence requirements

Learners must provide the following evidence:

Outcome 1

Learners research current examples of commercial crop production systems and use them to appraise the principles of sustainability and environmental implications. Learners' appraisals must include:

- ◆ identification of the commercial field and/or protected crop production systems they are appraising
- ◆ environmental, social and economic factors that have an impact on productivity, and practices for best commercial crop yield
- ◆ current levels of sustainable practice and recommendations for future improvements
- ◆ scientific and/or peer-reviewed evidence to justify the appraisal in current commercial practice

Examples of protected production systems could include (but are not limited to):

- ◆ tomato, cucumber and pepper production
- ◆ bedding plants
- ◆ cut-leaf salad production
- ◆ container production of houseplants
- ◆ cut flowers (under cover)
- ◆ hydroponic systems, including vertical farming

Examples of field crops for comparison could include (but are not limited to):

- ◆ field-grown vegetables, such as leek, carrot, and cabbage
- ◆ hardy ornamental nursery stock
- ◆ soft fruit (field grown)
- ◆ top fruit (orchard)
- ◆ cut flowers (field grown)

At your centre's discretion, learners can provide their appraisal as (but are not limited to):

- ◆ an oral presentation, with accompanying infographics
- ◆ a podcast
- ◆ a blog
- ◆ a written document

Outcomes 2, 3 and 4

Learners should individually produce an integrated crop management plan that focuses on a minimum of four crops being grown simultaneously for the basis of comparison. Ideally, these should be from distinct and/or different production lines.

It is at your centre's discretion if the crops selected are field grown, protected, or in a combination. The simulated platform should provide learners with specimen plants. We recommend site visits.

You can implement the integrated crop management plan individually or in groups, with small group work being encouraged.

Learners can provide evidence using a range of digital software, and they must include:

- ◆ a Gantt chart that follows the growing seasons of the crops, including successional growing, where appropriate, to the point of crop harvest
- ◆ industry standard protocols of production that inform the evidence for all crops, including:
 - detailed propagation requirements
 - maintenance
 - pest control
 - accepted standards for point-of-sale production
 - size
 - number
 - volume of commercial crop unit
- ◆ a management strategy for soils or growing media of chosen crops
- ◆ an integrated pest management (IPM) strategy that is commercially viable for crop production
- ◆ an irrigation and fertilisation strategy that reflects current UK law for the protection of water and the environment

- ◆ a commercially viable waste management strategy that reflects current UK law and standards for waste and environmental protection
- ◆ a financial plan that is applicable to any current UK situation and is of best commercial standing and efficacy for a financial profit at that time
- ◆ a risk assessment that adheres to and implements current UK health and safety-at-work law for all aspects of work activity in the management plan
- ◆ an advisement plan on new technologies, techniques and methods that could enhance crop production practices by enabling sustainability and improving environmental safeguarding
- ◆ a reflective and discursive log of practical activities, including:
 - application of and adherence to all or any points determined by the risk assessment and control of substances hazardous to health (COSHH) protocol
 - correct application of propagation techniques for best commercial practice
 - preparation and maintenance of crops and growing facilities for best commercial practice
 - implementation of their crop management plan, detailing irrigation, fertilisation and pest control for best commercial practice, and all obligations to UK laws for environmental protection and guidelines
 - raising, harvesting and grading of a crop, following best commercial industry standards and practices
 - disposal or clearance of all plant risings and growing materials, or media and chemicals, as required by UK law and guidelines and best environmental practice

Knowledge and skills

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

Knowledge	Skills
<p>Outcome 1 Learners should understand:</p> <ul style="list-style-type: none"> ◆ the scientific principles of crops grown for crop production practices ◆ how all crops are identified by botanical and commercial names ◆ how plant breeders' rights are applied ◆ the use and application of certified disease-free stock in commercial crop production in the UK ◆ the science of soil and growing media and commercial crop production practices ◆ how to apply the best control methods for common disorders, pests, and diseases of crops grown for crop production practices in the UK, with application of all relevant UK law and regulations ◆ the principles of sustainability, environmental protection and safeguarding of water in relation to commercial crop production practices in the UK 	<p>Outcome 1 Learners can:</p> <ul style="list-style-type: none"> ◆ apply scientific principles to inform strategies for commercial best practice of crop production, to a commercial crop standard ◆ apply strategies to predict, discover, limit, control and diminish common disorders, pests, and diseases of crops grown for crop production, adhering to all applicable UK laws and guidelines ◆ explore and understand the environmental impact of crop production and evaluate improvements in crop production for sustainability and environment ◆ apply and safeguard water as a resource, within UK law and guidelines ◆ discuss, understand and apply best commercial crop production practices, including best financial practice for crop production ◆ understand and apply all relevant UK law and regulations regarding crop production

Knowledge	Skills
<p>Outcome 2 Learners should understand:</p> <ul style="list-style-type: none"> ◆ the application of best financial strategies for economic return in crop production ◆ the management of resources to ensure best commercial practice in crop production practice ◆ how to implement technologies to enable and enhance best commercial crop production practice ◆ sustainable and environmental crop production practices 	<p>Outcome 2 Learners can:</p> <ul style="list-style-type: none"> ◆ apply best financial practice to inform decision making for management of crop production in a commercial environment ◆ engage with and apply technologies to enhance, develop and enable best commercial crop production practice ◆ engage with and inform a business using financial literacy and best economic practices of the current crop production market ◆ engage with better methods of sustainable practice ◆ engage with and apply environmental safeguarding methods in crop production practice
<p>Outcome 3 Learners should understand:</p> <ul style="list-style-type: none"> ◆ risk assessment under current UK health and safety-at-work-law and regulations ◆ risk assessment and regulation of working environments ◆ best practice for a range of advanced crop production techniques, and use of equipment and technologies ◆ the application and use of fertilisers, plant protection products, and plant growth regulators in commercial crop production 	<p>Outcome 3 Learners can:</p> <ul style="list-style-type: none"> ◆ create and implement a risk assessment for safe practices of crop production ◆ understand and implement UK COSHH law and regulations for the safe use of fertilisers, plant protection products and plant growth regulators in crop production practice ◆ demonstrate and advise on safe practice and techniques for use of equipment in commercial crop production practice ◆ monitor and advise others for their best practice of UK health and safety-at-work law and regulations in a crop production environment

Knowledge	Skills
<p>Outcome 4 Learners should understand:</p> <ul style="list-style-type: none"> ◆ all necessary phytosanitary guidelines ◆ how to select commercial certified propagation material ◆ commercial best practice for hygienic growing environments, including preparation, maintenance and post-harvest clearance of crop production environments ◆ the application of an integrated crop management plan within a commercial environment ◆ the application of disorder, disease, and pest control systems to minimise yield loss ◆ the application of commercial standards for a viable yield and unit of any crop ◆ how to reflect on practical activities for commercial best practice and improvements to current practice 	<p>Outcome 4 Learners can:</p> <ul style="list-style-type: none"> ◆ work safely, and discuss and apply any phytosanitary controls necessary in a commercial crop production environment ◆ apply best commercial practice to raise a crop to correct standard for point of sale ◆ discuss and advise on best hygienic practice for maintenance of a crop production environment ◆ use, apply and advise best commercial practice of disorder, disease, pest control, maintenance and mitigation of crops in a crop production environment ◆ carry out reflective practices to their activities and implement and advise on better strategies to inform better commercial practice

Meta-skills

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

Self-management

This meta-skill includes:

- ◆ adapting: responding to any issues that arise during the production process
- ◆ initiative: taking responsibility for growing crops

Social intelligence

This meta-skill includes:

- ◆ communicating: receiving and giving information
- ◆ collaborating: working in groups with peers

Innovation

This meta-skill includes:

- ◆ curiosity: observing crop growth and applying judgement to any crop management decisions
- ◆ critical thinking: designing and implementing a crop management plan

Literacies

Learners develop core skills in the following literacies:

Numeracy

Learners develop numeracy skills by carrying out a financial analysis of crop production using authentic assessments, and applying best financial practice to crop production planning.

Communication

Learners develop communication skills by carrying out outcome 1, as well as participating in the implementation of the crop management plan. They communicate health and safety risk assessment advice.

Digital

Learners develop digital skills and computer literacy by using digital software to design a crop management plan and report findings, where possible.

Delivery of unit

We recommend that you deliver the unit according to your centre's facilities and resources, and focus on your centre's areas of specialty. You should make use of industry contacts and, where possible, organise site visits to production nurseries to help learners to contextualise their understanding of the industry.

You can integrate delivery of the unit with Horticulture: Professional Practice at SCQF level 8.

The notional design length for the unit is 120 hours. However, the amount of time you allocate to each outcome is at your discretion.

We suggest the following distribution of time, including assessment:

Outcome 1 — appraise sustainability and environmental implications of commercial horticultural crop production systems
(30 hours)

Outcome 2 — produce a financially suitable integrated crop management plan for a commercial horticultural crop production enterprise
(30 hours)

Outcome 3 — demonstrate advanced understanding and application of crop production within a commercial environment
(30 hours)

Outcome 4 — implement and manage a crop management plan and reflect on the process of raising crops to a commercial UK standard
(30 hours)

Additional guidance

The guidance in this section is not mandatory.

Content and context for this unit

We recommend that you use a range of delivery methods. You should encourage experiential learning to strengthen practical skills. You should include visits to several case study sites as part of your unit delivery.

Outcome 1

We recommend that you relate the scientific principles of production to:

- ◆ planning
- ◆ production and maintenance techniques
- ◆ crop nutrition
- ◆ soil science: physical, chemical and biological
- ◆ substrate science: physical, chemical and biological
- ◆ integrated pest management
- ◆ irrigation methods and water management
- ◆ stock management
- ◆ current and future technologies

Outcome 2

We recommend that you use digital technologies, such as spreadsheets and Gantt charts, to enable authentic assessment. Where possible, outcome 2 should be a group experience, with collaborative decision making related to an actual crop production practice.

Outcome 3

We recommend that you regularly update advice on health and safety from the UK government website, with a minimum of a yearly update on laws, protocols and any relevant advice. Where possible, you should teach learners to risk assess using activities, to strengthen understanding and application.

Outcome 4

We recommend that you relate plant health and control to actual crops, to enable and develop understanding of the likelihood of pathogens. You should discuss all aspects of control, including chemical, biological, organic and IPM systems. You should update all advice with current UK government law and regulations, and discuss the environmental implications of control strategies.

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.

Information for learners

Advanced Production Horticulture (SCQF level 8)

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 enhances and furthers your understanding of commercial crop production, and you learn advanced techniques and technologies.

In the unit, you:

- 1 appraise sustainability and environmental implications of commercial horticultural crop production systems
- 2 produce a financially suitable integrated crop management plan for a commercial horticultural crop production enterprise
- 3 demonstrate advanced understanding and application of crop production within a commercial environment
- 4 implement and manage a crop management plan and reflect on the process of raising crops to a commercial UK standard

You apply skills in information and communications technology (ICT), and develop financial and marketing literacy to engage with the current best practices in crop production. You develop an understanding of environmental best practice and responsibility, and debate improved sustainable practice in crop production.

Before starting the unit, you would benefit from having a foundation knowledge of production horticulture, ideally having completed Production Horticulture at SCQF level 7, on which this unit expands.

You should actively participate with learning outcome achievement and class activities.

Throughout the unit, you develop meta-skills covering self-management, social intelligence and innovation.

On completion of the unit, and on achievement of the Higher National Diploma (HND), you can progress to the BSc in Horticulture, or you may wish to apply directly to the horticulture industry and related work placements.

Administrative information

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Superclass: SC

History of changes

Version	Description of change	Date

Note: please check [SQA's website](#) to ensure you are using the most up-to-date version of this document.