



Higher National Unit specification

General information for centres

Unit title: Forestry: Land Measurement

Unit code: F406 34

Unit purpose: This Unit is designed to provide the candidate with basic knowledge and practical skills in the survey of land forest areas, the interpretation of remotely-sensed data sets, and the production of thematic maps.

The Unit is relevant to candidates requiring practical skills in basic forest surveys for forest stand mapping in forest management.

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

- 1 Explain the principles of forest land surveying.
- 2 Collect and record field survey data.
- 3 Interpret remotely sensed data for a given forest area.
- 4 Produce a thematic map using spatial information technology.

Credit points and level: 1.5 HN credits at SCQF level 7: (12 SCQF credit points at SCQF level 7*)

**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: Access to this Unit is at the discretion of the centre. No prior knowledge of forest science is required, but a good knowledge of trigonometry would be helpful to the candidate.

Core Skills: There are opportunities to develop the Core Skills of *Information Technology*, *Working with Others* and *Numeracy* to SCQF level 5 although there is no automatic certification of Core Skills or the Core Skills components.

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: Outcome 1 could be assessed separately and Outcomes 2, 3 and 4 holistically in the form of a project on a given forest area.

Higher National Unit specification: statement of standards

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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

Explain the principles of forest land surveying

Knowledge and/or Skills

- ◆ Principles of forest land surveying
- ◆ Methods of forest land surveying
- ◆ Equipment used for forest land surveying
- ◆ Remotely sensed information in forest land surveying
- ◆ Survey techniques

Evidence Requirements

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

- ◆ explain the principles of forest land surveying.
- ◆ explain the current methods used in forest land surveying.
- ◆ explain the use of different pieces of equipment currently in common use for forest land surveying, including electronic equipment. Equipment must be relevant to specific techniques.
- ◆ explain how remotely sensed information can be used in forest land survey. This must include: boundaries, crop data, and vegetation changes.

Assessment Guidelines

This Outcome could be assessed using a case study of a forest land survey where the candidate explains the various Evidence Requirements in the form of a report of approximately 1,000 words or equivalent.

Higher National Unit specification: statement of standards (cont)

Unit title: Forestry: Land Measurement

Outcome 2

Collect and record field survey data

Knowledge and/or Skills

- ◆ Survey equipment
- ◆ Practical survey techniques
- ◆ Field survey team organisation
- ◆ Field data collection and recording skills
- ◆ Data transfer methods
- ◆ Traverse computations

Evidence Requirements

Candidates will need to provide evidence to demonstrate their Knowledge and/or Skills by showing that they can collect and record field survey data. Candidates must:

- ◆ choose appropriate survey equipment in current use.
- ◆ choose an appropriate survey technique.
- ◆ organise a survey team for the collection of field data. This must include allocating tasks and duties, supply and care of equipment and ensuring efficient team working.
- ◆ collect and record field data using an appropriate recording method.
- ◆ carry out calculations from the data gathered appropriate to the survey method. This must include traverse computations.
- ◆ transfer data to existing maps. This must be correct in terms of the data gathered.

Assessment Guidelines

Outcomes 2, 3 and 4 could be assessed holistically in the form of a project in which the candidate undertakes a basic survey, collects data and produces a thematic map. In addition, the organisation of the survey team could be assessed using an Assessor's checklist.

Outcome 3

Interpret remotely sensed data for a given forest area

Knowledge and/or Skills

- ◆ Aerial photo interpretation skills
- ◆ Satellite imagery interpretation skills
- ◆ Ordnance survey interpretation skills
- ◆ Thematic maps interpretation skills

Higher National Unit specification: statement of standards (cont)

Unit title: Forestry: Land Measurement

Evidence Requirements

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

- ◆ interpret correctly aerial photographs to extract relevant information relating to a forest area
- ◆ interpret correctly satellite imagery to extract relevant information relating to a forest area
- ◆ interpret correctly Ordnance Survey and maps to extract relevant information relating to a forest area
- ◆ interpret correctly thematic maps to extract relevant information relating to a forest area

The remotely sensed data must be of sufficient complexity to allow candidates to select a range of features, which should include crop species, felled areas and failed areas.

Assessment Guidelines

Outcomes 2, 3 and 4 could be assessed holistically in the form of a project in which the candidate undertakes a basic survey, collects data and produces a thematic map. In addition, the organisation of the survey team could be assessed using an Assessor's checklist.

Outcome 4

Produce a thematic map using spatial information technology

Knowledge and/or Skills

- ◆ Basic concepts of Geographical Information System
- ◆ GIS software skills
- ◆ Spatial data integration skills
- ◆ Thematic map production skills
- ◆ Data input, storage and analysis skills

Evidence Requirements

Candidates will need to provide evidence to demonstrate their Knowledge and/or Skills by showing that they can produce a thematic map. The map must:

- ◆ include crop species and water catchment.
- ◆ be based on remotely gathered data.
- ◆ be produced using current GIS software. Candidates must input spatial data, store the data, analyse data to produce the map.
- ◆ integrate multiple source spatial data using appropriate software.

This Outcome is integrated with Outcome 3 in that candidates will use their knowledge of aerial photography or satellite imagery to complete the fourth Evidence Requirement on multiple source spatial data.

Higher National Unit specification: statement of standards (cont)

Unit title: Forestry: Land Measurement

Assessment Guidelines

Outcomes 2, 3 and 4 could be assessed holistically in the form of a project in which the candidate undertakes a basic survey, collects data and produces a thematic map. In addition the organisation of the survey team could be assessed by using an Assessor's checklist.

Administrative Information

Unit code: F406 34
Unit title: Forestry: Land Measurement
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Higher National Unit specification: support notes

Unit title: Forestry: Land Measurement

This part of the Unit specification is offered as guidance. The support notes are not mandatory.

While the exact time allocation for this Unit is at the discretion of the centre, the notional length is 60 hours.

Guidance on the content and context for this Unit

This Unit is designed as a mandatory part of the following SQA Group Awards:

- ◆ HND Forestry
- ◆ HND Arboriculture and Urban Forestry

This Unit is designed as an optional part of the following SQA Group Awards:

- ◆ HNC Forestry
- ◆ HNC Arboriculture and Urban Forestry

The content of this Unit should provide the candidate with an understanding of current land survey and measurement and its application. The Unit should introduce the candidate to the current survey equipment in use for forest survey and in the use of that equipment for the collection of survey data. The Unit should introduce the candidate to remotely sensed information and its use in forest survey and provide the candidate with the basic skills in the use of current simple GIS software or its equivalent.

The candidate will collect and appraise varied information and use the GIS tool to produce simple forest maps from this data's interpretation

Outcome 1

The purpose of this Outcome is to give the candidate the underpinning knowledge with regards to current survey technique and the information available for use in forest survey and how it can be utilised.

- ◆ principles and methods of forest land surveying — map and compass survey, use of GPS
- ◆ different equipment used for forest land surveying — GPS, compass
- ◆ role of remotely sensed information in forest land surveying — aerial photos and satellite imagery and their use in interpreting the landscape through stereoscopy, IR and colours, tree species, crop condition, space in forest, damage to forest

Higher National Unit specification: support notes (cont)

Unit title: Forestry: Land Measurement

Outcome 2

The purpose of this Outcome is to give the candidate practice in the use of survey equipment and the techniques used to capture and record data from the forest during a survey exercise.

- ◆ choice of survey equipment and organisation of field survey team
- ◆ field data collection and recording in survey note book — name, location, area, ownership, bearings, lengths, GPS positions, altitudes
- ◆ traverse computations and transfer of information to existing maps

Outcome 3

The purpose of this Outcome is to give the candidate underpinning knowledge of the availability and uses of remotely sensed material and the uses this can be put to in forest land survey.

- ◆ aerial photo-interpretation — areas, tree species, damage, boundaries, vegetation
- ◆ interpretation/extraction of information from satellite images of a given area — vegetation, land use
- ◆ extraction of information from published Ordnance Survey/thematic maps — contours, topography, access, tree cover, areas, water courses, conservation areas, obstacles

Outcome 4

The purpose of this Outcome is to give the candidate practical use of current GIS software and to explore its power in bringing together information from different sources and interpreting it culminating in the resulting production of a map.

- ◆ basic concepts of Geographical Information System
- ◆ use of GIS software for spatial data input, storage, analysis and map production
- ◆ integration of multiple source spatial data (from Outcome 3) in GIS, and production of thematic maps of a forest area

Higher National Unit specification: support notes (cont)

Unit title: Forestry: Land Measurement

Guidance on the delivery and assessment of this Unit

The Unit Outcomes should be delivered through initial classroom instruction on the concepts but with the majority of the learning taking place through practical exercises on land survey and the interpretation on remotely sensed imagery. This will all be brought together and analysed with the aid of GIS software and the production of a map or maps displaying the required information.

The Unit lends itself also to being delivered through a distance learning mode where candidates could be set tasks in their own locality and use the web to access the remotely sensed imagery where available.

Outcome 1 could be assessed using a case study of a forest land survey where the candidate explains the various Evidence Requirements in the form of a report.

Outcomes 2, 3 and 4 could be assessed holistically with a given area being identified, or agreed with the tutor if for a distance learning candidate, where the candidate can display their knowledge of survey techniques through the practical exercise of collecting data while working in a small team of two to four. The team should use current equipment such as GPS and should use this data in the compilation of a simple map. The area should not be too extensive, say 10ha, in order that the team can complete the survey work in 6–10 hrs

The information should be augmented with remotely sensed aerial photographs and internet satellite imagery and the interpretation and analysis of this information translated into a simple map using GIS software.

The map should show the information required by the exercise, eg name of forest, location, grid reference, area, ownership, boundaries, crop details, contours, features, scale and be annotated with text boxed where appropriate.

Discussion groups may be used to direct the project assessment but the evidence presented must be the individual candidate's own analysis and interpretation of the findings.

Opportunities for developing Core Skills

The Core Skills of *IT*, *Numeracy* and *Working with Others* may be developed to SCQF level 5 during the delivery and assessment of this Unit. Candidates may use a range of IT skills in carrying out and recording field data and producing maps using IT software. *Numeracy* may be developed when carrying out calculations and computations based on field data. Candidates are also required to take on the role of organising a field survey team and ensuring it works effectively. This will provide opportunities to develop *Working with Others*.

Open learning

All Outcomes are appropriate for open and distance learning approaches, providing candidates are given appropriate learning materials and tutor input and support at all stages. Centre devised supervision agreements should detail any controlled conditions to ensure authenticity of evidence.

Higher National Unit specification: support notes (cont)

Unit title: Forestry: Land Measurement

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: Forestry: Land Measurement

The Unit through practical survey techniques will develop your ability to use forest survey equipment. The Unit will also give you an introduction to the theory and practical use of GIS techniques as applied to forest survey.

The Outcomes that you will acquire on completion of the Unit are as follows:

Outcome 1 will give you an understanding of the survey techniques available and the uses they can be put to, to assist in forest management.

Outcome 2 will develop your practical survey techniques and the skills needed to collect field data with currently used equipment.

Outcome 3 will give you knowledge to interpret remotely sensed information and the skills to apply this information to forest management.

Outcome 4 will introduce you to GIS techniques and how to produce a thematic map from this technology.

Overall, the knowledge and skills acquired in this Unit will help you understand the theory, knowledge and practice of forest survey techniques to enable you to carry out practical land survey and to develop a basic understanding of GIS and its uses to forest management.

If you are already in employment, this Unit provides an opportunity to extend your existing knowledge and skills and lays a sound grounding for further study in forestry and general land survey techniques and the use of GIS.

This Unit may give you the opportunity to develop Core Skills in *Information Technology*, *Working with Others*, and *Numeracy* to SCQF level 5.