



National Unit specification: general information

Unit title: Geographical Information Systems: Project

Unit code: FN4V 12

Superclass: RF

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Summary

The purpose of this Unit is to enable candidates to apply GIS theory and knowledge of its applications by designing a basic GIS project to solve a real issue. Candidates will develop practical and critical evaluation skills in completing a GIS project.

This is a mandatory Unit within the National Progression Award in Geographical Information Systems: An Introduction (SCQF level 6), but can also be taken as a free-standing Unit. Students successfully completing this Unit should exit with a good working knowledge of how a GIS operates and the basic skills to be able to apply GIS in a range of workplace situations or progress to further study specific to or involving the use of GIS.

This Unit is suitable for candidates who:

- ◆ are undertaking GIS for the first time
- ◆ wish to develop their practical skills in the application of GIS
- ◆ are considering further study or employment in a field which requires an ability to use GIS to solve problems and find solutions

Outcomes

- 1 Plan a GIS project.
- 2 Implement a GIS project.
- 3 Evaluate the planning and implementation of the project.

National Unit specification: general information (cont)

Unit title: Geographical Information Systems: Project

Recommended entry

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

- ◆ Standard Grade (Credit) English
- ◆ Standard Grade (Credit) Mathematics
- ◆ Geographical Information Systems: Handling Data
- ◆ Geographical Information Systems: Using a GIS
- ◆ Basic IT skills, which could be evidenced by attainment of Intermediate 1 ICT Core Skills or equivalent qualifications or comparable levels of skill obtained through experience

Credit points and level

1 National Unit 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

Achievement of this Course gives automatic certification of the following:

Complete Core Skill Problem Solving at SCQF level 6

Core Skill component None

There are also opportunities to develop aspects of Core Skills which are highlighted in the Support Notes of the Unit Specifications for this Course.

National Unit specification: statement of standards

Unit title: Geographical Information Systems: Project

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

Plan a GIS project.

Performance Criteria

- (a) Research a situation where GIS could be applied.
- (b) Frame a question which GIS might be expected to answer.
- (c) Select an appropriate methodology to carry out the project.
- (d) Determine a feasible timescale for completion of the project.

Outcome 2

Implement a GIS project.

Performance Criteria

- (a) Collect data and determine its quality and accuracy.
- (b) Create a database appropriate to the data collected.
- (c) Input data correctly into the database.
- (d) Import the data into a GIS correctly.
- (e) Edit and manipulate the data in preparation for analysis.
- (f) Analyse the findings of the project.
- (g) Produce a range of visual outputs.

Outcome 3

Evaluate the planning and implementation of the project.

Performance Criteria

- (a) Identify critical elements and stages of the project.
- (b) Review and evaluate the processes and outputs of the project.
- (c) Identify potential improvements for future work in a similar GIS application.

National Unit specification: statement of standards (cont)

Unit title: Geographical Information Systems: Project

Evidence Requirements for this Unit

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

Written and/or oral recorded evidence should be produced to demonstrate that the candidate has achieved all of the Outcomes and Performance Criteria.

The evidence should be produced under supervised open book conditions, and may be gathered holistically using a range of methods.

Outcome 1

Evidence to demonstrate that the candidate can:

- ◆ research and select **one** situation where GIS could be applied and frame an appropriate question for its application.
- ◆ select methodology appropriate to the project and produce a timeline identifying relevant stages. The methodology must include a data collection strategy

Outcome 2

Evidence in the form of four visual outputs from maps, tables, graphs, reports or any other visuals appropriate to the project theme, is required to demonstrate the candidate's ability to:

- ◆ collect data and determine their quality and accuracy
- ◆ create a database appropriate to the selected GIS situation
- ◆ correctly enter data into a database
- ◆ import the data into a GIS
- ◆ edit and manipulate the data
- ◆ analyse and display the findings

Outcome 3

Evidence to demonstrate that the candidate can:

- ◆ identify at least **two** critical elements and **two** critical stages of the project
- ◆ evaluate at least **two** processes and **two** outputs of the project
- ◆ suggest at least **two** potential improvements in project planning and processes/ implementation

National Unit specification: support notes

Unit title: Geographical Information Systems: Project

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 is a mandatory Unit within the National Progression Award in Geographical Information Systems: An Introduction (SCQF level 6), but can also be taken as a free-standing Unit.

This Unit allows candidates the opportunity to apply knowledge and understanding of GIS theory to a real situation and to demonstrate practical GIS skills. The Unit is intended to provide candidates with the necessary skills required to plan and undertake a small-scale project. Where candidates are undertaking this Unit as the final part of the NPA in Geographical Information Systems, the Outcomes will further build on knowledge developed in earlier Units but the focus will be on the practical application in the context of the chosen project topic. The project topic could be tailored to suit candidates' study interests, such as environment, health, education or marketing but should be agreed with the tutor prior to commencement.

This Unit should prepare candidates for progression to the workplace or to further study involving use of GIS.

Outcome 1 focuses on project planning and time management, key elements which are often skimmed over, to the detriment of a project. Candidates should be introduced to some key elements of project planning and understand that the planning stage of any project will have a major impact on the success or otherwise of the outcomes. As part of the planning process candidates will select an appropriate methodology for carrying out the project, which should include a data collection strategy.

In **Outcome 2** the visual outputs produced could include maps, tables, graphs, or other visuals as appropriate to the topic.

The aim of **Outcome 3** is to evaluate the decision-making and implementation processes carried out in Outcomes 1 and 2. Critical elements and stages of the project could include: planning, data collection strategy, data quality, data entry, data importation, appropriate queries of the data, analysis of the findings, preparation and presentation of outputs.

National Unit specification: support notes (cont)

Unit title: Geographical Information Systems: Project

National Occupational Standards

This Unit is aligned to the following National Occupational Standards for IT Users (NOS)

Using IT Systems: IT User Fundamentals

- ◆ IUF:B2 Manage information storage and retrieval appropriately

Using IT to find and exchange information: Communication fundamentals

- ◆ ICF:B1 Select and use a variety of sources of information to meet needs
- ◆ ICF:B2 Access, search for, select and use internet-based information and assess its fitness for purpose

Using IT productivity tools and applications: Bespoke or specialist software:

- ◆ BS:C3 Exploit the functions of the software effectively to process and present information
- ◆ BS:B3 Use the functions of the software effectively to process and present information

Using IT productivity tools and applications Database Software:

- ◆ DB:B2 Enter, edit and organise structured information in a database
- ◆ DB:C3 Use database software tools to create, edit and run data queries and produce reports
- ◆ ISF:B2 Enter, develop, combine and format software applications to meet needs and solve problems
- ◆ ISF:B3 Exploit the functions of software effectively to process and present information

Using IT productivity tools and applications: Spreadsheet software

- ◆ SS:A1 Use a spreadsheet to enter, edit and organize numerical and other data
- ◆ SS:A2 Use appropriate formulas and tools to summarise and display spreadsheet information
- ◆ SS:A3 Select and use appropriate tools and techniques to present spreadsheet information effectively

Source <http://www.e-skills.com>

National Unit specification: support notes (cont)

Unit title: Geographical Information Systems: Project

Guidance on learning and teaching approaches for this Unit

This Unit is designed to encourage a practical and interactive approach to teaching and learning. A candidate-centred and flexible approach should be encouraged wherever possible in order that candidates' knowledge and understanding is developed through personal discovery.

The Outcomes of this Unit should be taught in sequence.

The outputs should be an individual effort but candidates would benefit from:

- ◆ class discussions on the planning, decision-making and implementation processes
- ◆ working in small research groups
- ◆ presenting interim findings to the class
- ◆ working individually to build a folio of outputs
- ◆ having visits from people involved in GIS projects, or visiting centres where GIS is used on a regular basis, such as local planning, police, health, business, marketing, local environmental projects

Outcome 1

Candidates undertaking this Unit as part of the NPA in GIS will have looked at existing applications in the Unit Using a GIS, and may already have formulated an idea(s) which could be applied in this Outcome. A candidate-based, flexible approach is recommended, such as allowing and assisting candidates to tailor the project theme to suit their academic or vocational route, for example a focus on health, business, environmental or marketing. Candidates should be encouraged to keep a personal log throughout this Unit, detailing all their decision making processes. Not only would this be a diary of their progress but would also be a valuable source of evidence for Outcome 3 evaluations.

Outcome 2

In this Outcome candidates will put their project plan into action. Candidates should collect data as outlined in their collection strategy and carry out appropriate editing before entering them in a database and importing them into a GIS. Manipulation of the data will depend on the question or hypothesis they wish the GIS to address. Results should be analysed and used to produce a range of outputs, including maps, tables and a report. It is suggested that the outputs could be collated into a folio suitable for presentation to potential employers as evidence of their GIS project planning and implementation skills.

National Unit specification: support notes (cont)

Unit title: Geographical Information Systems: Project

Outcome 3

This Outcome is the culmination of the candidates' planning and implementation strategies and focuses on evaluating the project findings and the impacts of their decision making processes. Candidates should be encouraged to review their progress at each step of their plan, with a final evaluation of the overall process at the end of the project. Evidence of these reviews could be included in the personal log and folio.

Using the above approaches, candidates may also develop essential skills for life, learning and work, including:

- ◆ Time Management
- ◆ Creativity and Innovation
- ◆ Analytical and Interpretative Skills
- ◆ Presentation Skills
- ◆ Independent Learning
- ◆ Resilience
- ◆ Responsibility
- ◆ Confidence

Guidance on approaches to assessment for this Unit

Candidates are required to produce evidence which demonstrates knowledge and understanding of the decision-making and implementation processes required for a successful project outcome. Evidence could be presented in the format of a folio of written work and GIS outputs. A detailed personal log could be kept throughout as evidence of planning and implementation considerations and decision-making. The folio of evidence could be also be used by candidates to demonstrate these skills to potential employers.

Where candidates are drawn from a variety of academic or vocational backgrounds and/or have varied data interests, opportunities may exist for the assessment brief to be tailored to meet individual areas of interest. Alternatively, the candidates may work on a single theme or data set.

Gathering of research evidence may involve a mix of individual, small group or class work, but the final folio should be an individual effort. The visual outputs of the project should be as appropriate to the project theme but are likely to include a mix of maps, tables, graphs and report.

Time should be allowed for re-assessment. Where the Unit is assessed holistically candidates need only be re-assessed on those elements that have not met the Performance Criteria.

National Unit specification: support notes (cont)

Unit title: Geographical Information Systems: Project

Opportunities for the use of 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 Communication 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)*.

Opportunities for developing Core Skills

In this Unit Candidates will apply knowledge, understanding of GIS and practical skills using GIS software to complete a project.

Candidates will:

- ◆ plan and implement a data collection strategy
- ◆ plan a suitable time frame to ensure successful completion of the project
- ◆ design and create a database and correctly enter data
- ◆ assess the relevance and assure the quality of the data
- ◆ import data into a GIS
- ◆ use the GIS to answer a research question
- ◆ interpret findings
- ◆ review decisions and processes throughout the course of the project
- ◆ report/present findings
- ◆ use graphs, tables and other visual information to illustrate findings
- ◆ evaluate the project and suggest potential improvements

This Unit has the Core Skill of Problem Solving embedded in it, so when candidates achieve this Unit their Core Skills profile will be updated to show that you have achieved Problem Solving at SCQF Level 6. In addition, as candidates are doing this Unit they will be developing aspects of the Core Skills in Communication, Numeracy and Information technology.

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

History of changes to Unit

Version	Description of change	Date
02	Core Skill Problem Solving at SCQF level 6 embedded.	08/08/2011

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