Higher National Unit specification

General information for centres

Unit title: Data Collection and Handling Methods

Unit code: F3X3 35

Unit purpose: This Unit develops skills and knowledge to allow candidates to use the cycle of data handling: observation, formulation of hypotheses, application of tests of statistical significance and the formation of conclusions. It introduces candidates to methods of collecting data. The Unit provides underpinning skills for further studies in a wide range of subjects in the sciences and social sciences and supports understanding of other Units that require candidates to collect and analyse information.

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

1 Explain the collection, arrangement and display of data.
2 Analyse data using statistics.

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: Access to this Unit is at the discretion of the centre. However, it would be beneficial if candidates had studied mathematics or numerical subjects at SCQF level 5. It would also be beneficial if the candidate had prior experience in basic Information Technology at SCQF level 6 Unit and the ability to structure reports.

Core Skills: There are opportunities to develop the Core Skills of *Numeracy* at SCQF level 6 and *Problem Solving* at SCQF level 6, although there is no automatic certification of Core Skills or 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: Outcomes 1 and 2 of this Unit could be assessed separately or together, by a series of restricted response questions or a report utilising data provided or collected by the candidate in the course of a different Unit.

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 by sampling, 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 collection, arrangement and display of data

Knowledge and/or Skills

- Primary and secondary research
- Quantitative and qualitative research techniques
- Principles of experimental and observational sampling
- Collection, collation and tabulation of data
- Graphical and diagrammatic presentation of quantitative and qualitative data

Evidence Requirements

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

- for each collection method, explain three potential sources of error in the collection of quantitative and qualitative data
- explain the following methods to reduce error: controlled experiment, random sampling and systematic sampling
- collate one quantitative data set into an appropriate tabular format using any method
- present both quantitative and qualitative data in appropriate graphical and diagrammatic format

Assessment Guidelines

This Outcome could be assessed on its own or in conjunction with Outcome 2, the details of which are given under Outcome 2. Calculations may be undertaken manually or with the aid of computer software.

Higher National Unit specification: statement of standards (cont)

Unit title: Data Collection and Handling Methods

Outcome 2

Analyse data using statistics

Knowledge and/or Skills

- Descriptive statistics
- Statistical hypotheses
- Probability and statistical significance
- Interpretation of tests of statistical significance

Evidence Requirements

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

- use appropriate descriptive statistics to analyse data, to include measures of central tendency and variation
- state correct null and alternative hypotheses to test a given theory
- explain the application of probability and statistical significance in hypothesis testing
- correctly interpret the output of a test of statistical significance and relate the result to theory

Assessment Guidelines

This Outcome could be assessed on its own or in conjunction with Outcome1. Calculations may be undertaken manually or with the aid of computer software. The assessment could consist of a series of restricted response questions or a report based on data provided to the candidate or collected by the candidate in the course of another Unit

Administrative Information

Unit code: F3X3 35

Unit title: Data Collection and Handling Methods

Superclass category: RA

Original date of publication: August 2008

Version: 01

History of Changes:

Version	Description of change	Date

Source: SQA

SQA acknowledges the valuable contribution that Scotland's colleges have made to the development of Higher National qualifications.

Additional copies of this Unit specification can be purchased from the Scottish Qualifications Authority. Please contact the Customer Contact Centre for further details, telephone 0845 279 1000.

Higher National Unit specification: support notes

Unit title: Data Collection and Handling Methods

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 Unit provides an introduction to the principles of data collection and handling for candidates who require this knowledge to underpin their studies of other subjects, especially in the sciences and social sciences. It presupposes no previous experience of data analysis but previous study of numerical and IT subjects would be advantageous. The aim is to give candidates an insight into the scientific method of observation — theory — hypothesis — data — test — conclusion and its importance to all areas of academic enquiry. For this reason it is important to place the Unit into the context of the candidate's own interests or programme of study wherever possible, by using relevant data and examples. Real life examples and practical experience should be used whenever possible and it may be possible to base assessments on data collected by candidates in the course of other Units.

The focus in Outcome 1 should be on understanding the principles of how an investigation should be designed and the raw data collated and displayed. A range of examples should be used, presenting both quantitative and qualitative data. It could be advantageous for candidates to practise drawing some graphs and diagrams by hand, to facilitate understanding, but the use of computer software, while not mandatory, should nevertheless be encouraged. For Outcome 2, the emphasis should be on the selection of appropriate statistics and the interpretation of the results, rather than the manipulation of numbers. The use of computer software would be advantageous. The chief aim of the Outcome is to develop an understanding of how statistics can be used to test real-life theories and explore variability in data, with the mechanics of the tests and calculations being less important.

Guidance on the delivery and assessment of this Unit

It is anticipated that lectures will be supplemented with practical exercises in class, working with a range of data sets. Formative assessment should be used at regular intervals to check understanding as the Unit progresses.

Assessment could take the form of a series of restricted response questions and exercises or a report based around one or more data sets. If a report is used, candidates should present this in a standard format of Introduction, Methods, Results, Discussion, References.

Opportunities for developing Core Skills

Although the Unit is designed to provide candidates with the knowledge and skills related to their specific occupational area, there are opportunities to develop the Core Skills of *Numeracy* and *Problem Solving* at SCQF level 6 although there is no automatic certification of Core Skills or Core Skills components. The appropriate tabulation and graphical representation of data could contribute towards the components Using Number and Using Graphical Information of the Core Skill *Numeracy* at SCQF level 6. An understanding of the scientific method and statistical analysis contributes towards the component Critical Thinking of the Core Skill *Problem Solving* at SCQF level 6.

Higher National Unit specification: support notes (cont)

Unit title: Data Collection and Handling Methods

Open learning

It would be possible to deliver this Unit by distance or blended learning methods, including internet-based material.

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: Data Collection and Handling Methods

This Unit will provide you with an introduction to the principles of data collection and handling to underpin your studies of other subjects, especially in the sciences and social sciences. It presupposes no previous experience of data analysis but previous study of numerical and IT subjects and report writing would be advantageous. The aim is to give you an insight into the scientific method of observation — theory — hypothesis — data — test — conclusion and its importance to all areas of academic enquiry.

In Outcome 1 you will consider how data may be collected, understand how investigations should be designed to reduce bias and error and how the data collected should be arranged and displayed. You will look at examples of both quantitative and qualitative data from experiments and surveys. You will practise drawing graphs and diagrams, by hand or using computer software. For Outcome 2, the emphasis will be on how conclusions can be drawn from the data to test your theories and seek explanations. You will learn how to select, apply and interpret appropriate statistics. The chief aim of the Outcome is to develop an understanding of how statistics can be used to test real-life theories and explore variability in data, with the mechanics of the tests and calculations being less important.

It is anticipated that lectures will be supplemented with practical exercises in class, working with a range of data sets. The assessment could take the form of a series of restricted response questions and exercises or a report based around one or more data sets, possibly collected in the course of another Unit.

There are opportunities to develop the Core Skills of *Numeracy* at SCQF level 6 and *Problem Solving* at SCQF level 6, although there is no automatic certification of Core Skills or Core Skills components.