

National Unit Specification: general information

UNIT	Statistics 2 (Advanced Higher)
NUMBER	D330 13
COURSE	Applied Mathematics (Advanced Higher)

SUMMARY

This unit is the second of two Advanced Higher units which, together with one optional unit, comprise one of the variants of the Advanced Higher Applied Mathematics course. It builds on the work of Statistics 1 (AH) and introduces control charts and the t-distribution.

OUTCOMES

- 1 Use simple control charts.
- 2 Test a statistical hypothesis.
- 3 Use the t-distribution.
- 4 Analyse the relationship between two variables.
- 5 Undertake a statistical investigation.

RECOMMENDED ENTRY

While entry is at the discretion of the centre, candidates will normally be expected to have attained:

- Statistics 1 (AH)

CREDIT VALUE

1 credit at Advanced Higher.

Administrative Information

Superclass:	RB
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National Unit Specification: general information (cont)

UNIT Statistics 2 (Advanced Higher)

CORE SKILLS

Core skills for Advanced Higher remain subject to confirmation and details will be available at a later date.

Additional information about core skills is published in *Automatic Certification of Core Skills in National Qualifications* (SQA, 1999).

National Unit Specification: statement of standards

UNIT **Statistics 2 (Advanced Higher)**

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 the Scottish Qualifications Authority.

OUTCOME 1

Use simple control charts.

Performance criteria

- (a) Construct a control chart.
- (b) Interpret a control chart.

OUTCOME 2

Test a statistical hypothesis.

Performance criteria

- (a) Carry out a chi-squared test.
- (b) Carry out a sign test.
- (c) Carry out a Mann-Whitney test.

OUTCOME 3

Use the t-distribution.

Performance criteria

- (a) Determine a confidence interval for a population mean.
- (b) Carry out a one sample t-test for the population mean.

National Unit Specification: statement of standards (cont)

UNIT **Statistics 2 (Advanced Higher)**

OUTCOME 4

Analyse the relationship between two variables.

Performance criteria

- (a) Test the significance of the strength of a linear relationship.
- (b) Use a residual plot to check model assumptions.
- (c) Construct an interval estimate for a given response.

Evidence requirements

Although there are various ways of demonstrating achievement of the outcomes, evidence would normally be presented in the form of a closed-book test. Tests should be carried out under supervision. Examples of such tests are contained in the National Assessment Bank.

In assessment, candidates should be required to show their working in carrying out algorithms and processes.

OUTCOME 5

Undertake a statistical investigation.

Performance criteria

- (a) Pose the question that the investigation addresses.
- (b) Collect (generate) the relevant data.
- (c) Analyse the data.
- (d) Interpret and communicate the conclusions.

Evidence requirements

The investigation must satisfy the performance criteria, using the statistical content of the unit. A full report on the investigation is to be written by the candidate individually. This report may include sets of data, graphs, computer printout, calculated statistics, consideration of probability and a conclusion.

National Unit Specification: support notes

UNIT Statistics 2 (Advanced Higher)

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

While the time allocated to this unit is at the discretion of the centre, the notional design length is 40 hours.

GUIDANCE ON CONTENT AND CONTEXT FOR THIS UNIT

Each mathematics unit at Advanced Higher level aims to build upon and extend candidates' mathematical knowledge and skills with the emphasis on the application of mathematical ideas and techniques to relevant and accessible problems. This unit is designed to build on the content of Statistics 1(AH) and extend the specialism in this topic to a wider experience and to a more advanced level.

In this unit, Outcomes 1 and 3 introduce the statistical concepts of control charts and the t-distribution respectively.

Hypothesis testing, introduced in Statistics 1(AH), is now extended in Outcome 2 to include chi-squared, sign and Mann-Whitney tests.

Regression analysis studied in Statistics (H) is extended in Outcome 4 to include the significance of the product moment correlation coefficient and the consideration of interval estimates.

To reinforce the practical nature of the subject, candidates, in Outcome 5, are required to demonstrate competence in all the stages of undertaking a statistical investigation.

The recommended content for this unit can be found in the course specification. The *detailed content* section provides illustrative examples to indicate the depth of treatment required to achieve a unit pass and advice on teaching approaches.

National Unit Specification: support notes (cont)

UNIT **Statistics 2 (Advanced Higher)**

GUIDANCE ON LEARNING AND TEACHING APPROACHES FOR THIS UNIT

The investigative approaches to teaching and learning consistently recommended at earlier levels are equally beneficial at Advanced Higher level.

Where appropriate, statistical topics should be taught and skills in applying statistics developed through real-life contexts. Candidates should be encouraged, throughout this unit, to make efficient use of the arithmetical, mathematical, statistical and graphical features of calculators, to be aware of the limitations of the technology and always to apply the strategy of checking.

Numerical checking or checking a result against the context in which it is set is an integral part of every mathematical process. In many instances, the checking can be done mentally, but on occasions, to stress its importance, attention should be drawn to relevant checking procedures throughout the mathematical process. There are various checking procedures which could be used:

- relating to a context – ‘How sensible is my answer?’
- estimate followed by a repeated calculation
- calculation in a different order

Further advice on learning and teaching approaches is contained within the Subject Guide for Mathematics.

GUIDANCE ON APPROACHES TO ASSESSMENT FOR THIS UNIT

The assessment for this unit will normally be in the form of a closed book test. Such tests should be carried out under supervision and it is recommended that candidates attempt an assessment designed to assess all the outcomes within the unit. Successful achievement of the unit is demonstrated by candidates achieving the threshold of attainment specified for all outcomes in the unit. Candidates who fail to achieve the threshold(s) of attainment need only be retested on the outcome(s) where the outcome threshold has not been attained. Further advice on assessment and retesting is contained within the National Assessment Bank.

The fifth outcome is assessed by means of a statistical investigation. This investigation should be a substantial piece of work, taking up to ten hours, in which candidates collect their own data by, for example, carrying out an experiment. The analysis, interpretation and communication of the conclusions should be included in each candidate’s report. Examples of such investigations, are contained within the National Assessment Bank.

In assessments, candidates should be required to show their working in carrying out algorithms and processes.

National Unit Specification: support notes (cont)

UNIT Statistics 2 (Advanced Higher)

SPECIAL NEEDS

This unit specification is intended to ensure that there are no artificial barriers to learning or assessment. Special needs of individual candidates should be taken into account when planning learning experiences, selecting assessment instruments or considering alternative outcomes for units. For information on these, please refer to the SQA document *Guidance on Special Assessment and Certification Arrangements for Candidates with Special Needs/Candidates whose First Language is not English* (SQA, 1998).