



Advanced Higher Applied Mathematics (Statistics) — draft Course rationale and summary



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Course rationale

Background

All new and revised National Courses reflect Curriculum for Excellence values, purposes and principles. They offer flexibility, provide more time for learning, more focus on skills and applying learning, and scope for personalisation and choice.

In this Course, and its component Units, there will be an emphasis on skills development and the application of those skills. Assessment approaches will be proportionate, fit for purpose and will promote best practice, enabling learners to achieve the highest standards they can.

This Course provides learners with opportunities to continue to acquire and develop the attributes and capabilities of the four capacities, as well as skills for learning, skills for life and skills for work.

All Courses provide opportunities for learners to develop breadth, challenge and application, but the focus and balance of the assessment will be appropriate for the subject area.

Relationship between the Course and Curriculum for Excellence values, purposes and principles

Mathematics is important in everyday life, allowing us to make sense of the world around us and to manage our lives. Using mathematics enables us to model real-life situations and to make connections and informed predictions. It equips us with the skills we need to interpret and analyse information, simplify and solve problems, assess risk and make informed decisions.

Because mathematics is rich and stimulating, it engages and fascinates learners of all ages, interests and abilities. Learning in mathematics develops logical reasoning, analysis, problem solving skills, creativity and the ability to think in abstract ways. It uses a universal language of numbers and symbols, which allows us to communicate ideas in a concise, unambiguous and rigorous way.

Mathematics equips us with many of the skills required for learning, life and work. Understanding the part that mathematics plays in almost all aspects of life is crucial. This reinforces the need for mathematics to play an integral part in lifelong learning and be appreciated for the richness it brings.

This Course allows learners to acquire and develop the attributes and capabilities of the four capacities. For example, success in mathematical learning and activity leads to increased confidence as an individual, being able to think logically helps towards being a responsible citizen, and being able to understand, use and communicate mathematical ideas will assist in becoming an effective contributor.

Purpose and aims of the Course

Statistics is concerned with the collection, analysis and interpretation of data. It develops an understanding of degree of certainty which can be attributed to inferences made and conclusions reached when interpreting and analysing data.

The Course should motivate and challenge learners by enabling them to:

- ◆ understand the appropriateness of different methods of data collection, particularly ways of sampling from a population
- ◆ select and use appropriate statistical models to assist with the analysis of data
- ◆ interpret results in context, evaluating the strength and limitations of their models
- ◆ develop skills in effectively communicating conclusions reached on the basis of statistical analysis

The Course is highly relevant for modelling and data analysis in many areas, including medicine, actuarial science, economics and other social sciences, business and management. The Course offers a solid foundation for the study of

Statistics beyond Advanced Higher level, in that it is centred on the exploration of probability theory, hypothesis testing and confidence intervals.

Information about typical learners who might do the Course

This Course is suitable for learners who are secure in their attainment of the Higher Mathematics Course or an equivalent qualification.

Learners will develop skills in selecting and applying complex mathematical techniques in a variety of mathematical situations. These skills will enable progression to further learning and to employment.

On successful completion of this Course, learners could progress to:

- ◆ National Certificate Group Awards
- ◆ HNC, HND or degree in Mathematics or a related area
- ◆ employment

Mathematics has applications in many other subject areas, and skills developed in this Course support progression in other curriculum areas.

Course summary

Course title: Advanced Higher Applied Mathematics (Statistics)

SCQF level 7 (32 SCQF credit points)

Course outline

Mandatory Units

The Course comprises the following mandatory Units:

Applied Mathematics (Statistics): Probability (Advanced Higher)	8 SCQF credit points
Applied Mathematics (Statistics): Sampling (Advanced Higher)	8 SCQF credit points
Applied Mathematics (Statistics): Statistical Modelling (Advanced Higher)	8 SCQF credit points

Course assessment **8 SCQF credit points**

This Course includes eight SCQF credit points to allow additional time for preparation for Course assessment. The Course assessment covers the added value of the Course. Further information on the Course assessment is provided in the Assessment section.

Course structure and conditions of award

Course structure

This Course will develop, deepen and extend the mathematical skills necessary at this level and beyond.

Learners will acquire and apply operational skills necessary for exploring mathematical ideas through symbolic representation and diagrams. In addition, learners will develop mathematical reasoning skills and will gain experience in making informed decisions.

The Advanced Higher Applied Mathematics (Statistics) Course has three Units, totalling 24 SCQF credit points, with an additional eight SCQF credit points to allow the use of an extended range of learning and teaching approaches, consolidation of learning, integration, and preparation for external assessment.

Units are statements of standards for assessment and not programmes of learning and teaching. They can be delivered in a variety of ways.

Applied Mathematics (Statistics): Probability (Advanced Higher)

This Unit will explore the theoretical methods used to attempt to describe real-world situations and their usefulness, or otherwise, in relating to experimental results.

Applied Mathematics (Statistics): Sampling (Advanced Higher)

This Unit will introduce the key concepts of population and sample, and discuss the significance of the central limit theorem, giving opportunity to use simulations to demonstrate principles. Practical methods of sampling are considered, as is the validity of the information they can generate.

Applied Mathematics (Statistics): Statistical Modelling (Advanced Higher)

This Unit continues the themes of the other Units and looks at a broader range of statistical methods, giving the opportunity to use data sets from more varied contexts. These techniques may well be used in a biological, psychological or one of many other areas of interest, and it is intended that learners will gain significant grounding to support future study.

Conditions of award

To gain the award of the Course, the learner must pass all of the Units as well as the Course assessment. The required Units are shown in the Course outline section. Course assessment will provide the basis for grading attainment in the Course award.

Assessment

Information about assessment for the Course is included in the *Course Assessment Specification*, which provides full details including advice on how a learner's overall attainment for the Course will be determined.

Unit assessment

All Units are internally assessed against the requirements shown in the Unit Specification.

They can be assessed on a Unit-by-Unit basis or by combined assessment.

They will be assessed on a pass/fail basis within centres. SQA will provide rigorous external quality assurance, including external verification, to ensure assessment judgments are consistent and meet national standards.

Exemplification of possible assessment approaches for these Units is provided in the *National Assessment Resource*.

Course assessment

Courses from National 4 to Advanced Higher include assessment of added value¹. At National 5, Higher and Advanced Higher, the added value will be assessed in the Course assessment. The added value for the Course must address the key purposes and aims of the Course as defined in the Course Rationale. It will do this by addressing one or more of breadth, challenge or application.

In the Advanced Higher Applied Mathematics (Statistics) Course, added value will focus on:

- ◆ breadth
- ◆ challenge
- ◆ application

Learners will draw on, extend and apply the skills they have learned during the Course. This will be assessed within a question paper² requiring demonstration of the breadth of knowledge, skills and understanding acquired from across the Units and how they can be applied in unfamiliar contexts and/or integrated ways.

¹ Definitions can be found here: www.sqa.org.uk/sqa/45528.html

² See link above for definitions.