SQA Advanced Unit Specification

General information for centres

Unit title: Statistics for Business

Unit code: HP6V 48

Unit purpose: This Unit introduces candidates to statistical concepts and descriptive statistics used in business. The Unit will provide candidates with the underpinning knowledge and skills required to use statistical and graphical techniques to address business problems using appropriate IT software.

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

1 Explain statistical techniques for collecting data.
2 Use statistical techniques to analyse and interpret data.
3 Use software to produce forecasts and diagrams.

Credit points and level: 1 SQA 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 National 1 to Doctorates.*

Recommended prior knowledge and skills: Access to this Unit will be at the discretion of the centre. However, it would be beneficial if candidates have basic skills in numeracy and in the use of appropriate IT software. This could be demonstrated by possession of the Core Skill *Numeracy* at SCQF level 5, the Core Skill *Information and Communication Technology* at SCQF level 5, NQ Unit *DM3R 11: Information Technology for Administrators*, SQA Advanced Unit HP78 47 *IT in Business: Spreadsheets*, or equivalent.

Core Skills: The achievement of this Unit gives automatic certification of the following:

- The Core Skill *Numeracy* at SCQF level 6

There are also further opportunities to develop the Core Skill of *Information and Communication Technology* at SCQF level 5 in this Unit.

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: The Unit may be assessed by three instruments of assessment.

Outcome 1 could be assessed using an assessment containing short response questions and given circumstances covering all aspects of Outcome 1.

Outcome 2 could be assessed by an open-book assessment carried out in controlled conditions. The use of calculation aids such as a scientific calculator and/or appropriate software is permitted. Candidates will have to present data in differing formats, perform calculations and draw inferences from interpreting figures and provide meaningful comment.

Outcome 3 could be assessed by an open-book assessment carried out under controlled conditions in which candidates must use appropriate software

Data files may be provided for the candidates as appropriate to avoid the need for them to enter large amounts of text or data.

Interpretation of results should demonstrate the candidate understands the basic concepts and has an ability to apply these in a practical situation.

Assessment Exemplar packs and marking guidelines have been produced to indicate the national standard of achievement required at SCQF level 8.

Unit specification: statement of standards

Unit title: Statistics for Business

Unit code: HP6V 48

The sections of the Unit stating the Outcomes, Knowledge and/or Skills, and Evidence Requirements are mandatory.

Outcome 1

Explain statistical techniques for collecting data

Knowledge and/or Skills
- Types of data
- Sources of data
- Survey methods
- Sampling methods

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

- provide clear and accurate definitions of four types of data, and provide one example of each
- identify two appropriate sources where specified types of data may be found
- identify and explain appropriate survey methods for data collection in three given circumstances
- identify and explain appropriate sampling methods for data collection in three given circumstances

Candidates should demonstrate competence by providing satisfactory responses, in line with the standard exemplified in the Assessment Exemplar Packs.

The evidence should be generated under closed book, supervised conditions.

Assessment Guidelines
Assessment could take the form of short response questions covering all aspects of Outcome 1.

If Candidates fail to meet the requirements of the assessment on a first attempt, an alternative instrument of assessment must be used for reassessment purposes. In order that the candidates cannot foresee the form of the assessment, different scenarios should be developed for alternative instruments of assessment.

Outcome 2

Use statistical techniques to analyse and interpret data

Knowledge and/or Skills

- Presentation of quantitative data
- Presentation of qualitative and ordinal data
- Measures of central location
- Measures of dispersion

- Index numbers
- Analysis techniques and interpretation techniques

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

- present quantitative data in the form of a frequency distribution table and two other appropriate formats
- display qualitative and ordinal data in an appropriate format
- calculate appropriate measures of central location and measures of dispersion
- calculate a series of index numbers
- use/interpret index numbers to draw relevant inferences
- interpret the results of the analysis, both graphical and numerical, and provide meaningful comment

Candidates should demonstrate competence by providing satisfactory responses in line with the standard exemplified in the Assessment Exemplar Packs.

The evidence should be generated under open book, supervised conditions.

Where candidates are provided with data files, these should contain only the raw data and should not be provided in the form of pre-prepared files containing templates of formulae.

Assessment Guidelines
A scientific calculator and/or appropriate software may be used and diagrams may be drawn by hand or with appropriate software.

If Candidates fail to meet the requirements of the assessment on a first attempt, an alternative instrument of assessment must be used for reassessment purposes. In order that the candidates cannot foresee the form of the assessment, different scenarios should be developed for alternative instruments of assessment.

Outcome 3

Use software to produce forecasts and diagrams

Knowledge and/or Skills

- Scatter diagrams including predictor and response variables
- Linear regression forecasting
- Pearson's product-moment correlation coefficient
- Time series forecasting
- Historigrams
- Analysis skills and interpretation skills
- Use of appropriate software

Evidence Requirements

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

- use linear regression and correlation to analyse a suitable problem and produce a prediction using appropriate software
- use software to perform a time series analysis and use this to analyse a suitable problem and produce a forecast
- produce a scatter diagram and historigram using appropriate software
- interpret the results of the analysis, both graphical and numerical, and provide meaningful comment

Candidates should demonstrate competence by providing satisfactory responses in line with the standard exemplified in the Assessment Exemplar Packs.

The evidence should be generated under open book, supervised conditions.

Where candidates are provided with data files, these should contain only the raw data and should not be provided in the form of pre-prepared files containing templates or formulae.

Assessment Guidelines

Appropriate software should be used to produce the forecasts and diagrams.

If Candidates fail to meet the requirements of the assessment on a first attempt, an alternative instrument of assessment must be used for reassessment purposes. In order that the candidates cannot foresee the form of the assessment, different scenarios should be developed for alternative instruments of assessment.

Administrative information

Unit code: HP6V 48

Unit title: Statistics for Business

Superclass category: AG

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History of changes:

Version	Description of change	Date
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Source: SQA

SQA acknowledges the valuable contribution that Scotland's colleges have made to the development of SQA Advanced Qualifications.

FURTHER INFORMATION: Call SQA's Customer Contact Centre on 44 (0) 141 500 5030 or 0345 279 1000. Alternatively, complete our Centre Feedback Form.

Unit specification: support notes

Unit title: Statistics for Business

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 is designed to provide candidates with a knowledge and understanding of descriptive statistics and the use of appropriate IT software to provide appropriate analysis and interpretation of quantitative, ordinal and qualitative data. This Unit is mandatory within the SQA Advanced Diploma in Business (GM8Y 48) but may form part of other group awards and may be delivered as a stand-alone Unit.

Some candidates may view this Unit as a stepping-stone to a more in-depth study of statistics while for others it may be their only experience of the subject.

If delivered as part of a group award, it is envisaged that this Unit will be delivered after the completion of any appropriate IT software Units, but sufficiently early to give more meaning to management activities associated with planning and control.

It should be noted that some of the knowledge in this Unit, eg primary/secondary data sources, could be covered in other Units such as HP0M 47 *Marketing: An Introduction.*

Outcome 1

Topics which could be covered within this Outcome:

- Quantitative, ordinal and qualitative data could include creating numerical values for qualitative data.
- Terms associated with data: attribute and variable; discrete and continuous; primary and secondary.
- Sources of secondary data could include historical records and published statistics from government and other sources.
- Survey methods for collecting data could include observation, interviews, and respondent's schedules and postal questionnaires.
- Sampling methods: random, stratified, systematic, multistage and quota sampling.

Outcome 2

Topics which could be covered within this Outcome:

- Presentation of quantitative data: stem and leaf diagrams, frequency tables, histograms, box plots, pie charts and line graphs.
- Presentation of qualitative and ordinal data could include tables, charts and line graphs.
- Measures of central location: mean, median and mode.
- Measures of dispersion: range, standard deviation and semi interquartile range.
- Calculate and use index numbers.

Outcome 3

Topics which could be covered within this Outcome:

Use of software to:

- produce correlation coefficients and forecasts
- analyse and interpret data
- produce a scatter diagram and historigram

Guidance on the delivery and assessment of this Unit

This Unit is likely to form part of a group award and is designed to raise awareness of managerial and professional behaviour within a working environment. This Unit is mandatory within the SQA Advanced Diploma in Business (GM8Y 48) but may form part of other group awards and may be delivered as a stand-alone Unit.

It is envisaged that an integrated approach to teaching the Unit will be adopted whereby the candidate will appreciate the strong link that exists between the three Outcomes. The teaching of the Unit should be slanted towards the individual needs of different candidate groups and the assessments should also reflect this approach, where possible being thematic.

All Outcomes will involve delivering some theory but where possible a practical activity-centred approach to delivery coupled with the use of IT should be encouraged.

Areas and topics to be covered within each Outcome:

For Outcome 1, it is envisaged that the internet will be used to provide some examples of secondary data from government sources but examples from other sources should also be sought.

Outcomes 2 and 3 will principally involve the practical use of an IT package. In particular, the calculation of a correlation coefficient and forecasts, and the production of diagrams for Outcome 3 must be assessed where candidates use an appropriate software package.

The emphasis should, therefore, be on presenting data in an understandable form, rapid analysis providing correct results, and reaching relevant early conclusions.

Candidates' predictions should be realistic and they should be encouraged to check that answers obtained are consistent with the data provided.

Guidance on making assessment decisions

The Evidence Requirements specify that candidates must provide satisfactory responses.
The following guidance is provided to assist assessors in making these judgements.

OUTCOME 1
The number of correct examples required is specified in the Evidence Requirements

OUTCOMES 2 AND 3

Appropriate marks thresholds OR error tolerances can be applied.
The professional judgement of the assessor will be central to the assessment decisions.

Marks Threshold

Where marks thresholds are applied, 60% would normally be appropriate. However, one meaningful comment for each Outcome must be made.

Error Tolerances

Where an error tolerance is applied, the following limits are appropriate:

- Diagrams must be produced within a tolerance of
  - four errors in Outcome 2, with no more than **two** errors in any one diagram
  - two errors in Outcome 3
- There should be a maximum of two calculation errors in each of Outcomes 2 and 3 with no more than one relating to each calculation of a measure or index number
- There must be one meaningful comment given for each of Outcomes 2 and 3

The following lists, while not exhaustive, are offered as guidance to assist assessors in making assessment decisions. The professional judgement of the assessor will be at the centre of assessment decisions.

Errors in the production of diagrams (e.g. tables, charts and graphs)

- A minor error in the selection of source data from a spreadsheet for use in the production of a diagram, such as the omission of one or two values
- A missing title or label
- A misleading title or label
- e.g. "total sales figures" when only one branch of the company or part of the time period has been represented
- A value omitted or wrongly plotted
- Use of an inappropriate or inaccurate scale
- e.g. a vertical scale not starting at zero where it should, or both scales starting at zero unnecessarily leading to the data being plotted in one small area of the graph
- A choice of diagram which only partially represents the relevant aspects of the data where a different diagram would have been more appropriate
- e.g. a multiple bar chart showing sales figures being drawn to represent the relative contribution of different branches of a company each year over a four-year period where a percentage component bar chart would have been more appropriate

Errors of calculation

- A wrong value obtained when carrying out a mathematical operation, whether by hand, using a calculator or using software – e.g. correctly identifying the minimum and maximum values in a data set as 17 and 82, then calculating the range as 75 instead of 65
- The use of a wrong figure taken from a diagram – e.g. using 2.3 instead of 2300, forgetting that the scale was in thousands
- A transcription error, where a figure has been wrongly copied
- Using a formula incorrectly – e.g. for the mean of three values, performing a + b + c/3 instead of (a + b + c)/3
- An error in the selection of values for use in a formula, whether by hand or using software – e.g. the omission of a value
- Using a previously calculated wrong value to perform a further calculation which gives rise to an improbable or impossible value in the context of the task – e.g. using a wrong mean to calculate a

standard deviation and accepting s = 20.2 when all the values in the original data set were between 6 and 14

In general, following a calculation error, subsequent working should be followed through without further penalty unless it clearly demonstrates a lack of understanding of the task.

The manipulation of data using a calculator/software package should produce results that are accurate to an appropriate number of decimal places.

Opportunities for developing Core Skills

The achievement of this Unit gives automatic certification of the following:

- The Core Skill *Numeracy* at SCQF level 6

Candidates will identify and create appropriate graphical representations from numerical data and interpret and make inferences from both graphical and numerical sources. In Outcomes 2 and 3 candidates will work with numbers to produce statistical measures and forecasts, and make inferences based upon their analysis. In Outcome 3 candidates are required to create a spreadsheet for a time series analysis and to use this spreadsheet in the analysis of a suitable problem and to produce forecasts.

Candidates will use a wide range of numerical and graphical data in routine contexts which may include non-routine elements.

Throughout this Unit candidates will be encouraged to develop and use their IT skills. They will be required as part of Outcome 2 to create graphs/charts and to calculate statistics in both Outcomes 2 and 3, thereby providing opportunities to develop the Core Skill of *Information and Communication Technology* at SCQF level 5.

Open learning

If this Unit is delivered by open or distance learning methods, additional resources will be required for candidate support, assessment and quality assurance. It would require planning by the centre to ensure the sufficiency of evidence.

Equality and inclusion

This Unit specification has been designed to ensure that there are no unnecessary barriers to learning or assessment. The individual needs of learners should be taken into account when planning learning experiences, selecting assessment methods or considering alternative evidence.

Further advice can be found on our website www.sqa.org.uk/assessmentarrangements.

General information for candidates

Unit title: Statistics for Business

It is widely recognised that statistics has an essential part to play in planning, control and communication within an enterprise. This Unit will focus on the underpinning knowledge and skills required to use basic statistical and graphical techniques to assist with these management functions and your ability to address business problems.

Outcome 1 will enable you to develop an understanding of statistical terms, source relevant published statistical data and demonstrate statistical techniques associated with collecting your own data for business purposes.

Outcome 2 builds on these skills by allowing you to analyse, present and interpret data to assist with improving business effectiveness and efficiency.

Outcome 3 will enable you to develop and demonstrate an understanding of relationships that may exist between data to assist you with business planning and control activities.

The skills required in this Unit underpin the vocational relevance of your course and use a mixture of assessment instruments. These will build on your skills for researching, evaluating and interpreting data and communicating information.

This Unit may be assessed by three separate assessments or by one single integrative assessment dependent on the delivery model adopted by the college or training centre. The use of appropriate software to produce assessment evidence is a requirement of Outcome 3 and is recommended in Outcome 2.

If you successfully achieve this Unit, you will also gain automatic certification of the Core Skill *Numeracy* at SCQF level 6. You may also have opportunities to develop the Core Skill of *Information and Communication Technology* to SCQF level 5 although certification of this Core Skill is not automatic.