

Unit Title: Quantitative Methods for Business and Management Guided Learning Hours: 160 Level: Level 5 Number of Credits: 18

Learning Outcome 1

The learner will: Understand different types of numerical data and different data collection processes, and be able to present data effectively for users in business and management.

Assessment Criteria The learner can:	Indicative Content
1.1 Explain the main sources and types of data and distinguish between alternative sampling methods and measurement scales.	1.1.1 Explain the main sources and types of data (including primary and secondary data, discrete and continuous data, quantitative and categorical data).
	1.1.2 Compare and contrast alternative sampling methods and explain the main features of surveys, questionnaire design and the concept of sampling error and bias.
	1.1.3 Distinguish between alternative measurement scales (nominal, ordinal, interval and ratio scales).
1.2 Construct appropriate tables and charts, and calculate and interpret a set of descriptive statistics.	1.2.1 Construct appropriate tables and charts, including frequency and cumulative frequency distributions and their graphical representations.
	1.2.2 Calculate and interpret measures of location, dispersion, relative dispersion and skewness for ungrouped and grouped data.
1.3 Compute and interpret index numbers.	1.3.1 Compute unweighted and weighted index numbers and understand their applications.
	1.3.2 Change the base period of an index number series.

Learning Outcome 2

The learner will: Understand the basic concepts of probability and probability distributions, and their applications in business and management.

Assessment Criteria The learner can:	Indicative Content
2.1 Demonstrate an understanding of the basic	2.1.1 Demonstrate an understanding of the basic rules of probability.

rules of probability and probability distributions, and apply them to compute probabilities.	2.1.2 Explain the conditions under which the binomial and Poisson distributions may be used and apply them to compute probabilities.
	2.1.3 Explain the characteristics of the normal distribution and apply it to compute probabilities.
2.2 Explain and discuss the importance of sampling theory and the central limit	2.2.1 Explain and discuss the importance of sampling theory and the sampling distribution of the mean.
theorem and related concepts.	2.2.2 Discuss the importance of the central limit theorem.
	2.2.3 Define the 'standard error of the mean'.
2.3 Construct and interpret confidence intervals and conduct hypothesis tests.	2.3.1 Construct and interpret confidence intervals, using the normal or t distribution, as appropriate, and calculate the sample size required to estimate population values to within given limits.
	2.3.2 Conduct hypothesis tests of a single mean, a single proportion, the difference between two means and the difference between two proportions.
	2.3.3 Conduct chi-squared tests of goodness-of-fit and independence and interpret the results.

Learning Outcome 3 The learner will: Understand how to apply statistical methods to investigate inter-relationships between, and patterns in, business variables.

Assessment Criteria The learner can:	Indicative Content
3.1 Construct scatter diagrams and calculate and interpret correlation coefficients between	3.1.1 Construct scatter diagrams to illustrate linear association between two variables and comment on the shape of the graph.
business variables.	3.1.2 Calculate and interpret Pearson's coefficient of correlation and Spearman's 'rank' correlation coefficient and distinguish between correlation and causality.
3.2 Estimate regression coefficients and make predictions.	3.2.1 Estimate the regression line for a two-variable model and interpret the results from simple and multiple regression models.
	3.2.2 Use an estimated regression equation to make predictions and comment on their likely accuracy.

3.3 Explain the variations in time-series data, estimate the trend and seasonal factors in a time series and make business forecasts. 3.3.1 Distinguish between the various components of a time series (trend, cyclical variation, seasonal variation and random variation).

3.3.2 Estimate a trend by applying the method of moving averages and simple linear regression.

3.3.3 Apply the additive and multiplicative models to estimate seasonal factors.

3.3.4 Use estimates of the trend and seasonal factors to forecast future values (and comment on their likely accuracy) and to compute seasonally-adjusted data.

Learning Outcome 4

The learner will: Understand how statistics and mathematics can be applied in the solution of economic and business problems.

Assessment Criteria The learner can:	Indicative Content
4.1 Construct probability trees and decision trees and compute and interpret EMVs (Expected Monetary Values) as an aid to business decision-making under conditions of uncertainty.	 4.1.1 Explain and calculate expected monetary values and construct probability trees. 4.1.2 Construct decision trees and show how they can be used as an aid to business decision-making in the face of uncertainty. 4.1.3 Discuss the limitations of EMV analysis in business decision-making.
4.2 Construct demand and supply functions to determine equilibrium prices and quantities, and analyse the effects of changes in the market.	4.2.1 Use algebraic and graphical representations of demand and supply functions to determine the equilibrium price and quantity in a competitive market.4.2.2 Analyse the effects of changes in the market (e.g. the imposition of a sales tax) on the equilibrium price and quantity.
4.3 Apply, and explain the limitations of, break-even analysis to determine firms' output decisions, and analyse the effects of cost and revenue changes.	 4.3.1 Apply break-even analysis to determine the output decisions of firms and to analyse the effects of changes in the cost and revenue functions. 4.3.2 Discuss the importance and explain the limitations of simple break-even analysis.

Assessment:

- Assessment method: written examination (unless otherwise stated).
- Written examinations are of three hours' duration.
- All learning outcomes will be assessed.

Recommended Reading:

- Quantitative Methods for Business and Management ABE Study Manual.
- Please refer to the Tuition Resources section of the Members Area of the ABE website (<u>www.abeuk.com</u>) for further recommended reading.