

Unit Title: Quantitative Methods for Business and Management	Unit Code: QM
Level: 5	Learning Hours: 160
Learning Outcomes and Indicative Content:	
Candidates will be able to:	
<ol style="list-style-type: none"> 1. Distinguish between different types of data and different data collection processes <ol style="list-style-type: none"> 1.1 Explain the main sources and types of data (including primary and secondary data, discrete and continuous data, quantitative and categorical data) 1.2 Distinguish between alternative measurement scales (nominal, ordinal, interval and ratio scales) 1.3 Compare and contrast alternative sampling methods and understand the main features of surveys, questionnaire design and the concept of sampling error and bias 2. Present data effectively and compute and interpret a range of summary statistics <ol style="list-style-type: none"> 2.1 Construct appropriate tables and charts, including frequency and cumulative frequency distributions and their graphical representations 2.2 Calculate and interpret measures of location, dispersion, relative dispersion and skewness for ungrouped and grouped data 2.3 Compute unweighted and weighted index numbers and understand their applications 2.4 Change the base period of an index number series 3. Explain the basic concepts of probability and probability distributions and compute probabilities <ol style="list-style-type: none"> 3.1 Demonstrate an understanding of the basic rules of probability 3.2 Explain the conditions under which the binomial and Poisson distributions may be used and apply them to compute probabilities 3.3 Explain the characteristics of the normal distribution and apply it to compute probabilities 4. Apply concepts of probability to analyse business decision-making under conditions of uncertainty <ol style="list-style-type: none"> 4.1 Explain and calculate expected monetary values (EMVs) and construct probability trees 4.2 Construct decision trees and show how they can be used as an aid to business decision-making under uncertainty 4.3 Discuss the limitations of EMV analysis in business decision-making 	

5. Apply the normal and t distributions in estimation and hypothesis testing and conduct chi-squared tests

- 5.1 Explain and discuss the importance of sampling theory and the central limit theorem
- 5.2 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
- 5.3 Conduct hypothesis tests of a single mean, a single proportion, the difference between two means and the difference between two proportions
- 5.4 Conduct chi-squared tests of goodness-of-fit and independence and interpret the results

6. Apply correlation and regression analysis to identify the strength and form of relationships between variables

- 6.1 Construct scatter diagrams to illustrate linear association between two variables and comment on the shape of the graph
- 6.2 Calculate and interpret Pearson's coefficient of correlation and Spearman's 'rank' correlation coefficient and distinguish between correlation and causality
- 6.3 Estimate the 'least squares' regression line for a two-variable model and interpret basic results from simple and multiple regression models
- 6.4 Use an estimated regression equation to make predictions and comment on their likely accuracy

7. Demonstrate how time-series analysis can be used in business forecasting

- 7.1 Distinguish between the various components of a time series (trend, cyclical variation, seasonal variation and random variation)
- 7.2 Estimate a trend by applying the method of moving averages and simple linear regression
- 7.3 Apply the additive and multiplicative models to estimate seasonal factors
- 7.4 Use estimates of the trend and seasonal factors to forecast future values (and comment on their likely accuracy) and to compute seasonally adjusted data

8. Explain how mathematical relationships can be applied in the solution of economic and business problems

- 8.1 Use algebraic and graphical representations of demand and supply functions to determine the equilibrium price and quantity in a competitive market
- 8.2 Analyse the effects of changes in the market (e.g. the imposition of a sales tax) on the equilibrium price and quantity
- 8.3 Apply break-even analysis to determine the output decisions of firms and to analyse the effects of changes in the cost and revenue functions
- 8.4 Discuss the importance and explain the limitations of simple break-even analysis

Throughout, students will be expected to be able to define relevant terms, discuss the importance of statistical and mathematical concepts in business decision-making and to interpret all results.

Assessment Criteria:

- Assessment method: written examination
- Length of examination: three hours
- Candidates should answer four questions from a choice of eight, each question carrying equal marks

Recommended Reading

ABE, *ABE Study Manual –Quantitative Methods*, ABE

Curwin J, Slater R, *Quantitative Methods for Business Decisions* (2001), Thomson Learning
ISBN: 1861525311

Burton G, Carrol G, Wall S, *Quantitative Methods for Business and Economics* (2001), Prentice Hall
ISBN: 0273655701