

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

**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