Unit 9 Quantitative Methods			
Unit aims	This unit will enable learners to further develop understanding and skills in the application of quantitative methods appropriate to support decision-making in organisations.		
Unit level	7		
Unit code	L/650/5368		
GLH	60		
Credit value	15		
Unit grading structure	Pass-Merit-Distinction		
Assessment guidance	To achieve this unit learners must produce work which demonstrates achievement of the learning outcomes at the standards provided by the assessment criteria. Learners must relate their work to the ATHE assignment scenario and use real life examples to illustrate their points. There is a requirement to use information from specific organisations to meet some of the stated standards. Learners will need to agree with tutors appropriate organisations on which to base their study. Tutors need to ensure that the organisations chosen are suitable. The learner will need to demonstrate a full understanding of quantitative methods and they will need to be applied in context to business decision-making. Additional assessment guidance is provided in the ATHE assignment. Learner work should demonstrate substantial coverage of the unit indicative content.		
Learning outcomes The learner will demonstrate that they:	**Assessment criteria The learner can:**		
	Pass	**Merit**	**Distinction**
1. Understand the types of data which can be used by organisations to monitor and improve their performance	1.1 Evaluate the different types of data which can be gathered by organisations to monitor and improve their performance 1.2 Distinguish between alternative sampling methods and measurement scales		

2. Can analyse and evaluate raw business data to inform decision-making	2.1 Analyse raw business data from a range of examples using appropriate quantitative and qualitative methods	2M1 Evaluate the differences in application between descriptive statistics, inferential statistics and measuring association	
3. Can apply a range of quantitative methods to support effective business decision-making	3.1 Apply a range of quantitative methods for business decision-making for quality, inventory and capacity management	3M1 Justify the application of appropriate quantitative methods used by specific organisations	3D1 Recommend business decisions based on the application of quantitative methods
4. Can report on data and communicate findings to inform decision-making	4.1 Explain different ways of summarising and presenting a set of business statistics 4.2 Construct tables and charts with a commentary, using summary data	4M1 Justify the rationale for choosing the methods for communicating the data	4D1 Evaluate the use of different types of charts and tables for communicating given variables to inform decision-making

Indicative Content

LO1 Understand the types of quantitative data which can be used by organisations to monitor and improve their performance

- The nature of data and types of data such as qualitative and quantitative, and of information, how data can be turned into information and information used to inform decision making
- Interpreting data from a variety of sources using different methods of analysis with advantages, disadvantages and limitations of each
- Use and comparison of sampling techniques including random sampling with and without replacement; stratified sampling; cluster sampling; systematic sampling and other types of sampling techniques, i.e., postcode analysis, demographic analysis
- Scales of measurement: nominal, ordinal, interval and ratio

LO2 Analyse and evaluate raw business data to inform decision-making

- Quantitative methods that are used to analyse and evaluate data
- Descriptive statistics:
    - Measures of central tendency (e.g., mean, median)
    - Measures of variability (e.g., range, standard deviation)
    - Application to business data (e.g., finding average earnings, measuring)
    - Variability in business processes such as queuing times and customer arrival rates

- Inferential statistics, the difference between sample and population and reliability of estimates from samples

- Measuring association:
    - Use of scatter plots, correlation and regression analysis (linear), simple forecasting
    - Business applications such as the association between output and cost, advertising and sales
    - Evaluating use of software such as Excel and SPSS to perform raw data analysis

LO3 Apply a range of quantitative methods to support effective business decision-making

- Probability distributions and application to business decisions, normal distribution (e.g., weights and measures regulations and statistical process control), poisson distribution (e.g., customer arrival rates) and binomial distribution (e.g., inspection sampling), Inference (e.g., margins of error and confidence limits)
- Inventory management including optimum inventory and economic order quantities capacity management and factors effecting capacity and maximum output rates, forecast capacity and the use of decision trees
- The issue of variability in business processes (e.g., arrival rates of customers and time taken to deal with customers), and how this leads to a trade-off between waiting time and process utilisation
- Quantitative methods used to analyse trends over time such as time series analysis and index numbers and how they support planning and decision making

LO4 Report on data and communicate findings to inform decision-making

- Identifying data: numerical, both discrete and continuous; categorical data - nominal or ordinal
- Levels of measurement - nominal, ordinal, interval, ratio
- Centre, and spread of data, ordering, frequency and scatter plots, ranking.
- Levels of measurement - nominal, ordinal, interval, ratio
- Time series analysis, indices, histograms, charts, tables, bar and line graphs and their use in representing and interpreting data
- Choosing the most effective ways analysing data and of communicating the results of the analysis and information for decision taking using tables and charts with appropriate limitations conclusions and recommendations given
- Utilising Software for producing charts/tables

Suggested Resources

Anderson, D. et al., 2015, Statistics for Business and Economics. 12th Ed., Cengage

Bergin, T., 2018, An Introduction to Data Analysis: Quantitative, Qualitative and Mixed Methods, Sage

Fávero, L.P. and Belfiore, P., 2019, Data Science for Business and Decision Making, Academic Press

Morris, C., 2012, Quantitative Approaches in Business Studies, 8th Ed., Harlow: Pearson Prentice Hall

Davis, D. and Pecar, B., 2013, Business Statistics Using Excel, 2nd Ed., Oxford: Oxford University Press

Lee, N. and Peters, M., 2015, Business Statistics Using EXCEL and SPSS, Sage

Oakshott, L., 2020, Essential Quantitative Methods: For Business, Management and Finance, Bloomsbury Publishing

Wisniewsk, M., 2016, Quantitative Methods for Decision-Makers – Student Edition, Pearson

Websites

quantitative - HBS Working Knowledge - Harvard Business School knowledge website

Research Methods (research-methodology.net) - British Research Methodology

Analyzing, Interpreting and Reporting Basic Research Results - Management Library - The Management Library

Unit 9 Quantitative Methods - Supporting information	
Opportunities for Synoptic Teaching and Learning	
Learners and tutors will have the opportunity to link the learning from this unit with the content of other units.	
Learning Outcome	**Teaching and learning links to other unit LO/AC**
LO1 Understand the types of data which can be used by organisations to monitor and improve their performance	Unit 12 Corporate Communication Strategies, LO2 Implement corporate communications audits Unit 14 Managing Continuous Organisation Improvement LO2 Analyse opportunities for improvement to organisational activities
LO2 Analyse and evaluate raw business data to inform decision-making	Unit 2 Finance for Strategic Managers, LO2 Use financial analysis as a tool for strategic decision-making Unit 10 Strategic Marketing, LO2 Understand the role of consumer behaviour in marketing strategies
LO3 Apply a range of quantitative methods to support effective business decision-making	Unit 3 Research for Strategic Development, LO2 Apply different research methodologies to gather sufficient and valid data
LO4 Report on data and communicate findings to inform decision-making	Unit 3 Research for Strategic Development, LO3 Present research findings in an appropriate format
Opportunities for Synoptic Assessment	
Some of the AC require knowledge from one or more of the LOs. In this unit, LO3 Apply a range of quantitative methods to support effective business decision-making draws on the knowledge and understanding developed via LO1 and LO2.	

Opportunities for Skills Development within this unit	
Employability Skills	**Study Skills**
Problem-solving – Using analytical skills, e.g. research skills, handling information, consulting multiple sources, categorising information. Using critical thinking skills, e.g., listening to/reading all information, identifying others' positions, arguments and conclusions, weighing up opposing arguments (avoiding jumping to conclusions, spotting fake ideas/news) drawing conclusions **(LO2, LO3, LO4)**	**Using sources of information** – Accessing information ie choosing current, sufficient, relevant and reliant sources **(LO2, LO3, LO4)** **Reading skills** – Identifying different reading materials. Reading with a purpose, e.g., to understand an idea/concept, to retain information for revision, to research **(LO1, LO2, LO3, LO4)** **Thinking skills** - Using analytical skills, eg research skills, handling information, consulting multiple

Communication skills – Taking the right action with the information gathered. Written communication eg appropriate formats, style and tone, spelling, punctuation and grammar **(LO4)** **Digital skills** - Handling and judging the reliability of information. Conducting online transactions, Problem-solving (eg online research, presenting data), Applying relevant numeracy skills to explore, organise and share data appropriately, Keeping users safe and legal in the digital world **(LO4)**	sources, categorising information. Using critical thinking skills, eg listening to/reading all information, identifying and interpreting others' positions, arguments and conclusions, weighing up opposing arguments (avoiding jumping to conclusions, spotting fake ideas/news), drawing conclusions **(LO1, LO2, LO3, LO4)**