

Course Title

Business Quantitative Analysis (BQA)

Knowledge Pillar	Level	Course Title	Course Code	Total Marks
Information Technology & Business Analytics [ITBA]	Foundation level	Business Quantitative Analysis (BQA)	TA112	100

Syllabus Structure

The syllabus comprises the following main topics with the relative study weightings:

Segment	Segment Title	Weight
A	Business Mathematics	50 %
B	Business Statistics	50 %

Course Description

This course provides fundamentals of quantitative analysis under two broad categories, Business Mathematics and Business Statistics. The course is designed to enable students with reasonable quantitative aptitude in grasping the contents of other courses under the CMA professional program. In the first part of the course, students will be oriented to the use of logarithms, exponential functions, calculus and trigonometric formulas in addition to the basic concepts of mathematics. Subsequently, this course covers descriptive statistics, probability concepts, probability distribution, hypotheses testing, regression and correlation, Index numbers and Forecasting-Time series. The amalgamation of these quantitative issues with information technology is made in this course.

Course Objectives

The main objective of this course is to enable learners to use the knowledge of mathematics and statistics in the decision-making process. It is expected that a successful learner of the course will be able to express business problems in mathematical terms, solve the problem and be able to interpret the results. In the process, they will also be able to identify sources, types and use of data. This course will provide a foundation for the quantitative skills, logical reasoning and critical thinking ability expected from an aspiring professional accountant.

Course Learning Outcomes

On successful completion of this course, the student will be able to:

1. understand the basic mathematical theories and their application using MS Excel spreadsheet;
2. use set theory, exponential and logarithmic functions in solving critical business problems;
3. understand the use of trigonometry and calculus in solving industrial issues;
4. comprehend the use of mathematics in financial management;
5. conduct scenario analysis using probability theory;
6. develop basic forecasting and optimization models; and
7. draw conclusion about population characteristics based on sample data via hypothesis testing.

DETAILED CONTENTS

Parts	Topics	Level of study required	Subtopics	Learning outcomes of topics	Probable weight
A. Business Mathematics (50 Marks)	A1. Basic Mathematics	R, U, AP	<ul style="list-style-type: none"> • Introduction; • Mathematical operations and brackets; • Different types of numbers; • Rounding, fractions, percentage and ratios; • Constants, variables and functions; • Exponential numbers; • Formulae; • Solving equations; • Manipulating inequalities; • Mathematical operations in excel; • Accuracy and approximation. 	Upon successful completion, students shall be able to: <ol style="list-style-type: none"> 1. demonstrate the application of basic mathematics in the computation of values; 2. solve and present graphically the relationship of different variables; 3. demonstrate the use of formulas in MS Excel spreadsheet. 	20%
	A2. Set Theory	R, AP, AN, D	<ul style="list-style-type: none"> • Introduction; • Definition of sets and elements; • Methods of expressing sets; • Types of sets; • Venn diagrams; • Operations of sets; • Number of elements of a finite set; • Application of set theory to solve business problems and calculation of probability. 	<ol style="list-style-type: none"> 4. illustrate the underlying philosophy of set theory; 5. apply set theory in solving real-life problems. 	20%
	A3. Exponential and Logarithmic Functions	U, AP, AN, E	<ul style="list-style-type: none"> • Exponential functions: exponent; positive integral exponent; zero, negative integral exponent; rules of exponent; fractional exponent; • Logarithmic functions: logarithm; formulae of logarithms; natural logarithm and common logarithm; the scientific form of numbers; use of a calculator. 	<ol style="list-style-type: none"> 6. understand the implications of exponential and logarithmic functions; 7. illustrate the use of logarithm as an alternative to a calculator and computer. 	15%
	A4. Permutations and Combinations	U, AP, D	<ul style="list-style-type: none"> • Introduction; • Fundamental principles of counting: multiplication rule; addition rule; • Permutations: properties of permutations; circular permutation; permutations with restrictions; 	<ol style="list-style-type: none"> 8. apply the concept of permutation and combination in arranging objects; 9. describe the meaning and computational 	15%

Parts	Topics	Level of study required	Subtopics	Learning outcomes of topics	Probable weight
B. Business Statistics (50 Marks)			<ul style="list-style-type: none"> Combination: properties of combinations. 	circular permutation and permutation with restriction.	
	A5. Mathematics of Finance	R, AP, E, D	<ul style="list-style-type: none"> Interest and its computation Power of compound growth Present and future values: single payment, annuity Cost-benefit analysis: discounted cash flow, NPV, IRR 	10. compute present and future values of cashflows 11. decide the financial feasibility of a project 12. demonstrate the use of MS Excel spreadsheet in solving financial problems	30%
	B1. Descriptive Statistics	U, AP, AN	<ul style="list-style-type: none"> Organize ungrouped data into a frequency distribution Construct different types of graphs using statistical software. Arrange ungrouped data into an array, and determine the mean, median, mode, percentiles, and quartiles; Measure of dispersions coefficient of variation; Skewness and kurtosis. 	13. present data in tabular and graphical forms 14. understand and interpret the features of a distribution 15. apply the appropriate data presentation techniques using MS Excel for descriptive statistics.	15%
	B2. Regression and Correlation	U, AP, AN, D	<ul style="list-style-type: none"> Linear regression analysis; Determination of correlation coefficient; The least-squares criterion. 	16. identify and interpret the best fit solution using regression analysis; 17. use regression analysis as a forecasting technique; 18. demonstrate correlation and regression results in MS Excel.	20%
	B3. Basic Probability	U, AP, AN	<ul style="list-style-type: none"> Concept of probability; Rules of probability; Conditional probability; Solve problems using different rules. 	19. demonstrate the use of the addition and multiplication rules of probability.	10%

Parts	Topics	Level of study required	Subtopics	Learning outcomes of topics	Probable weight
	B4. Probability Distributions	AP, AN, D	<ul style="list-style-type: none"> • Random variables; • Probability distributions (binomial and normal); • Use binomial and normal distribution to calculate probabilities. 	20. compute probability from a binomial and normal distribution; 21. generate business solution using a probability distribution.	10%
	B5. Hypothesis testing	AP, AN, D	<ul style="list-style-type: none"> • Introduction to hypothesis testing; • State null and alternative hypothesis; • Tests of statistical hypotheses. 	22. explore the relationship between variables in an experimental setting; 23. apply hypothesis testing in quality management.	15%
	B6. Index numbers	U, AP, V	<ul style="list-style-type: none"> • Basic terminology; • Combining series of index numbers; • Composite index numbers; • Weighted index numbers; • Retail price index for Bangladesh. 	24. demonstrate the computation and use of index number; 25. construct and apply the relative price index.	10%
	B7. Forecasting Time series	U, E	<ul style="list-style-type: none"> • Components of time series; • Finding the trend; • Finding seasonal variations; • Forecasting; • Limitation of forecasting models. 	26. develop and interpret a forecasting model generated from a time series analysis; 27. demonstrate the use of MS Excel to develop time-series forecasts.	20%

Here, R = Remembering; U = Understanding; AP = Applying; AN = Analyzing; E = Evaluating; C = Creating; D = Decision making; are the seven levels of learning developed based on the Bloom's Taxonomy.

Recommended Books and Learning Materials

Primary Textbook

1. ICMAB. (2021). ICMAB Learning Manual for Business Quantitative Analysis.

Recommended Textbook (Latest Edition)

1. Kappor, V. K., & Sancheti, D. C. (2019). *Business mathematics*. (11th ed.). Sultan Chand & Sons.
2. Gupta, S. P., & Gupta M. P. (2019). *Business statistics*. (19th ed.). Sultan Chand & Sons.

Reference Books/Other Learning Materials (Latest Edition)

1. Agarwal, D. R. (2018). *Business mathematics* (1st ed.). Vrinda Publications (P) Ltd.
2. Zameeruddin, Q., Khanna, V. K., & Bhambri, S. K. (2009). *Business mathematics*. (2nd ed.). Vikas Publishing House Pvt Limited.
3. Levin, R. I., & Rubin, D. S. (2017). *Statistics for management*. (8th ed.). Prentice-Hall.
4. Anderson, D. R., Sweeney, D. J., Williams, T. A., Camm, J. D., & Cochran, J. J. (2020). *Essentials of statistics for business and economics*. (9th ed.). South-Western College Pub/ Cengage Learning.

BQA Course Mapping

PrOs	POs	POs	CLOs	CLOs	TLOs
PrO1	2	PO1	1, 2, 3	CLO1	1, 2, 3, 8, 9, 10, 16, 17, 18, 19, 22, 28, 29, 31
PrO2	1	PO2	5, 6	CLO2	4, 5, 6, 7
PrO3	2,3	PO3	1, 4, 7	CLO3	10, 11, 12, 13,
PrO4	-	PO4	-	CLO4	14, 15, 16,
PrO5	1,2,3	PO5	-	CLO5	16, 23, 24, 25,
PrO6	-	PO6	-	CLO6	13, 16, 20, 21, 30, 31
PrO7	2	PO7	-	CLO7	16, 19, 20, 21, 26, 27, 30, 31

Here, PrOs = Program Objectives; POs = Pillar Objectives; CLOs = Course Learning Outcomes; TLOs = Topic Learning Outcomes