STAGE-2

S-203 - BUSINESS MATHEMATICS & STATISTICS

i. Introduction:

This course comprises basic concepts and techniques of mathematics & statistics. A thorough knowledge in the areas of basic mathematics and presentation of data, is an essential skill for management accountant. The management accountant should understand statistical concepts, because of the need to estimate the uncertainties of business decisions. This course also gives basic understanding of mathematical techniques applied for, forecasting in corporate planning and Financial Management.

ii. Objectives:

To provide the students with the basic knowledge of mathematics and statistics to enable them to:

- Use and interpret mathematical and statistical methods, and present the results of quantitative nature, in a suitable form for taking business decisions.

iii. Outcomes:

On completion of this course, students should be able to:

- describe and demonstrate the use of mathematical and statistical techniques,
- understand the proper use of formulae and ratios,
- describe reasonableness in the computation of answer,
- understand and apply techniques for summarising and analysing data,
- describe and demonstrate the use of probability, in case of involvement of risk and uncertainty,
- describe and apply financial mathematical techniques, and
- describe and demonstrate forecasting techniques.

INDICATIVE GRID:

SYLLABUS CONTENT AREA	WEIGHTAGE
SECTION-A **BUSINESS MATHEMATICS** 1. Preliminaries 2. Mathematical Functions 3. Differentiation 4. Optimisation: Application 5. Integral Calculus 6. Matrix Algebra 7. Sequence And Series 8. Mathematics of Finance	50%
SECTION-B **STATISTICS** 9. Probability Theory 10. Probability Distributions 11. Decision-Making 12. Statistical Forecasting	25%
SECTION-C **OPERATIONAL RESEARCH** 13. Network Analysis 14. Linear Programming 15. Optimisation	25%
TOTAL	**100%**

Note: The weightage shown against each section indicates, study time required for the topics in that section. This weightage does not necessarily specify the number of marks to be allocated to that section in the examination.

CONTENTS

SECTION-A

BUSINESS MATHEMATICS

1. Preliminaries

Factorization, Equations, Inequalities, Absolute Value Relationships. Quadratic Equation and Nature of Roots, Mid-Points, Two Point Formula, Distance Formula, Rectangular Co-ordinate System

2. Mathematical Functions

Functions, Domain Range Relationship, Restricted Domain and Range, Univariate, Bivariate and Multivariate Functions. Value of the Functions. Graph Representation of the Functions, Type of Functions (Constant, Linear, Rational, Combinations, Composite, Polynomial, etc.), Applications of the Linear Functions, Break-Even Models (Analysis)

3. Differentiation

The Limit and Introduction, Average rate of change, Concepts of derivative and differentiation, Basic Rules of Differentiation. Instantaneous-rate of change. Partial Derivatives and Mixed Partial Derivatives

4. Optimisation: Application

Derivatives, Maxima and Minima, Curve Sketching, 1st and 2nd Derivative Tests, Restricted-domain considerations revenue, Cost and profit applications, additional applications

5. Integral Calculus

Concepts of Anti-derivatives, Integration, Rules of Integration, Definite and indefinite integrals. Application of Integral Calculus.

6. Matrix Algebra

Concept of Matrices, Addition, Subtraction, Multiplication, Inverse of Matrices, Solution of linear equation with the help of Matrices (up to three variables), The Determinant and its Properties. Cramer's Rule, Gaussian Elimination Method, Method of Elimination. Slope Intercept form, selected applications

7. Sequence and Series

Concept of Sequence and Series, Arithmetic And Geometric Progression and its business applications. Arithmetic and Geometric Means etc.

8. Mathematics of Finance

Concepts of Interest rate, Simple and Compound Interest, singe-payment computations, Present value, Nominal and Effective Interest Rates. Concept of Annuities and Their Future Value, Annuities and their present value, Mortgages, Cost-Benefit Analysis, Discounted Cash Flow, Net Present Value.

SECTION-B

BUSINESS STATISTICS

9. Probability Theory

Introduction to sets and set operation, permutations and combinations, Basic probability concepts, Statistical dependence and independence, Rues of Probability (Additive and Multiplicative). Conditional Probability, Marginal Probability, Joint Probability.

10. Probability Distribution

Probability Distributions, Measures of Central Tendency, Statistical Dispersions, Normal and Binomial Distributions.

11. Decision-Making

Sampling Methods (Probability and Non-Probability Sampling), Sampling Distribution of Mean), Estimation (Confident Innerves) for single population mean, Test of hypothesis (t & z test) for single population mean, Chi-Squire Test, Concept of Sample Size.

12. Statistical Forecasting

Linear Correlation Coefficient, Coefficient of Determination, Linear regression model, Least square methods, semi-average, moving average, Index Number (Simple and Weighted).

SECTION-C

OPERATIONAL RESEARCH

13. Network Analysis

Critical Path Analysis (CPM), Gantt Charts Analysis of network, crashing program evaluation and network analysis, activity-on-arrow and activity-on mode diagrams, probabilities network.

14. Linear Programming

Optimisation by linear programming using graphical and simplex methods. Sensitivity Analysis.

15. Optimisation

Linear and non-Linear Optimisation.

Recommended Books

CORE READINGS		
TITLE	**AUTHOR**	**PUBLISHER**
Quantitative Techniques	T. Lucy	DP. Publications Ltd., Aldine place, 142-144 Uxbridge Road Shepherds Bush, Green, London W12 8AW.
Introduction to Statistics	Ronald E. Walpole	Macmillan Publishing Co. Inc. New York.
Applied Mathematics for Business, Economics & the Social Sciences.	Frank S. Budnick	McGraw-Hill Company Inc., Princeton Road, S-1 Hightslown, NJ08520, New York.
Business Mathematics	PBP	Professional Business Publications, Lahore.
ADDITIONAL READING		
Business Mathematics	Mirza Muhammad Hassan & Muhammad Ali Mirza	Farooq Kitab Ghar, 32-33 Urdu Bazar, Karachi.