SEMESTER 2

BUSINESS MATHEMATICS & STATISTICAL INFERENCE [BML-202]

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.

OBJECTIVES

To provide the students 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.

OUTCOMES

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

- Understand the use of mathematical and statistical techniques,
- Understand the proper use of formulae and equations,
- Get acquainted with the use of derivate, and apply to solve problem
- Describe and apply financial mathematical techniques,
- Comprehend 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 demonstrate forecasting techniques.
- Evaluation of historical data over the period.
- Presentation of data collected through diagram charts and graphs.
- Apply statistical methods on historical data for decision making
- Understand the application of techniques for investment decision
- Apply financial and mathematical formulas to solve business problem
- understanding application of linear programming through graphical methods

INDICATIVE GRID

PART	SYLLABUS CONTENT AREA	WEIGHTAGE
A	**BUSINESS MATHEMATICS** 1 Basic Mathematical Techniques 2 Formulae and Equations 3 Derivatives 4 Compounding and Discounting 5 Basic Investment Appraisal 6 Linear Programming	40%
B	**STATISTICS AND STATISTICAL INFERENCE** 7 Data and Information 8 Collection and Presentation of Data 9 Measurement of Location 10 Dispersion 11 Correlation and Linear Regression 12 Index Numbers 13 Probability 14 Probability Distribution 15 Estimation & Testing 16 Sampling 17 Forecasting - Time Series	60%
	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

PART – A
BUSINESS MATHEMATICS

1. **Basic Mathematical Techniques**
   - Integers, Fractions and Decimals
   - Using Scientific & Financial Calculator
   - Order of Operations
   - Percentage and Ratios
   - Roots and Powers
   - Errors

2. **Formulae and Equations**
   - Introduction
   - Manipulating Inequalities
   - Linear Equations
   - Linear Equations and Graphs
   - Simultaneous Equations
   - Non-Linear Equations

3. **Derivatives**
   - Basic concepts of functions
   - Concepts of Derivative and Differentiation
   - Basic Rules of Differentiation
   - Instantaneous Rate of Change
   - Derivatives, Maxima and Minima & Point of Inflection

4. **Compounding and Discounting**
   - Simple Interest
   - Compound Interest
   - Equivalent Rates of Interest
   - Regular Savings and Sinking Funds
   - Loan and Mortgages
   - Concept of Discounting

- Discounting at simple discount rate

5. **Basic Investment Appraisal**
   - The time value of money
   - Net Present Value (NPV) Method
   - Internal Rate of Return (IRR) Method
   - Annuities and Perpetuities
   - Linking Compounding and Discounting
   - Shareholder Value

6. **Linear Programming**
   - Concept of Linear Programming
   - Graphical method of linear programming

PART – B
STATISTICS AND STATISTICAL INFERENCE

7. **Data and Information**
   - Introduction
   - Characteristics of Good Information
   - Data Type

8. **Collection and Presentation of Data**
   - Tables
   - Charts
   - Frequency Distribution
   - Histograms
   - Ogives
   - Scatter Diagram

9. **Measuring Location**
   - Arithmetic Mean
   - Geometric Mean
   - Harmonic Mean
   - Mode
   - Median
   - Quartiles and the Semi-Quartiles Range

10. **Dispersion/Measures of Shape of Distribution**
    - Range
    - Mean Deviation
    - Quartile Deviation
    - Variance and Standard Deviation
    - Coefficient of Variation
    - Skewness

11. **Correlation and Linear Regression**
    - Correlation

- Correlation Coefficient and Coefficient of Determination
- Spearman's Rank Correlation Coefficient
- Lines of Best Fit
- Scatter Graph Method
- Linear Regression Analysis

12. **Index numbers**
    - Basic Terminology
    - Index Relatives
    - Time Series of Index Relatives
    - Time Series Deflation
    - Composite Index Numbers
    - Weighted Index Numbers
    - Retail Price Index for Pakistan

13. **Probability**
    - Concept of Probability
    - Rules of Probability
    - Expected Values
    - Expectation and Decision Making

14. **Probability Distributions**
    - Normal Distribution
    - Binominal Distribution
    - Standard Normal Distribution
    - Using Normal Distribution to Calculate Probabilities
    - Pareto Distribution and 80:20 Rule

15. **Estimation & Testing**
    - Computation of sample size
    - Confidence Interval for Single Population Mean
    - Testing hypothesis for Single population Mean
    - Test of independence (Chai-Square Test)

16. **Sampling**
    - Introduction to Probability and non-probability sampling
    - Simple Random Sampling
    - Sampling Distribution

17. **Forecasting - Time series**
    - Components of Time Series
    - Finding the Trend
    - Finding the Seasonal Variations
    - Forecasting
    - Limitation of Forecasting Models

TEACHING METHODOLOGY: The faculty is advised to teach the topics in the mode of case studies based on knowledge and application with practical approach.

RECOMMENDED BOOKS

CORE READINGS		
TITLE	**AUTHOR**	**PUBLISHER**
CIMA, UK Study Text	---	BPP
Relevant Study Text	---	Kaplan Publishing
Introduction to Statistics	Ronald E. Walpole	Macmillan Publishing Co.
Applied Mathematics for Business, Economics & the Social Sciences.	Frank S. Budnick	McGraw-Hill
ADDITIONAL READING		
Statistics: Concepts and Methods	Syed Khursheed Alam	Farooq Kitab Ghar, 32-33 Urdu Bazar, Karachi.
Business Mathematics	Mirza Muhammad Hassan / Muhammad Ali Mirza	Farooq Kitab Ghar, 32-33 Urdu Bazar, Karachi.