ADC/B.Com-I
PAPER-V
BUSINESS MATHEMATICS AND STATISTICS

Objectives
This course deals with some basic mathematical and statistical tools needed in commerce concepts, such as data presentation, graphs, measures of central tendency and dispersion, correlation, and index numbers. The principal aims of the course are to introduce students to the basic mathematical methods and use of statistical tools/applications.

BUSINESS MATHEMATICS

1. **COORDINATE GEOMETRY**
    - **a.** Distance between two points,
    - b. slope of a straight line, Equation of straight lines passing through two points,
    - c. Slope – intercept form, point and slope form.
    - d. Graph of quadratic equation, vertex and roots of the equation.
2. **CALCULUS**
    - a. Idea of Limits,
    - b. Differentiation,
    - c. Rate of change,
    - d. Techniques in differentiation,
    - e. Polynomial and composite function.
    - f. Addition, Product and Quotient rule,
    - g. Application of derivatives Marginal functions
        - i. Cost, demand, supply, profit, revenue.
    - h. Optimization of simple function,
    - i. Point of inflexion, maxima minima.
3. **MATRICES AND DETERMINANTS.**
    - **a.** Addition, subtraction, multiplication of matrices.
    - b. Inverse of a matrix (upto 3 x 3)
    - c. Determinants;
        - i. Properties of determinants,
        - ii. Cramer's Rule.

ELEMENTARY STATISTICS

1. **INTRODUCTION**
    - **a.** Definition, scope limitation of statistics.
    - b. Collection of primary and secondary data.
    - c. Presentation of Data;
        - i. Frequency distribution, cumulative and relative frequencies Simple and composite diagrams,
        - ii. Pie diagram, Frequency Polygon, frequency curves. Histogram and ogive.
2. **MEASURES OF CENTRAL TENDENCY**
    - a. All the measures of central tendency and their properties including quartiles, deciles and percentiles,
    - b. Graphical Determination median and quartiles.

3. **MEASURES OF DISPERSION**
    a. Absolute and relative measures:
        i. Range,
        ii. Quartile deviation,
        iii. Mean deviation
        iv. Standard deviation,
        v. Variance.
        vi. Skewness
4. **REGRESSIONS AND CORRELATION**
    a. Scatter diagram linear regression models (two variables) estimation and forecasting.
    b. Idea of correlation,
    c. Co-efficient of correlation and its properties. Rank correlation.
5. **INDEX NUMBER**
    a. Introduction,
    b. Application of index number Price index (fixed and chain relatives)
    c. Composite index number; weighted and un-weighted.
    d. Special type of index numbers (Laspeyre, Passche, Fisher and Marshall Edgeworth).

PROBABILITY & STATISTICAL INFERENCE

1. COUNTING TECHNIQUES
    a. Fundamental Principle.
    b. Permutation and combination.
2. **PROBABILITY**
    a. Introduction,
    b. Set theory, sample space, events.
    c. Equally likely, mutually exclusive, exhaustive, independent and dependent events.
    d. Addition and Multiplication laws of probability, conditional/ probability, Mathematical expectation (only concept of mean).
3. PROBABILITY DISTRIBUTIONS
    a. Random variable,
    b. Binomial,
    c. Poisson,
    d. Hyper Geometric and Normal distributions.
4. **SAMPLING**
    a. Concept of finite and infinite population.
    b. Simple random sampling methods of drawing simple random samples from finite population (with and without replacement), parameter and Statistics Standard error.
    c. Central limit theorem.
    d. Sampling distribution of mean and difference between two mean numerical proof of $E(x) = \mu$

5. **STATISICAL INFERENCE**
    a. Point and Interval estimation of mean and difference between two means for large and small samples.
    b. Null and Alternate Hypothesis.
    c. Idea of Type I and Type II Error test concerning mean and difference between two means for large and small samples (z and t tests).
    d. Chi square statistic for goodness of fit test and test for independence in contingency table

RECOMMENDED BOOKS

i) Abdul Waheed, ***Statistical Analysis in Business and Economics,*** Royal Book Company, Karachi, Latest Edition, Karachi
ii) Anderson, Sweeney and Williams, ***Statistics for Business and Economics***, South-Western, Cengage Learning. (latest edition)
iii) Frank S. Budnick ***Applied Mathematics***, International edition, United States. Mcgraw Hill book, latest edition.
iv) Gerald, K. ***Statistics for Management and Economics***, Pearson. (latest edition)
v) Hamid A. Hakim ***Business Mathematics*****:** Latest Edition Karachi Meyori Matbooaat,
vi) Hamid A. Hakim ***Introductory Statistics for Economics and Management*****:** latest edition ,Karachi Meyari Matbooaat,
vii) Lind, D. A. ***Statistical Techniques in Business and Economics***, The McGraw-Hill Companies (latest edition)
viii) McClave, J.and Sincich, T. ***Statistics*** Pearson. (latest edition)
ix) Ronald E. Walpole ***Introduction to Statistics***, (Latest Edition).
x) S. Khurshid Alam ***Business Mathematics***, Latest Edition Karachi Rehber Publisher,
xi) S. Khurshid Alam ***Statistics Concept and Methods***, Karachi: Rehber publisher,
xii) Shahid Jamal ***Statistics Problem & Practices*****.** Ahmed Academy,2004
xiii) Weiss, N. A. ***Elementary Statistics***, Pearson. (latest edition)

Note: 1. Latest edition of books are recommended.
2. Duration of course will be 20 weeks.
3. Total 20 lectures of two hours duration will be delivered.