

# Business Statistics

BBS FIRST YEAR

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**B U D D H A**



P U B L I C A T I O N S

## Business Statistics

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# Preface

Business Statistics enhances our understanding of all sciences-social, physical and natural. It is applied mathematics of finding numerous applications in various diversified fields such as agriculture, industry, sociology, biometry, planning, economics, business, management, insurance, accountancy and auditing and so on. We are sure after studying this book; the reader will develop skill to make conclusions of real situations occurring in business, industry, management etc. Each chapter of this book includes the necessary theory and methods of carrying out the various techniques and analysis with suitable examples. Other than providing useful guidance to the students in several professional and competitive examinations, this book is a modest though determined bid to serve as a text-book, for BBA, and BIM.

We hope that all readers will find the presentation and exposition of the subject quite lucid and easy to understand. It is fundamental of applied statistical techniques and more interesting subjects. The readers will be able to grasp the basic and theoretical concept of statistics and application of different statistical tools and techniques in practical life.

Our sincere thanks go to Mr. Nabaraj Bajgain, Managing Director of Buddha Publications Pvt. Ltd. for taking all the responsibilities of publishing and distributing this book. At the same time we appreciate and thank to Mr. Dipendra Shrestha and Ms. Rajani Shrestha for excellent desktop work.

We also express our deep gratitude to all those for inspiring and supporting us directly or indirectly to have the book published.

Any healthy suggestions and criticism for further improvement of the book and correction of errors from the readers will be gratefully accepted.

**Authors**

# Syllabus

Course No: MGT 202

Nature of the Course: Compulsory

Lecture hour: 150

Full Marks: 100

Pass Marks: 35

## Course objective

The basic objective of this course is to provide students an understanding of concepts of business statistics and to acquaint the students with necessary statistical and mathematical tools and techniques to be used in business decision-making processes.

## Course Details

### Unit 1: Introduction to Statistics 5 LHs

Meaning, scope and limitation of statistics; Importance of statistics in business and management; Types and sources of data; Methods of collection of primary and secondary data; Precautions in using secondary data; and Problems of data collection.

### Unit 2: Classification and Presentation of Data 5 LHs

Data classification: meaning, need, objectives and types of classification; Construction of frequency distribution and its principles; Presentation of data: tabular presentation, diagrammatic presentation: bar diagram, Pie diagram, graphic presentation: histogram, frequency polygon, frequency curve and ogive.

*(Illustrations related to Business and Management).*

### Unit 3: Measures of Central Tendency 15 LHs

Mean: simple and weighted (Arithmetic Mean, Geometric Mean and Harmonic Mean); Median; Partition values; Mode; Properties of averages; and Choice and general limitations of an average.

### Unit 4: Measures of Dispersion 15 LHs

Absolute and Relative measures; Range; Quartile deviation; Standard deviation; Coefficient of variation; and Lorenz curve.

### Unit 5: Skewness, Kurtosis and Moments 15 LHs

Meaning, objective and measurement of Skewness; Karl Pearson's and

Bowley's methods; Five number summary; Box-Whisker Plot; Kurtosis and its measurement by Percentile method; Meaning of moments; Central and raw moments and their relationship; and Measurement of Skewness and Kurtosis by method of moment.

**Unit 6: Simple Correlation and Regression Analysis 15 LHs**

Karl Pearson's correlation coefficient including bi-variate frequency distribution; Coefficient of determination; Probable Error(P.E.); Spearman's rank correlation coefficient; Concept of linear and non-linear regression; Simple linear regression equations including bi-variate frequency distribution; and Properties of regression coefficients.

**Unit 7: Analysis of Time Series 15 LHs**

Meaning, need and components of time series; Measurement of trend: semiaverage, moving average, method of least squares; Measurement of seasonal variation: method of simple average and ratio to moving average (only quarters).

**Unit 8: Index Numbers 15 LHs**

Meaning and types of Index Number; General rule and problems in construction of index number; Methods of constructing index numbers: simple and weighted (aggregative and average of price relative method), Laspeyre's index number, Paasche's index number, Fisher's ideal index number; and Time and factor reversal tests.

Cost of living index number (or Consumer's price index number): aggregative expenditure method and family budget method; and Base shifting and deflating.

**Unit 9: Probability 10 LHs**

Definition of probability; Addition and multiplication theorem; Application of combination rule in probability; and Conditional probability.

**Unit 10: Sampling and Estimation 5 LHs**

Meaning of sample and population; Census versus sampling; Sampling techniques; Concept of sampling distribution; Standard error; Estimation: estimator, concept of types of estimates: Point and Interval estimates.

**Unit 11: Quantitative Analysis 15 LHs**

Introduction to Quantitative Analysis; Application of management science: scientific approach to decision making; Decision making under Definition and types of Matrix; Addition, subtraction and multiplication of matrices; Cofactors; Transpose; Adjoint and inverse of a matrix; Matrix method to solve simultaneous equations up to three unknown variables. the condition of uncertainty: maximax (optimism), maximin (pessimism), minimax regret; Decision making under risk : Expected Profit (EP) Or Expected Monetary value (EMV), Expected Profit with perfect Information (EPPI), Expected Value of Perfect Information (EVPI); Linear Programming Problem (LPP): Problem formulation with two decision variables, graphical solution of maximization and minimization problems.

**Unit 12: Determinant 10 LHs**

Definition of determinant; Methods of finding the numerical values of determinant up to three order; Properties of determinant and its use to find the numerical values of determinants; and Cramer's rule to solve simultaneous equations up to three variables.

**Unit 13: Matrix 10 LHs**

Definition and types of Matrix; Addition, subtraction and multiplication of matrices; Cofactors; Transpose; Adjoint and inverse of a matrix; Matrix method to solve simultaneous equations up to three unknown variables.

*Note: Illustrations and applications in all chapters should be based on Business and Management situation as far as possible.*

**Suggested Readings:**

1. Gupta, S.C., *Fundamentals of Statistics for Management*, Mumbai: Himalayan Publishing House.
2. Tulsian, P.C. & Pandey, Vishal, *Quantitative Techniques: Theory and Problems*, New Delhi: Pearson Education.
3. David, M., Levine, Timothy, C. Krehbiel, & Mark, L. Berenson, *Business Statistics A first course*, USA: Prentice Hall.
4. Gupta, S.P., *Statistical Methods*, New Delhi: Sultan Chand and Sons.
5. Levine, Richard I, and Dabid S. Rubin, *Statistics for Management*, New Delhi: Prentice hall of India Pvt. Ltd.
6. Aitken, A.C., *Determinant and Matrices*, UK: Amazon.

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