

## GENERIC ELECTIVES (GE-4): STATISTICS FOR BUSINESS

### CREDIT DISTRIBUTION, ELIGIBILITY AND PRE-REQUISITES OF THE COURSE

Course title & Code	Credits	Credit distribution of the course			Eligibility criteria	Pre-requisite of the course (if any)
		Lecture	Tutorial	Practical/ Practice		
Statistics for Business (GE4)	4	3	0	1	Class 12	Mathematics at Class 12 level

### Learning Objectives

The objective of this course is to enable students to:

- Describe data using summary statistics.
- Develop detailed understanding of discrete and continuous distributions.
- Develop skills in statistical computing, statistical reasoning and inferential methods.
- Comprehend and analyse real data like real indices.

### Learning outcomes

By studying this course, students will be able to:

- Learn tools and concepts of statistical analysis and interpretation.
- Comprehend fundamentals of probability theory.
- Develop skills in statistical computing, statistical reasoning and inferential methods.
- Comprehend and analyse real data like real indices.

### SYLLABUS OF GE-4

#### Unit 1: Descriptive Statistics and Exploratory Data Analysis (15 hours)

Types of Variables (Quantitative, Qualitative, discrete, continuous), Scales of Data Measurement (nominal, ordinal, Interval & Ratio), Variable-; Primary & secondary Data.

Frequency distributions, Relative Frequency, Cumulative Distributions, Percentiles, Quartiles; Graphical representation of data- bar charts, pie, histograms, box plots.

Measures of central tendency: Mean, median, mode, Geometric Mean, Harmonic Mean, Weighted Mean & their properties. Selection of a measure of central tendency.

Measures of Dispersion: Range, inter-quartile range, quartile deviation, mean deviation, standard deviation, variance, coefficient of variance, properties of standard deviation, merits & demerits.

Skewness and Kurtosis: Meaning, measures- Karl Pearson, Bowley, Kelly's, Kurtosis- meaning, Moments, Kurtosis

Bivariate Analysis: Cross-tabulations and Scatter diagram; Correlation, Association and Simple Regression.

#### Unit 2: Probability

(12 hours)

Axioms of probability; Review of counting rules, experiments, sample space, simple and complex events; Addition and multiplication rules; Concepts of Mutually exclusive events, independent events; Concepts of Joint, marginal and conditional probability; Permutation and Combinations

Concept of Discrete and continuous Random Variables; Expected value and variance; Examples of Theoretical Discrete and Continuous Probability Distributions – Binomial, Poisson and Normal distributions.

### **Unit 3: Sampling, Estimation and Hypotheses**

**(15 hours)**

Population versus Sample; Sample Statistics versus population parameters; Definition and Statistical properties of a Random Sample; Point and Interval Estimation and Small Sample Properties of Estimators (unbiasedness, efficiency); Central Limit Theorem. (Interval estimation for mean for large samples)

Basic concepts of Hypotheses Testing: Formulation of Null and Alternate Hypotheses; One-tailed and two-tailed Tests about population Mean; Concepts of Type I and Type II errors. (Hypothesis testing for mean and difference between mean for large samples only)

### **Unit 4: Index Numbers**

**(6 hours)**

Index Numbers: Use and construction of Laspeyres and Paasche index numbers; Fixed and chain base index numbers; Base shifting, splicing and deflating. Construction of real indexes: Consumer Price Index and BSE index.

**Practical Component (30 hours) :** Practicals to be based on a spreadsheet package (Microsoft Excel or equivalent) to enable the student to execute all the measures and tests taken up in the theory classes in the course.

### **Essential/recommended readings**

1. Spiegel, M.R.(2003). Theory & Problems of Statistics, Schaum's outline series, McGraw Hill.
2. Levin, Richard I. and Rubin, David (1998). Statistics for Management (7th Edition), Pearson.
3. Gupta, S.C. (2018). Fundamentals of Statistics, Himalaya Publishing House
4. Spiegel, M. and Stephens, Larry (2017). Statistics (Schaum's Outline Series), Tata-Mcgraw-Hill, New Delhi

### **Suggestive readings**

1. Nagar, A. L. and Das. R. K.. Basic Statistics (2nd Edition), Oxford University Press
2. Karmel, P. H. and Polasek, M. (1978). Applied Statistics for Economists (4th edition), Pitman.
3. Larsen, Richard J. and Marx, Morris L. (2011). An Introduction to Mathematical Statistics and its Applications. Prentice Hall.

**Note: Examination scheme and mode shall be as prescribed by the Examination Branch, University of Delhi, from time to time.**