UNIT III
Bivariate data: scatter diagram, Karl Pearson's coefficient of correlation. Spearman's rank correlation coefficient (Introductory with interpretation). Regression: lines of regression, properties of regression coefficients, angle between two regression lines. Principle of least-squares and fitting of linear equations, polynomials and exponential curves. Coefficient of determination.

UNIT IV
Random experiment, sample point and sample space, event, algebra of events. Definition of probability: classical, relative frequency and axiomatic approaches to probability, merits and demerits of these approaches (only general ideas to be given).

UNIT V
Addition and multiplication theorems of probability, theorem of total probability, conditional probability. Examples based on laws of addition, multiplication and conditional probability. Independent events: pairwise and mutual independence. Bayes' theorem and its applications.

SUGGESTED READINGS

6. Freund, J. E. (2009). Mathematical Statistics with Applications (7thEd.). Pearson Education.

7. Goon, A.M., Gupta, M.K., &Dasgupta,B. (2005). Fundamentals of Statistics,Vol.I (8th Ed.). World Press, Kolkata.

8. Gupta, S.C., &Kapoor, V.K. (2007). Fundamentals of Mathematical Statistics (11th Ed.). Sultan Chand and Sons.

9. Hogg, R.V., Craig,A.T., &McKean,J.W. (2005). Introduction to Mathematical Statistics (6th Ed.). Pearson Education.

10. Mood, A.M., Graybill, F.A. and Boes, D.C. (2007). Introduction to the Theory of Statistics (3rd Ed.). Tata McGraw Hill Publication.

INTER DISCIPLINARY COURSE IN STATISTICS: IDC-101

(Introduction to Statistics)
(Credits: 03)
Contact Hours: 45 Hours

Full Marks=100 [End Semester Exam (70) +Internal (30)]
Pass Marks =40   [End Semester Exam (28) +Internal(12)]

Learning objectives

- To understand statistical population, sample, data types, and effective data presentation.
- To compute measures of central tendency and dispersion.
- To analyze bivariate data using scatter diagrams and calculate correlation coefficients.
- To understand various statistical techniques to summarize and interpret data effectively.
- To understand the basic concepts of probability and apply them in solving problems.

Learning outcomes

- Classification and presentation of data using tables and diagrams.
- Interpret measures of central tendency and dispersion.
- Analyze bivariate data and determine the relationship between variables using scatter diagrams and correlation coefficients.
- Apply statistical techniques to summarize and interpret data accurately.
- Apply basic probability concepts to solve simple probability problems.

UNIT I: Data Representation
Concepts of a statistical population and sample. Quantitative and qualitative data, nominal, ordinal and time-series data, discrete and continuous data. Presentation of data by tables and by diagrams. Frequency distributions for discrete and continuous data, graphical representation of a frequency distribution by histogram and frequency polygon, cumulative frequency distributions (inclusive and exclusive methods).

UNIT II: Measures of Central Tendency
Concept of central tendency. Criteria for an ideal measure of central tendency. Arithmetic mean: computation for ungrouped and grouped data, combined mean. Median: computation for ungrouped and grouped data, graphical method, merits and demerits. Mode: computation for ungrouped and grouped data, graphical method, merits and demerits.

UNIT III: Measures of Dispersion
Concept of dispersion, criteria for good measure of dispersion. Range, quartile deviation, mean deviation, standard deviation, variance, coefficient of dispersion: coefficient of variation. Moments: raw and central moments. Measures of skewness and kurtosis

UNIT IV: Correlation and Regression
Bivariate data: Scatter diagram. Correlation and regression: Karl Pearson's coefficient of correlation, Spearman's rank correlation coefficient. Regression: lines of regression, properties of regression coefficients, angle between two regression lines. Principle of least-squares and fitting of straight line.

UNIT V: Elements of Probability

Probability: Introduction, random experiments, sample space, events and algebra of events. Mathematical (classical) definition of Probability and its limitations and applications.Statements and simple applications of addition and multiplication theorems.

SUGGESTED READINGS:

1. Goon, A.M., Gupta, M.K., & Dasgupta,B. (2003). An outline of Statistical Theory(Vol. I) (4th ed.). World Press, Kolkata.

2. Gupta, S.C., & Kapoor,V.K. (2007). Fundamentals of Mathematical Statistics (11th ed.). Sultan Chand and Sons.

3. Hogg, R.V., Craig, A.T., & McKean, J.W. (2005). Introduction to Mathematical Statistics (6th ed.). Pearson Education.

4. Bhattacharjee, D., & Bhattacharjee, D. (2008): B.Sc Statistics Vol-I. Kalyani Publication.

INTER DISCLIPLINARY COURSE IN STATISTICS: IDC-151
(Index Number and Time Series Analysis)
(Credits: 03)
Contact Hours: 45 Hours
Full Marks=100   [End Semester Exam (70) +Internal (30)]
Pass Marks =40   [End Semester Exam (28) + Internal(12)]

Learning objectives

•   To understand and construct index numbers, both weighted and unweighted.
•   To evaluate the limitations and applications of index numbers.
•   To perform factor reversal and time reversal tests for index numbers.
•   To understand chain index numbers for handling changing base periods and calculating consumer price index numbers.
•   To introduce the basics of time series data, its components, and decomposition methods.

Learning outcomes

•   Interpret index numbers using various methods.
•   Represent the limitations and practical applications of index numbers.
•   Apply factor reversal and time reversal tests to assess index number reliability.
•   Use consumer price index numbers using chain index methods accurately.