



DETAILED SYLLABI

DISCIPLINE SPECIFIC CORE COURSE: DSC- 101 (Descriptive Statistics and Probability)

(Credits: 03)

Contact Hours: 45

Full Marks = 100 [End Semester Exam (70) + Internal (30)]

Pass Marks = 40 [End Semester Exam (28) + Internal (12)]

Learning Objectives

- To understand the fundamental concepts and scope of statistics.
- To identify and classify different types of data and scales of measurement.
- To acquire knowledge and skills in data collection, classification, and tabulation.
- To apply appropriate statistical measures of central tendency and dispersion.
- To develop a solid understanding of probability theory and its applications.

Learning Outcomes

- Exhibit a clear understanding of the principles and limitations of statistics.
- Classification of data based on their type and scale of measurement.
- Collection of data from primary and secondary sources.
- Interpret measures of central tendency and dispersion.
- Apply probability concepts and to solve real life problems

UNIT I:

Statistical Methods: Definition, scope and limitations of Statistics. Concepts of statistical population and sample. Types of Data: quantitative and qualitative data, cross-sectional and time-series data, discrete and continuous data. Scales of measurement: nominal, ordinal, interval and ratio. Collection of Data: Primary data and Secondary data – its major sources. Classification and tabulation of data. Frequency distributions, cumulative frequency distributions and their graphical representations (Histograms, frequency polygon and cumulative frequency curves).

UNIT II

Measures of Central Tendency: mathematical and positional, partition values. Measures of Dispersion: range, quartile deviation, mean deviation, standard deviation, coefficient of variation. Graphical representation of various measures of location and dispersion (ogives, histograms and box plot). Moments: raw moments, central moments, absolute moments, factorial moments. Sheppard's corrections for moments. Measures of skewness and kurtosis.

UNIT III

Theory of attributes: Consistency and independence of attributes. Association of attributes: Yule's coefficient of association and coefficient of colligation. Principle of least squares and fitting of polynomials and exponential curves.

UNIT IV

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. Coefficient of determination. Concepts of intra-class correlation coefficient and correlation ratio.

UNIT V

Probability: introduction, random experiment, sample point and sample space, event, algebra of events. Definition of probability: classical and statistical. Limitations of classical and statistical definition. Examples based on classical approach. Axiomatic definition of probability and problems based on it. Addition and multiplication theorems of probability. Conditional probability and theorem of total probability. Examples based on laws of addition, multiplication and conditional probability. Independent events: pairwise and mutual independence. Bayes' theorem and its applications.

SUGGESTED READINGS:

1. Feller, W. (1991). An introduction to probability theory and its applications, Volume 2 (Vol. 81). John Wiley & Sons.
2. Gun, A. M., Gupta, M. K., & Dasgupta, B. (2013). Fundamentals of statistics. World Press Private.
3. Gupta, S.C., & Kapoor, V.K. (2007). Fundamental of Mathematical Statistics, (11th ed., Reprint), Sultan Chand & Sons.
4. Mood, A. M., Graybill, F. A., & Boes, D. C. (2007). Introduction to the Theory of Statistics, (3rd ed., Reprint).
5. Meyer, P. L. (1965). Introductory probability and statistical applications. Oxford and IBH Publishing.