B.Sc. (P)/B.A(P) with Statistics as Non- Major

Category III

> **DISCIPLINE SPECIFIC CORE COURSE-1: DESCRIPTIVE STATISTICS AND PROBABILITY THEORY**

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)
		Lectures	Tutorial	Practical/ Practice		
Descriptive Statistics and probability theory	4	3	0	1	Class XII pass with Mathematics	Nil

Learning Objectives

Learning objectives include:
4. Introduction to Statistics.
5. Graphical representation of data.
6. Understanding the concept of Probability.

Learning outcomes
After completion of this course, students will develop a clear understanding of:
6. Apply the fundamental concepts of statistics.
7. Understand handling various types of data and their graphical representation.
8. Employ measures of location and dispersion.
9. Bivariate data. Significance of various coefficients of correlation.
10. Employ fitting of linear curve.
11. Use probability theory and its applications.

SYLLABUS OF DSC-1

Theory
UNIT – I   (15 hours)
Basic Statistics
Fundamentals of statistics. Diagrammatic representation of data. Measures of central tendency: location and positional. Partition values, Measures of Dispersion: range, quartile deviation, mean deviation, standard deviation, coefficient of variation. Moments: raw and central, Measures of skewness and kurtosis.

UNIT – II   (15 hours)
Correlation and Regression
Bivariate data: definition, scatter diagram. Correlation and regression: Karl Pearsons coefficient of correlation, Spearman's rank correlation coefficient, lines of regression, properties of regression coefficients, angle between two regression lines. Principle of least-square and fitting of linear curve.

UNIT – III   (15 hours)
Probability
Probability: Introduction, 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). Theorems on probability, conditional probability, independent events: pairwise and mutually independent. Bayes theorem and its applications.

Practical -30 Hours
List of Practicals:
1.   Problems based on graphical representation of data. Histograms (equal class intervals and unequal class intervals), frequency polygon, ogive curve.
2.   Problems based on mean using raw data, grouped data for change of origin and scale.
3.   Problems based on arithmetic mean and to find missing frequencies given arithmetic mean.
4.   Problems based on median and partition vales using formulae and to find them graphically
5.   Problems based on mode by using formula, graphically, method of grouping.
6.   Problems based on mean deviation and standard deviation.
7.   Problems based on combined mean and variance.

8.	Problems based on coefficient of variation.
9.	Comparison of data using consistency approach.
10.	Problems on skewness based on mean, median, mode and standard deviation.
11.	Problems based on central moments.
12.	Relationships between moments about origin and central moments.
13.	Problems based on skewness and kurtosis.
14.	Problems based on Karl Pearson correlation coefficient.
15.	Problems based on Spearman's rank correlation with ties.
16.	Problems based on Spearman's rank correlation without ties.
17.	Problems based on lines of regression and estimated values of variables.
18.	Problems on regression coefficients.

Practical work to be conducted using electronic spreadsheet / EXCEL/ Statistical Software Package/ SPSS/ calculators.

ESSENTIAL READINGS
- Goon, A.M., Gupta, M.K. and Dasgupta, B. (2005). Fundamentals of Statistics, Vol. I, 8th Ed., World Press, Kolkatta.
- Gupta, S.C. and Kapoor, V.K. (2014). Fundamentals of Mathematical Statistics, 11th Ed., Sultan Chand and Sons.
- Hogg, R. V., McKean, J., and Craig, A. T. (2005). Introduction to mathematical statistics. Pearson Education.
- Freund, J.E. (2009). Mathematical Statistics with Applications, 7th Ed., Pearson Education.

SUGGESTIVE READINGS
- Mood, A.M., Graybill, F.A. and Boes, D.C. (2007). Introduction to the Theory of Statistics, 3rd Ed., Tata McGraw Hill Publication
- Miller, Irwin and Miller, Marylees (2006): John E Freund's Mathematical Statistics with Applications, (7th ed.) Pearson Education, Asia.
- Nagar and Das (1997) Basic Statistics. 2nd ed., Oxford University Press

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