

UNIVERSITY OF DELHI

DEPARTMENT: Statistics

COURSE NAME: B.A. (Programme)

(SEMESTER – 1)

based on
Undergraduate Curriculum Framework 2022 (UGCF)
(Effective from Academic Year 2022-23)

University of DelhiList of DSC Papers

Course Title	Nature of the Course	Total Credits	Components			Contents of the course and reference is in
			Lecture	Tutorial	Practical	
Descriptive Statistics	DSC	4	3	0	1	Annexure-I
Statistical Methods	DSC	4	3	0	1	Annexure-II

List of GE Papers

Course Title	Nature of the Course	Total Credits	Components			Contents of the course and reference is in
			Lecture	Tutorial	Practical	
Basic Statistics	GE	4	3	0	1	Annexure-III

B.A. (Programme)

Semester 1

(i) Descriptive Statistics

Course Objectives:

The learning objectives include:

- To motivate students towards intrinsic interest in statistical thinking.
- To analyze and interpret data.

Course Learning Outcomes:

After completing this course, students should have developed a clear understanding of:

- Basic concepts of Statistics.
- Difference between different types of data.
- Graphical methods of displaying data.
- Measures of Locations.

Unit 1: Introduction: Definition, importance, scope and limitations of Statistics. Population and Sample Concept of statistical population with illustrations, concept of sample with illustrations. Raw data, Attributes and variables, discrete and continuous variables, classification and construction of frequency distribution. Graphical Representation: Histogram, Frequency polygon, Frequency curve, Ogive curves and their uses. Examples and Problems.

Unit 2: Measures of central tendency: Concept of central tendency, Criteria for good measures of central tendency. Arithmetic mean: Definition, computation for ungrouped and grouped data, combined mean, weighted mean, merits and demerits. Median: Definition, computation for ungrouped and grouped data, graphical method, merits and demerits. Mode: Definition, computation for ungrouped and grouped data, graphical method, merits and demerits. Quartiles: Definition, computation for ungrouped and grouped data graphical method. Numerical problems.

Unit 3: Measures of Dispersion Concept of dispersion and measures of dispersion, absolute and relative measures of dispersion. Range and Quartile Deviation: definition for ungrouped and grouped data, and their coefficients, merits and demerits. Mean Deviation: Definition for ungrouped and grouped data, minimal property (statement only). Standard deviation and Variance: definition for ungrouped and grouped data, coefficient of variation, combined variance and standard deviation for two groups, merits and demerits. Numerical problems.

SUGGESTED READINGS:

1. Goon, A.M., Gupta, M.K. and Dasgupta, B. (2002). Fundamentals of Statistics, Vol. I, 8th Ed. The World Press, Kolkata.
2. Miller, I. and Miller, M. (2006). John E. Freund's Mathematical Statistics with Applications, 7th Ed., Pearson Education, Asia.
3. Mood, A.M., Graybill, F.A. and Boes, D.C. (2007). Introduction to the Theory of Statistics, 3rd Ed., (Reprint), Tata McGraw-Hill Pub. Co. Ltd.

Practical/Lab Work

List of Practicals

1. Problems based on graphical representation of data: Histograms, Frequency polygon, Ogive curve for equal class intervals.
2. Problems based on graphical representation of data: Histograms, Frequency polygon, Ogive curve for unequal class intervals.
3. Problems based on measures of central tendency using raw data, grouped data.
4. Problems based on change of origin and scale.
5. Problems based on measures of dispersion using raw data, grouped data.
6. Problems based on measures of dispersion for change of origin and scale.
7. Problems based on combined mean.
8. Problems based on combined variance.
9. Problems based on coefficient of variation.
10. Problems based on standard deviation of two groups

B.A. (Programme)

Semester 1

(ii) Statistical Methods

Course Objectives:

The learning objectives include:

- Acquainting the students with various statistical methods
- Students should be able to understand and compute various statistical measures of correlation, fitting of curve and regression.

Course Learning Outcomes:

Upon successful completion of this course students will demonstrate knowledge of

- Correlation and regression.
- Theory of attributes.

Unit 1: Introduction and meaning of Correlation, Scatter diagram, Karl Pearson's coefficient of correlation, limits for correlation coefficient, correlation coefficient for bivariate distribution, rank correlation: tied and repeated rank, correlation ratio, measure of correlation ratio, Intra class correlation, multiple and partial correlation.

Unit 2: Introduction to Linear regression, regression coefficient, properties of regression coefficients, angle between two lines of regression, regression curve, curvilinear regression. Principle of least-squares and fitting of polynomials and exponential curves

Unit 3: Theory of attributes : Notion and terminology, , class frequencies, ultimate class frequencies, Contingency table, consistency, association of attributes, independence, measure of association for 2x2 table, Yule's coefficient of association.

SUGGESTED READINGS:

1. Goon, A. M., Gupta, M. K. and Dasgupta, B. (2003). An Outline of Statistical Theory (4th ed., Vol. I). World Press, Kolkata.
2. Gupta, S. C. and Kapoor, V. K. (2007). Fundamentals of Mathematical Statistics (11th ed.). Sultan Chand and Sons.
3. Hogg, R. V., Craig, A. T. and McKean, J. W. (2005). Introduction to Mathematical Statistics (6th ed.). Pearson Education.
4. Miller, I. and Miller, M. (2006). John E. Freund's Mathematical Statistics with Applications, 7th Ed., Pearson Education, Asia.

Practical/Lab Work

List of Practicals

1. Problems based on Karl Pearson correlation coefficient.
2. Problems based on Karl Pearson correlation coefficient with change of scale and origin.
3. Problem based on multiple correlation
4. Problem based on partial correlation
5. Problems based on lines of regression.
6. Problems based on angle between two lines of regression.
7. Problems based on Spearman rank correlation.
8. Problems based on fitting of polynomials and exponential curves.
9. Problems based on association and independence of attributes.
10. Problems based on fundamental set of class frequencies in attributes (find missing frequencies given fundamental set of class frequencies)

B.A. (Programme)
Semester I
GE-I Basic Statistics

Course Objectives:

- To summarize the data and to obtain its salient features from the vast mass of original data.
- To understand the concepts of probability and its applications.
- To understand the concept of random variables, probability distributions and expectation.

Course Learning Outcomes:

After completing this course, the students should have developed a clear understanding of

- Concepts of statistical population and sample, variables and attributes.
- Tabular and graphical representation of data based on variables.
- Measures of central tendency, Dispersion, Skewness and Kurtosis.
- Moments and their use in studying various characteristics of data.
- Correlation and regression analysis of bivariate data.

Unit I: Concepts of a statistical population and sample from a population, 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 location (or central tendency) and dispersion, moments, measures of skewness and kurtosis, cumulants. Bi-variate data: Scatter diagram, principle of least-squares and fitting of polynomials and exponential curves.

UNIT III Bivariate data: Definition, scatter diagram, simple, partial and multiple correlation (3 variables only), rank correlation. Simple linear regression, principle of least squares and fitting of polynomials and exponential curves.

SUGGESTED READINGS:

1. Goon, A. M., Gupta, M. K. and Dasgupta, B. (2003). An Outline of Statistical Theory (4th ed., Vol. I). World Press, Kolkata.
2. Gupta, S. C. and Kapoor, V. K. (2007). Fundamentals of Mathematical Statistics (11th ed.). Sultan Chand and Sons.
3. Hogg, R. V., Craig, A. T. and McKean, J. W. (2005). Introduction to Mathematical Statistics (6th ed.). Pearson Education.
4. Miller, I. and Miller, M. (2006). John E. Freund's Mathematical Statistics with Applications, 7th Ed., Pearson Education, Asia.

Practical/Lab Work

List of Practicals

1. Problems based on graphical representation of data.
2. Problems based on measures of central tendency using raw data, grouped data and for change of origin and scale.
3. Problems based on measures of dispersion using raw data, grouped data and for change of origin and scale.
4. Problems based on combined mean and variance and coefficient of variation.
5. Problems based on Moments using raw data, grouped data and for change of origin and scale.
6. Problems based on relationships between moments about origin and central moments.
7. Problems based on Skewness and kurtosis.
8. Problems based on Karl Pearson correlation coefficient (with/without change of scale and origin).
9. Problems based on Lines of regression, angle between two lines of regression
10. Problems based on Spearman rank correlation.
11. Fitting of polynomials and exponential curves.