

B. Sc. Part – I Semester – I
DSC-I
(DESCRIPTIVE STATISTICS – I)
Theory: 30 hrs. Marks -50 (Credits: 02)

Course Outcomes: The students will acquire knowledge of

- i. Meaning and scope of Statistics, various statistical organizations.
- ii. Population, sample and various methods of sampling.
- iii. Various measures of central tendencies and dispersion.
- iv. Moments, skewness and kurtosis.

CONTENTS:

Unit - 1

(15 hrs.)

1.1 Introduction to Statistics: Meaning of Statistics as a Science, Importance of Statistics, Definition of Statistics, Various fields where Statistics is used, Names of various statistical organizations in India.

- **Population and Sample:** Statistical population. Finite population, Infinite population, Census method, Sampling method, Advantages of sampling method over census method.
- **Methods of sampling (Description only):** Sample and Random sample, Simple random sampling with and without replacement (SRSWR and SRSWOR), Stratified random sampling, Systematic sampling.

1.2 Nature of Data: Primary and Secondary data, Time series data, Quantitative and Qualitative data, Attributes, Variables, Discrete and Continuous variables, Scales of measurement - Nominal, Ordinal, Interval and Ratio scale, illustrative examples.

- **Presentation of Data: Classification:** Raw data and its classification, Discrete frequency distribution, Continuous frequency distribution, Cumulative frequency distribution, Inclusive and Exclusive methods of classification, Open end classes, Relative frequency distribution, illustrative examples.

Unit - 2

(15 hrs.)

2.1 Measures of Central Tendency: Mathematical and positional, Concept of central tendency of statistical data, statistical average, requirements of good statistical average.

- **Arithmetic Mean (A.M.):** Definition, Effect of change of origin and scale, Deviation of observations from A.M., Mean of pooled data, Weighted A.M.
- **Geometric Mean (G.M.):** Definition, illustrative examples.
- **Harmonic Mean (H.M.):** Definition, Relation: $A.M \geq G.M \geq H.M$ (proof for $n = 2$ positive observations), illustrative examples.
- **Median:** Definition, Derivation of formula for grouped frequency distribution.
- **Mode:** Definition, Derivation of formula for grouped frequency distribution. Empirical relation between mean, median and mode. Graphical method of determination of Median and Mode.
- **Partition values:** Quartiles, Deciles and Percentiles. Comparison between averages in accordance with requirements of good average. Situations where one kind of average is preferable to others, illustrative examples.

2.2 Measures of Dispersion: Concept of dispersion, Absolute and Relative measures of dispersion, Requirements of a good measure of dispersion.

- **Range:** Definition, Coefficient of range.
- **Quartile Deviation (Q. D. or Semi-inter quartile range):** Definition, Coefficient of Q.D.,
- **Mean Deviation (M.D.):** Definition, Coefficient of M.D., Minimal property of M.D.,
- **Mean Square Deviation (M.S.D.):** Definition, Minimal property of M.S.D.,
- **Variance and Standard Deviation (S.D.):** Definition, Effect of change of origin and scale, variance and S.D. of pooled data (proof for two groups).
- **Coefficient of Variation:** Definition and use. Illustrative examples.

2.3 Moments, Skewness and Kurtosis:

- **Moments:** Raw moments and central moments for ungrouped and grouped data. Effect of change of origin and scale on central moments, relation between central moments and raw moments (up to 4th order). Sheppard's corrections.
- **Skewness:** Concept of skewness of a frequency distribution, types of skewness. Bowley's coefficient of skewness, Karl Pearson's coefficient of skewness, measure of skewness based on moments.
- **Kurtosis:** Concept of kurtosis of a frequency distribution, Types of kurtosis, Measure of kurtosis based on moments. Illustrative examples.

Books Recommended:

1. Bhat B. R., Srivenkatramana T. and Madhava Rao K. S. (1996): Statistics: A Beginner's Text, Vol. 1, New Age International (P) Ltd.
2. Croxton F. E., Cowden D.J. and Kelin S. (1973): Applied General Statistics, Prentice Hall of India.
3. Goon A.M., Gupta M.K., and Dasgupta B.: Fundamentals of Statistics Vol. I and II, World Press, Calcutta.
4. Gupta S. P. (2002): Statistical Methods, Sultan Chand and Sons, New Delhi.
5. Gupta V.K. & Kapoor S.C.: Fundamentals of Mathematical Statistics.- Sultan & Chand.
6. Hogg R. V. and Crag R. G.: Introduction to Mathematical Statistics Ed.4.
7. Hoel P. G. (1971): Introduction to Mathematical Statistics, Asia Publishing House.