

U.G. 1st Semester

Paper: STA101C (Core) Descriptive Statistics

Credits: 5 = 4+0+1 (64 Lectures)

UNIT I (Lectures: 16)

Statistical Methods: definition and scope of Statistics, concepts of statistical population and sample.

Data: Primary and Secondary, Quantitative and qualitative, Time series and spatial, variables- discrete and continuous, scales of measurement- nominal, ordinal, interval and ratio.

Presentation of data: Classification, tabulation, frequency distribution and graphical representation. Stem and leaf chart, Box plot.

UNIT II (Lectures: 16)

Measures of Central Tendency: mathematical and positional.

Measures of Dispersion: range, quartile deviation, mean deviation, standard deviation, coefficient of variation, Moments- raw, central, absolute, factorial, Sheppard's corrections, skewness and kurtosis.

UNIT III (Lectures: 24)

Bivariate data: Definition, scatter diagram, correlation- simple, partial and multiple (3 variables only), Rank correlation, Intra class correlation, Correlation ratio, Simple linear regression, Principles of least square and fitting of polynomials and exponential curves.

UNIT IV (Lectures: 08)

Analysis of Categorical Data: consistency of data, independence and association of attributes, Measures of association- Pearson's, Yule's, Goodman-Kruskal's γ and Odds Ratio.

PRACTICAL/ LAB. WORK: (Lectures: 16)

List of Practicals

1. Graphical representation of data.
2. Problems based on measures of central tendency.
3. Problems based on measures of dispersion.
4. Problems based on combined mean and variance and coefficient of variation.
5. Problems based on moments, skewness and kurtosis.
6. Fitting of polynomials, exponential curves.
7. Karl Pearson's correlation coefficient.
8. Correlation coefficient for a bivariate frequency distribution.
9. Intra class correlation coefficient
10. Lines of regression, angle between lines and estimated values of variables.
11. Spearman's rank correlation with and without ties.
12. Partial and multiple correlations.

SUGGESTED READING:

1. Goon A.M., Gupta M.K. and Dasgupta B. (2005): Fundamentals of Statistics, Vol. I & II, 8th Edn. The World Press, Kolkata.
2. Gupta S.C and Kapoor V.K (2007): Fundamentals of Mathematical Statistics, 11th Edition, Sultan Chand & Sons.
3. Miller, Irwin and Miller, Marylees (2006): John E. Freund's Mathematical Statistics with Applications, (7th Edn.), Pearson Education, Asia.
4. Mood, A.M. Graybill, F.A. and Boes, D.C. (2007): Introduction to the Theory of Statistics, 3rd Edn., (Reprint), Tata McGraw-Hill Pub. Co. Ltd.

Paper: STA102C (Core)
Probability- I

Credits: 5=5+0+0 (80 Lectures)

UNIT I (Lectures: 20)

Probability: Introduction, random experiments, sample space, events and algebra of events. Definitions of Probability– classical, statistical, and axiomatic. Conditional Probability, laws of addition and multiplication, independent events, theorem of total and compound probability, Bayes' theorem and its applications.

UNIT II (Lectures: 20)

Random variables: discrete and continuous random variables, p.m.f., p.d.f. and c.d.f., illustrations and properties of random variables, univariate transformations with illustrations.

Two dimensional random variables: discrete and continuous type, joint, marginal and conditional p.m.f, p.d.f., and c.d.f., independence of variables, bivariate transformations with illustrations.

UNIT III (Lectures: 20)

Mathematical Expectation: Expectation of single and bivariate random variables and its properties, Theorems on sum and product of expectation of random variables, Moments, Measures of location and dispersion of random variables, Conditional expectations and Conditional variance.

UNIT IV (Lectures: 20)

Generating Functions: Moments and Cumulants, moment generating function, cumulant generating function and characteristic function. Uniqueness and inversion theorems (without proof) along with applications, Factorial moments and its properties.

SUGGESTED READING:

1. Goon A.M., Gupta M.K. and Dasgupta B. (2003): An Outline of Statistical Theory, Vol. I, 4th Edn. The World Press, Kolkata.
2. Gupta S.C and Kapoor V.K (2007): Fundamentals of Mathematical Statistics, 11th Edition, Sultan Chand & Sons.

3. Hogg, R.V., Tanis, E.A. and Rao J.M. (2009): Probability and Statistical Inference, 7th Ed, Pearson Education, New Delhi.
4. Miller, Irwin and Miller, Marylees (2006): John E. Freund's Mathematical Statistics with Applications, (7th Edn.), Pearson Education, Asia.
5. Myer, P.L. (1970): Introductory Probability and Statistical Applications, Oxford & IBH Publishing, New Delhi.
6. Rohatgi V.K. (2009): An introduction to Probability and Statistics, 2nd Edition, John Wiley and Sons.

Paper: STA103M (Modular General Elective)
Process of Statistical Data Analysis
Credits: 4 = 4+0+0 (64 Lectures)

UNIT I (Lectures: 16)

Data: Introduction, primary and secondary data, methods of collection of primary data with their merits and demerits, Major sources of secondary data, scrutiny of data for internal consistency and detection of errors in recording. Idea of cross-validation. Classification, tabulation and diagrammatic representation of data. Frequency distribution and graphical presentation of data.

UNIT II (Lectures: 16)

Sampling Techniques: Idea of population, sample, target populations, sampling frame, error in surveys, Introduction to sampling, advantage of sampling over complete enumeration, types of sampling, simple random sampling. Idea of sample size determination.

UNIT III (Lectures: 16)

Designing a questionnaire, pretesting a questionnaire, Collection of survey data pertaining to a research problem.

UNIT IV (Lectures: 16)

Data Analysis and Interpretation: Applications of statistical techniques for data analysis, interpret the results and draw inferences.

SUGGESTED READING:

1. Kotahri, C.R (2009): Research Methodology: Methods and Techniques, 2nd Revised Ed. Reprint, New Age International Publishers
2. Lilien, Gary L. and Philip Kotler, 1983. Marketing Decision Making; A Model Building Approach, Harper & Row, New York.
3. Shenoy, GVS, et al., (1983). Quantitative Techniques for Managerial Decision Making, Wiley Eastern