



Telangana University

Syllabus of Bachelor of Science (B.Sc) Statistics - I year

Paper-I: Descriptive Statistics and Probability Distributions 120 hrs (4 hrs/ week)

Unit –I

Descriptive Statistics: Concept of primary and secondary data. Methods of collection and editing of primary data. Designing a questionnaire and a schedule. Sources and editing of secondary data. Classification and tabulation of data. Measures of central tendency (mean, median, mode, geometric mean and harmonic mean) with simple applications. Absolute and relative measures of dispersion (range, quartile deviation, mean deviation and standard deviation) with simple applications. Importance of moments, central and non-central moments, and their interrelationships, Sheppard's corrections for moments for grouped data. Measures of skewness based on quartiles and moments and kurtosis based on moments with real life examples. 15L

Probability: Basic concepts in probability-deterministic and random experiments, trial, outcome, sample space, event, and operations of events, mutually exclusive and exhaustive events, and equally likely and favourable outcomes with examples. Mathematical, statistical and axiomatic definitions of probability with merits and demerits. Properties of probability based on axiomatic definition. Conditional probability and independence of events. Addition and multiplication theorems for n events. Boole's inequality and Bayes' theorem. Problems on probability using counting methods and theorems. 15L

UNIT-II

Random Variables: Definition of random variable, discrete and continuous random variables, functions of random variables, probability mass function and probability density function with illustrations. Distribution function and its properties. Transformation of one-dimensional random variable (simple 1-1 functions only). Notion of bivariate random variable, bivariate distribution and statement of its properties. Joint, marginal and conditional distributions. Independence of random variables. 15L

Mathematical Expectation: Mathematical expectation of a function of a random variable. Raw and central moments and covariance using mathematical expectation with examples.

Addition and multiplication theorems of expectation. Definition of moment generating function (m.g.f), cumulant generating function (c.g.f), probability generating function (p.g.f) and characteristic function (c.f) and statements of their properties with applications. Chebyshev's , and Cauchy-Schwartz's inequalities and their applications. Statement and applications of weak law of large numbers and central limit theorem for identically and independently distributed (i.i.d) random variables with finite variance. 15L

UNIT-III

Discrete distributions: Uniform, Bernoulli, Binomial, Poisson, Negative binomial, Geometric and Hyper-geometric(mean and variance only) distributions. Properties of these distributions such as m.g.f ,c.g.f., p.g.f., c.f., and moments up to fourth order and their real life applications. Reproductive property wherever exists. Binomial approximation to Hyper-geometric, Poisson approximation to Binomial and Negative binomial distributions. 30L

UNIT – IV

Continuous distributions: Rectangular and Normal distributions. Normal distribution as a limiting case of Binomial and Poisson distributions. Exponential, Gamma, Beta of two kinds (mean and variance only) and Cauchy (definition and c.f. only) distributions. Properties of these distributions such as m.g.f., c.g.f., c.f., and moments up to fourth order, their real life applications and reproductive productive property wherever exists. 30L

List of reference books:

1. Willam Feller : Introduction to Probability theory and its applications. Volume –I, Wiley
2. V.K.Kapoor and S.C.Gupta: Fundamentals of Mathematical Statistics, Sultan Chand&Sons, New Delhi
3. GoonAM,Gupta MK,Das Gupta B : Fundamentals of Statistics , Vol-I, the World Press Pvt.Ltd., Kolakota.
4. Hoel P.G: Introduction to mathematical statistics, Asia Publishing house.
5. M.JaganMohan Rao and Papa Rao: A Text book of Statistics Paper-I.
6. Sanjay Arora and Bansilal: New Mathematical Statistics : Satya Prakashan , New Delhi
7. Hogg.Tanis.Rao: Probability and Statistical Inference. 7th edition. Pearson
8. Sambhavyata Avadhi Siddantalu-Telugu Academy
9. Sahasambandham-Vibhajana Siddantamulu – Telugu Academy
10. K.V.S. Sarma: statistics Made Simple:do it yourself on PC. PHI
11. Gerald Keller :Applied Statisticswith Microsoft excel . Duxbury, Thomson Learning.
12. Levine, Stephen, Krehbiel, Berenson: Statistics for Managers using Microsoft Exce 4th edition. Pearson Publication.

Bachelor of Science (B.Sc) Statistics – I Year

PRACTICAL PAPER – I

Descriptive Statistics and Probability Distributions

1. Basics of Excel- data entry, editing and saving, establishing and copying a formulae, built in functions in excel, copy and paste and exporting to MS word document.
2. Graphical presentation of data (Histogram, frequency polygon, Ogives).
3. Graphical presentation of data (Histogram, frequency polygon, Ogives) using MS Excel
4. Diagrammatic presentation of data (Bar and Pie).
5. Diagrammatic presentation of data (Bar and Pie) using MS Excel
6. computation of non-central and central moments – Sheppard's corrections for grouped data.
7. Computation of coefficients of Skewness and Kurtosis – Karl Pearson's and Bowley's β_1 and β_2 .
8. Computation of measures of central tendency, dispersion and coefficients of Skew -ness, Kurtosis using MS Excel.
9. Fitting of Binomial distribution – Direct method.
- 10 Fitting of Binomial distribution – Direct method using MS Excel.
11. Fitting of binomial distribution – Recurrence relation Method.
12. Fitting of Poisson distribution – Direct method.
13. Fitting of Poisson Distribution – Direct method using MS Excel.
14. Fitting of Poisson distribution - Recurrence relation Method.
15. Fitting of Negative Binomial distribution.
16. Fitting of Geometric distribution.
17. Fitting of Normal distribution – Areas method.
18. Fitting of Normal distribution – Ordinates method.
19. Fitting of Exponential distribution.
20. Fitting of Exponential distribution using MS Excel.
21. Fitting of a Cauchy distribution.
22. Fitting of a Cauchy distribution using MS Excel.

Note: Training shall be on establishing formulae in Excel cells and derive the results. The excel output shall be exported to MS word for writing inference.