Inter Department Elective Course
Offered by Department of Statistics(2019-2020) - CBCS
19STSE215.1 – Statistical Methods   Credits:3
                                                                            Hours:3

Learning Objectives: To enable the students of other discipline to understand the basic concepts of statistical methods.

Unit–1

Definition, scope, functions and limitations of Statistics – Collection, Classification, Tabulation of data, Diagrammatic representation of data – Simple, Multiple and Percentage Bar diagram, Pie diagram and Graphical representation of data – Histogram, frequency polygon, frequency curve and ogives. Primary and Secondary data – Questionnaire method.

Unit–2

Measures of Central tendency – Mean, Median and Mode and their practical usages. Measures of Dispersion: Range, Quartile Deviation, Mean Deviation, Standard Deviation, Variance and Coefficient of Variation. Measures of Skewness – Pearson's, Bowley's method. Applications of Binomial and Normal distributions.

Unit–3

Measure of Bivariate data – Simple, Partial and Multiple Correlation. Scatter diagram, Pearsons method and Rank correlation method. Regression and their equations – Prediction. Basic concept of Sampling – Parameter and Statistics – Sampling distribution and Standard Error – Simple random sampling and stratified random sampling.

Unit–4

Tests of Significance with their important concepts. Tests for large samples - Test for mean, difference of means, proportion and equality of proportions. Small sample tests – Test for mean, difference of Means, paired samples, test for correlation and regression coefficients.

Unit– 5

Chi square test for goodness of fit and independence of attributes. F-test – Analysis of variance, Assumptions, Applications, one way anova and two way anova classifications.

Note: The emphasis is only on the application of the methods. The derivations of the formulae are not necessary.

Books for Study and References:
1) Gupta, S.P. (2011) Statistical Methods, Sultan Chand & Sons, Pvt. Ltd, New Delhi
2) Gupta, S.C and V.K. Kapoor, (2011) Fundamentals of Mathematical Statistics, Sultan Chand & Sons, Pvt. Ltd, New Delhi
3) Darren George, Paul Mallery (2011) SPSS for Windows, 10th Edition, PEARSON

19STSE215.2 - Mathematical Statistics   Credits:3
                                                                                Hours:3

Learning Objectives: To impart basic knowledge about random variables and various distributions.

Unit-1

Random Variables and Distribution Functions- Introduction, Properties of Distribution Function, Discrete Random variable-Probability Mass Function, Discrete Distribution Function, Continuous Random variable - Probability density function, Various Measures of Central Tendency, Dispersion, Skewness and Kurtosis for Continuous Probability Distributions, Continuous Distribution Function, Two Dimensional Random Variables- Two dimensional or JPMF, Two dimensional Distribution Functions, Joint Density Function, Marginal Density Function, The Conditional Distribution Function and Conditional Probability Density Function, Stochastic Independence, Problems and Exercises. (Content as in Chapter-5 of Book 1)

Unit-2

Mathematical Expectation- Introduction, Mathematical Expectation or Expected Value of A Random Variable, Expected Value of Function of a Random Variable, Properties of Expectation - Addition Theorem of Expectation, Multiplication Theorem of Expectation, Properties of Variance, Covariance - Variance of Linear combination of Random Variables, Some Inequalities Involving Expectation, Moment of Bivariate Probability Distributions, Conditional Expectation and Conditional Variance, Problems and Exercises.(Content as in Chapter-6 of Book 1)

Unit-3

Generating Functions – Moment Generating Function- Limitations, Properties, Uniqueness Theorem, Cumulants - Properties, Characteristic Function- Properties of Characteristic Function, Necessary and Sufficient Conditions for a Function □(t) to be Characteristic Function, Some Important properties – Inversion Theorem, Uniqueness Theorem of Characterisic Functions, Problems and Exercises. (Content as in Chapter-7 of Book 1)

Unit-4

Discrete Probability Distributions - Binomial, Poisson, Negative Binomial, Geometric, Hyper geometric, Multinomial Distributions and theirs –Moments, Recurrence, MGF, Additive Properties, Characteristic Functions, PGF, Problems and Exercises. (Content as in Chapter-8 of Book 1)

Unit-5

Continuous Probability Distributions – Normal, Rectangular, Gamma, Beta, Exponential, Standard Laplace, Cauchy Distributions, Sampling Distributions of t,F, Chi-Square and their Derivations, Additive Properties, Characteristic Functions, MGF, PGF.(Content as in Chapter-9 of Book 1)

Books for Study and Reference:-

1) Gupta S.G and Kapoor.V.K 'Fundamentals of Mathematical Statistics' Sultan Chand & Sons.
2) Mood, A.M,F.A Graybill and D.C Boes (1974), Introduction to the Theory of Statistics, 3rd Edn.McGraw Hill.
3) Wilks, S.S.(1983) , Mathematical Statistics, Wiley.
4) Rao, c.R (1983), Linear Statistical Inference and its applications, 2nd Edn, Wiley Eastern.
5) Johnson and Kotz, (2002) Continuous Univariate Distributions-1, John Wiley and Sons.
6) Johnson and Kotz, (2002) Continuous Univariate Distributions-2, John Wiley and Sons.

19STSE315.1 – Bio Statistics   Credits:3
                                                   Hours:3

Learning Objectives: To enable the students of other discipline to understand the basic concepts of Bio statistics in Biological applications.

Unit–1

Definition, scope, functions and limitations of Statistics – Collection, Classification, Tabulation of data, Diagrammatic representation of data – Simple, Multiple and Percentage Bar diagram, Pie diagram and Graphical representation of data – Histogram, frequency polygon, frequency curve and ogives. Primary and Secondary data – Questionnaire method.

Unit–2

Measures of Central tendency – Mean, Median and Mode and their practical usages. Measures of Dispersion: Range, Quartile Deviation, Mean Deviation, Standard Deviation, Variance and Coefficient of Variation. Measures of Skewness – Pearson's, Bowley's method. Applications of Binomial and Normal distributions. Applications to Biological Studies.

Unit–3

Measure of Bivariate data – Simple, Partial and Multiple Correlation. Scatter diagram, Pearsons method and Rank correlation method. Regression and their equations – Prediction. Basic concept of Sampling – Parameter and Statistics – Sampling distribution and Standard Error – Simple random sampling and stratified random sampling. Applications to Biological studies.

Unit–4

Tests of Significance with their important concepts. Tests for large samples - Test for mean, difference of means, proportion and equality of proportions. Small sample tests – Test for mean,

difference of Means, paired samples, test for correlation and regression coefficients. Applications to Biometric experiments.

Unit–5

Chi square test for goodness of fit and independence of attributes. F-test – Analysis of variance, Assumptions, Applications, one way anova and two way anova classifications. Applications to Clinical experiments.

Note: The emphasis is only on the application of the methods. The derivations of the formulae are not necessary.

Books for Study and References:
1) Gupta, S.P. (2011) Statistical Methods, Sultan Chand & Sons, Pvt. Ltd, New Delhi
2) Gupta, S.C and V.K. Kapoor, (2011) Fundamentals of Mathematical Statistics, Sultan Chand & Sons, Pvt. Ltd, New Delhi
3) Darren George, Paul Mallery (2011) SPSS for Windows, 10th Edition, PEARSON