**Bharathiar University, Coimbatore 641 046**

**Affiliated college syllabus**

**Allied paper for BSC Maths and BSc Maths CA**

**Statistics for mathematics I**

**(With effect from 2025-26 and onwards)**

**Unit I**

 **Random variables - Distribution function - Properties of distribution function - Discrete discrete random variables - Probability mass function - continuous random variable – probability density function – continuous distribution function - simple problems**

 **Unit II**

 **Mathematical expectation - Expected value of a random variable – Expected value of function of a random variable – properties of expectation - Properties of variance – covariance – variance of a linear combination of random variables - Chebychev’s inequality.**

**Unit III**

 **Moment generating function - Some limitations of moment generating functions - Properties of moment generating functions – Cumulants - Properties of cumulants - Characteristic function - Properties of characteristic function - simple problems.**

**Unit IV**

 **Probability distributions - Binomial distribution - Moments of binomial distribution – Recurrence relation – Moment generating function – Additive property - Characteristic function – Poisson distribution – Recurrence relation - Moment generating function - Limiting case of Binomial distribution - Characteristic function – Additive property - Normal distribution – Chief characteristics – M.G.F - Simple problems**

**Unit V**

 **Curve fitting and principle of least square - fitting of curves of straight line and power curve – Correlation and regression analysis.**

**Text book:**

1. **Fundamentals of Mathematical statistics by Guptha, S.C & Kapoor, V.K**

**Unit I : 5.1, 5.2, 5.2.1, 5.3, 5.3.1, 5.4, 5.4.1, 5.4.3**

**Unit II: 6.1, 6.2, 6.3, 6.4, 6.5, 6.6, 6.6.1, 7.5 (6.5.1 and 6.5.2 excluded)**

**Unit III : 7.1, 7.1.1, 7.1.2, 7.1.3, 7.2, 7.2.1, 7.3, 7.3.1**

**Unit IV : 8.4, 8.4.1, 8.4.2, 8.4.6 to 8.4.8, 8.5, 8.5.2,8.5.4 - 8.5.6, 8.5.8, 9.2, 9.2.2, 9.2.5**

**Unit V : 10.1, 10.2, 10.3, 10.4, 11.1, 11.2, 11.3.**

**Reference**

1. **Introduction to Statistical methods by Guptha, C.B and Vijay Guptha.**
2. **Mathematical Statistics by Dr. P.R.Vital.**

**Statistics for mathematics II**

**Unit I**

 **Concept of population and Sample - Sampling - Types of sampling - Sampling distribution of a Standard error.**

**Test of significance – Null and alternative hypothesis – Errors in sampling – Critical region – Type 1 and Type 2 error - Procedure for testing of hypothesis - Test of significance for large samples - Test of significance for single proportion, difference of proportions, single mean, difference of means, difference of means , difference of standard deviations – Simple problems**

 **Unit II**

 **Chi square distribution – Moment generating function of Chi square – Additive property - application of chi square distribution - Inference about population variance - goodness of fit. Students t - distribution - Application of t distribution, t test for single mean, difference of means – F distribution - Applications of F distributions - F test for equality of two population variances – Simple problems**

**Unit III**

 **Analysis of variance – Techniques – Coding of Data - One way, two way classification - Fundamental principles of experimentation – Randomized Block Design (RBD) – Latin squares – RBD vs Latin - Simple problems**

**Unit IV**

 **Theory of estimation – Estimation - characteristics of estimators- unbiasedness – consistency – efficiency - Neyman factorization theorem- Cramer Rao inequality - Simple problems.**

**Unit V**

 **Minimum variance unbiased estimation and blackwelisation – Rao blackwell theorem - Methods of Estimation - Method of maximum likelihood estimation- Properties of maximum likelihood Estimation – Invariance property of MLE - Method of minimum variance - Method of moments - simple problems**

**Text book:**

1. **Fundamentals of Mathematical statistics by Guptha, S.C & Kapoor, V.K**

**Unit I – 14.1, 14.2, 14.2.1 to 14.2.4, 14.3, 14.3.1, 14.3.2, 14.3.3, 14.4, 14.4.1 to 14.4.5, 14.5,14.6, 14.7, 14.8.3 to 14.8.5, 15.1 to 15.3, 15.3.5, 15.6, 15.6.1 to 15.6.3**

**Unit II - 16.1, 16.2, 16.3, 16.3.1, 6.3.2, 16.3.3, 16.6, 16.7, 16.7.1.**

 **Unit IV - 17.1, 17.2 , 17.2.1 to 17.2.4, 17.3.**

 **Unit V - 17.5 , 17.6, 17.6.1 to 17.6.3.**

1. **Statistical Methods - By S.P. Gupta**

**Unit III – Chapter 5 : page no. 1033 – 1066**

 **Chapter 6 : page no. 1067 - 1078**

**Reference**

1. **Introduction to Statistical methods by Guptha, C.B and Vijay Guptha.**
2. **Mathematical Statistics by Dr. P.R.Vital.**