

Appendix to UO No Acad/C2/3269/2007 Dated 22/08/2007  
**KANNUR UNIVERSITY**

**SYLLABUS**

**B.Sc. STATISTICS – SUBSIDIARY**  
 (Effective from 2007 Admission onwards)

**SCHEME OF EXAMINATION:**

	Duration	Marks		Total
		Internal	External	
<b>First Year: Paper I</b>				
Basic Statistics and Probability Theory	3 hrs.	20	70	90
<b>Second Year: Paper II</b>				
Probability distributions and Statistical Inference	3 hrs.	20	90	110

- Paper I will have 4 hours a week and examination is to be written at the end of first year.
- Paper II will have 5 hours a week and examination is to be written at the end of second year.

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**PAPER I: BASIC STATISTICS AND PROBABILITY THEORY**

**PART A : Basic Statistics**

- Measures of central tendency - arithmetic mean, geometric mean, harmonic mean, median, mode, weighted average - definitions, properties and applications, Partition values.  
 Measures of dispersion – mean deviation, standard deviation, quartile deviation, Lorenz curve – definitions, properties and applications  
 Moments, measures of skewness and kurtosis – definitions and applications.  
 Index numbers – meaning and uses. Laspeyer's, Paasche's, Fisher's Index numbers, cost of living index number. (25 hrs.)
- Correlation and Regression: Karl Pearson's correlation coefficient – definition and properties; rank correlation coefficient; scatter diagram; principle of least squares; fitting linear, quadratic, and exponential curves; linear regression, regression coefficients and properties. Multiple and partial correlation (for three variable case only)- plane of regression and regression coefficients; Properties of residual; Multiple correlation coefficients, properties; Partial correlation coefficients. (30 hrs.)

3. Sample survey method: collection of data, primary and secondary data, comparison of sampling and census, sampling and non-sampling errors; types of sampling judgment, random and mixed sampling; different methods of sampling-SRS, Stratified and systematic sampling (concepts only); methods of selecting SRS, estimation of population mean. (15 hrs.)

### **PART B : Probability Theory**

4. Probability: random experiments, sample point, sample space, events, frequency and classical approach to probability, probability as a measure-sigma field, probability space; addition and multiplication theorem, Boole's inequality, conditional probability, independence of events, Baye's theorem and its applications. (35 hrs.)
5. Random variables: discrete and continuous type, probability mass function, probability density function, distribution function-definitions and properties. Change of variable-discrete and continuous type (univariate case only) (20 hrs.)
6. Mathematical expectation: definition and elementary properties of mathematical expectation(univariate case), moments-relation between raw and central moments, moment generating function, cumulant generating function, characteristic function (univariate case) (15 hrs.)

### **Text Books:**

1. Fundamentals of Statistics (Vol. I) –Goon,Gupta, DasGupta (The World Press)
2. Fundamentals of Mathematical Statistics-S.C.Gupta & V.K. Kapoor (Sulthan Chand & Sons)
- 3 Fundamentals of Applied Statistics-S.C.Gupta & V.K.Kapoor (Sulthan Chand &Sons)
- 4 Mathematical Statistics – J.N.Kapoor & H.C.Saxena (S.Chand)
5. Statistical methods; An Introductory text – J.Medhi (New Age International)
6. A first course in probability- Sheldon M Ross (Macmillan Publishing Co.)

### **Topic wise distribution of marks:**

The entire topics are divided in to two sections, **Part A** and **Part B**. There shall be questions for a total of 105 marks to score the maximum of **70** marks. The maximum marks that can be scored from **Part A** and **Part B** is **35 each**. Scientific calculators are permitted in the examination.

<b>Section</b>	<b>Topic</b>	<b>marks</b>
1.	Measure of central tendency, dispersion, skew ness kurtosis, index numbers.	20
2.	Correlation and Regression	20
3.	Sample survey method	10
4.	Probability	30
5.	Random variables	15
6.	Mathematical Expectation	10

**PAPER II: PROBABILITY DISTRIBUTIONS AND  
STATISTICAL INFERENCE**

**PART A : Probability Distributions**

1. Bivariate distributions: definitions of bivariate distribution and density functions, properties (without proof); marginal and conditional density functions; independence of random variables; Mathematical expectation (bivariate case) and properties, conditional mean, conditional variance, covariance and correlation coefficient, Tchebecheff's inequality. (25 hrs.)
2. Standard distribution: one point and two point distributions, uniform point binomial, binomial, Poisson, geometric, rectangular, exponential, gamma, beta and normal distributions; Fitting of binomial, Poisson, exponential and normal distributions. (45 hrs.)
3. Law of large numbers: mode of convergence-convergence in distribution, convergence in probability; Weak law of large numbers, Bernoulli's law of large numbers, central limit theorem for iid random variables (statement and examples only) (20 hrs.)
4. Sampling distributions: definition, standard error, sampling distributions of mean and variance of a sample drawn from normal population; Chi-square, Student's t and F distribution, their relations and applications. (20 hrs.)

**PART B :Statistical Inference**

5. Theory of estimation: Point estimation-properties of good estimator, CRLB(without proof), Fisher-Neyman factorization theorem (without proof); Method of estimation – MLE, Method of moments; interval estimation-interval estimation of mean and variance of a normal population, proportion of success. (30 hrs.)
6. Testing of hypothesis: concept of testing, types of errors, critical region, significance level, power of test, best critical region, most powerful and uniformly most powerful test, Neyman-Pearson lemma(without proof); Large sample tests-testing mean, equality of means, testing of proportion and equality of proportions; Chi-square test of goodness of fit and independence. Small sample tests-tests based of chi-square, t and F distributions; Non-parametric tests-concept and merits; testing of hypothesis using Sign tests, Wilcoxin signed rank test, Run test, Mann-Whitney test (procedure and examples only). (40 hrs.)

**Text Books:**

1. A first course in probability – T.K.Chandra & D.Chatterjee (Narosa Publishing House)
2. Introduction to probability theory and mathematical statistics – V.K. Rohatgi (Wiely Eastern Ltd.)
3. Fundamentals of Applied Statistics-S.C.Gupta & V.K.Kapoor (Sulthan Chand & Sons )

4. Fundamentals of Mathematical Statistics-S.C.Gupta & V.K. Kapoor (Sulthan Chand & Sons)
5. Introductory statistics – Sheldon M Ross (Elsevier, Academic press)
6. Introduction to probability and statistics for engineers and scientists – Sheldon M Ross (Elsevier)

**Topic wise distribution of marks:**

The entire topics are divided in to two sections, **Part A** and **Part B**. There shall be questions for a total of 135 marks to score the maximum of **90** marks. The maximum marks that can be scored from **Part A** is **55** and from **Part B** is **35**. Scientific calculators are permitted in the examination.

<b>Section</b>	<b>Topic</b>	<b>marks</b>
1.	Bivariate distributions, expectation (bivariate)	25
2.	Standard distributions	35
3.	Law of large numbers	10
4.	Sampling distributions	10
5.	Theory of estimations	20
6.	Testing of hypothesis	35

Sd/-  
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