

**TRIPURA BOARD OF SECONDARY EDUCATION**

**SYLLABUS**

**(effective from 2015)**

**SUBJECT : STATISTICS**

**(Class – XII)**

**STATISTICS**  
**COURSE STRUCTURE**  
**CLASS XII (Theory)**

**One Paper**

**Time: 3 Hours**

**Marks: 70**

<b>Unit</b>	<b>Title</b>	<b>Marks</b>
I	Mathematics	15
II	Correlation & Regression	10
III	Probability & Probability Distributions Sampling, Estimation & Testing of	20
IV	Hypothesis	20
V	Population Studies	5
	<b>Total</b>	<b>70</b>

## **Unit I: Mathematics**

Basis concept of Limit, Continuity and Differentiability. First and second order derivatives of a variety of non-trigonometric univariate functions. Maximum and minimum of a variety of non-trigonometric univariate functions.

Integration of a variety of non-trigonometric univariate functions by substitution, by partial fractions and by parts. Standard definition of gamma integral and results involving it (without derivations).

## **Unit II: Correlation & Regression**

Bivariate data. Scatter diagram. Correlation and Correlation coefficient. Properties of Correlation coefficient. Rank correlation, Spearman's rank correlation coefficient (without tie).

Concept of regression. Principle of least squares. Fitting of Regression lines. Important results relating to regression lines.

## **Unit III: Probability & Probability Distributions**

Random experiment, Trial, Sample space, Sample point and different types of events. Definition of Probability: Classical, Statistical & Axiomatic. Theorem on the probability of a union of (two & three) events. Conditional probability, Theorem on conditional probability for two & three events. Independence of events. Bayes' theorem and its application.

Random variable (discrete and continuous) and its probability distribution. Cumulative distribution function. Probability mass function and Probability density function. Mathematical expectation.

Uniform (Discrete & Continuous), Bernoulli, Binomial, Poisson, Geometric, Exponential & Normal distributions.

## **Unit IV: Sampling, Estimation & Testing of Hypothesis**

Population & Sample. Parameter & Statistic. Census & Sample Survey. Concepts of probability sampling and random number tables. Concepts of Sampling distribution of statistic and its Standard Error. Simple random sampling with replacement (SRSWR) and simple random sampling without replacement (SRSWOR).

Concept of point estimation. Requirement of a good estimator: Unbiasedness, Consistency, Efficiency. Elementary concept of MVUE & BLUE.

Statistical tests of Hypothesis - Null and alternative hypotheses. Simple and composite hypotheses, Critical region, Type-I and type-II errors, Level of significance and size of critical region, Power of a test. Tests of significance related to a single Binomial proportion, Poisson Parameter and two Binomial proportions using large sample approximations. Exact tests of

hypotheses under normal set-up for a single mean, equality of two means and single variance. Frequency Chi-square test & goodness of fit.

## **Unit V: Population Studies**

Vital events. Rates and ratios. Measurement of mortality: Crude, Specific and Standardised death rates, Infant mortality rate. Measurement of fertility and Reproduction: Crude birth rate, General, Specific and Total fertility rates, Gross and Net reproduction rates.

### **PRACTICAL**

<b>Time: 3 Hours</b>	<b>Marks: 30</b>
<b>Evaluation Scheme for Examination</b>	<b>Marks</b>
Practical Notebook	5
Viva Voce	5
Experiments (5+5+10)	20
<b>Total</b>	<b>30</b>

### **PRACTICAL SYLLABUS**

**Three Experiments to be given in the examination as follows:**

1. Scatter Diagram, Correlation coefficient and Linear Regression.
2. Spearman's rank correlation coefficient (without tie).
3. Applications and fitting of Binomial distribution.
4. Applications and fitting of Poisson distribution.
5. Applications of Normal distribution.
6. Sampling distribution and estimation of population mean and its standard error under SRSWR and SRSWOR.
7. Large sample tests of a single mean, single proportion and difference of two proportions.
8. Pearson's chi-square test.
9. Exact tests of hypotheses under normal set-up for a single mean, difference of two means, and single variance.
10. Drawing of random sample from Uniform and Normal distributions.
11. Calculation of different rates and ratios of fertility, mortality and measures of reproduction.

**UNITWISE QUESTION TYPES WITH MARKS DISTRIBUTION**

<b>Unit</b>	<b>Title</b>	<b>MCQ/ Objective 1 Mark</b>	<b>SA-I 2 Marks</b>	<b>SA-II 3 marks</b>	<b>LA 5 marks</b>	<b>Total</b>
I	Mathematics	3	2	1	1	15
II	Correlation & Regression Probability & Probability	-	1	1	1	10
III	Distributions Sampling, Estimation &	2	1	2	2	20
IV	Testing of Hypothesis	2	1	2	2	20
V	Population Studies	3	1	-	-	05
	<b>Total no. of Questions</b>	<b>4+6=10</b>	<b>6</b>	<b>6</b>	<b>6</b>	
	<b>Total</b>	<b>10</b>	<b>12</b>	<b>18</b>	<b>30</b>	<b>70</b>

N.B. 1. Internal choice : There is no overall choice in the paper. However, there is an internal choice of one question of 5 marks in Unit – I, one question of 3 marks in Unit - II and one question of 5 marks in Unit – II, one question of 3 marks in Unit-III and one question of 5 marks in Unit – III and one question of 5 marks in Unit – IV.

2. In SA-II & LA-types, total allotted marks in each may be subdivided if, necessary.

3. Questions should be set covering each unit.