# Annexure A

## Syllabus and Courses of Study in Statistics for B. Sc./B.A. (Semester I) Under CBCS For the Examination to be held in November- December 2016, 2017 and 2018

### I SEMESTER

**Paper Code: USTTC 101** **Title: DESCRIPTIVE STATISTICS AND PROBABILITY THEORY**

**Credits: 4** **Total Marks: 100**
**Internal Test: 20(1 Hour)**
**End semester Exam: 80(3 Hours)**

**Objectives:** The Objectives of this course is to impart students the basic knowledge of measures of central tendencies and measure of dispersion along with the introduction to concept of probability and its basic theory.

**Unit- I**

Definitions, Scope and importance of statistics, General nature of statistical data, qualitative and quantitative data, discrete and continuous data, Primary and secondary data, classification & Tabulation, frequency distribution and their graphical and diagrammatic representations histogram, frequency curves, bar diagram, Ogive and measures of central tendency (A.M.,G.M.,H.M.) Median and mode, their merits and demerits.

**Unit-II**

Measures of Dispersion: Range. Inter Quartile range, Mean Deviation, Standard Deviation, Variance & Coefficient of Variation, Partition values, Moments (raw and central moments) up to order four. Effect of change of origin and scale on moments. Shephard's correction (without proof). Skewness and Kurtosis meaning and measures.

**Unit-III**

Bivariate data: Scatter Diagram, product moment correlation coefficient ,its properties and simple illustrations. Spearman's rank correlation coefficient, Intra class correlation coefficient & correlation ratio. Coefficient of determination.

**Unit IV**

Probability: Random experiment, events, algebra of events, sample space, definitions of Probability, simple illustrations for three events, conditional Probability, theorem on Probability of two events and its extension. Independent events, simple illustrations, Bayes Theorem and its applications.

**Unit – V**

Probability mass function and Probability density function, joint marginal and conditional pmf and pdf, Jacobian Transformation for one and two variables. Independence of random variables, Discrete and continuous random variables. Mathematical expectation, expectation of sum of two random variables and product of two independent random variables, conditional expectation and conditional variance, moment generating function and properties of mgf.

**Note for paper setting: End Semester External University Examination**

The question paper will contain three Sections. Section A will contain compulsory ten very short answer type questions of 1 mark each. Section B will contain 7 short answer type questions of 5 marks each atleast one question from each unit and the student has to attempt any five questions. Section C will contain 10 long answer type questions, two from each unit, of 9 marks each and the student has to attempt five questions selecting one from each unit.

**Books Recommended**


1. Gupta and Kapoor: Fundamentals of Mathematical Statistics
2. Kapoor and Saxena: Mathematical Statistics
3. Goon, Gupta and Dass Gupta; fundamentals of Statistics vol-I
4. S.P. Gupta; Statistical Methods
5. Croxton F.E., Cowden D.J. and Kelin S: Applied General Statistics, Prentice Hall of India
6. Mood, A.M. Boes, D.C. and Graybill, F.A.: Introduction to the Theory of Statistics.
7. E. Parzen: Modern Probability Theory
8. V.K. Rohatgi; Introduction to the theory of Probability

**Paper Code: USTPC 102** **Title: Statistical Computing-I**

**Credits: 2**

**Total Marks: 50**
**Internal : 25**
**External: 25( Exam: 20 Viva-Voce: 05)**

**Objectives:** The objective of the course is to expose the students to the real life applications Statistical Tools.

There shall be atleast twenty computing exercises covering the applications of Statistics based on the entire syllabus of course USTTC101.

## Scheme of Examination

The 20% of the marks allotted to each theory paper and 50% of the marks allotted to each practical paper including field work, wherever prescribed, shall be reserved for internal assessment. The evaluation of a candidate shall be awarded and record thereof maintained in accordance with the Regulations prescribed for the purpose under the CBCS as per the following:

| **THEORY** | **Syllabus to be covered in the examination** | **Time allotted** | **% Weightage (Marks)** |
|---|---|---|---|
| Internal Assessment Test (**Pattern**: One long answer type question of 10 marks and Five short answer type questions of 2 marks each) | Upto 50%(after 45 days) | 1 hour | 20 |
| External End Semester University Exam ( **Pattern**: As proposed by the concerned BOS and approved by Academic Council) | Upto 100%( after 90 days) | 3 hour | 80 |
| **Total** | | | **100** |
| **PRACTICAL** | | | |
| Daily evaluation of practical records/Viva voce/attendance etc. | | | 50( including 20% for attendance, 20% for Viva-voce and 60% for internal test and day to day performance) |
| Final Practical Performance + viva voce (External Examination) | 100% Syllabus | | 50<br>40 Exam<br>10 viva-voce |
| **Total** | | | **100** |

# Annexure B

## Syllabus and Courses of Study in Statistics for B. Sc./B.A. (Semester II) Under CBCS For the Examination to be held in April-May 2017, 2018 and 2019 II SEMESTER

**Paper Code: USTTC 201** **Title: DESCRIPTIVE STATISTICS AND PROBABILITY DISTRIBUTIONS**

**Credits: 4** **Total Marks: 100**
**Internal Test: 20(1 Hour)**
**End semester Exam: 80(3 Hours)**

### Unit – I

Discrete Probability distributions: Uniform distribution, its mean and variance, Bernoulli distribution, binomial distribution, its mean, variance, mode and mgf, recurrence relation for B.D. Definition, moments and mgf. Negative binomial distribution, Poisson distribution and and its moments. Poisson distribution as a limiting case of B.D., its mean, variance and mg, Recurrence relation of Poisson distribution, Poisson distribution as a limiting case of negative B.D. recurrence formula for N.B.D. Hyper geometric distribution; its definition, mean, variance and relation with Binomial distribution.

### Unit – II

Rectangular distribution; Moments of rectangular distribution, mgf and mean deviation of rectangular distribution. Normal distribution: its definition, mean, variance and mgf. Properties of Normal curve, simple problems on Normal distribution including area problems, Normal distribution as a limiting case of binomial distribution, under the conditions to be stated. Mean deviation, Median and Mode of Normal distribution.

### Unit –III

Gamma and Beta distribution: Definition and properties of Gamma distribution, beta distribution of first kind as well as of second kind, Exponential distribution along with simple illustrations.

Markov, Chebbychev and Jensens inequalities with proof and their simple illustrations.

**Unit -IV**

Regression lines, regression coefficient and their properties. Principle of least squares, fitting of a straight line, parabola, logarithmic and exponential curve by the method of least squares.

Multivariate Data: Multiple regression line, Partial and multiple correlation coefficients of three variables only (Derivations and simple illustrations).

**Unit V**

Scales of measurement of Data. Theory of Attributes: Notation and terminology for attributes, contingency table, class frequency, ultimate class frequency, relationship between class frequencies, consistency of data, conditions for consistency of data. Association and independence of attributes (upto three attributes

**Note for paper setting: End Semester External University Examination**

The question paper will contain three Sections. Section A will contain compulsory ten very short answer type questions of 1 mark each. Section B will contain 7 short answer type questions of 5 marks each atleast one question from each unit and the student has to attempt any five questions. Section C will contain 10 long answer type questions, two from each unit, of 9 marks each and the student has to attempt five questions selecting one from each unit.

**Books Recommended**


1. Mood, A.M. , Boes, D.C. and Graybill, F.A.: Introduction to the theory of Statistics.

2. Hogg. R.V. and Graig, A. T. : Introduction to the mathematical statistics.

3. Saxena, H.C.; Finite Mathematics.

4. Lindgren: Statistical Theory

5. E. Parzen: Modern Probability Theory

6. V.K. Rohatgi; Introduction to the theory of Probability.

**Paper Code: USTPC 202** **Title: Statistical Computing-II**

**Credits: 2**

**Total Marks: 50**
**Internal : 25**
**External: 25( Exam: 20 Viva-Voce: 05)**

**Objectives:** The objective of the course is to expose the students to the real life applications Statistical Tools.

There shall be atleast twenty computing exercises covering the applications of Statistics based on the entire syllabus of course **USTTC 201.**

## Scheme of Examination

The 20% of the marks allotted to each theory paper and 50% of the marks allotted to each practical paper including field work, wherever prescribed, shall be reserved for internal assessment. The evaluation of a candidate shall be awarded and record thereof maintained in accordance with the Regulations prescribed for the purpose under the CBCS as per the following:

| **THEORY** | **Syllabus to be covered in the examination** | **Time allotted** | **% Weightage (Marks)** |
|---|---|---|---|
| Internal Assessment Test (**Pattern**: One long answer type question of 10 marks and Five short answer type questions of 2 marks each) | Upto 50%(after 45 days) | 1 hour | 20 |
| External End Semester University Exam ( **Pattern**: As proposed by the concerned BOS and approved by Academic Council) | Upto 100%( after 90 days) | 3 hour | 80 |
| **Total** | | | **100** |
| **PRACTICAL** | | | |
| Daily evaluation of practical records/Viva voce/attendance etc. | | | 50( including 20% for attendance, 20% for Viva-voce and 60% for internal test and day to day performance) |
| Final Practical Performance + viva voce (External Examination) | 100% Syllabus | | 50<br>40 Exam<br>10 viva-voce |
| **Total** | | | **100** |