

DEPARTMENT OF STATISTICS

B. Sc. Statistics

Programme Outcomes

PO1: Students learn to apply theory learned so far upto 12 th standard since Statistics is applied subject.

PO2: Students Employability increases due to various techniques covered in the papers like “Design of Experiment”, “Regression Analysis”, “Reliability and Survival analysis” which are the main features used in Business Analytics

PO3: Due to the Subjects like “C Programming” and “Statistical Computing using R Software” students get exposure to computer knowledge and their use and hence their logical thinking is developed.

PO4: Students get knowledge of basic concepts required for higher studies.

PO5: Students starts thinking more Scientifically and Analytically.

Programme Specific Outcomes

PSO1: Students learn different techniques used in Industries and research used for carrying the analysis.

PSO2: Students will be well acquainted with various fields in statistical knowledge is useful.

PSO3: Students learn the team work while completing the project work.

PSO4: Students get knowledge and training of technical subjects and get more employability in upcoming industries.

Course Outcomes

F. Y. B. Sc. Statistics (2019 pattern)

ST 111: Descriptive Statistics-I

CO1: Students will understand the concept of population and sample . They will understand how to collect data using various statistical sampling methods and how to classify and represent that data graphically.

CO 2: Students will go through various statistical measures such as measures of central tendency, dispersion, skewness and kurtosis.

CO 3: Students will be able to describe the comparison between interrelated data sets and also be able to find appropriate conclusions using the suitable measures of centrality, dispersion and skewness – kurtosis.

CO 4: They will understand mathematical operations done with attributes.

CO 5: Students will understand the applications of attributes in the real life.

CO 6: The students are expected to start using some statistical software and verify their theoretical knowledge about different statistical entities and computations during practical sessions.

ST-112 Discrete Probability

CO1: Students will get familiar with basic concepts of probability, random variable and probability distributions.

CO2: Students will be able to understand the difference between random and non-random experiments.

CO3: Students will be able to solve the numerical problems on probability.

CO4: Students will be able to obtain the probability distributions of random variables.

CO5: Students will be able to apply the standard discrete probability distributions to different real-life situations.

ST-121 Descriptive Statistics-II

CO1: Students will understand the concept of bivariate data. They will understand how to collect bivariate data using various statistical sampling methods and how to classify and represent that data graphically.

CO 2: Students will go through statistical measures such as Karl Pearson's correlation coefficient to estimate relationship among variables.

CO 3: Students will be able to describe the correlation between interrelated variables and also be able to find appropriate regression equation among the variables.

CO 4: They will understand how to construct mathematical equations to display the relationship among variables using line fitting and curve fitting methods.

CO 5: Students will understand the applications of index numbers in the real life.

CO 6: The students are expected to start using some statistical software and verify their theoretical knowledge about different statistical entities and computations during practical sessions.

ST 122: Discrete Probability Distributions

CO1: Students will get familiar with basic concepts of Standard Probability Distributions.

CO2: Students will be able to apply the standard Discrete probability distributions like Poisson and Geometric to different real life situations

CO3: Students will get familiar with Bivariate Discrete Probability Distribution.

CO4: Students will be able to solve the numerical problems on Bivariate Discrete Probability Distribution.

CO5: Students will get familiar with Raw and Central Moments and Mathematical Expectation.

ST-113 and 123 Statistics Practical Paper

CO1: Numerical ability will be developed.

CO2: Problem solving skills will be developed

CO3: All the formulae developed in the theory will be practiced and will be remembered by the students.

CO4: Students will get familiar with computer (MS Excel), and they can use it more efficiently.

S. Y. B. Sc. Statistics (2013 Pattern)

ST-231 Discrete Probability Distributions, Time Series

CO1: Students will be able to identify the real-life situations of discrete probability distributions.

CO2: They will be able to find probabilities related to standard probability distributions.

CO3: Students will be able to understand the concept of time series.

CO4: They will learn different methods of measurements of trend and seasonal variations.

ST-232 Continuous Probability Distributions

CO1: Students will understand the concept of continuous random variable and its probability distribution.

CO 2: Students will go through various derivations done for mathematical expectation and variance, moment generating function and cumulant generating functions.

CO 3: Students will be able to describe and study the different kinds of continuous probability distributions such as Uniform distribution, Normal distribution, Gamma and Exponential distribution.

CO 4: They can find relations among aforesaid continuous random variables.

CO 5: Students can implement these probability distributions in handling the real life data.

ST-241 Testing of Significance and Statistical Methods

CO1: Students will be able to fit the best equation of plane of multiple regression.

CO2: They will be able to understand the concept of testing of hypothesis and they will carry out test for means and proportions.

CO3: Students will be able to carry out different tests of hypothesis using R software.

CO4: They will understand the concept of vital statistics and they can compute rates of different vital events.

CO5: Students will understand the concept of queuing models.

ST-242 Sampling Distributions and Exact Tests

CO1: Students will understand the concept of sampling distributions of functions of different continuous random variables.

CO2: Students will go through various derivations done for mathematical expectation and variance, moment generating function and cumulant generating functions.

CO3: Students will be able to describe and study the different kinds of continuous probability distributions such as Chi Square distribution, t- distribution, F distribution.

CO 4: They can find relations among aforesaid continuous random variables.

CO 5: Students can implement these probability distributions in handling the real-life data in terms of testing different types of hypothesis.

ST-233 and 243 Statistics Practical Paper

CO1: Students will be familiar with model sampling and fitting of distribution

CO2: Students will learn to apply distributions they have learnt in real life situations.

CO3: All the formulae developed in the theory will be practiced and will be remembered by the students.

CO4: Students will get familiar with computer with more advanced formulae/ techniques in (MS Excel), and they can use it more efficiently.

T. Y. B. Sc. Statistics (2013 Pattern)

ST 331 Distribution Theory

CO1: Students will understand the concept of continuous random variable and its probability distribution.

CO 2: Students will go through various statistical distributions and their respective mathematical expectation and variance, moment generating function and cumulant generating functions.

CO 3: Students will be able to describe and study the relations between various continuous probability distributions such as Beta distribution, Lognormal distribution, Cauchy and double exponential distribution.

CO 4: They can find relations among aforesaid continuous random variables and can generate data using it.

CO 5: Students can implement these probability distributions in handling the real life data.

CO 6: Exploratory data analysis techniques would be used to recognize pattern of the data.

ST 332 Theory of Estimation

CO1: Students will understand the problem of Statistical inference, problem of Point estimation.

CO 2: Students will learn properties of a point estimator such as Consistency, Unbiasedness, Sufficiency.

CO 3: Students will be able to obtain estimators using methods of estimation such as Maximum Likelihood Estimator and Methods of moments.

CO 4: Students will be able to check efficiency of various estimators and obtain minimum variance unbiased estimators.

CO 5: Students will learn how to quantify information in Statistic using Fisher's Information Function.

CO 6: Students will understand problem of Interval Estimation and how to construct confidence interval (for one or two parameters).

ST 333 Sampling Methods

CO1: Students will understand different ways to prepare questionnaire.

CO 2: Students will understand different ways of selecting a sample.

CO 3: Students will be able to compare efficiency of different sampling methods.

CO 4: Students will be able to understand Ratio and Regression estimators.

CO 5: Students will learn sampling errors and their importance.

ST 334 Design of Experiments

CO1: Students will understand the concept of Design of Experiment. They will understand how to analyze collected data using various Designs techniques. They also learn how to use Design of Experiments in real life situations.

CO 2: Students will learn through various Design techniques how to deal with real life data.

CO 3: Students will be able to check variability in various treatments by using ANOVA and ANCOVA technique.

CO 4: Students will be able to do analysis of Non-normal data.

CO 5: Students will learn how to check effects of various factors using Factorial experiments.

CO 6: Students will be able to understand how to apply various treatments to experimental units so that precision of experiment will increase to get better results.

ST 335 C Programming (Turbo C)

CO1: Students will be able to think logically.

CO 2: Students will learn data types and commands in C.

CO 3: Students will be able learn different unconditional and conditional type of instructions in programming

CO 4: Students will learn to write code in C to do statistical calculations and can solve different problems in Statistics.

CO 5: Students can write code in any other language since logical thinking is developed.

ST 336 Introduction to Regression Analysis

CO1: Students will understand the concepts of Regression Analysis. They will learn how to use Regression techniques to predict future values of interested variables.

CO 2: Students will learn through various Regression techniques such as Simple linear regression and Multiple linear regression models

CO 3: Students will able to check the violations of model assumptions using residual analysis.

CO 4: Students will be able to learn how to interpret different types of plots such as residual plots, normal probability plots.

CO 5: Students will understand the differentiate between linear and non-linear regression and how to apply them in real life situations.

CO 6: Students will learn how to deal with data where response variable have only two outcomes using Logistic regression

ST 341 Actuarial Statistics

CO1: Students will be able to explain the role of Statistics in Insurance business.

CO 2: Students will be able to describe and apply the fundamental theories of Actuarial Science as they are applying in life insurance, general insurance.

CO 3: Students will be able to explain the concept of Utility function and feasibility of Insurance business.

CO 4: Students will be able to use Actuarial Statistics techniques and its application in assessing probability models and data and able to construct life table using random survivorship approach.

CO 5: Students will be able to explain the concept of Annuity.

CO 6: Students will learn various life insurance products and they can calculate benefit premiums for respective products.

ST 342 Testing of Hypotheses

CO1: Students will understand the difference between type I and type II errors and their importance

CO 2: Students will learn hypothesis testing in general and the decision rules for different situations.

CO 3: Students will able to conduct and interpret tests for different population parameters and for different distributions.

CO 4: Students will be able to handle the situation of testing for non- normal data.

CO 5: Students will learn conduct the test sequentially.

ST 343 Statistical Quality Control

CO1: Students will understand various types of control charts such as \bar{X} , R and p chart.

CO 2: Students will learn through various performance measures of control chart such as OC, ARL, ATS etc.

CO 3: Students will able to perform various sampling inspection techniques.

CO 4: Students will be able to determine appropriate sampling plans and sample sizes.

CO 5: Students will learn how to implement control charting in order to assess process stability.

ST 344 Operation Research

CO1: Students will understand the concepts of Operation Research. They will understand how to formulate real life problem in Linear programming problem and to optimize solution to problem.

CO 2: Students will learn through various operation research techniques to maximize profit and to minimize cost of resources.

CO 3: Students will be able to minimize transportation cost of commodity using Transportation Problem.

CO 4: Students will be able to allocate various jobs to various resources using Assignment Problem.

CO 5: Students will learn how to do project evaluation and management using CPM and PERT. They will know how to reduce project durations and how to complete project in given time by controlling activity time.

CO 6: Students will be able to understand how to apply simulation to real life problem for computations of probabilities of events related to various distributions.

ST 345(A) Reliability and Survival Analysis

CO1: Reliability and Survival Analysis primarily refers to the study of time-to-event data.

Students will understand this concept and they will learn how to visualize and communicate time-to-event data.

CO 2: Students will go through various types of coherent systems and can compute reliability of the same based on their reliability block diagrams.

CO 3: Students will be able to describe the system and component redundancy and can study system reliability using cut sets and path sets.

CO 4: Students will be able to study the several terms and definitions used in the ageing of any component or system of components. They will be able to prove various properties about “no ageing” type.

CO 5: They will classify the different probability distributions as positive and negative ageing type distributions.

CO 6: Students should differentiate among censored and uncensored data. The estimation of survival function based on non-parametric and actuarial methods will be used for different datasets.

ST 346 Statistical Computing using R software

CO1: Reliability and Survival Analysis primarily refers to the study of time-to-event data.

Students will understand this concept and they will learn how to visualize and communicate time-to-event data.

CO2: Students will go through various types of coherent systems and can compute reliability of the same based on their reliability block diagrams.

CO3: Students will be able to describe the system and component redundancy and can study system reliability using cut sets and path sets.

CO4: Students will be able to study the several terms and definitions used in the ageing of any component or system of components. They will be able to prove various properties abouts “no ageing” type.

CO5: They will classify the different probability distributions as positive and negative ageing type distributions.

CO6: Students should differentiate among censored and uncensored data. The estimation of survival function based on non-parametric and actuarial methods will be used for different datasets.

ST-347,348, and 349 Statistics Practical Paper

CO1: Students will be able to apply the techniques of “ANOVA” they have learnt.

CO2: Students will be able draw control charts and their interpretation.

CO3: Students will be able to write C programs and R programs and hence the interpretation.
