

Course Outcomes of B.Sc.(Statistics)

Mechanism of Communication:

Our College adapts Outcome based education of learning. The Statistics program promotes Statistical skills and knowledge for their intrinsic beauty, effectiveness in developing proficiency in analytical reasoning, and utility in modeling and solving real world problems. The students will be able to formulate the mathematical/statistical models for real data set arising in various fields in order to analyse in respect of various useful characteristics of the populations.

The following mechanism is followed by the college to communicate the learning outcomes to the teachers and students.

1. Prospectus: -

Prospectus is used for admission process. The Prospectus of the college is made available to the students before the admission process starts. In Every academic session new prospectus is printed. And all information about the college, admission, admission fees, and new curriculum is included in it.

2. Institutional website: -

Institutional website is available and all the information about the academic course is available in it and is utilized for admission process by students. The students are also communicated about the Course outcomes through website and daily classes. Soft Copy of Curriculum and Courses Outcomes are uploaded on the college website.

3. Meeting: -

Through regular meetings of principal teacher are acquainted about the stated program and course outcomes and also guided for effective implementation. Course Outcomes are observed and measured time to time and the importance of Courses Outcomes has been communicated to the teachers periodically in every IQAC Meeting and Staff Meeting.

4. Personal Counseling –

Personal counseling of the student is done as per the need of the students. At the beginning of session, graduate attributes are described to the first year students. Teachers introduce the subject to the students.

COURSE OUTCOME OF STATISTICS

:: Programme Outcomes (POs)::

Students having Degree in B.Sc. (with Statistics) should have knowledge of different concepts and fundamentals of Statistics and ability to apply this knowledge in various fields of industry. They may pursue their future career in the field of Statistics and Research.

:: Programme Specific Outcomes (PSOs)::

After completing B.Sc. (with Statistics) the student should have

- Knowledge of different concepts, principles, methodologies and tools (skills) of statistics.
- Ability to collect, tabulate, represent graphically, analyze and interpret data/information by using appropriate statistical tools.
- Ability to identify and solve a wide range of problems in real life/industry related to Statistics.
- Familiarity with computational techniques and statistical software including programming language (e.g. R) for mathematical and statistical computation.
- Capability to use appropriate statistical skills in interdisciplinary areas such as finance, health, agriculture, government, business, industry, telecommunication and bio-statistics.
- Ability to compete with industrial/private sector demand in the field of data analysis, marketing survey, etc. in professional manner and pursue their future career in the field of Statistics.
- Ability to develop original thinking for formulating new problems and providing their solutions. As a result, they will be able to pursue higher studies or research in the field of Statistics.

Course Outcome of B.Sc. I (Statistics)

Paper code No. - B-194

Paper Title- Statistical Methods

After completing this course a student will have:

- Knowledge of Statistics, its scope and importance in various fields.
- Ability to understand concepts of sample vs. population and difference between different types of data.
- Knowledge of methods for summarising data sets, including common graphical tools (such as boxplots, histograms and stem plots). Interpret histograms and boxplots.
- Ability to describe data with measures of central tendency and measures of dispersion.
- Ability to understand measures of skewness and kurtosis and their utility and significance.

Paper code no -B-195

Paper Title : Probability Theory

Course Outcome

After completing this course a student will have:

- Ability to understand the concept of probability along with basic laws and axioms of probability.
- Ability to understand the terms mutually exclusive and independence and their relevance.
- Ability to identify the appropriate method (i.e. union, intersection, conditional, etc.) for solving a problem.
- Ability to apply basic probability principles to solve real life problems.

Paper code no -B-196

Paper Title : Probability Distribution & Theory of Attributes

Course Outcome

After completing this course a student will have:

- After studying the concept of random variable; in probability theory, the knowledge of Statistical distributions is of prime need.
- It gives the idea, how the total probability is distributed among the possible values of random variables. The main objective of the course is to provide the detailed knowledge of the characterization of all the useful discrete and continuous distributions.
- The students will be able to formulate the mathematical/statistical models for real data set arising in various fields in order to analyse in respect of various useful characteristics of the populations.
- Ability to understand the concept of random variable (discrete and continuous), concept of probability distribution.

Paper code- P-494

Practicals

Based on above Theory Papers

After completing this course a student will have:

- Ability to represent/summarise the data/information using appropriate Graphical methods including common graphical tools (such as boxplots, histograms and stem plots) and also to draw inferences from these graphs
- Acquire the knowledge to identify the situation to apply appropriate measure of central tendency as per the nature and need of the data and draw meaningful conclusions regarding behavior of the data.
- Acquire the knowledge to identify the situation to apply appropriate measure of dispersion as per the nature and need of the data and draw meaningful conclusions regarding heterogeneity of the data.
- Ability to measure skewness and kurtosis of data and define their significance.
- Acquire the knowledge to compute conditional probabilities based on Bayes Theorem.

Course Outcome of B.Sc. II (Statistics)

Paper code- B-294

Paper title: Statistical Inference

Course Outcome

After completing this course a student will have:

- In Statistics population parameters describe the characteristics under study.
- These parameters need to be estimated on the basis of collected data called sample.
- The purpose of estimation theory is to arrive at an estimator that exhibits optimality.
- The estimator takes observed data as an input and produces an estimate of the parameters.
- This course will make a student learn the various properties of a good estimator as well as techniques to develop such estimators from both classical and Bayesian point of view.
- Knowledge of the terms like null and alternative hypotheses, two-tailed and one tailed alternative hypotheses, significant and insignificant, level of significance and confidence, p value etc.

- Ability to understand the concept of MP, UMP and UMPU tests
- Ability to understand the t, f and chi-square distribution and to identify the main characteristics of these distributions.
- Knowledge of the concept of Point and Interval Estimation and discuss characteristics of a good estimator

Paper code- B-295

Paper Title: Survey Sampling

Course Outcome

After completing this course a student will have:

- Sampling is that part of statistical practice concerned with the selection of individual observations intended to yield some knowledge about a population of concern, specially for the purpose of Statistical Inference.
- The course aims to defining the population under study, its sampling frame, studying various sampling methods, determining the sample size and collecting data.
- The course will equip a student with the knowledge of adopting a suitable sampling plan in a variety of situations and develop statistical inferences about the population.
- Ability to understand the concept of sampling and how it is different from complete enumeration.
- Knowledge of various probability and non-probability sampling methods along with estimates of population parameters
- Ability to identify the situations where the various sampling techniques shall be used.
- Knowledge of sampling and non-sampling errors.

Paper code- B-296

Paper Title: Analysis of Variance & Design of Experiment

Course Outcome

After completing this course a student will have:

- In many areas like Industrial, Biological, Agricultural, etc, the prime focus is to formulate the layout of the design of experiment so that appropriate information regarding the population can be gathered and analyzed.
- Thus, it is must to have the knowledge of the experimental techniques such as CRD, RBD, LSD, BIBD and factorial designs.
- To provide background of the fundamental theories and practices of statistical modeling and the analysis of observational, experimental and survey data, including continuous, binary and categorical data.
- Students should be able to understand the random behavior of experimental processes, particularly, scientific, engineering and industrial.
- Knowledge of the concept of Analysis of Variance (ANOVA).
- Ability to carry out the ANOVA for One way and Two way Classification.
- Ability to carry out the post-hoc analysis.
- Knowledge of the concept of Design of experiment and its basic principles.
- Ability to perform the basic symmetric designs CRD, RBD and LSD with and without missing observations.
- Knowledge of the concept of factorial experiments and their practical applications.

Practical Based on above theory papers

Course outcomes:

After completing this course a student will have:

- Ability to conduct test of significance based non-parametric tests.
- Ability to deal with multivariate data.
- Ability to perform ANOVA for one way and two classification.
- Ability to perform post-hoc analysis.
- Ability to conduct analysis of CRD, RBD and LSD with and without missing observations.
- Ability to draw a simple random sample with the help of table of random numbers.
- Ability to estimate population means and variance in simple random sampling.
- Ability to deal with problems based on Stratified random sampling for population means (proportional and optimum allocation).
- Ability to deal with problems based on Systematic random sampling
- Ability to conduct test of significance based on t , F tests and Chi-square test.
- Ability to deal with problems based on large sample tests.

Course Outcome of B.Sc. III (Statistics)**Paper code- B-394****Paper Title: Non Parametric Methods & Numerical Analysis****Course Outcome**

After completing this course a student will have:

- Sometimes, the number of observations required by the procedure to reach a decision is not fixed in advance of the experiment.
- In such cases, inferences can be drawn by the use of the sequential procedure.
- More so, when we do not know the form of the population, non-parametric statistical tools like Sign, Run, Median, Mann-Whitney, K-S and Chi-square tests are used to infer about the characteristics of the population.
- The aim of the course is to provide deeper knowledge of the inferential statistics such as sequential estimation, OC and ASN functions, loss and risk functions, one, two and k-samples non-parametric tests.
- Define divided difference and its application.
- Learn Newton divided difference and its application. Obtain numerical solutions of algebraic and transcendental equations.
- Find numerical solutions of system of linear equations and check the accuracy of the solutions.
- Solve initial and boundary value problems in differential equations using numerical methods. Derive Simpson's $1/3$, $3/8$ rules using trapezoidal rule and their application.
- Find the solution of ordinary differential equation of first by Euler, Taylor and Runge-Kutta methods

Paper code- B- 395**Paper Title: Applied statistics****Course Outcome**

After completing this course a student will have:

- Time series is a sequence of data points measured at, often uniform, intervals.

- It is needed to forecast the future events.
- For social and economic purposes one needs to study the societies or groups in view of their birth and mortality rates. Demography studies the measurement of population processes.
- The course aims to study various models and components of time series analysis for forecasting purposes.
- It also gives the study of distribution of population with respect to birth, migration, aging and death. After studying this course one learns the most important technique of forecasting used in economic analysis.
- It will also equip a student with tools used in population studies.
- In engineering and manufacturing, the knowledge of this course deals with assurance and failure testing in design and production of products or services to meet or exceed customer requirements.
- The objective of the course is to have the knowledge of various methods to control the quality of a product and to increase the reliability of a device/system. The students will be able to apply the fundamental tools/methods in various industrial plants.

Paper code- B-396

Paper Title: Linear Programming & Computer Techniques

Course Outcome

After completing this course a student will have:

- In the modern age of computing, Statistics uses computers for large and fast calculations.
- The basic knowledge of computers and a scientific programming language is a must for a student of statistics.
- The objective of the course is to introduce a student with basic know how of Hardware as well as software and
- To train him in the popular scientific computer programming language C++.After this course a student will be fully equipped with the techniques of developing his own computer programmes for most of the mathematical as well as Statistical methods.

Paper code- P-694

Practical

Practical Based on above theory papers

Course Outcome

After completing this course a student will have:

- Ability to deal with problems based on time series and calculation of its different components for forecasting.
- Ability to deal with problems based on Index number.
- Acquire knowledge about measurement of mortality and fertility.
- Ability to deal with problems based on life table.
- Knowledge of mathematical formulation of L.P.P
- Ability of solving LPP using different methods.
- Ability to solve Allocation Problem based on Transportation and Assignment models.
- Ability to solve problems based on Game Theory