

## **M.Sc. Statistics Programme Outcome**

Master of Science in statistics is a postgraduate statistics course. Statistics is the study of the collection, organization, and interpretation of data. It deals with all aspects of this, including the planning of data collection in terms of the design of survey and experiments. The duration of M.Sc. in Statistics is mostly of two academic years. M.Sc. Statistics course is of four semesters and it is career orienting and offering many jobs in the very field.

They can have jobs with the government department which conduct experiments on consumer prices, fluctuations in the economy, employment patterns, population trends etc. They can also have jobs in wildlife field as statisticians which help to collect data on the various animal populations and try to design strategies to protect endangered species. Teaching is an evergreen field for them; where they can go after having certain qualifications after master degree course such as UGC-NET exam.

After completing M.Sc. Statistics the employment areas are research centre, manufacturing sector, pharmaceutical companies, educational institutes, scientific research organizations, public sector research organizations, market research companies, banking sector, insurance companies.

### **Course Outcome**

#### **Semester I**

##### 1. ST1C01 - Measure Theory and Integration

To achieve knowledge in the field of real analysis, focusing in particular on the basics of measure and integration in Euclidean space.

##### 2. ST1C02 - Analytical Tools for Statistics-I

It requires us to find new ways of picturing functions. The graphical methods of real variable calculus are of limited use. An important concept throughout the course will be that of a path integral. Many of our main theorems will concern how one can evaluate these path integrals without doing any integration.

##### 3. ST1C03 - Analytical Tools for Statistics-II

It is a course about the basic notions of linear algebra and describes the notions of vectors, including operations and linear combinations of vectors, the concept of vector space, and the bases of a vector space. The notions of matrices, transposes of matrices, matrix multiplication, square matrices, symmetric matrix, positive-definite matrix, quadratic forms, orthogonal matrix, the rank of a matrix, and determinant

of a square matrix are introduced in the chapter. It also covers the topics of homogenous systems of equations, inverse and generalized inverse matrices, eigenvalues and eigenvectors, similarity of square matrices, diagonalizable matrix.

#### 4. ST1C04 – Regression and Linear Programming

In regression problems alternative criteria of “best fit” to least squares are least absolute deviations and least maximum deviations. Linear programming deals with the maximization or minimization of linear functions subject to linear inequality constraints.

#### 5. ST1C05 – Distribution Theory

To present the general theory of statistical distributions as well as the standard distributions found in statistical practice, and the relationships among them, to provide a good grounding in the general theory of statistical distributions and to derive many important statistical distributions using the general theory of the calculus of random variables including the use of the moment generating function.

### **Semester II**

#### 1. ST2C06 – Estimation Theory

Estimation theory is a branch of statistics that deals with estimating the values of parameters based on measured empirical data that has a random component. The parameters describe an underlying physical setting in such a way that their value affects the distribution of the measured data.

#### 2. ST2C07 - Sampling Theory

Sampling is the selection of a subset (a statistical sample) of individuals from within a statistical population to estimate characteristics of the whole population. Two advantages of sampling are that the cost is lower and data collection is faster than measuring the entire population. Various methods of sampling were also included in this paper.

#### 3. ST2C08 – Probability Theory

Probability theory is the branch of mathematics concerned with probability. Probability theory treats the concept in a rigorous mathematical manner by expressing it through a set of axioms.

#### 4. ST2C09 - Design and Analysis of Experiments

The design of experiments (DOE, DOX, or experimental design) is the design of any task that aims to describe or explain the variation of information under conditions that are hypothesized to reflect the variation.

#### 5. ST2C10 – Statistical Computing I

Practical is to be done using R programming. It helps in analyzing the data.

### **Semester III**

#### 1. ST3C11 – Stochastic Process

In probability theory and related fields, a stochastic or random process is a mathematical object usually representing numerical values of some system randomly changing over time. Stochastic processes are widely used as mathematical models of systems and phenomena that appear to vary in a random manner.

#### 2. ST3C12 - Testing Of Statistical Hypotheses

A statistical hypothesis test is a method of statistical inference. Hypothesis tests are used in determining what outcomes of a study would lead to a rejection of the null hypothesis for a pre-specified level of significance. An alternative framework for statistical hypothesis testing is to specify a set of statistical models, one for each candidate hypothesis, and then use model selection techniques to choose the most appropriate model.

#### 3. ST3E07 – Biostatistics

This paper is used to determine how diseases develop, progress and spread. It uses statistics and research methodologies to reach conclusions about diseases within certain population groups and finds the causes and risks of certain diseases

#### 4. ST3E03 – Statistical Quality Control

It promotes the understanding and appreciation of quality control and leads to more uniform quality of production. It provides a basis for attainable specifications and a means of detecting errors at inspection. It reduces inspection costs, the number of rejects and save the cost of material.

### **Semester IV**

#### 1. ST4C13- Multivariate Analysis

Multivariate analysis (MVA) is the statistical analysis of many variables at once. Many problems in the analysis of life science are multivariate in nature. The analysis of large multivariable data sets is a major challenge for life science research.

## 2. ST4E04- Reliability Theory

Reliability is theoretically defined as the probability of success as the frequency of failures; or in terms of availability, as a probability derived from reliability, testability and maintainability. Reliability plays a key role in the Reliability engineering deals with the estimation, prevention and management of high levels of "lifetime" and risks of failure cost-effectiveness of systems.

## 3. ST4C14 – Project / Dissertation and External viva- voice

It could be a theoretical work or data analysis type. To enable students to collect and analyze the data and interpret their results.

## 4. ST4C15 – Statistical Computing II

Practical is to be done using R programming. It helps in analyzing the data.