



NAME OF THE PROGRAMME: B.Sc. / B.A. STATISTICS (CBCS)

Programme Outcomes (PO)

After completing the Three Year Undergraduate Programme in Statistics, Students are expected to achieve the following Programme Outcomes:

PO1: Fundamental Knowledge

PO2: Critical Thinking

PO3: Experimental Skills

PO4: Innovative Thinking

PO5: Ethical Awareness

PO6: Quantitative Reasoning

PO7: Information Literacy

PO8: Technology Proficiency

PO9: Employability skills

PO10: Communication Skills and Team Work

PO11: Leadership Development

PO12: Research Skills

Programme Specific Outcomes (PSO)

The programme specific outcomes of the Undergraduate Programme in Statistics are listed below. After completing the programme the students will be able to-

PSO1: Basic Theories of Statistics:

Develop new techniques/methods for solving the unsolved problems of Statistics and Page 7 of 31 other disciplines

PSO2: Applications of Statistics in Different Domain:

Apply Statistical tools and techniques to solve problems of other relevant disciplines. Develop new techniques/methods for solving the unsolved problems of Statistics.

PSO3: Data Analysis and Interpretation:

Construct Statistical models to mimic real life problems and make prediction and to identify important factors.

Course Outcomes (CO)**B.Sc. 1st Semester****Course Title: Descriptive Statistics**

Course Code: STAT-C1

On completion of this course, the students will be able to –

- CO1** Understand the definition and scope of statistics, types of data, collection, presentation, tabulation of quantitative data and attributes
- CO2** Evaluate measures of central tendency and dispersion
- CO3** Understand the concept of bivariate data, correlation and regression
- CO4** Understand Index number- definition, its' construction and uses
- CO5** Understand the application of CPI in policy formulation

Course Title: Calculus

Course Code: STAT-C2

At the end of this course, the students will be able to:

- CO1** Understand the concept of differential calculus
- CO2** Apply Integral Calculus essential for understanding Statistics
- CO3** Evaluate various types of Differential Equation essential for understanding Statistics
- CO4** Understand formation and solution of various types of partial differential equations and applications in Statistics
- CO5** Understand the applications of differential equations in real life problems

B.Sc. 2nd Semester**Course Title: Probability and Probability Distributions**

Course Code: STAT-C3

At the end of this course, the students will be able to:

- CO1** Understand basic concepts of Probability theory
- CO2** Remember knowledge of random variable, pmf, pdf, cdf, distribution function etc.
- CO3** Evaluate Mathematical expectation, generating functions for single and bivariate r.v. and related topic
- CO4** Understand probability distributions: discrete and continuous
- CO5** Understand the role of probability theory in Statistics

Course Title: AlgebraCourse Code: **STAT-C4****At the end of this course, the students will be able to:**

- CO1** Apply theories of equations required for learning statistical theory
- CO2** Understand Algebra of Matrices and other related topics
- CO3** Evaluate Determinants of matrices and other related topics
- CO4** Understand Rank of matrices and other related topics
- CO5** Understand the applications of quadratic forms in Statistics

B.Sc. 3rd Semester**Course Title: Sampling Distributions Course**Course Code: **STAT-C5****At the end of this course, the students will be able to:**

- CO1** Understand Convergence in probabilities, WLLN, CLT, Order Statistics
- CO2** Understand the Concept of random sample, parameter, statistic, sampling distribution
- CO3** Evaluate the Exact sampling distribution of chi-square, application of chi square test and related topic
- CO4** Apply Exact sampling distribution of t & F and related topic
- CO5** Analyze and interpret the data via statistical inference in data analysis

Course Title: Survey Sampling & Indian Official StatisticsCourse Code: **STAT-C6****At the end of this course, the students will be able to:**

- CO1** Understand and apply the concepts of probability and non-probability sampling, simple random sampling and related topic
- CO2** Understand the theory and techniques of stratified random sampling
- CO3** Apply the theory and techniques of ratio and regression estimates, cluster sampling
- CO4** Understand statistical system of India, MOSPI, NSSO, CSO, their functions etc
- CO5** Apply different sampling method in real life situations

Course Title: Mathematical Analysis

Course Code: STAT-C7

At the end of this course, the students will be able to:

- CO1 Apply Real Analysis essential for Statistics
- CO2 Evaluate Infinite Series, their convergence and related topics essential for understanding Statistics
- CO3 Understand Review of limit, continuity, differentiability etc.
- CO4 Understand Numerical Analysis
- CO5 Apply interpolation and extrapolation in estimating missing observations

B.Sc. 4th Semester**Course Title: Statistical Inference**

Course Code: STAT-C8

At the end of this course, the students will be able to:

- CO1 Understand theory of Estimation and its applications
- CO2 Apply different methods of estimation
- CO3 Understand and apply Principles of test of significance and related subjects
- CO4 Gain working knowledge of sequential analysis
- CO5 Analyze and interpret the data via statistical inference in data analysis

Course Title: Linear model

Course Code: STAT-C9

At the end of this course, the students will be able to:

- CO1 Understand the concept of linear model and Gauss Markov set up
- CO2 Evaluate Regression Analysis-SLRM, MLRM, Matrix and scalar version etc.
- CO3 Apply Analysis of Variance Model- one way and two- way ANOVA, ANCOVA etc.
- CO4 Apply prediction from fitted model, violation of assumptions of normality etc.
- CO5 Understand different model adequacy checking technique

Course Title: Statistical Quality Control

Course Code: STAT-C10

At the end of this course, the students will be able to:

- CO1 Understand the concept of quality, quality standard, ISO, SPC, causes of variation etc
- CO2 Apply Control charts for variables and attributes, Analysis of patterns of control chart, process capability
- CO3 Understand single and double sampling Acceptance Plan, OC, AQL, LTPD, AOQ, ASN etc.
- CO4 Apply the concept of Six Sigma methodology
- CO5 Interpret production or service quality by using different quality control charts

B.Sc. 5th Semester**Course Title: Stochastic Processes and Queuing Theory**

Course Code: STAT-C11

At the end of this course, the students will be able to:

- CO1** Understand and Apply Probability Generating Functions, concept of Stochastic process, stationary process
- CO2** Understand Markov Chain, transition probability matrix, graph theoretic approach etc.
- CO3** Apply Poisson Process
- CO4** Apply Queuing System
- CO5** Applications of queuing theory in management of congestion

Course Title: Statistical Computing using C Programming

Course Code: STAT-C12

At the end of this course, the students will be able to:

- CO1** Learn the history and importance of C, execution of C program etc
- CO2** Understand Decision making and branching, arrays
- CO3** Apply User defined functions, multi-function program using user defined functions etc.
- CO4** Apply knowledge of Declaration and initializations of pointer variables etc.
- CO5** Apply and formulate programme in solving complicated statistical problems

Course Title: Time Series Analysis

Course Code: STAT-DSE 2

At the end of this course the student will be able to:

- CO1** Understand about time series data, application of time series in various fields, components of time series and decomposition of time series.
- CO2** Apply the method of moving average, detrending, seasonal components, various estimation methods.
- CO3** Apply the methods of deseasonalisation, cyclical components, Harmonic Analysis Auto regressive and moving average process etc.
- CO4** Apply random component, forecasting, exponential smoothing
- CO5** Application of Box Jenkins Methodology in forecasting real data set

Course Title: Econometrics

Course Code: STAT-DSE 3

At the end of this course, the students will be able to:

- CO1 Understand and apply the econometric models, GLM and estimation, Simultaneous equation model etc
- CO2 Understand the concepts, consequences, detection and remedies of multicollinearity
- CO3 Apply GLS, Aitken estimators, Autocorrelation, its Consequences, detection and remedies
- CO4 Understand about Heteroscedasticity, test and solution of heteroscedasticity, concepts Autoregressive and Lag model
- CO5 Understand different model adequacy technique

B.Sc. 6th Semester**Course Title: Design of Experiments**

Course Code: STAT-C13

At the end of this course, the students will be able to:

- CO1 Learn about the basic role of experimental design, CRD, RBD, LSD, their layout, model and analysis etc
- CO2 Understand about BIBD- parameters, incidence matrix and its properties
- CO3 Understand knowledge of Factorial Experiments- total and partial confounding
- CO4 Understand and apply Fractional factorial experiments
- CO5 Apply different techniques of randomization in real field

Course Title: Multivariate Analysis and Nonparametric Methods

Course Code: STAT-C14

At the end of this course, the student will be able to:

- CO1 Understand about BVN, Multivariate data, its distribution function, mean vector and dispersion matrix etc.
- CO2 Apply Multivariate Normal Distribution, its properties, mean vector, variance covariance matrix
- CO3 Understand and Apply Discriminant Analysis, Principal Component Analysis, Factor Analysis
- CO4 Apply various nonparametric tests.
- CO5 Apply multivariate techniques in data reduction problem

Course Title: Demography and Vital StatisticsCourse Code: **STAT-DSE 4****At the end of this course, the students will be able to:**

- CO1** Understand about nature and scope of demography, population theories, population composition etc
- CO2** Apply Vital statistics, census and registration data, Measurement of mortality
- CO3** Understand and apply Stationary and stable population, Construction of Life Table, it's uses etc.
- CO4** Apply and understand Measurement of fertility, measurement of population growth NRR, GRR etc
- CO5** Understand different mortality measurement methods

Course Title: Project ReportCourse Code: **STAT-DSE 8****At the end of this course the student should be able to:**

- CO1** Understand and apply hands on experiences on data collection from real life situation
- CO2** Learn how to relate the data with statistical theory for analysis
- CO3** Learn to use statistical software for computational purpose or to make a program for analyzing the data
- CO4** Learn to write and present a statistical report
- CO5** Applications of different statistical methods in real data set
