Course Outcomes of B.SC Statistics Honours

Semester	Course	Course Outcome
Semester-1	CC1(DescriptiveStatistics)	(a) knowledge of Statistics and its scope and importance in various areas such as Medical, Engineering, Agricultural and Social Sciences etc. (b) information about various Statistical organisations in India and their functions for societal developments, (c) knowledge of various types of data, their organisation and evaluation of summary measures such as measures of central tendency and dispersion etc. (d) knowledge of other types of data

		reflecting quality characteristics including concepts of independence and association between two attributes, (e) insights into preliminary exploration of different types of data.
	CC-2 Probability and Probability Distribution -I	(a) ability to distinguish between random and non-random experiments, (b) knowledge to conceptualise the probabilities of events including frequentist and axiomatic approach. Simultaneously, they will learn the notion of conditional probability including the concept of Bayes' Theorem, (c) knowledge related to concept of discrete random variable and its probabilitydistribution including expectation and moments, (d) knowledge of important discrete distributions such as Binomial, Poisson, Geometric,Negative Binomial and Hypergeometric and their interrelations if any, (e) acumen to apply standard discrete **probability** distribution to different situations.

Semester-II	CC3 (Mathematical Analysis)	They will acquire knowledge about a) Real Number b) Sequence , series of real number c) Limit , Continuity, Differentiability d) Improper Integral e) Function of two variables
	CC-4 (Probability and Probability Distribution - II)	(a) knowledge about some probability inequalities, law of large numbers, Central Limit Theorem etc., (b) ability to handle transformed random variables and derive associated distributions, (c) knowledge of important continuous distributions such as Uniform, Normal,Exponential and Gamma and relations with some other distributions, (d) ability to use and interpret Normal probability and q-q plots for testing Normality ofdata, knowledge about Box Mueller transformation for simulations
Semester-III	CC-5(Linear Algebra)	Students will acquire Knowledge about a)Vectors and Vector Space b) Matrices and Determinants c)Rank of Matrix d) They will get idea about Eigen Value & Eigen Vector e) Quadratic Form

	CC-6 (Demography and Vital Statistics)	Students will acquire knowledge about a)Concepts of Population b) Concepts of Mortality Rate C)Concepts of Fertility Rate d)Concepts about Life Table e) Students will get idea about measurement of Population Growth.
	CC-7 (Statistical Computing and Analysis Numerical Analysis using C Programming)	(a) demonstrate knowledge of different numerical methods , essential for providingMathematical support to the Statisticians where intractability becomes severe, (b) be able to learn various difference, interpolation formulae, (c) be in a position to find solutions to equations using Bisection, Newton Raphson andRegula Falsi Methods, (d) handle numerical differentiation and integration, (e) be able to find solutions to difference equations of first order and lineardifference equations with constant coefficients. f) Students will get idea to compute differentStatistical measure Using C Programming.

	SEC-A (Statistical Data Analysis using R)	Students will know about a) various basic concepts related to computer architecture and its organization,various peripheral devices, b) languages: machine language, assembly language and high level languages, c) ideas on operating systems, linker, loader and compiler etc., d) R programming with some basic notions for developing their own simpleprograms and visualizing graphics in R.
Semester-III	SECA Research Methodology	Students will know about Statistical Techniques provide scientific approaches to develop the domain of humanknowledge largely through empirical studies. The course will enable the students to (a) understand basic concepts and aspects related to research, data collection, analysesand interpretation, (b) Prepare and finalize research report on some real life situations.
Semester-IV	CC-8 Survey Sampling and Official Reearch	(a) basic knowledge of complete enumeration and sample, sampling frame, sampling distribution, sampling and non-sampling errors, principal steps in sample surveys, limitations of

		sampling etc., (b) introduced to various statistical sampling schemes such as simple, stratified,systematic and pps sampling, (c) an idea of conducting the sample surveys and selecting appropriate samplingtechniques, (d) knowledge about comparing various sampling techniques.
	CC-9 (Statistical Inference-I and Sampling Distribution)	(a) a fundamental understanding of advanced level topics in statistical inference on testing of statistical hypotheses forboth randomized and non-randomized tests, (b) confidence interval estimation and their relationships with testing, (c) order statistics and their distributions, (a) Parametric models for developing relevant inferences on associated parameters, (b) to work on several standard examples to help them understand the various inherent concepts. (c) Cocepts of Chi – Square , Student's and Fisher's t Distribution, Sendecor's F Distribution.

	CC-10(Index Number and Time Series Analysis)	a) Concept of Index Number, b) Different types of Index Number (a) c)Wholesale Index Number , Consumer Price Index Number, Cost Of Living Index Number. fitting and plotting of various growth curves such as modified exponential, Gompertz and logistic curve, (b) fitting of trend by Moving Average method, (c) measurement of Seasonal Indices by Ratio-to-Trend , Ratio-to-Moving Average and Link Relative methods, (d) calculation of variance of random component by variate component method, (e) forecasting by exponential smoothing and short term forecasting methods such as Box Jenkins Method and Bayesian forecasting, (f) weak stationarity, autocorrelation and correlogram, (g) applications to real data by means of laboratory assignments.
	SECB , (Data Base Management)	Students Will learn about a) Concept of Data Base Management System. b) SQL c) Network Database , Relational Database
	SEC-B (Monte Carlo Method)	They will learn about a) Random Number Generation b) CDF Inversion Method c) Concepts of finding Probabilities and moments using simulation. d) Concepts of generating Binomial, Poisson Distribution from uniform(0,1) e) Concepts of Graphical demonstration of Large Number.

Semester-V	CC-11(Statistical Inference-II)	(a) advanced level topics in statistical inference on testing of statistical hypotheses for both randomized and non-randomized tests, (b) using Neyman Pearson Lemma and finding Uniformly Most Powerful Test, (c)likelihood ratio test and its applications. knowledge of point and interval estimation procedures and different methods of point estimation, (d) to understand the Cramer-Rao Inequality, Rao Blackwell and Lehmann Scheffe theorems and their applications in obtaining Minimum Variance Unbiased and Minimum Variance Bound estimators, e) knowledge about Large Sample Distribution , Central Limit Theorem.
	CC-12 (Linear Model and Regression)	(a) know about correlation and regression techniques, the two very powerful tools in statistics, (b) get an idea of Linear, Polynomial and Multiple Linear regression, (c) and estimation andtests for regression coefficients. (d) study concept of coefficient of determination and inference on partial and multiplecorrelation coefficients. (e) Estimation and hypothesis

		testing of multiple Regression Model. (f) Concepts of Linear Model (g) Gauss -Markov Theorem (h) Estimation of Error Variance. (i) Concepts of ANOVA Model.
	DSE-A 1(Statistical Quality Control)	(a) construct group control chart, (b) draw charts for variables and attributes, (c) understand single and double sampling inspection plans, OC and ASN functions, Students shallbe able to draw different types of control charts for variables and attributes. They will also be able to understand the practical applicability of single and double sampling inspection plans.
	DSEA1 (Econometrics)	The course on econometrics will primarily focus on the use of statistical modelling and therelevant analyses to economic data problems. The students will get a thorough idea of The course on econometrics will primarily focus on the use of statistical modelling and therelevant analyses to economic data problems. The students will get a thorough idea of 1. various important econometric models and relevant model building conceptsin econometrics

		2. general linear models and estimation of inherent model parameters 3. multicollinearity, its detection and consequences and related inferential aspects 4.some advanced concepts of generalised least squares estimation, autocorrelation,its consequences, detection and strategy for reducing autocorrelation, heteroscedasticity and its inherent concepts including its consequences Practical aspects and real data illustration of the related problem.
	DSEB1 (Operation Research)	(a) graphical and simplex method of solving linear programming problem (LPP) forfinding degenerate, unbounded, alternate and infeasible solutions, (b) post-optimality: addition of constraints, change in requirement vector, addition ofnew activity and change in cost vector, (c) use of duality to solve a LPP, (d) obtaining solution of a transportation problem by North West corner method, Matrix Minima method, Vogel's method, (e) Hungarian Method for solving assignment problems,

		(f) game theory for graphical solution of mx2 or 2xn rectangular game and mixed strategy
	DSEB1 (Stochastic Process)	The students will get acquainted with some important and useful concepts on (a) Markov chains including the notion of transition probability matrix, (b) various other stochastic processes such as Poisson process, birth and death processes,queuing process and Gambler ruin problems, (c) application of these processes in real life problems, (d) practical aspects relevant to above problems based on the considered topics.
Semester-VI	CC-13(Design of Experiments)	(a) carry out one way and two way Analysis of Variance (ANOVA), (b) understand the basic terms used in design of experiments, (c) use appropriate experimental designs to analyze the experimental data,
	CC-14 (Multi variate Analysis &Non Parametric Method)	This course will help the students to (a) use different nonparametric/distributi on-free tests when data don't meet the assumptions of parametric test, (b) understand importance of different non-parametric test procedures, their applicationsand interpretation

		(c) analyse categorical data using logistic regression models. (d) Understand Multivariate Distribution
	DSEA2(Survival Analysis)	(a) Type-I (time), Type-II (order) and random censoring, (b) Survival Function, Failure rate, mean residual life, Total time on Test, (c) applications of exponential, gamma, Weibull distributions, lognormal, Pareto, linearfailure rate distributions to lifetime data, (d) ageing properties of IFR, IFRA, DMRL, NBU, NBUE and HNBUE and Dual classes. (e) Actuarial and Kaplan –Meier estimator of survival function, (f) Cox's proportional hazards and competing risk models, (g) tests for exponentiality, (h) Real lifetime data implementation of various concepts as outlined above throughpractical assignments.
	DSE B2 (Project Work)	Students will opt for a compulsory industrial Project in Semester VI. A copy of rules and regulations regarding completion and submission of the project work by a student and assessmentof the project work to make available in the Department of Statistics in each university. Studentsshould use advanced statistical tools in their project and submit the dissertation at the end of thesemester. There will be subsequent presentations and seminars by the students along with projectsupervisor, internal subject expert and Head of the Department. The grades on the presentation and evaluation of the project will be given by

		the subject expert and project supervisor allotted tothe student. The project has to be completed within a semester. At the end of this project, studentscan analyze and interpret and take appropriate decisions in solving real life problems using statistical tools in the present situations