Programme Outcomes (PO), Programme Specific Outcomes (PSO) and Course Outcomes (CO) of B.Sc. Statistics at Rajah Serfoji Government College, Thanjavur-613005, Tamil Nadu.

Department of Statistics	
B.Sc. Statistics - Programme specific outcomes	
PSO1	A student should be able to recall basic facts about statistics and should be able to display knowledge of conventions such as notations, terminology.
PSO2	A student should get adequate exposure to global and local concerns that explore them many aspects of mathematical sciences.
PSO3	Student is equipped with statistical modeling ability, problem solving skills, creative talent and power of communication necessary for various kinds of employment.
PSO4	Student should be able to apply their skills and knowledge that is translate information presented verbally into statistical form, select and use appropriate statistical formulae or techniques in order to process the information and draw the relevant conclusion.
PSO5	Enabling students to develop a positive attitude towards statistics as an interesting and valuable subject of study.

Course code/Paper/ Semester	Title	Course Outcomes
S1ST1 Core Course 1	Descriptive Statistics	Learning basic statistical tools, types of qualitative and quantitative data, and diagrammatic and graphical representations and Organize, manage and present data.
S2ST2 Core Course 2	Probability and Discrete Distributions	Identify the type of statistical situation to which different distributions can be applied. Use different distributions to solve simple practical problems. Ability to distinguish between random and non-random experiments. Discrete distributions expose the real-life applications.
S2STP1 Core Course 3	Major Practical-I	Identify the characteristics of different discrete distributions. Practiced into the basic level statistical tools Use discrete probability distributions, including requirements, mean and variance, and making decisions.
S3ST3 Core Course 4	Continuous Probability Distributions	Use the Normal probability distribution including standard normal curve calculations of appropriate areas. Practice and solve the various distributions to simple practical problems. Expose the real-life applications of continuous distribution

S4ST4 Core Course 5	Statistical Inference – I	Understand the concept of estimation of parameters. Calculate the problems related to point estimation and interval estimation. Explain the concepts of testing of hypotheses (large sample test small sample test). concept of random sample from a distribution, sampling distribution of a statistic, standard error of important estimates such as mean and proportions
S4STP2 Core Course 6	Major Practical-II	Learn to obtain and sketch densities of order statistics Students will be able to implement methods estimation and testing by using appropriate methods and computing formulae. Practiced into the basic level statistical tools
S5ST5 Core Course 7	Sampling Techniques	Students will acquire the 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., an idea of conducting the sample surveys and selecting appropriate sampling techniques. Introduced to various statistical sampling schemes such as simple, stratified and systematic sampling.
S5ST6 Core Course 8	Statistical Inference-II	Understand the systematic enquiry in understanding the cause and consequences of events and use to improve research technique in various fields. The one-sample runs test for randomness – The Sign test – Wilcoxon's Signed Rank Test. Application of– Wilcoxon-Mann-Whitney U-test, Kolmogorov – Smirnov two- sample test
S5STP3 Core Course 9	Major Practical-III	Improve research technique in various fields. Practiced into the basic level statistical tools Estimation strategies resulting from different sampling techniques
S5STEL1A Major Elective Course (1A)	Vital Statistics	The vital events based on the population studies, understanding birth, death process and life table combing demography data. Learning about the theory of stable population, population projection and about the concept of migration theory.
S5STEL1B Major Elective Course (1B)	Econometrics	Recognize the autoregressive model us instrumental variables, estimate the linear model, apply qualitative response regression model
S5STEL1C Major Elective Course (1C)	Survival Analysis	Analyze survival data and interpret results using parametric regression models. compute sample size for survival analysis study. Assess models for fulfilment to proportional hazards and other aspects of model.

S5STEL2A Major Elective Course (2A)	Numerical Methods	It is used for solving a system of equations, analyze and evaluate the accuracy of common numerical methods. Apply numerical methods to obtain approximate solutions to mathematical solution.
S5STEL2B Major Elective Course (2B)	Simulation and Inventory Control	Discuss the role information technology in managing inventories, determine in the order quantity, and describe the function and costs of an inventory system.
S5STEL2C Major Elective Course (2C)	Psychological and Educational Statistics	Critical and communication, Practical and techniques improvement, Contextualization of knowledge.
S6ST7 Core Course10	Time Series and Index Numbers	Index number application various field, Fitting of trend by Moving Average method. Applications to real data by means of laboratory assignments. Time series data, its applications to various fields and components of time series,
S6ST8 Core Course11	Statistical Quality Control	Although descriptions of specific characteristics are helpful, they are not enough to identify whether there is a problem with quality. The tools in each of these categories provide different types of information for use in quality analysis. Acceptance sampling can help to solve this problem.
S6ST9 Core Course12	Design of Experiments	Understand the basic terms used in design of experiments. Use appropriate experimental designs to analyze the experimental data. Carry out one way and two way Analysis of Variance.
S6STP4 Core Course13	Major Practical – IV	Identify the characteristics of different times series, Use quality control for Sampling attributes. Practiced into the basic level of one way and two way classification. Practiced into the basic level statistical tools
S6STEL3A Major Elective Course (3A)	Computational Statistics	Understand languages: machine language, assembly language and high level languages, various basic concepts related to computer architecture and its organization, various peripheral devices. Compute operating systems, linker, loader and compiler etc.,
S6STEL3B Major Elective Course (3B)	Programming in C	Acquire and learning Control statements, conditional statements, break and continue statements, arrays, etc. in C program, various operators used like logical, assignment, conditional, bitwise in C program. various basic concepts, features and components related to C programming language, and structure of C program.

S6STEL3C Major Elective Course (3C)	Actuarial Statistics	Gain the knowledge of statistics students can exploit the emerging opportunities in the insurance policy. Statistics is a foundation of actuarial science, Finding distribution of aggregate claims, compound distributions and their applications.
S5SEL01 Non Major Elective Course 1	Bio Statistics (For B.Sc., Bio-Technology)	Know the theory behind fundamental bioinformatics analysis methods. describe statistical methods and probability distributions relevant for molecular biological data. perform and interpret bioinformatics and statistical analyses with real molecular biological data.
S6SEL02 Non Major Elective Course 2 Sem V	Statistical Data Analysis (For B.Sc., Bio-Chemistry)	Describe and discuss the key terminology, concepts tools and techniques used in business statistical analysis. Critically evaluate the underlying assumptions of analysis tools, Conduct basic statistical analysis of data.
S1AS1 Allied 1	Mathematical Statistics – I (For B.Sc., Mathematics)	Describe and discuss the key terminology, concepts tools and techniques used in statistical analysis. Derive the probability density function of transformations of random variables and use these techniques to generate data from various distributions. Applications of probabilities, and derive the marginal and conditional distributions of bivariate random variables.
S2AS2 Allied 2	Mathematical Statistics – II (For B.Sc., Mathematics)	Use discrete and continuous probability distributions, including requirements, mean and variance, and making decisions. Identify the characteristics of different discrete and continuous distributions. Identify the type of statistical situation to which different distributions can be applied. Identify the type of statistical situation to which different sampling distribution can be applied.
S2ASP Allied 3	Allied Statistics Practical – I (For B.Sc., Mathematics)	Understand and Practiced to solve the real analysis problems. Fit the distributions to a real life data. Perform sampling methods analysis.
S3AST1 Allied 4	Optimization Techniques - I (For B.Sc., Statistics)	Minima/Maxima problems in Linear Programming Problem. Deals with minimization of cost or maximization of profit. Used in Production engineering, Mathematics of finance, Networking, etc.
S4AST2 Allied 5	Optimization Techniques - II (For B.Sc.,	Model of minima/maxima problems as optimization techniques. Study linear programming problems. The fundamentals of game theory. Study on queuing and

	Statistics)	network analysis
S4ASTP Allied 6	Allied Practical-I (For B.Sc., Statistics)	Solve the real life analysis problems. Apply linear programming problems in real life situations. Perform analysis and sampling methods
S1ABA1 Allied I	Statistics for Management (For B.B.A)	Applications for statistical techniques in business. Provide statistical techniques for business data analysis. provide statistical techniques for real life situation

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M.Sc. Statistics - Programme specific outcomes	
PSO1	Students will be enriched with technical skills used in statistical data science, data analytics through projects including big data.
PSO2	Students are enhanced with the skills of creating taxonomy of cognitive domain in Statistics(Knowledge, Comprehension, Application, Analysis, Synthesis, evaluation)
PSO3	Student is equipped with statistical modeling ability, problem solving skills, creative talent and power of communication necessary for various kinds of employment. Students are stimulated with self learning skills that help them in research work in future and also to perform in NET, SLET, GATE and ISS (Indian Statistical Service).
PSO4	Students can synthesize their statistical expertise in Medical research, Finance and can work as a prominent part in the medical survey, research analytics.
PSO5	Students will be able to do Statistical softwares which will be very useful for their research programs.
PSO6	Elective papers in PG Programme enable the students to face the real time applications and more useful for the students to do their research programs in future.

Course code / Paper/ Semester	Title	Course Outcomes
S1PST1	Measures and	Learning to analysis the measure and measurable functions,

Core Course 1	Probability Theory	definition of random variable, distribution function and concepts of convergence of distribution. And Transferable skills: Ability to use abstract methods to solve problems. Ability to use a wide range of references and critical thinking.
S1PST2 Core Course 2	Advanced Distribution Theory	Understand the most common discrete and continuous probability distributions and their real life applications. Apply compound, Truncated, mixture and non-central probability distributions to solve problems. Analysis marginal and conditional distributions from joint distributions. Acumen to apply standard discrete probability distribution to different situations.
S1PST3 Core Course 3	Advanced Sampling Theory	Understand the basic principles underlying survey design and estimation. Apply the different sampling methods for designing and selecting a sample from a population. Implement Cluster sampling, Ratio and Regression estimation in real life problems. To apply various sampling methods for agricultural data.
S1PSTP1 Core Course 4	Practical – I	Problem solving skills of students are enhanced. Theoretical concepts are strengthened by solving maximum number of problems. Due to one to one interaction with the teacher doubts of the students get cleared if any. Students learn how to apply statistical concepts to practical and real life problems. Interdisciplinary approach is developed.
S1PSTEL1A Elective course 1 (A)	Real Analysis and Linear Algebra	Understand abstract ideas and rigorous methods in mathematical analysis to solve practical problems. Describe fundamental properties of the real numbers that lead to the formal development of real analysis. Comprehend rigorous arguments developing the theory underpinning real analysis. Demonstrate an understanding of limits and how they are used in sequences, series, differentiation and integration. Construct rigorous mathematical proofs of basic results in real analysis.
S1PSTEL1B Elective course 1 (B)	Advanced Numerical Analysis	Understand for the implementation of theories in problem solving. Implementation of the knowledge of basic theorems and concepts in the different area of the mathematics Ability to understand the different math concepts and be able to implement them in our everyday problems. Efficient use of the techniques, skills and tools of modern mathematics.
S1PSTEL1C Elective course 1 (C)	Deterministic Inventory Models	Understand the methods used by organisation to obtain the right quantities of stock or inventory. The output of the model is fully determined by the parameter values and initial conditions. The same set of parameter values and initial conditions will lead to an ensemble of different

		outputs. Case study requires student's comprehension of inventory management and emphasizes supply chain management applications.
S2PST4 Core Course 5	Statistical Inference – I	Understanding a fundamental of Parametric models for developing relevant inferences on associated parameters. Knowledge of point and interval estimation procedures and different methods of point estimation. To evaluate understand the Cramer-Rao Inequality, Rao Blackwell and Lehmann Scheffe theorems and their applications in obtaining Minimum Variance Unbiased and Minimum Variance Bound estimators.
S2PST5 Core Course 6	Multivariate Analysis	Understand Wishart distribution, Hotelling T^2 and Mahalanobis D^2 statistic. Implement dimension reduction techniques using software on real life problems. Demonstrate knowledge and understanding of the basic ideas behind discriminant and clustering analysis techniques with applications. Gaining the knowledge for the Multiple and Partial Correlation and their tests of significance, Multivariate Normal Distribution and its properties
S2PST6 Core Course 7	Linear Models and Design of Experiments	Describe how to design experiments, carry them out, and analyze the data they yield. Examine how a factorial design allows cost reduction, increases efficiency of experimentation, and reveals the essential nature of a process; and discuss its advantages to those who conduct the experiments as well as those to whom the results are reported. Construct fractional factorial experiments and apply confounding in real life problems. Evaluate the analysis of BIBD, PBIBD, Latin square, Youden square and cross over design and their applications in agriculture, business and industries.
S2PSTP2 Core Course 8	Practical – II	Demonstrate the concepts of point and interval estimation of unknown parameters and their significance using large and small samples. And Apply the idea of sampling distributions of difference statistics in testing of hypotheses. Will be able to use multivariate techniques appropriately, undertake multivariate hypothesis tests, and draw appropriate conclusions. Understand and use the terminology of experimental designs.
S2PSTEL2A Elective course 2 (A)	Stochastic Processes	Understand the stochastic processes, Markov chains, Transition probability matrix and various types of states. Explain Random walk, Gambler ruins problem and apply Poisson process in real life situations. Understand renewal theory and branching processes with applications. Also Stochastic process to developing in time according to Markov chains, Poisson process, the vital process and

		queues. Solve differential equations for distributions and expectations in time continuous processes and determine corresponding limit distributions
S2PSTEL2B Elective course 2 (B)	Non-Parametric Techniques	Gaining the knowledge of other social types of data reflecting quality characteristics including the concepts of independent and association between two or more attributes. Formulate test and interpret various hypothesis test for location, scale and independence problems. The students will have knowledge of Various one sample tests NPT such as test of randomness , Sign test, Kolmogorov Smirnov (KS) test and Kaplan –Meier Estimator.
S2PSTEL2C Elective course 2 (C)	Computer Programming with C++	Understand and trace the execution of programs written inC^{++} language. Introduce different techniques pertaining problem solving skills. Arm the students with the necessary constructs of C++ programming. To emphasis on guided practical sessions
S3PST7 Core Course 9	Statistical Inference – II	To obtained the gained the SPRT procedure for using the various most powerful invariant tests. Understand problem of statistical inference, problem of testing of hypothesis and construct SPRT in case of Binomial, Poisson, and Normal Distribution. Developed the knowledge for the field for fundamental lemma's and theorems.
S3PST8 Core Course 10	Linear Regression Analysis	Understand multiple linear regression models with applications and concept of Multicollinearity and autocorrelation. Compute multiple and partial correlation and checking residual diagnostic to validate model. Apply simple linear regression model to real life examples. Develop a deeper understanding of the linear regression model. Differentiate between linear and non-linear regression and how to apply them in real life situations.
S3PST9 Core Course 11	Operations Research	Students learn conversion of real life problems into mathematical models which enhance their problem solving and decision making abilities. Students learn to calculate optimal solution of models through graphical and iterative methods. Students study transportation and assignment models and methods to solve them. This helps them to get optimum solutions within the given constraints to problems arising in industry. Be able to build and solve Game theory, PERT/ CPM, simulation, investment analysis with real life applications.
S3PSTP3 Core Course 12	Practical –III	Understand Hypothesis various advanced statistical techniques for modeling and exploring practical situations.

		Enables to solve suitable problems of LPP and implement practical cases of decision making under different environments. Hands on experience in implementation of concepts in Statistical Inference, Linear Regression analysis and Operations Research. Practice and Develop a deeper understanding of the linear regression model.
S3PSTEL3A Elective course 3 (A)	Statistical Software Packages	Understand statistics environment related software packages. Get familiar with SPSS software and understand SPSS. Create and edit the data files, plot graphs using SPSS. Compute descriptive statistics using SPSS. Perform inferential statistical analysis through SPSS.
S3PSTEL3B Elective course 3 (B)	Bayesian Inference	Understand the concepts of prior and posterior distributions. Be able to differentiate between classical and Bayesian inference. Be able to apply the concept of Bayesian inference in different fields of applications. Develop the Bayesian frame work for data analysis and its flexibility and be able to demonstrate.
S3PSTEL3C Elective course 3 (C)	Data Mining Tools	Understand fundamentals of data mining. Understand data warehousing, OLAP, OLTP, Data visualization. Implement and interpret the results of data scientifically using R software. Evaluate different models used for data pre processing. The purpose of paper, participate more online activities proposed. Know feature and applications of data mining.
S4PST10 Core Course 13	Statistical Quality Control	The students will acquire understand basic of production process monitoring and apply concept of control charts on it. Apply the acceptance and continuous sampling plans in production process. Know and apply the concept of weighted control charts, six sigma, ISO: 2000 series standards and designs. Effectively interpret the results from the control charts
S4PSTP4 Core Course 14	Practical –IV	Apply different designs in real life situations. Train to Draw controls charts and apply acceptance sampling plans in industry point of view. To Provide hands on experience in implementation of concepts in Demography. Real data implementation of various demographic concepts as outlined above through practical assignments.
S4PSTPW Core Course 15	Project Work	At the end of this project, students will be in a position to Analyze and interpret and take appropriate decisions in solving real life problems using statistical tools. And use different Statistical packages for data analysis and

		interpretation; write a systematic Statistical project report.
S4PSTEL4A Elective course 4 (A)	Demography	Understand the measures of mortality, fertility and interdisciplinary nature of demography, balancing equation, use of indices. Describe the concept of life tables. Apply Quasi, stable population models. To learn out the vital events of fertility, mortality and migration and life tables for based on the population studies. Real data implementation of various demographic concepts as outlined above through practical assignments.
S4PSTEL4B Elective course 4 (B)	Statistical Survey Analysis	After completing this course we will be able to describe survival data format it appropriately for analysis and understanding. Apply the knowledge for Survival analysis including survival time and event censoring and survival function and hazard functions. To design a good qualitative purpose statement and a good central question in qualitative research. To create scientific knowledge, to integrate ideas into a solution, to propose an action plan, to formulate a new classification scheme
S4PSTEL4C Elective course 4 (C)	R Programming	The students will get acquainted with Understand basics of R environment. Able to work with R packages and their installation Demonstrate exploratory data analysis (EDA) for a given data set. Implement and assess relevance and effectiveness of machine learning algorithms for a given dataset. To provide the programming skills using job oriented concept in R program. R programming with some basic notions for developing their own simple programs and visualizing graphics in R.
S4PSTEL5A Elective course 5 (A)	Actuarial Statistics	This course is framed to equip the students with concepts of actuarial science and different premium models. After opting for this course, the students will be equipped with knowledge about. Modelling of individual and aggregate losses. Fitting of distributions to claims data, deductibles and retention limits, proportional and excess-of-loss reinsurance.Risk models: models for individual claims and their sums. finding distribution of aggregate claims, compound distributions and their applications, Finding of survival function, curate future lifetime, force of mortality. Real illustrations for the concepts mentioned above through laboratory assignments.
S4PSTEL5B Elective course 5 (B)	Statistical Methods for Epidemiology	The course is of applied nature and will provide the students about the basic idea of various terminologies in epidemiology, clinical trial experiments involving different phases etc., The ethics, principles and conduct of clinical trial experiments with an overall view of Phase I-IV trials, various data management and data collection systems for a

		good clinical trial practice, population pharmacokinetics and pharmacodynamics models applicable in clinical trials, Design and analysis of epidemiological studies including case-control and cohort study designs,
S4PSTEL5C Elective course 5 (C)	Official Statistics	Understand the concept of censoring, life distributions and ageing classes. Explain test of exponentiality against nonparametric classes, two sample problems. Official Statistics are numerical information collected and used by the government and its agencies to make decisions about society and the economy. To learn Official Statistics are collected in the 'national interest' and so avoid the biases of private research, which would only collect data which would be of interest to the particular researcher, or data which is profitable.