MAHENDRA ARTS & SCIENCE COLLEGE
(Autonomous)
Affiliated to Periyar University, Salem.
Accredited by NAAC with 'A' Grade & Recognized u/s 2(f) and 12(B) of the UGC Act 1956
Kalippatti – 637 501, Namakkal (Dt), Tamil Nadu.

DEPARTMENT OF STATISTICS

COURSE OUTCOMES (COs)

B.Sc. STATISTICS

For the students
admitted from the
Academic Year 2019-2020 onwards

Core Course- I	**B.Sc. STATISTICS**	**2019 - 2020**
Code: M19UST01	**DESCRIPTIVE STATISTICS**	**Hours / Week**
Credits: 5		**7**

Objective:

This course is to provide foundation as well as comprehensive background of 'Descriptive Measures', Correlation and Regression to beginners in simple and interesting manner. It covers concepts such as descriptive statistics and introduces common measures of central tendency, variability and frequently used graphs and charts, Moments, Skewness and Kurtosis and introduces the concept of association with graphics displaying different strengths of association between two variables. For learning the basic concepts which aims to resolve the real life problems

Course Outcomes

On the successful completion of the course, students will be able to

CO	Statement	Knowledge Level
CO1	Know the uses of statistics in society and Understand the method of data collection, Learn the types of statistical diagrams.	K1
CO2	Learn the Measures of central tendency.	K2
CO3	Learn the Measures of variability in practical life data.	K2
CO4	Applications of moments, Skewness and Kurtosis in real life situations.	K3
CO5	Analyse the Bivariate data in real life problems working different strengths of association between two variables.	K4

Core Practical- I	B.Sc. STATISTICS	2019 - 2020
Code: M19USTP01	**PRACTICAL – I** **Descriptive Statistics**	**Hours / Week**
Credits: 2		**4**

Objective:

This course introduces fundamental concepts such as practical based Descriptive Statistics. It covers concepts such as Measures of Central Tendencies, Measures of Dispersion, Correlation Analysis. It provides technical skills to understand and develop various applications for descriptive statistics.

Course Outcomes

On the successful completion of the course, students will be able to

CO	Statement	Knowledge Level
CO1	Learn the Solution of Measures of central tendency.	K2
CO2	Learn the Solution of Measures of variability in practical life data.	K2
CO3	Application of moments, Skewness and Kurtosis in real life situations.	K3
CO4	Obtaining the Correlation and rank correlation in practical situation.	K4
CO5	Apply Regression Analyse for Bivariate data in real life problems.	K4

ALLIED - I		2019 - 2020
Code:M19UMAA01	**ALLIED I: MATHEMATICS - I**	**Hours / Week**
Credits: 4		**5**

Objectives:

This course introduces fundamental concepts of Basic Mathematics. It covers such as matrix, Eigen Values and Eigen Vectors, Cayley Hamilton theorem, Polynomial equations, Imaginary and irrational roots, Descarte's rule of signs, Radius of curvature in Cartesian and polar co-ordinates, Integral Calculus, Integration by Parts, Fourier Series, Half range series. It provides technical skills to understand the concepts in allied mathematics.

Course Outcomes:

On the successful completion of the course, students will be able to

CO	Statement	Knowledge Level
CO1	Acquiring knowledge of basic idea of matrix, Eigen Values and Eigen Vectors, Cayley Hamilton theorem.	K1
CO2	Understand the theory of equations and its properties.	K2
CO3	Demonstrate understanding of the importance of the radius of curvature.	K2
CO4	Develop the idea about the solution of Integral Calculus, Integration by Parts.	K2
CO5	Understanding the concept of Fourier Series, Half range series.	K3

Core Course - II	**B.Sc. STATISTICS**	**2019 - 2020**
Code: M19UST02	PROBABILITY THEORY	**Hours / Week**
Credits: 5		**7**

Objective:

      This course is to introduce to the students about the applications of probability. It is hoped to convey that this subject is both a fascinating and important one. Many systems encountered in science and engineering require an understanding of probability concepts because they possess random variations. The study area is drawn mainly from the biological sciences but some originate in the engineering, physical, social and statistical sciences. Furthermore, the techniques are not limited to any one area. To study the basic concepts for promoting theoretical as well as applications of statistics.

Course Outcomes

      On the successful completion of the course, students will be able to

CO	Statement	Knowledge Level
CO1	Conduct random experiments in real life data and Understand the Axioms of probability.	K1
CO2	Create the Joint probability density function and Understand how to get density from marginal density.	K2
CO3	Compute the probability values for sum random variables using mathematical expectation.	K3
CO4	Obtain the cumulent generating functions and its properties.	K4
CO5	Compute the probability values for sum random variables using Chebyshev's inequality and Weak law of large numbers	K3

Core Practical- II	B.Sc. STATISTICS	2019 - 2020
Code: M19USTP02	**PRACTICAL – II** **Probability Theory**	**Hours / Week**
Credits: 2		**4**

Objective:

      This course introduces fundamental concepts such as practical based Probability Theory. It covers concepts such Addition theorem - Multiplication theorem - Conditional probability - Bayes theorem, Mathematical Expectation and Conditional Expectations. It provides technical skills to understand and develop various applications for Probability Theory.

Course Outcomes

      On the successful completion of the course, students will be able to

CO Number	Statement	Knowledge Level
CO1	Finding Probabilities of discrete and continuous random variables	K2
CO2	Apply Addition theorem and Multiplication theorem for real life problems.	K3
CO3	Obtain Bayes Theorem.	K3
CO4	Apply Joint and marginal distribution function and Joint and marginal density function.	K4
CO5	Compute the probability values for sum random variables using mathematical expectation.	K3

SEMESTER - II

Allied - II		2019 - 2020
Code:M19UMAA02	**ALLIED II: MATHEMATICS - II**	**Hours / Week 5**
Credits: 4		

Objectives:

      This course introduces fundamental concepts of Basic Mathematics. It covers such as Second order differential equation with constant coefficient, Formation of partial differential equation by eliminating arbitrary constants and arbitrary functions, Solutions of standard types of partial differential equations, Laplace transforms, Inverse Laplace transforms . It provides technical skills to understand the concepts in allied mathematics.

Course Outcomes:

      On the successful completion of the course, students will be able to

CO	Statement	Knowledge Level
CO1	Acquiring knowledge of basic idea of Second order differential equation with constant coefficient and its problems.	K1
CO2	Understand the Formation of partial differential equation by eliminating arbitrary constants and arbitrary functions.	K2
CO3	Demonstrate understanding of the importance of the Solutions of standard types of partial differential equations	K2
CO4	Develop the idea about the solution of the Laplace transforms and its problems.	K2
CO5	Understanding the concept of the inverse Laplace transforms and its problems.	K3

ALLIED PRACTICAL Code:M19UMAAP01 Credits: 2	**ALLIED PRACTICAL – I - MATHEMATICS**	**2019- 2020** Hours / Week 2

Objectives:

This course introduces fundamental concepts of Basic Mathematics. It covers such as Characteristic equation, Cayley Hamilton theorem, nth derivative, Leibnitz formula for nth derivative, Partial differentiation, Homogeneous functions, Scalar point function Divergence, curl of a vector point function Solenoidal and irrotational vectors. Application of Laplace transforms to solve second order differential equations with constant coefficients. It provides technical skills to understand the concepts in allied mathematics.

Course Outcomes:

On the successful completion of the course, students will be able to

CO	Statement	Knowledge Level
CO1	Acquiring knowledge of basic idea of Characteristic equation, Cayley Hamilton theorem and its problems.	K1
CO2	Understand the Formation of nth derivative, Leibnitz formula for nth derivative.	K2
CO3	Demonstrate understanding of the importance of the Solutions Partial differentiation, Homogeneous functions.	K2
CO4	Develop the idea about the solution of the Scalar point function Divergence, curl of a vector point function , Solenoidal and irrotational vectors.	K2
CO5	Understanding the concept of the Application of Laplace transforms to solve second order differential equations with constant coefficients.	K3

Core Course - III	**B.Sc. STATISTICS**	**2019 - 2020**
Code: M19UST03	SAMPLING TECHNIQUES	**Hours / Week**
Credits: 4		**5**

Objective:

This course introduces the challenges posed by less-than-perfect samples, giving background knowledge and practical guidance for those who have to deal with them. Samples used in social and commercial surveys, especially of the general population, are usually less random (often by design) than many people using them realize. Unless it is understood, this 'non-randomness' can compromise the conclusions drawn from the data. To learn the basic concepts and Applications of Sampling techniques for real life situations.

Course Outcomes

On the successful completion of the course, students will be able to

CO	Statement	Knowledge Level
CO1	Learn the role of survey in sampling.	K1
CO2	Understand the properties of simple random sampling unbiased estimate of the mean and variance of the estimated mean.	K2
CO3	Understand the properties of Stratified random sampling and Proportional allocation.	K2
CO4	Comparison of simple random sampling and stratified random sampling.	K3
CO5	Obtain the role of Regression estimation and Understand the concept of sampling and non sampling errors	K4

Core Course - IV	B.Sc. STATISTICS	2019 - 2020
Code: M19UST04	DISTRIBUTION THEORY	Hours / Week
Credits: 4		5

Objective:

This course introduces to build probability models for non mathematical forms of real life problems into mathematical forms and emphasize relevance statistical tools to make decision on the real life problems. To discuss various univariate distributions. To expose the applicability of various distributions in different disciplines.

Course Outcomes

On the successful completion of the course, students will be able to

CO	Statement	Knowledge Level
CO1	Apply standard discrete probability distribution to different situations.	K2
CO2	Learn the characteristics of Univariate Continuous distribution. To expose the applicability of various distributions in different disciplines.	K1
CO3	Obtain the Bivariate normal distributions and Marginal and Conditional distributions.	K3
CO4	Understand the relationship between t and F distributions.	K2
CO5	Apply sampling distribution to different situations and relationship for t, F and chi-square.	K4

Core Practical- III	B.Sc. STATISTICS	2019 - 2020
Code: M19USTP03	**PRACTICAL – III** **Sampling & Distribution Theory**	**Hours / Week**
Credits: 2		**2**

Objective:

This course introduces practical based Sampling and Distribution Theory. It covers concepts such as Simple random sampling, Stratified random sampling and Systematic Sampling. Fitting of curves and goodness of fit. It provides technical skills to understand and develop various applications for sampling and distribution theory.

Course Outcomes

On the successful completion of the course, students will be able to

CO	Statement	Knowledge Level
CO1	Conduct random experiments in real life data in simple random sampling.	K1
CO2	Conduct random experiments in real life data in stratified random sampling and proportional & optimum allocations	K2
CO3	Comparison of practical life simple random sampling and stratified random sampling.	K3
CO4	Fitting of curves by the least square method.	K4
CO5	Testing goodness of fit using chi-square test.	K4

Allied - I		2019 - 2020
Code: M19UCMA03	**STATISTICAL ECONOMICS**	**Hours / Week**
Credit: 4		**4**

Objectives:

- To understand the fundamental concept of economics and gain knowledge at the macro and micro level

Course Outcomes:

On the successful completion of the course, students will be able to

CO	Statement	Knowledge Level
CO1	Mention the nature and scope of economics	K1
CO2	Understand and describe the Law of demand and supply.	K2
CO3	Analyse the production and cost concepts	K4
CO4	Identify about the market competition and price determination	K1
CO5	Apply the Measures to control inflation and measuring national income	K3

NMEC I	B.SC STATISTICS & BBA	2019 - 2020
Code: M19NEN01	**ENGLISH FOR EMPLOYABILITY-I**	**Hours / Week 2**
Credit: 2		

PREAMBLE

To help the students meet a wider range of writing demands in business context to suit a varied clientele. Equip the student's knowledge and understanding of essential English vocabulary in a given topic. Make them to understand the appropriateness of Basic English structures. Impart the young graduates the basic concepts and practices of business communication and their application in the business world today.

Course Outcomes:

On the successful completion of the course, students will be able to

CO NUMBER	CO STATEMENT	KNOWLEDGE LEVEL
CO1	Introduce how to communicate with a stranger and day today use of communication.	K1
CO2	Apply writing effective skill of writing business letters	K3
CO3	Apply modern aids in presenting communication and presentation	K3
CO4	Understand how to use Various encodes	K2
CO5	Apply the interview techniques and resume writing skill	K3

SKILL ENHANCEMENT COURSE -I

SEC-I	**B.Sc., Statistics**	**2019 - 2020**
Code: M19USTS01	**QUANTITATIVE APTITUTE**	**Hours / Week 2**
Credits: 2		

Objective:

This course introduces fundamental concepts such as Numbers, system in Quantitative aptitude. It covers concepts such HCF, LCM, Square Root, Problems on Ages, Percentages, Profit & Loss, Simple interest and Compound interest. It provides technical skills to understand and develop various department examinations like Group Exams, TNPSC, RRB, SSC & IBPS.

Course Outcomes

On the successful completion of the course, students will be able to

CO	Statement	Knowledge Level
CO1	Identify the logic behind H.C.F & L.C.M of Numbers-Simplification .	K1
CO2	Understand the concepts of Square root, cube root and average.	K2
CO3	Develop the problems on Numbers and Ages.	K2
CO4	Analyze the problems on Percentages and Profit & Loss.	K2
CO5	Apply the concepts to solve a problem for simple interest and compound interest.	K3

Core Course – V	B.Sc. STATISTICS	2019 - 2020
Code: M19UST05	ESTIMATION THEORY	**Hours / Week**
Credits: 5		**5**

Objective:

The purpose of this course is to present up-to-date theory and techniques of statistical inference (estimation theory) in a logically integrated and practical form. Essentially, it incorporates the important developments in the subject that have taken place in the last three decades. Statistical inference techniques, if not applied to the real world, will lose their import and appear to be deductive exercises. Furthermore, it is belief that in a statistical course emphasis should be given to both mathematical theory of statistics and to the application of the theory to practical problems. The objective is to diagnose statistical distributions of real life problems and thereby represent reasonable approximations of statistical patterns of recognition by inductive logic.

Course Outcomes

On the successful completion of the course, students will be able to

CO	Statement	Knowledge Level
CO1	Understand the types of estimation and Learn the properties of good estimator.	K1
CO2	Know the importance of Minimum Variance Unbiased. Estimator and Obtain the importance of Cramer Rao rule.	K2`
CO3	Obtain Sufficient statistic and importance concept of Neyman - Factorization theorem.	K3
CO4	Apply for Maximum likelihood estimator and Method of moments.	K4
CO5	Obtain the Confidence interval in interval estimation real situations.	K3

SEMESTER – IV

Core Course – VI	B.Sc. STATISTICS	2019 - 2020
Code: M19UST06	TESTING OF HYPOTHESIS	**Hours / Week**
Credits: 4		**5**

Objective:

The purpose of this course is to present up-to-date theory and techniques of statistical inference (Testing of Hypothesis) in a logically integrated and practical form. Essentially, it incorporates the important developments in the subject that have taken place in the last three decades. Statistical inference techniques, if not applied to the real world, will lose their import and appear to be deductive exercises. Furthermore, it is belief that in a statistical course emphasis should be given to both mathematical theory of statistics and to the application of the theory to practical problems. The objective is to diagnose statistical distributions of real life problems and thereby represent reasonable approximations of statistical patterns of recognition by inductive logic.

Course Outcomes

On the successful completion of the course, students will be able to

CO	Statement	Knowledge Level
CO1	Understand the Statistical Hypothesis and Learn the Types of errors, Level of Significance.	K1
CO2	Obtain the Large sample tests and test for the equality of means of two normal populations.	K3
CO3	Obtain the Small sample tests and single mean, difference of means, paired t-test.	K3
CO4	Learn the role of Likelihood Ratio (LR) test and Properties.	K2
CO5	Apply for Sequential Probability Ratio Test and Average Sample Number (ASN) and Operating Characteristic (OC) functions in real situations.	K4

Allied – II		2019 - 2020
Code: M19UCMA04	**PSYCHOLOGICAL STATISTICS**	**Hours / Week**
Credit: 4		**4**

Objectives:

- To introduce the students the various behaviours of the organizations and their processes to compete in the business world.

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Course Outcomes:

On the successful completion of the course, students will be able to

CO	Statement	Knowledge Level
CO1	Identify the determinants of personality and relate the importance of attitudes to understand behavior	K1
CO2	Understand how the workplace perceptions, attitudes, and behaviours impact organizational performance	K2
CO3	Describe the concepts, theories and models of organizational behavior.	K3
CO4	Analyze the behavior of individuals and groups in organizations and identify the problems associated with organizing and managing teams	K3
CO5	Apply the ability to use theories in the practice of leadership	K1

NMEC II	**B.SC STATISTICS & BBA**	**2019 - 2020**
Code: M19NEN03	**ENGLISH FOR EMPLOYABILITY-II**	**Hours / Week 2**
Credit: 2		

PREAMBLE

To enhance the language skill of the students and the employability skills of the students. Comprehend the local and global issues through the lessons. Do the tasks centering on skill development and enhance their Grammar Using and Writing Skills and use interactive skills

Course Outcomes:

On the successful completion of the course, students will be able to

CO NUMBER	CO STATEMENT	KNOWLEDGE LEVEL
CO1	Introduce the level of confidence in articulation of the students in their communication.	K1
CO2	Apply to learn and speak and interact with one another.	K3
CO3	Analysis and train to present the best of proposal	K4
CO4	Introduce with conversation techniques, presentation skills and grooming	K1
CO5	Demonstrate the students to discuss in group to enhance their speaking skills.	K2

SEC – II	B.Sc. STATISTICS	2019 - 2020
Code: M19USTS02	STATISTICAL APTITUDE	**Hours / Week**
Credits: 2		**2**

Objective:

This course introduces statistical aptitude so that the students of statistics could accumulate sufficient knowledge about the subject matter in a short span of time, and may also abreast themselves with the nature of questions and their exact answers. For brevity and clarity "fill in the banks" and "multiple choices" type questions have been setup. It covers concepts such as it provides technical skills to understand and develop various department examinations like Group Exams, TNPSC, SSC & UPSC.

Course Outcomes

On the successful completion of the course, students will be able to

CO	Statement	Knowledge Level
CO1	Understand the univariate and bivariate data.	K1
CO2	Compute the measures of central tendencies.	K3
CO3	Understand the Axioms of probability and expectation.	K2
CO4	Obtain the statistical inference in based on sample.	K4
CO5	Obtain the role of rank correlation in some contests	K4

Core Practical- IV	B.Sc. STATISTICS	2019 - 2020
Code: M19USTP04	**PRACTICAL – IV** **Estimation & Testing of Hypothesis**	**Hours / Week**
Credits: 2		**2**

Objective:

This course introduces practical based Estimation and Testing. It covers concepts such as Multinomial distribution, exponential, normal, binomial and Poisson distributions. Method of maximum likelihood, Fitting of curves and Testing of hypothesis on the parameters of various distributions and Test of significance t, F distribution. It provides technical skills to understand and develop various applications for statistical inference.

Course Outcomes

On the successful completion of the course, students will be able to

CO	Statement	Knowledge Level
CO1	Conduct parameter estimation in real life data in Multinomial distribution and exponential.	K2
CO2	Obtain the Method of maximum likelihood estimator in exponential family.	K3
CO3	Test the parameter value in Binomial, Normal, Exponential and Cauchy distributions	K4
CO4	Obtain the Single mean – difference of two means and Chi-Square test.	K3
CO5	Test of significance paired t test and F test for equality of two variances	K4

Core Course – VII	**B.Sc. STATISTICS**	**2019 - 2020**
Code: M19UST07	**OFFICIAL STATISTICS**	**Hours / Week**
Credits: 5		**5**

Objective:

    This course is to provide foundation as well as comprehensive background of graphics displaying different strengths of association between two variables and data collection and presentation. For learning the basic concepts which aims to resolve the government organization.

Course Outcomes

    On the successful completion of the course, students will be able to

CO	Statement	Knowledge Level
CO1	Learn the Statistical organization.	K2
CO2	Learn the Industrial statistics – ASI.	K2
CO3	Obtain Price statistics – Price index numbers.	K3
CO4	Apply for Wage statistics and trade statistics	K4
CO5	Learn Indian Economy.	K2

Core Course - VIII	B.Sc. STATISTICS	2019 - 2020
Code: M19UST08	**DESIGN OF EXPERIMENTS**	**Hours / Week**
Credits: 5		**5**

Objective:

Throughout the course stressed the importance of experimental design as a tool for engineers and scientists to use for product design and development as well as process development and improvement. The use of experimental design in developing products those are robust to environmental factors and other sources of variability. Because the prerequisites are relatively modest, this course on statistics focusing on statistical design of experiments for undergraduate students in engineering, the physical and chemical sciences, statistics, mathematics, and other fields of science. This course as the basis of an industrial short course on design of experiments for practicing

Course Outcomes

On the successful completion of the course, students will be able to

CO	Statement	Knowledge Level
CO1	Know the basic principles of experimental design.	K1
CO2	Learn the multiple comparison methods.	K2
CO3	Understand the applications of CRD and LSD.	K2
CO4	Apply the factorial experiments in practical situations. .	K4
CO5	Obtain the Split plot design.	K3

Core Course - IX	B.Sc. STATISTICS	2019 - 2020
Code: M19UST09	**LINEAR PROGRAMMING AND ITS APPLICATIONS**	**Hours / Week**
Credits: 5		**5**

Objective:

The purpose of this course is provides a quantitative analysis of the problem from which management can make an objective decision. Operation Research has drawn upon skills from mathematics, engineering, business, computer science, economics, and statistics to contribute to a wide variety of applications in business, industry, government, and military. Operations Research and Management Science methodologies and their applications continue to grow and flourish in a number of decision-making fields. To impart basic knowledge of various optimization techniques. To find the optimal solution for real life situation with help of Operations Research Techniques.

Course Outcomes

On the successful completion of the course, students will be able to

CO	Statement	Knowledge Level
CO1	Know the different types of Operations Research models.	K1
CO2	Obtain the role of Linear Programming Problem in real life problem.	K3
CO3	Calculate the relationship between dual and primal problem.	K2
CO4	Obtain the real situation of Transportation problems in Transport company.	K4
CO5	Apply the practical situations in Assignment problems in a company.	K4

Core Practical- V	B.Sc. STATISTICS	2019 - 2020
Code: M19USTP05	**PRACTICAL – V** **Design & Linear Programming**	**Hours / Week**
Credits: 2		**4**

Objective:

This course introduces practical based Design of Experiment and Operation Research. It covers concepts such as ANOVA One Way - Two Way Classification, Analysis of CRD, RBD and LSD and Analysis of factorial experiments 2^2 and 2^3. Linear programming problem and Transportation Problem & Assignment Problem. It provides technical skills to understand and develop various applications for design of experiment and operation research.

Course Outcomes

On the successful completion of the course, students will be able to

CO	Statement	Knowledge Level
CO1	Test the Multiple Comparison methods and Analysis of one way & two way ANOVA.	K4
CO2	Analysis the practical life CRD, RBD and LSD problems.	K4
CO3	Comparison of practical life Analysis of factorial experiments	K2
CO4	Obtain the Linear programming problem, Simplex Method & Big – Method.	K3
CO5	Obtain the Transportation Problem & Assignment Problem	K3

Core Practical- VI	**B.Sc. STATISTICS**	**2019 - 2020**
Code: M19USTP02	**PRACTICAL – VI** STATISTICAL DATA ANALYSIS	**Hours / Week**
Credits: 2		**4**

Objective:

This course is aimed primarily at academic researchers, MBA students, doctoral, masters and undergraduate students of mathematics, management science, and various other science and social science disciplines, practicing managers, marketing research professionals etc. Statistics and Marketing Research and for use in such courses in business schools and engineering colleges. This course is an effort towards facilitating business managers and researchers in solving statistical problems using computers. We have chosen SPSS, which is a very comprehensive and widely available package for statistical analyses.

Course Outcomes

On the successful completion of the course, students will be able to

CO	Statement	Knowledge Level
CO1	Obtain the graphs and diagrams using SPSS.	K3
CO2	Formation of frequency distribution using SPSS.	K3
CO3	Obtaining the Regression lines using SPSS.	K3
CO4	Learn the solution of compare means using SPSS.	K2
CO5	Test the association between the attributes using SPSS.	K4

Elective Course - I	B.Sc. STATISTICS	2019 - 2020
Code: M19USTE01	ACTUARIAL STATISTICS	**Hours / Week**
Credits: 4		**5**

Objective:

The purpose of this course is actuarial statistics are ways of quantifying the dynamic relationships of sequences of random events. Stochastic models play an important role in elucidating many areas of the natural and engineering sciences. They can be used to analyze the variability inherent in biological and medical processes, to deal with uncertainties affecting managerial decisions and with the complexities of psychological and social interactions, and to provide new perspectives, methodology, models, and intuition to aid in other mathematical and statistical studies.

Course Outcomes

On the successful completion of the course, students will be able to

CO	Statement	Knowledge Level
CO1	Know the basic concepts of annuity.	K1
CO2	Understand the redemption of loan by uniform early payments.	K2
CO3	Obtain the Mortality table.	K3
CO4	Learn Principles of Insurance & Types of assurance.	K3
CO5	Formation whole life assurance plans.	K4

Elective Course – I	**B.Sc. STATISTICS**	**2019 - 2020**
Code: M19USTE02	NON – PARAMETRIC TEST	**Hours / Week**
Credits: 4		**5**

Objective:

This course is aimed Testing hypotheses in non-parametric models are discussed. A statistical model is non parametric if it cannot be written in terms of a finite dimensional parameter. The main hypotheses tested in such models are hypotheses on the probability distribution of elements of the following: data homogeneity, randomness and independence hypotheses.

Course Outcomes

On the successful completion of the course, students will be able to

CO	Statement	Knowledge Level
CO1	Understand parametric and non parametric test.	K1
CO2	Test for run test and sign test in real data.	K4
CO3	Obtain the Median and Mann Whitney U test in practical situations.	K3
CO4	Understand the Median test for several samples.	K2
CO5	Apply the goodness of fit by Kolmogorov – Smirnov test.	K4

Elective Course – I	B.Sc. STATISTICS	2019 - 2020
Code: M19USTE02	QUEUING THEORY	Hours / Week
Credits: 4		5

Objective:

The purpose of this course is many of the statistical methods now take for granted had not yet been invented, and given the computational intensity of techniques such as Queuing system and Kendal's Terminology, Poisson Queues, death process $M/M/1; \infty$ / FIFO queuing model and $M/M/1; N$ / FIFO queuing model there is a unity of ideas which gives statistics as a subject both its intellectual challenge and its importance.

Course Outcomes

On the successful completion of the course, students will be able to

CO	Statement	Knowledge Level
CO1	Learn the Queuing system Kendal's terminology.	K1
CO2	Understand the Poisson queues.	K2
CO3	Learn the Pure Birth – Death process	K1
CO4	Know the importance of $M/M/1; \infty$ / FIFO queuing Model.	K2
CO5	Obtain the $M/M/1; N$ / FIFO queuing model.	K3

SEC – IV	**B.Sc. STATISTICS**	2019 - 2020
Code: M19USTS03	STATISTICAL SOFTWARE PACKAGES	**Hours / Week**
Credits: 2		**2**

Objective:

This course is designed to help students learn how to analyze and interpret research data with intermediate statistics. For this reason, most of the practical statistical analyses is done with the help of an appropriate software package. A manager/researcher is only required to prepare the input data and should be able to get the final result easily with the help of software packages, so that focused attention can be given to various other aspects of problem solving and decision making.

Course Outcomes

On the successful completion of the course, students will be able to

CO	Statement	Knowledge Level
CO1	Learn the data entry using SPSS and Importing and Exporting data	K1
CO2	Formation of frequency distribution using SPSS.	K2
CO3	Learn the difference between the t test and Independent Samples t-test using SPSS.	K2
CO4	Obtain the Analysis of Variance in SPSS.	K3
CO5	Apply for Chi-square Test for Independence using SPSS.	K4

Core Course - X	B.Sc. STATISTICS	2019 - 2020
Code: M19UST10	STATISTICAL QUALITY CONTROL	**Hours / Week**
Credits: 5		**5**

Objective:

This course gives an exposure to various concepts in statistical quality control and the notions of reliability theory are the components to be dealt with in this course. This course is about the use of modern statistical methods for quality control and improvement. It provides comprehensive coverage of the subject from basic principles to state of the art concepts and applications. The objective is to give the reader a sound understanding of the principles and the basis for applying them in a variety of situations.

Course Outcomes

On the successful completion of the course, students will be able to

CO	Statement	Knowledge Level
CO1	Understand the general theory of Control charts	K1
CO2	Apply the X-Bar, R and S Charts	K4
CO3	Learn the approach of attribute and variable control charts. .	K2
CO4	Obtain the acceptance sampling.	K3
CO5	Apply for Sequential sampling plan, OC, AOQ, ASN curve.	K4

Core Course – XI	B.Sc. STATISTICS	2019 - 2020
Code: M19UST11	APPLIED STATISTICS	**Hours / Week**
Credits: 5		**5**

Objective:

In this course we have aimed to discuss the ideas involved in applying statistical methods to advance knowledge and understanding. To apply statistics in multi disciplinary sciences for making decisions. Statistical considerations arise in virtually all areas of science and technology and, beyond these, in issues of public and private policy and in everyday life. While the detailed methods used vary greatly in the level of elaboration involved and often in the way they are described, there is a unity of ideas which gives statistics as a subject both its intellectual challenge and its importance.

Course Outcomes

On the successful completion of the course, students will be able to

CO	Statement	Knowledge Level
CO1	Learn the concept of time series.	K1
CO2	Obtain the seasonal variation in real life data.	K3
CO3	Apply the Laspeyre's and Passche's and Fisher's index numbers in real life problems.	K4
CO4	Compute the different index numbers.	K3
CO5	Study the functions of NSSO – CSO.	K2

Core Course - XII	**B.Sc. STATISTICS**	**2019 - 2020**
Code: M19UST12	DECISION THEORY AND ITS APPLICATIONS	**Hours / Week**
Credits: 5		**5**

Objective:

The purpose of this course is provides a quantitative analysis of the problem from which management can make an objective decision. Operations Research and Management Science methodologies and their applications continue to grow and flourish in a number of decision-making fields. To impart basic knowledge of various optimization techniques. To find the optimal solution for real life situation with help of Operations Research Techniques. Operations research uses analyses and techniques from a variety of branches of mathematics, statistics, and other scientific disciplines. Certain analytical results arise repeatedly in applications of operations research to industrial and service operations.

Course Outcomes

On the successful completion of the course, students will be able to

CO	Statement	Knowledge Level
CO1	Know the different types of game theory.	K1
CO2	Obtain the role of decision theory in real life problem working.	K3
CO3	Apply the Sequencing and Replacement problems.	K4
CO4	Know the role of queuing theory concept M/M/1; ∞ / FIFO.	K2
CO5	Obtain the network analysis for Critical path method & Program Evaluation Review Technique.	K3

Core Practical- VII	B.Sc. STATISTICS	2019 - 2020
Code: M19USTP07	**PRACTICAL – VII** **APPLIED STATISTICS & DECISION THEORY**	**Hours / Week**
Credits: 2		**4**

Objective:

This course introduces practical based applied statistics and operation research. It covers concepts such as control charts, Acceptance samplig plan for attributes, OC, ASN & AOQ curves. Fitting of least square, Sequencing problem, Replacement problem & Network analysis. It provides technical skills to understand and develop various applications for sampling and distribution theory.

Course Outcomes

On the successful completion of the course, students will be able to

CO	Statement	Knowledge Level
CO1	Obtain control charts in real life data.	K3
CO2	Apply for OC, ASN & AOQ curves in acceptance sampling plan.	K4
CO3	Obtain the Fitting of least square & Seasonal variations in practical situations.	K3
CO4	Apply for Sequencing problem in real life situations.	K4
CO5	Obtain the replacement and network analysis in practical situations.	K3

Elective Course - II	B.Sc. STATISTICS	2019 - 2020
Code: M19USTE04	STOCHASTIC PROCESS	Hours / Week 4
Credits: 4		

Objective:

The purpose of this course is Stochastic processes are ways of quantifying the dynamic relationships ofsequences of random events. Stochastic models play an important role in elucidating many areas of the natural and engineering sciences. They can be used to analyze the variability inherent in biological and medical processes, to deal with uncertainties affecting managerial decisions and with the complexities of psychological and social interactions, and to provide new perspectives, methodology, models, and intuition to aid in other mathematical and statistical studies.

Course Outcomes

On the successful completion of the course, students will be able to

CO	Statement	Knowledge Level
CO1	Know the basic concepts of stochastic process.	K1
CO2	Understand the Markov chains.	K2
CO3	Obtain the classification of Random processes.	K3
CO4	Obtain the Pure birth process.	K3
CO5	Understand the Social mobility, disease and recovery.	K3

Elective Course - II	B.Sc. STATISTICS	2019 - 2020
Code: M19USTE05 Credits: 4	NUMERICAL ANALYSIS	Hours / Week 4

Objective:

This course introduces fundamental concepts of Numerical methods. It covers concepts such as Bisection method, Iteration method, Regular Falsi method, Newton-Raphson method, Iterative methods Gregory-Newton interpolation formulae , Interpolation with unequal intervals, Lagrange's interpolation formula , Inverse interpolation, Trapezoidal rule, Simpson's one third rule, Simpson's three-eighth rule, Taylor series method. It provides technical skills to understand and study various concepts in Numerical analysis.

Course Outcomes

On the successful completion of the course, students will be able to

CO	Statement	Knowledge Level
CO1	Acquiring knowledge of basic idea of the solution of algebraic and transcendental equations.	K1
CO2	Understand the Solution of Finite Differences.	K2
CO3	Obtain the Interpolation with equal and unequal intervals	K3
CO4	Obtain the Numerical Differentiation: based on Newton's Forward and Backward Interpolation.	K3
CO5	Apply the Numerical Integration.	K4

Elective Course - II	B.Sc. STATISTICS	2019 - 2020
Code: M19USTE06	REGRESSION ANALYSIS	Hours / Week
Credits: 4		4

Objective:

The purpose of this course is many of the statistical methods now take for granted had not yet been invented, and given the computational intensity of techniques such as regression analysis and curves. Furthermore, it is belief that in a statistical course emphasis should be given to both mathematical theory of statistics and to the application of the theory to practical problems. The objective is to diagnose regression forecasting of real life problems and thereby represent reasonable approximations of statistical patterns of recognition by inductive logic.

Course Outcomes

On the successful completion of the course, students will be able to

CO	Statement	Knowledge Level
CO1	Learn the concept of Simple regression models.	K2
CO2	Obtain Fitting of straight line by matrix method.	K3
CO3	Learn the Multiple regression analysis.	K3
CO4	Apply for prediction with multiple regression.	K4
CO5	Obtain ANOVA and ANACOVA models.	K3

SEC – II	B.Sc. STATISTICS	2019 - 2020
Code: M19USTS04	STATISTICAL FORECASTING	**Hours / Week**
Credits: 2		2

Objective:

The purpose of this course is to present up-to-date theory and techniques of statistical forecasting analysis in a logically integrated and practical form. Essentially, it incorporates the important developments in the subject that have taken place in the last three decades. Statistical forecasting techniques, if not applied to the real world, will lose their import and appear to be deductive exercises. Furthermore, it is belief that in a statistical course emphasis should be given to both mathematical theory of statistics and to the application of the theory to practical problems. The objective is to diagnose statistical forecasting of real life problems and thereby represent reasonable approximations of statistical patterns of recognition by inductive logic.

Course Outcomes

On the successful completion of the course, students will be able to

CO	Statement	Knowledge Level
CO1	Understand the partial and multiple correlation applications.	K1
CO2	Compute the regression coefficients.	K2
CO3	Obtain the curve fitting for least square method.	K3
CO4	Obtain the power and exponential curve in real life situations.	K3
CO5	Apply for Gompertz and Logistic curves in real life situations.	K4

Head of the Department

V. SHANMUGA SUNDARAM, M.Sc.,M.Phil.,(Ph.D.,)
Assistant Professor and Head,
Department of Statistics,
Mahendra Arts & Science College,
Kalippatti, Namakkal District.

Principal

DEPARTMENT OF STATISTICS

PROGRAMME OUTCOMES (POs) OF B.Sc. STATISTICS

Academic year 2020-2021

PO1: A student of three - year B.Sc. degree course will not be allowed to offer Statistics and Statistical Techniques simultaneously in any of the three years of the course.

PO2: Students offering Statistics at the First year of the three-year B.Sc. Course may be allowed to offer Statistical Techniques as one of their subjects in the second year of the three-year B.Sc. in place of Statistics.

PO3: Students offering Statistical Techniques at the first year of the three-year B.Sc. course may be allowed to offer Statistics as one of their subjects in the second year of the three-year B.Sc. course in place of Statistical Techniques.

PO4: Students must complete all the practicals to the satisfaction of the teacher concerned.

PO5: Students must produce at the time of practical examination, the laboratory journal along with the completion certificate signed by the Head of the Department.

Head of the Department

V. SHANMUGA SUNDARAM, M.Sc.,M.Phil.,(Ph.D.,)
Assistant Professor and Head,
Department of Statistics,
Mahendra Arts & Science College,
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Principal

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