FATIMA COLLEGE (AUTONOMOUS), MADURAI – 625018

2020 - 2021

CRITERION 1 - CURRICULAR ASPECTS

1.1.1 Curricula developed and implemented have relevance to the local, national, regional and global developmental needs which is reflected in Programme outcomes (POs), Programme specific outcomes(PSOs) and Course Outcomes (COs), of the Programmes offered by the Institution.

NAME OF THE PROGRAMME: B.SC. STATISTICS **PROGRAMME CODE : USST**

PROGRAMME OUTCOMES:

PO1: Evolve as globally competent professionals, researchers and entrepreneurs possessing collaborative and leadership skills, for developing innovative solutions in multidisciplinary environment

PO2: Create, select and apply appropriate techniques, resources and modelling to statistical activities with an understanding of the limitations

PO3: Involve in lifelong learning to foster the sustainable development in the emerging areas of technology and in the broadest context of statistical change

PO4: Communicate effectively through soft skills, report writing, documentation and effective presentations

PO5: Implement ethical principles and responsibilities of a statistician to serve the society

PROGRAMME SPECIFIC OUTCOMES:

PSO1: Apply the knowledge of Statistics, Mathematics and Computer science to become competent professionals at global level

PSO2: Apply statistical knowledge to analyze and solve complex problems using appropriate statistical methodology and interpret results in a variety of settings

PSO3: Demonstrate the ability of critical observation, logical, analytical and problem-solving skills

PSO4: Write code to extract and reformat real data and to utilize statistical programming environments **PSO5**: Effectively present statistical findings to an audience lacking statistical expertise and work collaboratively

PSO6: Excel as socially committed statistics students having mutual respect, effective communication skills, high ethical values and empathy for the needs of society

COURSE CODE	COURSE TITLE	NATURE OF THE COURSE (LOCAL/NATIONAL /REGIONAL/ GLOBAL)	COURSE DESCRIPTION	COURSE OUTCOMES
19ST1CC1	Basic Statistics	National	This course introduces the historical development of statistics, presentation of data, descriptive measures and fitting mathematical curves to the data.	CO1.Recognizes investigation, investigator, enumerator and enumeration and explain different methods of data collection. CO2. Identifies the need of Classification and Tabulation. CO3. Construct and analyze graphical display to summarize data. CO4. Explain and evaluate various measure of central tendency.

				CO5. Compute and interpret measure of centre and spread of data.
19ST1CC2	Probability Theory	Global	This course introduces the concepts of functions and its properties, theorems related to random variables.	CO1. Identify from a probability scenario events that are simple, complementary, mutually exclusive, and independent. CO2. Recognize multiplication rule for two independent events, the addition rule for union of two events, and the complement rule. CO3. Describe the main properties of probability distribution and

				Construct discrete and continuous random variables. CO4. Apply general properties of the expectation and variance operators. CO5. Identify and examine generating functions and law of large numbers.
19ST1AC1	Calculus	Global	This course covers differentiation and integration of functions of one variable.	CO1. Explain higher derivatives and apply Leibnitz theorem to find the nth derivative of functions. CO2. Explain multiple points, Envelopes, nodes and conjugate points. CO3. Construct reduction formula

				for trigonometric functions. CO4. Define Jacobian, double & triple integrals and apply the knowledge of change of variables to solve the problems in double and triple integrals. CO5. Construct Fourier series by recalling integration.
19ST2CC3	Descriptive Statistics	National	This course introduces measurement of relationship in terms of quantitative and qualitative data.	CO1. Evaluates and interprets the nature of skewness and kurtosis. CO2. Identify the direction and strength of a correlation between two factors. CO3. Compute and interpret the

				coefficient of determination and spearman correlation coefficient. CO4. Recognize regression analysis applications for purpose of description and prediction. CO5. Explain the methods of association of attributes.
19ST2CC4	Discrete Probability Distributions	National	This course introduces probability functions for random variables that are defined for different probabilistic situations.	CO1. Recognize cases where the Binomial distribution could be an appropriate model. CO2. Apply the Poisson distribution to a variety of problems. CO3. Explore the key properties such as the moment generating function, cumulant

				of a negative binomial distribution. CO4. Describe and derive the formula for the geometric and hyper geometric probability mass function. CO5. Explain and evaluate multinomial and power series distribution.
19ST2AC2	Algebra	National	This course introduces the concept of classical algebra to the students of Statistics.	CO1. Identify binomial series and solve problems in binomial expansion. CO2. Identify logarithmic and exponential series and solve problems. CO3. Relate the roots and co-

				efficient of the equations and Recognize the important methods in finding roots of the given polynomial. CO4. Explain the transformations of equations. CO5. Examine the nature of the roots and solve algebraic equations using Newton's method and Horner's method.
19 ST1NME /19ST 2NME	Fundamentals of Statistics		This course is designed to make the students learn the basics of statistics	CO1. Summarize the origin of statistics and its relation with other disciplines. CO2. Identify the method of collecting the statistical data. CO3. Classify the primary and

				secondary data. CO4. Find the mean, median and mode for the given distribution and analyse. CO5. Explain the various measures of dispersion and analyse.
19ST3CC5	Distribution Theory II	National	This course is designed to expose the students various important continuous probability models	CO1. Recognize cases where the normal distribution could be an appropriate. CO2. Understand and derive the moments, moment generating functions, characteristic functions of rectangular, beta and gamma distribution. CO3. Explore the key properties such as the moment

				generating function and cumulants of exponential and Cauchy distribution. CO4. Derive chi square distribution and apply in real life problem. CO5. State and apply the definitions of the t and F distributions.
19ST3CC6	Sampling Theory	Global	This course is introduced to the students to impart the basic knowledge of statistical sampling concepts.	CO1. Illustrate census and sampling and their advantages and disadvantages. CO2. Differentiates the SRSWOR, SRSWR, methods of SRS – lottery method and random number table method. CO3. Understand and identify

				stratified random sampling. CO4. Understand and identify systematic sampling. CO5. Analyze ratio estimator.
19ST3AC3	Linear Programming	National	The course provides appropriate methods for the efficient computation of optimal solutions to problems which are modelled by objective function and linear constraints.	CO1. Formulate linear programming problems and solve by graphical method. CO2. Classify simplex method to solve linear programming problems. CO3. Identify and solve two phase and Big – M method. CO4. Recognize and formulate transportation and find the optimal solution.

				CO5. Recognize and formulate assignment problems and find the optimal solution.
19ST3SB1	Practical Statistics - I	Global	The course provides problems related to measure of central tendency, measure of dispersion, and measures of association of attributes.	CO1. Calculate measures of central tendency. CO2. Classify measures of dispersion, skewness and kurtosis. CO3. Compute correlation, regression and measures of association of attributes.
19ST4CC7	Statistical Inference I	Global	This course introduces the concepts of statistical estimation theory.	CO1. Explain and compute point estimation. CO2. Estimate maximum likelihood estimator.

				CO3. Analyze minimum variance unbiased estimator. CO4. Compute interval estimation in large samples using normal distribution CO5. Distinguish Interval estimation in small samples based on F, chi square and t distribution
19ST4CC8	Applied Statistics	Global	This course provides some of the applications of statistics which includes topics such as curve fitting, time series, index numbers, interpolation and	CO1. Construct curve fitting. CO2. Define and explain analysis of time series. CO3. Explain index numbers CO4. Classify interpolation and

			extrapolation, birth and death rates.	extrapolation CO5. Evaluate birth, death rate, infant mortality and neo natal mortality rate.
19ST4AC4	Linear Algebra		This course will focus on matrix as linear transformations relative to a basis of a vector space.	CO1. Define Vector Space and explain its various concepts. CO2. Explain basis and dimension. CO3. Illustrate Inner Product Spaces. CO4. Define basic concepts of matrices and solve linear equations, Appraise Eigen Value and Eigen Vectors of matrices. CO5. Describe bilinear forms and

				quadratic forms.
19ST4SB2	Practical Statistics II	Global	The course provides an application related to the concepts of sampling theory, & sampling distribution for large & small samples.	CO1. Interpret discrete and continuous distributions. CO2. Calculate the sampling distributions for large samples. CO3. Compute the sampling distributions for small samples.
ST5CC9	Statistical Inference II	Global	❖ The course provides the basics of hypothesis testing with emphasis on some commonly encountered hypothesis tests in statistical data analysis.	
ST5CC10	Design of Experiments	Global	❖ This course is introduced to the students to understand the fundamental principles of experimental designs.	

ST5CC11	Computer Programming in C	Global	❖ This course provides skills in designing and writing simple programs in C.
ST5ME1	Real Analysis	Global	❖ This course introduces the basic concepts in analysis and to enable the students understand fundamental ideas and theorems in analysis.
ST5ME2	Multivariate Analysis	Global	❖ The course covers multivariate normal distribution, hotelling T2 statistics, multivariate classification and discrimination analysis, principal components and cluster analysis.
ST5SB3	Practical Statistics III	Global	❖ The course provides an application based on MLEs, analysis of time series, index numbers and vital statistics & cure fitting.
ST5SB4	Statistical Software - SPSS	Global	❖ The course is introduced to learn a programming language which helps to handle all aspects of data analysis using statistical software SPSS.

ST6CC12	Statistical Quality Control	National	❖ This course is designed to introduce students to statistical quality control emphasizing those aspects which are relevant for SQC's practical implementation.
ST6CC13	Stochastic Processes	Global	❖ This course covers Markov chains in discrete time, the Poisson process and the Markov processes in continuous time.
ST6CC14	Operations Research	National	❖ This helps in solving in different environments that needs decisions.
ST6ME3	Actuarial Statistics	Global	❖ The course covers the applications of insurance and finance.
ST6ME4	Regression Analysis	Global	❖ This course focuses on building a greater understanding on statistical tools for applying the linear regression model and its generations.
ST6ME5	Numerical	National	❖ This course enables the students to solve equations using

	Methods		various Numerical Methods
ST6ME6	Industrial Statistics	National	❖ This course is concerned with maintaining and improving the quality of goods and services.
ST6SB5	Practical Statistics IV	Global	❖ The course provides an application related to statistical quality control, non parametric tests & design of experiments.
ST6SB6	Statistical Software – R	Global	❖ The course is introduced to learn a programming language which helps to handle all aspects of statistical software.