THE MADURA COLLEGE

An Autonomous Institution affiliated to Madurai Kamaraj University
Re-accredited (3rd cycle) with 'A' grade by NAAC
Vidya Nagar, T.P.K. Road, Madurai – 625 011

DEPARTMENT OF STATISTICS

Course Outcomes mapped with POs

PROGRAMME : M.Sc. (Statistics)

Course code	Course Title	CLO	Mapping of CO with PO						
			PO1	PO2	PO3	PO4	PO5	PO6	PO7
21P1SMC1	Real Analysis and Linear Algebra	Understand the meaning of converges in sequences and series of real numbers.	2	3	2	1	-	2	2
		Identify the given functions are continuous or discontinuous.	2	2	2	2	1	2	1
		Understand the conditions for in tegrability of real valued functions.	3	1	2	1	-	2	1
		Describe the fundament concepts of vector and linear transformations.	2	2	1	-	1	-	1
		Determine the characteristic roots, eigen vector, the nature and reduction of quadratic forms.	2	3	2	-	2	3	2
21P1SMC2	Distribution Theory	Identify the type of statistical situation to which different distributions can be applied.	2	1	3	3	3	-	1
		Acquire knowledge of various discrete and continuous probability distributions and their applications in real life problems.	2	1	3	3	3	1	1
		Develop the properties of bivariate probability distributions	3	1	3	2	3	-	1
		Define order statistics and obtain their sampling distributions	2	1	3	2	3	-	1
		Use distribution of quadratic forms to solve statistical problems.	3	1	3	2	3	-	1
21P1SMC3	Operations Research	Perform sensitivity analysis to identify the direction and magnitude of change of a linear programming model's optimal solution as the input data change.	2	3	3	2	-	2	2
		Describe the theoretical workings of the solution methods for parametric programming and integer linear programming problems and demonstrate them by solving the problems.	2	2	1	2	-	2	2
		Capability to develop non-linear programming problems.	1	2	1	2	-	2	2

		Explains various cost related to inventory models and develop, extent various deterministic inventory problems to analysis real world systems.	1	2	2	2	-	2	3
		Deep understanding of the theoretical background of queuing systems, apply and extend queuing models to analyse real world systems.	2	2	2	2	2	1	2
21P1SME1(A)	**Actuarial Statistics**	Acquire the knowledge of different lifetime random variables.	-	-	3	-	3	2	1
		Know how to construct life tables and understand different types of insurances.	-	2	-	-	3	3	
		Knowledge about models for individual claims and their sums.	2	-	2	-	3		2
		Calculate quantities such as premiums and reserves using actuarial techniques	-	2	2	-	3	-	-
		Describe, explain and apply the fundamental theories of actuarial science as they apply in pension funds	2	2	-	-	2	3	-
21P1SME1(B)	**Data Mining**	Explain the concepts of data warehouse and Analyze OLAP tool Analyze the basic functions of data warehouse and data mining.	-	-	-	3	-	-	2
		Compare and evaluate different data mining techniques like classification, prediction and association rule mining	-	3	1	-	-	-	-
		Categorize and carefully differentiate between situations for applying different data-mining techniques: Chi square, Regression, cluster, and outlier analysis.	-	1	-	-	-	2	-
		Evaluate the performance of different data-mining algorithms.	3	2	3	-	-	-	-
		Describe complex data types with respect to web mining	-	-	-	-	-	1	3
21P1SMP1	**Statistical Practical - I (calculated based)**	Identify the type of statistical situation to which different distributions can be applied.	2	1	3	3	3	-	1
		Acquire knowledge of various discrete and continuous probability distributions and their applications in real life problems.	2	1	3	3	3	1	1
		Capability to develop non-linear programming problems.	1	2	1	2	-	2	2
		Explains various cost related to inventory models and develop, extent various deterministic inventory problems to analysis real world systems.	1	2	2	2	-	2	3
		Deep understanding of the theoretical background of queuing systems, apply and extend queuing models to analyse real world systems.	2	2	2	2	2	1	2
21P1SMP2	**Statistical Data analysis with MS-Excel**	Perform data calculation using basic statistical functions through Excel	2	1	2	1	3	1	3
		Calculate Probability distribution using excel in-build function.	2	1	2	2	3	1	3

		Analyze data and estimate optimal parameter using data analysis tools package Add-ins.	2	3	3	3	3	2	3
		Compute predictive analysis through excel and give inferences	2	3	3	3	3	2	3
		Conduct and interpret the outcome of multivariate analysis using excel – Add-ins.	2	3	3	3	3	2	3
21P2SMC4	**Measure and Probability Theory**	The knowledge on function, limit and set theory	2	2	3	2	-	2	2
		The knowledge on Measure integral and to apply convergence theorem	1	2	1	2	-	1	2
		To derive the inequalities and apply the probability in distributions	1	3	2	2	-	2	2
		To identify the convergence of sequences/situations	1	2	2	2	-	1	2
		To apply the law of large numbers and central limit theorem in the real time situations	1	1	2	2	2	2	2
21P2SMC5	**Statistical Estimation Theory**	Properties of point estimator such Consistency, Unbiasedness, Sufficiency	2	-	2	2	2	1	2
		Obtain minimum variance unbiased estimator	-	-	2	2	2	1	2
		Obtain estimators using methods of estimation.	-	3	2	2	2	1	2
		Acquire the knowledge of Interval estimation and Construct Confidence Interval	3	3	2	2	2	1	2
		Inferring the concepts of Bayes estimation in different fields of applications	3	3	2	2	2	1	2
21P2SMC6	**Sampling Techniques**	Use practical applications of ratio and regression method of estimation.	2	3	2	1	1	2	2
		Apply varying probability sampling viz. PPSWR, PPSWOR including Lahiri's method and Murthy's estimator for survey.	2	3	2	-	-	2	2
		Implement Cluster sampling for equal and unequal sampling	2	3	2	1	1	2	2
		Discuss and estimate two stage sampling and multiphase sampling	2	3	2	-	-	2	2
		Define and distinguish errors in survey	2	2	2	-	-	3	2
21P2SME2(A)	**Reliability Theory and Survival Analysis**	To gain the knowledge on Reliability and its conceptual measures	2	1	1	-	1	1	2
		To study the life distribution and estimation of parameters	1	2	3	-	1	2	1
		To built the growth models with its properties	1	3	1	-	1	2	1
		To analyze the Life tables through various estimators	1	1	2	-	2	2	1
		To study the risk models and its applications	1	2	1	-	1	2	2
21P2SME2(B)	**Time series analysis**	Describe times series model and apply various methods of analysis and forecasting in terms of time series data.	1	2	3	1	3	3	2
		Define the concept of stationary process.	2	2	2	2	2	2	2
		Discriminate between stationary, non-stationary time series and verify mathematical consideration for analysing time series,	1	2	2	2	2	2	1

		including concept of stationary, auto covariance and auto correlation.							
		Create suitable times series models for the given dataset by transforming standard data into time series format using software packages.	2	2	2	2	2	2	3
		Demonstrate spectral analysis of weakly stationary processes.	1	2	2	2	2	2	-
21P2SMP3	**Statistical Practical - II (calculated based)**	Apply various sampling methods and estimation the parameters	2	3	2	1	1	2	2
		Apply varying probability sampling viz. PPSWR, PPSWOR including Lahiri's method and Murthy's estimator for survey.	2	3	2	-	-	2	2
		Implement Cluster sampling for equal and unequal sampling	2	3	2	1	1	2	2
		Obtain estimators using methods of estimation.	-	3	2	2	2	1	2
		Acquire the knowledge of Interval estimation and Construct Confidence Interval	3	3	2	2	2	1	2
21P2SMP4	**Statistical Data Analysis using SPSS**	Understand the basic workings of SPSS and perform basic statistical analyses.	2	1	2	1	3	1	3
		Presenting data using relevant tables, graphical displays, and summary statistics.	2	1	2	2	3	1	3
		Explore relationship among variables	2	3	3	3	3	2	3
		Perform common parametric and non-parametric tests	2	3	3	3	3	2	3
		Perform advanced statistical analyses such as one way and two – way ANOVA, ANCOVA, simple regressions and multivariate analyses (factor and cluster)	2	3	3	3	3	2	3
21P3SMC7	**Testing Statistical Hypotheses**	Illustrate inferences about statistical unknown population parameters based on random samples.	1	2	3	1	-	-	-
		Apply Test statistical hypothesis and formulate statistical hypothesis by selecting suitable test procedure.	2	1	3	2	-	-	-
		Assume the size of critical region and power of test function.	-	-	-	-	2	-	-
		Testing the statistical hypothesis by applying suitable parametric, non-parametric.	3	2	2	-	-	1	1
		Analyze the sequential test at standard statistical distributions.	2	1	3	2	2	-	2
21P3SMC8	**Multivariate Statistical Analysis**	Account the important theorems and concepts related to multivariate normal distribution.	2	3	3	3	2	1	3
		Demonstrate the methods of Hotelling T^2 and identify the situation to use and give inferences.	3	3	3	3	2	3	3
		Describes the fundamental concepts of estimating parameters, sampling distribution of multivariate normal distribution and infers the mean vector and Covariance.	3	3	3	2	2	2	3

		Categories the data and recognises the relation exists between sets of data.	3	3	3	3	2	2	3
		Determines the data reduction and grouping techniques	3	3	3	3	2	2	3
21P3SMC9	**Stochastic Processes**	Understand and apply the theoretical concepts of Stochastic process on possibilities of movement of a particle through various techniques.	3	2	3	3	2	-	-
		Develop a model for real time scenario using Markov process with differential equations	3	2	3	3	-	2	-
		Create a model in processing the data through various procedures	3	2	3	3	-	-	2
		Apply the various techniques of Renewal theory in diversified fields	3	2	2	3	2	2	3
		Understand the concepts of generation using the methods in Branching process	3	2	2	3	-	-	2
21P3SMDC	**Econometrics and Cost Analysis**	Apply the concepts of differentiation and their applications in Economics	2	2	3	-	2	1	1
		Understand and apply the generalized linear model by eliminating the errors faced in modeling	3	3	3	3	3	3	2
		Create a model for forecasting in short term and long term by studying the issues in the model	3	3	3	3	2	3	2
		Apply the methodologies to identify the parameters by using various statistical techniques	3	3	2	2	3	3	2
		Apply the skills on preparation of Budget with the knowledge on costing	1	2	3	3	2	3	2
21P3SMP5	**Statistical Practical – III (Calculated based)**	Identify the hypothesis tests and use the critical regions and power curves	1	2	1	3	-	-	-
		Apply testing of hypothesis for different statistical distributions.	2	2	2	3	-	-	-
		Make use of non-parametric tests in real life problems	3	-	1	-	2	2	-
		Analyzing the Sequential Probability Ratio Test for simple hypotheses	-	2	2	2	1	3	1
		Examining the real life problems using Multivariate Techniques	1	-	-	3	2	1	-
21P3SMP6	**Programming in R**	Understand how to use data visualization and descriptive statistics	2	1	2	1	3	1	3
		Explore relationship among variables	2	1	2	2	3	1	3
		Apply large and small sample tests in real life situations.	2	3	3	3	3	2	3
		Perform non-parametric tests and advanced statistical analyses such as ANOVA and goodness of fit	2	3	3	3	3	2	3
		Acquiring skills in flexible matrix manipulation.	2	3	3	3	3	2	3
21P4SMC10		Remember and understand the theoretical behind the linear model, and design of experiments.	1	2	3	1	-	-	-

	Linear Models and Design of Experiments	Understand the type of given experiment and the type of design	2	2	3	1	-	-	-
		Apply various designs of experiments in several practical situations and evaluate its results.	3	-	-	-	2	-	-
		Analyze the incomplete block designs	-	2	2	-	3	1	1
		Use new types of designs and their behaviour while proceeding to the research	-	-	3	2	2	1	-
21P4SMC11	**Statistical Quality Control and Reliability**	Design various types of complex level control charts .	3	2	3	2	1	-	3
		Construct and design graphical representations of various sampling plans in deciding the quality of the lot	3	3	3	3	2	1	3
		Build and identify the parameters of the variable sampling plans	3	2	3	2	-	1	3
		Construct and design graphical representations advanced level sampling plans	3	2	3	2	-	1	3
		Develop reliability models and format system maintenance strategies	3	2	3	3	2	2	3
21P4SMC12	**Programming in Python**	Explain various data types of Python programming language	2	1	2	1	3	1	3
		Implement the various operations and control structures	2	1	2	2	3	1	3
		Create the arrays by using Numpy	2	3	3	3	3	2	3
		Express proficiency in the handling of strings and functions and create & manipulate Python programs by utilizing the data structures like lists, dictionaries, tuples	2	3	3	3	3	2	3
		Apply Statistical technique and interpret the output.	2	3	3	3	3	2	3
21P4SME4 (A)	**Applied Regression Analysis**	understand and detect the regression models more precisely.	3	3	3	3	2	3	3
		identify the heteroscedastic and autocorrelation in regression model and eradicate it.	3	3	3	2	2	1	3
		know how to diagnose and apply corrections to multicollinear problems with the generalized linear model found in real data.	3	3	3	3	2	3	3
		explore the concept of non-linear regression, report and interpret models.	3	3	3	3	2	3	3
		understand and use generalizations of the regression model when dependent is dichotomous variable.	3	3	2	3	1	2	2
21P4SME4 (B)	**Categorical Data Analysis**	Understand and apply on ordinal data sets with advanced models	3	2	3	3	3	-	3
		Develop various suitable parametric models for categorical data	3	3	2	3	3	-	3
		Apply different non parametric methods for the contingency tables.	3	3	2	3	2	1	2
		Design the generalized linear models for ordinal datas.	3	2	2	3	3	-	3
		Apply various models for ordinal, nominal and missing datas.	3	2	3	3	3	1	3
21P4SMP7	**Statistical Practical - IV (Calculated based)**	Apply various designs of experiments in several practical situations and evaluate its results.	3	-	-	-	2	-	-

		Analyze the incomplete block designs	-	2	2	-	3	1	1
		Design various types of complex level control charts .	3	2	3	2	1	-	3
		Build and identify the parameters of the variable sampling plans	3	2	3	2	-	1	3
		Develop reliability models and format system maintenance strategies	3	2	3	3	2	2	3
21P4SMP8	**Lab: Practical in Python**	Understand how to use data visualization	2	1	2	1	3	1	3
		Presenting data using relevant tables and summary statistics	2	1	2	2	3	1	3
		Acquiring skills in flexible matrix manipulation.	2	3	3	3	3	2	3
		Perform advanced statistical analyses such as simple regressions and multivariate analyses	2	3	3	3	3	2	3
		Perform Parametric and non-parametric test	2	3	3	3	3	2	3
21P4SPR	**Project**	Carry out a substantial research-based project	2	2	3	2	3	2	2
		Demonstrate capacity to improve student achievement, engagement and retention	2	1	3	2	3	2	2
		Demonstrate capacity to lead and manage change through collaboration with others	2	2	2	2	2	2	2
		Demonstrate an understanding of the ethical issues associated with practitioner research	3	2	2	2	2	2	2
		Analyse data and synthesize research findings in written and verbal forms. Use research findings to advance education theory and practice	2	3	3	2	2	3	2

P. Vei Sr
Head of the Department (i/c)

HEAD (i/c)
Department of Statistics
The Madura College (Autonomous)
Madurai-625 011.