MARIS STELLA COLLEGE (AUTONOMOUS), VIJAYAWADA

A College with Potential for Excellence

ISO 9001: 2015 Certified

PROGRAMME REGISTER

2020-2023

DEPARTMENT OF STATISTICS

INDEX

UG PROGRAMME OFFERED

S. No.	Programme	Combination offered	Programme Code
1	B.Sc.	Mathematics, Statistics, Computer Science (MSCs)	304

PROGRAMME OUTCOMES (POs)

2020-2023

At the end of the programme students will have:

PO1: Essential Knowledge:

Comprehensive discipline knowledge and understanding, the ability to engage with different schools of thought and to apply their knowledge in practice including in multidisciplinary or multi-professional contexts.

PO2: Creative and critical thinking and problem solving abilities:

Be effective problem solvers, able to apply critical and evidence-based thinking to conceive innovative responses to future challenges.

PO3: Teamwork and communication skills:

Be able to convey ideas and information effectively to a range of audiences for a variety of purposes and contribute in a positive and collaborative manner to achieving common goals.

PO4: Motivation and Preparation in life-long learning:

Exhibit life-long skills;broad based multiple career oriented general skills;self and field based learning skills;digital skills; social responsibility and compassionate commitment; preparedness for living; learning and working in any environment

PO5: Professionalism and leadership readiness:

Be able to engage in professional behaviour and have the potential to be entrepreneurial and take leadership roles in their chosen occupations and communities.

PO6: Intercultural and ethical competency:

Be responsible and effective global citizens whose personal values and practices are consistent with their roles as responsible members of society.

PO7: Self-awareness and emotional intelligence:

Be self-aware and reflective, flexible and resilient and act with integrity and take responsibility for their actions as empowered women.

PO8: Social responsibility:

Be sensitive to and demonstrate agency in matters of environment, gender and other social issues to promote an equitable society.

PROGRAMME SPECIFIC OUTCOMES (PSOs)
2020-2023

For Physical Sciences:

At the end of the programme the student will be able to

PSO1: Interpret the principles, classifications, concepts, theories and mechanisms.

PSO2: Analyze hypothesis, procedures, properties, experimental facts and draw conclusions.

PSO3: Apply techniques in solving problems, results, sample analysis and production.

PSO4: Develop communicative competence,creative and critical thinking, practical, technical and employability skills, social sensibility and responsibility.

For Commerce , Management studies & BBA:

PSO1: Demonstrate fundamental knowledge of domain areas.

PSO2: Acquire competence to apply and communicate principles, techniques and skills to analyze and interpret texts and data and draw conclusions.

PSO3: Demonstrate problem-solving skills in real life situations by drawing from imbibe theories and principles

PSO4: Develop communicative competence, creative and critical thinking, practical, technical and employability skills, social sensibility and responsibility.

Course Outcomes (COs)
2020-2023

S. No.	Semester	Course Code	Course Title	Course Outcomes (COs)
1	I	20STCCDS13	Descriptive Statistics	**CO1:** Interpret diagrammatic data presentation for common understanding
				CO2: Determine the reliability of an average and compare variability of two or more series and solve problems using moments.
				CO3: Interpret bivariate data and apply curve fitting, correlation and regression methods to forecast business data.
				CO4: Differentiate between quantitative and qualitative data and apply association and contingency techniques using attributes.
2	I	20STP1DS12	Descriptive Statistical Methods-Practical	**CO1:** Interpret diagrammatic data presentation, determine the reliability of an average using central tendency measures and compare the variability of two or more series.
				CO2: Apply the curve fitting, correlation and regression methods to the given data
				CO3: Apply Association and Contingency techniques for qualitative data using Attributes
3	II	20STCCPD23	Probability Theory & Distributions	**CO1:** Explain the basics of probability, types, theorems and applications in real life.
				CO2: Interpret Univariate & bi-variate random variables.
				CO3: Apply mathematical expectations applications to real data.
				CO4: Identify different real life problems and apply discrete and continuous distributions to

				draw valid inferences.
4	II	20STP2PD22	Probability Distributions-Practical	**CO1:** Identify different real life problems
				CO2: Apply discrete distributions (Binomial, Poisson, Negative Binomial and Hypergeometric) to the real life situations to draw valid conclusions
				CO3: Interpret continuous distributions (Uniform, Normal and Exponential) in day to day life to draw valid inferences.
5	II	20LSCES2	Elementary Statistics	**CO1:** Explain the scope and limitations of statistics, collection and representation of data.
				CO2: Interpret central tendency and dispersion measures to the given data.
				CO3: Estimate the degree of relationship between variables using the concepts of correlation and regression.
6	III	20STCCSI33	Statistical Inference	**CO1:** Interpret t, F and $\chi 2$ distributions in terms of statistics of a sample from a normal distribution.
				CO2: Examine different methods of estimation.
				CO3: Explain the definitions and concepts of hypothesis testing
				CO4: Differentiate the types of sample sizes and apply large and small sample tests to real data.
				CO5: Distinguish between parametric and non-parametric tests.
7	III	20STP3SI32	Statistical Inference-Practical	**CO1:** Apply Large sample tests and small sample tests to different real life situations
				CO2: Distinguish between the Parametric and the non-parametric tests and apply them for real life data

8	III	20STCCBS34	Business Statistics	**CO1:** Interpret diagrammatic data presentation which makes it easier for a common man to understand the given data.
				CO2: Determine the reliability of an average and compare variability of two or more series.
				CO3: Derive the correlation between two variables
9	IV	20STCCSD43	Sampling Techniques & Designs of Experiments	**CO1**: Design and implement surveys using sampling techniques.
				CO2: Interpret the results of ANOVA through computation.
				CO3: Summarize the principles, phases and scope of designs
				CO4: Analyze and interpret basic designs (CRD, RBD and LSD).
				CO5: Demonstrate the analysis of full factorial designs.
10	IV	20STP4SD42	Sampling & Designs-Practical	**CO1:** Design and implement surveys with the sampling designs (simple random, systematic, stratified).
				CO2: Apply the Basic designs (CRD, RBD& LSD) to the real life situations and interpret the results using ANOVA and F-test.
				CO3: Demonstrate how to analyse the results of the full Factorial designs.
11	IV	20STCCAS43	Applied Statistics	**CO1**: Interpret chronological data to derive trends in economy
				CO2: Analyze the standard of living in different countries using index numbers
				CO3: Explain the importance of demography in the development of society.
				CO4: Apply the methods of obtaining birth and death rates to draw inferences regarding demography.
				CO5: Construct the life table for different age groups to examine the reproduction rates.

12	IV	20STP5AS42	Applied Statistical Methods-Practical	**CO1**: Apply Trend derivation methods to different chronological series in real life situations.
				CO2: Analyze the economy and standard of living in different countries using Index Numbers
				CO3: Interpret the methods of obtaining birth & death rates and construct the Life table for living beings from different age groups
13	V/VI Set 1	20STSEC11OR3	Operations Research I	**CO1:** Identify and develop operational research models from the verbal description of the real system.
				CO2: Understand the mathematical tools that are needed to solve optimization problems
				CO3: Differentiate between IBFS and OBFS and obtain the solution for LPP
				CO4: Differentiate the primal and dual and solve the given LPP and to derive the primal-dual relationship
14	V/VI Set 1	20STP611OR2	Operations Research I-Practical	**CO1:** Construct a linear programming problem to the given data.
				CO2: Apply the mathematical tools to solve optimization problems
				CO3: Calculate IBFS and OBFS to the given LPP
15	V/VI Set 1	20STSEC12OR3	Operations Research II	**CO1:** Analyze various types of deterministic models like transportation Problem and Assignment problem.
				CO2: Minimize the total elapsed time in an industry by efficient allocation of suitable persons.
				CO3: Evaluate real time problems related to Queues, CPM and PERT.
				CO4: Demonstrate and solve the simple models of Game theory.
16	V/VI	20STP712OR2	Operations	**CO1:** Apply and analyze various types of

	Set 1		Research II-Practical	deterministic models like transportation Problem and Assignment problem
				CO2: Maximize the work time and profits of an industry by efficient allocation of jobs to the suitable persons
				CO3: Minimize the elapsed time of the projects by using CPM , PERT and queuing models and solve simple game models.
17	V/VI Set 2	20STSEC21QC3	Statistical Quality & Process control	**CO1:** Differentiate the concepts of Quality Control(SQC) and Statistical Process Control (SPC)
				CO2: Construct different control charts for Variables variables(x-bar, Rcharts) and attributes(p,np and c charts)
				CO3: Identify different acceptance sampling plans and differentiate them.
				CO4: Evaluate the probabilities of sampling plans using Binomial and Poisson distributions
				CO5: Understand the structure of OC and ASN curves
18	V/VI Set 2	20STP621QC2	Statistical Quality & Process control -Practical	**CO1:** Construct the control charts for variables and attributes
				CO2: Infer whether the process is within control for the given data by calculating the OC, ASN curves
				CO3: Determine the single and double sampling plans.
19	V/VI Set 2	20STSEC22CR3	Computational Techniques & R Programming	**CO1:** Understand the basic functioning of a computer
				CO2: Acquire skills in handling business and organizational data using Excel
				CO3: Perform simple analytics using Excel
				CO4: Understand the R programming language and its importance in analyzing the data
				CO5: Analyze the real life situations statistically using R language.

20	V/VI Set 2	20STP722CR2	Computational Techniques & R Programming-Practical	**CO1:** Perform simple analytics using Excel
				CO2: Apply R programming language the data pertaining to different fields
				CO3: Analyze the real life situations statistically using R language.
21	V/VI Set 3	20STSEC31EM3	Econometrics	**CO1:** Understand various important econometric models
				CO2: Understand the assumptions upon which different econometric methods are based and their implications
				CO3: Explain core concepts and techniques in econometrics, with a special focus on the classical linear regression model
				CO4: Interpret heteroscedasticity and its inherent concepts including its consequences
22	V/VI Set 3	20STP631EM2	Econometrics-Practical	**CO1:** Estimate the parameters of general linear trend.
				CO2: Forecast the general linear trend
				CO3: Diagnose and evaluate the consequences of Multicollinearity, Autocorrelation and Heteroscedasticity
23	V/VI Set 3	20STSEC32RA3	Regression Analysis	**CO1:** Understand Linear and Multiple Linear regression
				CO2: Analyze the relationship between a single dependent (criterion) variable and several independent (predictor) variables
				CO3: Apply statistical tests of hypotheses on regression coefficients
				CO4: Interpret the best regression model
24	V/VI Set 3	20STP732RA2	Regression Analysis-Practical	**CO1:** Analyze the relationship between a single dependent (criterion) variable and several independent (predictor) variables

				CO2: Apply statistical tests of hypotheses on regression coefficients
				CO3: Derive the best regression model

Mapping of Cos with PSOs & POs

S. No.	Sem	Course Code	Course Title	COs	PSOs	POs
1	I	20STCCDS13	Descriptive Statistics	CO1	PSO1,PSO2, PSO3,PSO4	PO1,PO2,PO3,PO4
				CO2	PSO1,PSO2, PSO3,PSO4	PO1,PO2,PO3,PO4
				CO3	PSO1,PSO2, PSO3,PSO4	PO1,PO2,PO3,PO4
				CO4	PSO1,PSO2, PSO3,PSO4	PO1,PO2,PO3,PO4
2	I	20STP1DS12	Descriptive Statistical Methods-Practical	CO1	PSO1,PSO2, PSO3,PSO4	PO1,PO2,PO3,PO4
				CO2	PSO1,PSO2, PSO3,PSO4	PO1,PO2,PO3,PO4
				CO3	PSO1,PSO2, PSO3,PSO4	PO1,PO2,PO3,PO4
3	II	20STCCPD23	Probability Theory & Distributions	CO1	PSO1,PSO2, PSO3,PSO4	PO1,PO2,PO3,PO4
				CO2	PSO1,PSO2, PSO3,PSO4	PO1,PO2,PO3,PO4
				CO3	PSO1,PSO2, PSO3,PSO4	PO1,PO2,PO3,PO4
				CO4	PSO1,PSO2, PSO3,PSO4	PO1,PO2,PO3,PO4
4	II	20STP2PD22	Probability Distributions-Practical	CO1	PSO1,PSO2, PSO3,PSO4	PO1,PO2,PO3,PO4
				CO2	PSO1,PSO2, PSO3,PSO4	PO1,PO2,PO3,PO4
				CO3	PSO1,PSO2, PSO3,PSO4	PO1,PO2,PO3,PO4
5	II	20LSCES2	Elementary Statistics	CO1	PSO1,PSO2, PSO3,PSO4	PO1,PO2,PO3,PO4
				CO2	PSO1,PSO2, PSO3,PSO4	PO1,PO2,PO3,PO4

				CO3	PSO1,PSO2, PSO3,PSO4	PO1,PO2,PO3,PO4
6	III	20STCCSI33	Statistical Inference	CO1	PSO1,PSO2, PSO3,PSO4	PO1,PO2,PO3,PO4
				CO2	PSO1,PSO2, PSO3,PSO4	PO1,PO2,PO3,PO4
				CO3	PSO1,PSO2, PSO3,PSO4	PO1,PO2,PO3,PO4
				CO4	PSO1,PSO2, PSO3,PSO4	PO1,PO2,PO3,PO4
				CO5	PSO1,PSO2, PSO3,PSO4	PO1,PO2,PO3,PO4
7		20STP3SI32	Statistical Inference-Practical	CO1	PSO1,PSO2, PSO3,PSO4	PO1,PO2,PO3,PO4
				CO2	PSO1,PSO2, PSO3,PSO4	PO1,PO2,PO3,PO4
8	III	20STCCBS34	Business Statistics	CO1	PSO1,PSO2, PSO3,PSO4	PO1,PO2,PO3,PO4
				CO2	PSO1,PSO2, PSO3,PSO4	PO1,PO2,PO3,PO4
				CO3	PSO1,PSO2, PSO3,PSO4	PO1,PO2,PO3,PO4
9	IV	20STCCSD43	Sampling Techniques & Designs of Experiments	CO1	PSO1,PSO2, PSO3,PSO4	PO1,PO2,PO3,PO4
				CO2	PSO1,PSO2, PSO3,PSO4	PO1,PO2,PO3,PO4
				CO3	PSO1,PSO2, PSO3,PSO4	PO1,PO2,PO3,PO4
				CO4	PSO1,PSO2, PSO3,PSO4	PO1,PO2,PO3,PO4
				CO5	PSO1,PSO2, PSO3,PSO4	PO1,PO2,PO3,PO4
10	IV	20STP4SD42	Sampling & Designs-Practical	CO1	PSO1,PSO2, PSO 3,PSO4	PO1,PO2,PO3,PO4
				CO2	PSO1,PSO2, PSO 3,PSO4	PO1,PO2,PO3,PO4

				CO3	PSO1,PSO2, PSO 3,PSO4	PO1,PO2,PO3,PO4
11	IV	20STCCAS43	Applied Statistics	CO1	PSO1,PSO2, PSO3,PSO4	PO1,PO2,PO3,PO4
				CO2	PSO1,PSO2, PSO3,PSO4	PO1,PO2,PO3,PO4
				CO3	PSO1,PSO2, PSO 3,PSO4	PO1,PO2,PO3,PO4
				CO4	PSO1,PSO2, PSO3,PSO4	PO1,PO2,PO3,PO4
				CO5	PSO1,PSO2, PSO 3,PSO4	PO1,PO2,PO3,PO4
12		20STP5AS42	Applied Statistical Methods-Practic al	CO1	PSO1,PSO2, PSO 3,PSO4	PO1,PO2,PO3,PO4
				CO2	PSO1,PSO2, PSO 3,PSO4	PO1,PO2,PO3,PO4
				CO3	PSO1,PSO2, PSO 3,PSO4	PO1,PO2,PO3,PO4
13	V/VI Set 1	20STSEC11O R3	Operations Research I	CO1	PSO1,PSO2, PSO 3,PSO4	PO1,PO2,PO3,PO4
				CO2	PSO1,PSO2, PSO 3,PSO4	PO1,PO2,PO3,PO4
				CO3	PSO1,PSO2, PSO 3,PSO4	PO1,PO2,PO3,PO4
				CO4	PSO1,PSO2, PSO 3,PSO4	PO1,PO2,PO3,PO4
14	V/VI Set 1	20STP611OR 2	Operations Research I-Practical	CO1	PSO1,PSO2, PSO 3,PSO4	PO1,PO2,PO3,PO4
				CO2	PSO1,PSO2, PSO 3,PSO4	PO1,PO2,PO3,PO4
				CO3	PSO1,PSO2, PSO 3,PSO4	PO1,PO2,PO3,PO4
15	V/VI Set 1	20STSEC12O R3	Operations Research II	CO1	PSO1,PSO2, PSO 3,PSO4	PO1,PO2,PO3,PO4
				CO2	PSO1,PSO2, PSO 3,PSO4	PO1,PO2,PO3,PO4

				CO3	PSO1,PSO2, PSO 3,PSO4	PO1,PO2,PO3,PO4
				CO4	PSO1,PSO2, PSO 3,PSO4	PO1,PO2,PO3,PO4
16	V/VI Set 1	20STP712OR 2	Operations Research II-Practical	CO1	PSO1,PSO2, PSO 3,PSO4	PO1,PO2,PO3,PO4
				CO2	PSO1,PSO2, PSO 3,PSO4	PO1,PO2,PO3,PO4
				CO3	PSO1,PSO2, PSO 3,PSO4	PO1,PO2,PO3,PO4
17	V/VI Set 2	20STSEC21Q C3	Statistical Quality & Process control	CO1	PSO1,PSO2, PSO 3,PSO4	PO1,PO2,PO3,PO4
				CO2	PSO1,PSO2, PSO 3,PSO4	PO1,PO2,PO3,PO4
				CO3	PSO1,PSO2, PSO 3,PSO4	PO1,PO2,PO3,PO4
				CO4	PSO1,PSO2, PSO 3,PSO4	PO1,PO2,PO3,PO4
				CO5	PSO1,PSO2, PSO 3,PSO4	PO1,PO2,PO3,PO4
18	V/VI Set 2	20STP621QC 2	Statistical Quality & Process control-Practical	CO1	PSO1,PSO2, PSO 3,PSO4	PO1,PO2,PO3,PO4
				CO2	PSO1,PSO2, PSO 3,PSO4	PO1,PO2,PO3,PO4
				CO3	PSO1,PSO2, PSO 3,PSO4	PO1,PO2,PO3,PO4
19	V/VI Set 2	20STSEC22C R3	Computational Techniques & R Programming	CO1	PSO1,PSO2, PSO 3,PSO4	PO1,PO2,PO3,PO4
				CO2	PSO1,PSO2, PSO 3,PSO4	PO1,PO2,PO3,PO4
				CO3	PSO1,PSO2, PSO 3,PSO4	PO1,PO2,PO3,PO4
				CO4	PSO1,PSO2, PSO 3,PSO4	PO1,PO2,PO3,PO4
				CO5	PSO1,PSO2, PSO 3,PSO4	PO1,PO2,PO3,PO4

20	V/VI Set 2	20STP722CR 2	Computational Techniques & R Programming-Practical	CO1	PSO1,PSO2, PSO 3,PSO4	PO1,PO2,PO3,PO4
				CO2	PSO1,PSO2, PSO 3,PSO4	PO1,PO2,PO3,PO4
				CO3	PSO1,PSO2, PSO 3,PSO4	PO1,PO2,PO3,PO4
21	V/VI Set 3	20STSEC31E M3	Econometrics	CO1	PSO1,PSO2, PSO 3,PSO4	PO1,PO2,PO3,PO4
				CO2	PSO1,PSO2, PSO 3,PSO4	PO1,PO2,PO3,PO4
				CO3	PSO1,PSO2, PSO 3,PSO4	PO1,PO2,PO3,PO4
				CO4	PSO1,PSO2, PSO 3,PSO4	PO1,PO2,PO3,PO4
22	V/VI Set 3	20STP631EM 2	Econometrics-Practical	CO1	PSO1,PSO2, PSO 3,PSO4	PO1,PO2,PO3,PO4
				CO2	PSO1,PSO2, PSO 3,PSO4	PO1,PO2,PO3,PO4
				CO3	PSO1,PSO2, PSO 3,PSO4	PO1,PO2,PO3,PO4
23	V/VI Set 3	20STSEC32R A3	Regression Analysis	CO1	PSO1,PSO2, PSO 3,PSO4	PO1,PO2,PO3,PO4
				CO2	PSO1,PSO2, PSO 3,PSO4	PO1,PO2,PO3,PO4
				CO3	PSO1,PSO2, PSO 3,PSO4	PO1,PO2,PO3,PO4
				CO4	PSO1,PSO2, PSO 3,PSO4	PO1,PO2,PO3,PO4
24	V/VI Set 3	20STP732RA 2	Regression Analysis-Practical	CO1	PSO1,PSO2, PSO 3,PSO4	PO1,PO2,PO3,PO4
				CO2	PSO1,PSO2, PSO 3,PSO4	PO1,PO2,PO3,PO4
				CO3	PSO1,PSO2, PSO 3,PSO4	PO1,PO2,PO3,PO4

Mapping of Courses with PSOs

S. No.	Course	PSO1	PSO2	PSO3	PSO4
1	20STCCDS13	✔	✔	✔	✔
2	20STP1DS12	✔	✔	✔	✔
3	20STCCPD23	✔	✔	✔	✔
4	20STP2PD22	✔	✔	✔	✔
5	20LSCES2	✔	✔	✔	✔
6	20STCCSI33	✔	✔	✔	✔
7	20STP3SI32	✔	✔	✔	✔
8	20STCCBS34	✔	✔	✔	✔
9	20STCCSD43	✔	✔	✔	✔
10	20STP4SD42	✔	✔	✔	✔
11	20STCCAS43	✔	✔	✔	✔
12	20STP5AS42	✔	✔	✔	✔
13	20STSEC11OR3	✔	✔	✔	✔
14	20STP611OR2	✔	✔	✔	✔
15	20STSEC12OR3	✔	✔	✔	✔
16	20STP712OR2	✔	✔	✔	✔
17	20STSEC21QC3	✔	✔	✔	✔
18	20STP621QC2	✔	✔	✔	✔
19	20STSEC22CR3	✔	✔	✔	✔
20	20STP722CR2	✔	✔	✔	✔
21	20STSEC31EM3	✔	✔	✔	✔
22	20STP631EM2	✔	✔	✔	✔
23	20STSEC32RA3	✔	✔	✔	✔
24	20STP732RA2	✔	✔	✔	✔

Mapping of Courses with POs

S. No.	Course	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO 8
1	DS	✔	✔	✔	✔	-	-	-	-
2	DS-P 1	✔	✔	✔	✔	-	-	-	-
3	PD	✔	✔	✔	✔	-	-	-	-
4	PD- P2	✔	✔	✔	✔	-	-	-	-
5	ES- LSC	✔	✔	✔	✔	-	-	-	-
6	SI	✔	✔	✔	✔	-	-	-	-
7	SI- P3	✔	✔	✔	✔	-	-	-	-
8	BS	✔	✔	✔	✔	-	-	-	-
9	SD	✔	✔	✔	✔	-	-	-	-
10	SD-P4	✔	✔	✔	✔	-	-	-	-
11	AS	✔	✔	✔	✔	-	-	-	-
12	AS-P5	✔	✔	✔	✔	-	-	-	-
13	OR I	✔	✔	✔	✔	-	-	-	-
14	OR I-P6	✔	✔	✔	✔	-	-	-	-
15	OR II	✔	✔	✔	✔	-	-	-	-
16	OR II-P7	✔	✔	✔	✔	-	-	-	-
17	QC	✔	✔	✔	✔	-	-	-	-
18	QC-P6	✔	✔	✔	✔	-	-	-	-
19	CR	✔	✔	✔	✔	-	-	-	-
20	CR-P7	✔	✔	✔	✔	-	-	-	-
21	EM	✔	✔	✔	✔	-	-	-	-
22	EM-P6	✔	✔	✔	✔	-	-	-	-
23	RA	✔	✔	✔	✔	-	-	-	-
24	RA-P7	✔	✔	✔	✔	-	-	-	-