MUTHAYAMMAL COLLEGE OF ARTS AND SCIENCE

(An Autonomous College)

Affiliated to Periyar University, Salem | Accredited by **NAAC** with '**A**' Grade

Recognized by **UGC** under Section 2(f) & 12 (B)

MUTHAYAMMAL COLLEGE OF ARTS AND SCIENCE (Autonomous) | Learn Lead

ESTD-1994 A UNIT OF VANETRA GROUP

www.muthayammal.in

DEGREE OF BACHELOR OF SCIENCE

Learning Outcomes - Based Curriculum Framework

- Choice Based Credit System

Syllabus for B.Sc., Statistics

(Semester Pattern)

(For Candidates admitted from the academic year 2021 -2022 and onwards)

MUTHAYAMMAL COLLEGE OF ARTS & SCIENCE

Muthayammal College of Arts & Science

Rasipuram-637 408

VISION

- To redefine the scope of higher education by infusing into each of our pursuits, initiatives that will encourage intellectual, emotional, social and spiritual growth, thereby nurturing a generation of committed, Knowledgeable and socially responsible citizens.

MISSION

*To Ensure State of the world learning experience

*To espouse value based Education

*To empower rural education

*To instill the sprite of entrepreneurship and enterprise

*To create a resource pool of socially responsible world citizens

Department Of UG Statistics

VISION

- Creating a amiable environment to learn statistical designs and to use statistical knowledge for problem solving and soft skills.

MISSION

* Playing a vibrant role in the newly emerging fields of statistical soft skills, Economics, Finance and Bioinformatics.
* Preparing the student's to venture in to the dynamic programmes in Mathematical sciences.
* Offering more flexible and diverse tracks/double majors.
* Enhancing the student's competitive skills to establish themselves in the Job markets/work-spots.

PROGRAMME EDUCATIONAL OBJECTIVES (PEO)

PEO1: Graduates will be able to promote learning environment to meet the industry expectation

PEO2: Graduates will be incorporated the critical thinking with good Communication and Leadership skills to become a self-employed

PEO3: Graduates will be uphold the human values and environmental sustenance for the betterment of the society.

GRADUATE ATTRIBUTES

The Graduate Attributes Of B.Sc.,STATISTICS are:

GA 1 Self Directed Learning

GA 2 Multicultural Competitive Skills

GA 3 Critical Thinking

GA 4 Problem Solving

GA 5 Disciplinary Knowledge

GA 6 Moral and Ethical Awareness

PROGRAMME OUTCOMES (POs)

PO1: Graduates will be able to comprehend the concepts learnt and apply in real-life situations with analytical skills.

PO2: Graduates with acquired skills and enhanced knowledge will be employable/become entrepreneurs or will pursue higher education.

PO3: Graduates with acquired knowledge of modern tools and communicative skills will be able to contribute effectively as team members.

PO4: Graduates are able to read the signs of the time analyze and provide practical solutions.

PO5: Graduates imbibed with ethical values and social concern will be able to understand and appreciate social harmony, and cultural diversity ensures a sustainable environment.

PROGRAMME SPECIFIC OUTCOMES (PSOs)

PSO1: Gain the knowledge of statistical concepts and apply them in any domain.

PSO2: Create logical thinking and reasoning which enhance the capability of solving complex problems in statistics to meet the opportunities for career development and higher studies.

PSO3: Recognize the importance of statistical modeling and computing, and mathematical approaches to analyze the real problems using various statistical tools.

PSO4: Apply the knowledge of statistical software to solve real-world problems.

PSO5: Imbibe personal skills such as the ability to work both independently and in a group.

MUTHAYAMMAL COLLEGE OF ARTS AND SCIENCE(Autonomous) - Rasipuram - 637 408

Scheme of Examinations LOCF-CBCS Pattern

(for the Students Admitted from the Academic Year:2021-2022 Onwards)

Programme : B.Sc., STATISTICS

S.No.	PART	STUDY COMPONENTS	COURSE_CODE	TITLE OF THE COURSE	Hrs./W		CREDIT POINTS	MAX.MARKS		
					Lect.	Lab.		CIA	ESE	TOTAL
SEMESTER - I										
1	I	LANGUAGE-I	21M1UFTA01	TAMIL - I	5		3	25	75	100
2	II	LANGUAGE-II	21M1UCEN01	COMMUNICATIVE ENGLISH - I	5		3	25	75	100
3	III	DSC THEORY - I	21M1USTC01	DESCRIPTIVE STATISTICS	6		4	25	75	100
4	III	GEC THEORY - I	21M1UMAA01	ALLIED: ALGEBRA AND CALCULUS	5		4	25	75	100
5	III	DSC PRACTICAL - I	21M2USTP01	PRACTICAL: STATISTICS - I		3				
6	IV	GEC PRACTICAL - I	21M2UMAAP1	PRACTICAL : ALLIED-MATHAMETICS		2				
7	IV	AECC - VALUE EDUCATION	21M1UVED01	YOGA	1		2	25	75	100
8	IV	PROFESSIONAL ENGLISH - I	21M1UPES01	PROFESSIONAL ENGLISH FOR PHYSICAL SCIENCES - I	3		2	25	75	100
				TOTAL	25	5	18	150	450	600
SEMESTER - II										
1	I	LANGUAGE - I	21M2UFTA02	TAMIL - II	5		3	25	75	100
2	II	LANGUAGE - II	21M2UCEN02	COMMUNICATIVE ENGLISH - II	5		3	25	75	100
3	III	DSC THEORY - II	21M2USTC02	PROBABILITY AND RANDOM VARIABLES	5		4	25	75	100
4	III	GEC THEORY - II	21M2UMAA02	ALLIED: DIFFERENTIAL EQUATIONS AND LAPLACE TRANSFORMS	5		4	25	75	100
5	III	DSC PRACTICAL - I	21M2USTP01	PRACTICAL : STATISTICS - I		3	4	40	60	100
6	III	GEC PRACTICAL - I	21M2UMAAP1	PRACTICAL : ALLIED-MATHAMETICS		2	2	40	60	100
7	IV	AECC - ENVIRONMENTAL STUDIES	21M2UEVS01	ENVIRONMENTAL STUDIES	2		2	25	75	100
8	IV	PROFESSIONAL ENGLISH - II	21M2UPES02	PROFESSIONAL ENGLISH- PHYSICAL SCIENCE - II	3		2	25	75	100
				TOTAL	25	5	24	230	570	800
SEMESTER - III										
1	I	LANGUAGE - I	21M3UFTA03	TAMIL - III	5		3	25	75	100
2	II	LANGUAGE - II	21M3UCEN03	COMMUNICATIVE ENGLISH - III	5		3	25	75	100
3	III	DSC THEORY - III	21M3USTC03	DISTRIBUTIONS THEORY	5		4	25	75	100
4	III	GEC THEORY - III	21M3UCSA02	ALLIED: C PROGRAMMING	4		4	25	75	100
5	III	DSC PRACTICAL - II	21M4USTP02	PRACTICAL : STATISTICS - II		3				
6	III	GEC PRACTICAL - II	21M3UCSAP2	PRACTICAL : ALLIED- C PROGRAMMING		3	2	40	60	100
6	III	SEC - I	21M3USTSP1	PRACTICAL: DATA ANALYSIS WITH ADVANCED EXCEL		3	2	40	60	100
7	IV	NMEC - I	21M3UCSN02	OFFICE AUTOMATION	2		2	25	75	100
				TOTAL	21	9	20	205	495	700

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Scheme of Examinations LOCF-CBCS Pattern

(for the Students Admitted from the Academic Year:2021-2022 Onwards)

Programme : B.Sc., STATISTICS

S.No.	PART	STUDY COMPONENTS	COURSE_CODE	TITLE OF THE COURSE	Hrs./W		CREDIT POINTS	MAX.MARKS		
					Lect.	Lab.		CIA	ESE	TOTAL
				SEMESTER - IV						
1	I	LANGUAGE - I	21M4UFTA04	TAMIL - IV	5	-	3	25	75	100
2	II	LANGUAGE - II	21M4UCEN04	COMMUNICATIVE ENGLISH - IV	5	-	3	25	75	100
3	III	DSC THEORY - IV	21M4USTC04	STATISTICAL INFERENCE	5		4	25	75	100
4	III	GEC THEORY - IV	21M4UCSA04	ALLIED: PYTHON PROGRAMMING	4		4	25	75	100
5	III	DSC PRACTICAL - II	21M4USTP02	PRACTICAL : STATISTICS - II		3	3	40	60	100
6	III	GEC PRACTICAL - II	21M4UCSAP4	PRACTICAL : ALLIED - PYTHON PROGRAMMING		3	2	40	60	100
7	IV	SEC - II	21M4USTSP2	PRACTICAL: DATA ANALYSIS WITH TABLEAU		3	2	40	60	100
8	IV	NMEC - II	21M4UCSN03	IMAGE EDITING TOOL	2		2	25	75	100
				TOTAL	21	9	23	245	555	800
				SEMESTER - V						
1	III	DSC THEORY - V	21M5USTC05	OPERATIONS RESEARCH	6		5	25	75	100
2	III	DSC THEORY - VI	21M5USTC06	SAMPLING TECHNIQUES	6		5	25	75	100
3	III	DSC PRACTICAL - III	21M5USTP03	PRACTICAL : STATISTICS - III		3	2	40	60	100
4	III	DSC PRACTICAL - IV	21M5USTP04	PRACTICAL : STATISTICS - IV		3	2	40	60	100
5	III	DSE - I	21M5USTE01	R PROGRAMMING FOR DATA ANALYSIS	5		4	25	75	100
6	III	DSE - II	21M5USTE02	TIME SERIES AND INDEX NUMBERS	5		4	25	75	100
7	IV	SEC - THEORY- I	21M5USTS01	ECONOMETRICS	2		2	25	75	100
8	IV	INTERNSHIP								
				TOTAL	24	6	24	205	495	700
				SEMESTER - VI						
1	III	DSC THEORY - VII	21M6USTC07	DESIGN OF EXPERIMENTS	6		5	25	75	100
2	III	DSC THEORY - VIII	21M6USTC08	STATISTICAL QUALITY CONTROL	6		5	25	75	100
3	III	DSE - III	21M6USTE03	POWER BI IN DATA VISUALIZATION	5		4	25	75	100
4	III	DSE - IV	21M6USTE04	MYSQL FOR DATA ANALYSIS	5		4	25	75	100
5	III	DSC PRACTICAL - V	21M6USTP05	PRACTICAL : STATISTICS - V		3	2	40	60	100
6	III	DSC PRACTICAL - VI	21M6USTP06	PRACTICAL : STATISTICS - VI		3	2	40	60	100
7	III	PROJECT WORK	21M6USTPR1	PROJECT WORK			4	40	60	100
8	III	ONLINE - COMPETITIVE EXAMINATION	21M6USTOE1	STATISTICS FOR COMPETITIVE EXAMINATION			2	100		
9	IV	SEC - THEORY- II	21M6USTS02	BIOSTATISTICS AND SURVIVAL ANALYSIS	2		2	25	75	100
10	V	EXTENSION ACTIVITY	21M6UEXA01	EXTENSION ACTIVITIES			1	100		
				TOTAL	24	6	31	445	555	800
				OVERALL TOTAL	140	40	140	1480	3120	4400
		EXTRA CREDIT COURSE	21M6USTEC1	MOOC COURSES OFFERED IN SWAYAM / NPTEL	-	-	2	-	-	-
		EXTRA CREDIT COURSE		VAC	-	-	2	-	-	-

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PRINCIPAL
MUTHAYAMMAL COLLEGE OF ARTS AND SCIENCE
(AUTONOMOUS)
RASIPURAM - 637 408,
NAMAKKAL DISTRICT.

UG-REGULATION

1.InternalExamination Marks- Theory

Components	Marks
CIA I&II	15
Attendance	5
Assignment	5
Total	25

Attendance Percentage	Marks
96 %to 100%	5
91%to 95%	4
86%to 90%	3
81%to 85%	2
75%to 80%	1
Below 75%	0

2. QUESTIONPAPERPATTERNFORCIA I,II AND ESE(3HOURS) MAXIMUM:75Marks

SECTION-A (10 Marks) (Objective Type)

AnswerALLQuestions

ALLQuestionsCarryEQUAL Marks (10 x1=10 marks)

SECTION-B(10 Marks)(Short Answer)

AnswerALLQuestions

ALLQuestionsCarryEQUAL Marks (5 x 2 = 10 marks)

SECTION-C (25 Marks)(Either or Type)

AnsweranyFIVEquestions

ALLQuestionsCarryEQUALMarks

Eitheror Type.(5 x 5 = 25 marks)

SECTION-D (30 Marks)(Analytical Type)

AnsweranyTHREEQuestionsout of FIVEquestions

ALLQuestionsCarryEQUALMarks (3 x 10 = 30 marks)

(Syllabus for CIA-I 2.5 Unit ,Syllabus for CIA-II All 5 Unit)

2a)ComponentsforPractical CIA.

Components	Marks
CIA -I	15
CIA - II	15
Observation Note	5
Attendance	5
Total	**40**

2.b)ComponentsforPracticalESE.

Components	Marks
CompletionofExperiments	50
Record	5
Viva	5
Total	**60**

3. GuidelinesforValue Education Yoga and Environmental Studies (PartIV)

- TheCourse Value Education Yogaistobetreatedas100%CIAcoursewhichisofferedinI Semesterforl year UGstudents.
- TheCourseEnvironmentalStudiesistobetreatedas100%CIAcoursewhichisofferedinII Semesterforl year UGstudents.
- TotalMarks fortheCourse=100

Components	Marks
TwoTests(2 x30)	60
Fieldvisitandreport(10+10)	20
Twoassignments(2 x10)	20
Total	100

Thepassingminimum forthis course is 40%

- Incase,thecandidatefailstosecure40%passingminimum,he/shemayhavetoreappear forthesame in the subsequent odd/even semesters.

4. GuidelinesforExtension Activity(PartV)

- Atleasttwoactivitiesshouldbeconductedwithinsemesterconsistingoftwodayseach
- TheactivitiesmaybeEducatingRuralChildren,UnemployedGraduates,SelfHelpGroupetc.

Themarks maybeawarded as follows

NoofActivities	Marks
2 x50 (Each Activityfor twodays)	100

5. Internship/IndustrialTraining,MiniProjectandMajorProjectWork

Internship/IndustrialTraining		MiniProject	MajorProjectWork		
Components	**Marks**	**Marks**	**Components**		**Marks**
CIA*2 WorkDiary Report Viva-voce Examination	 25 50 25	 - 50 50	**CIA** a) Attendance **b)** Review /WorkDiary *1	10 Marks 30 Marks	40
Total	**100**	**100**	**ESE*2** a)FinalReport b)Viva-voce	 40Marks 20Marks	 60
				Total	**100**

*1ReviewisforIndividualProjectandWorkDiaryisforGroupProjects(Groupconsistingofminimum3 and maximum 5)

*2Evaluationof report and conductof viva vocewill bedonejointlybyInternal andExternalExaminers

6. Guidelinesfor Competitive Exams- Online Mode(PartIII)- Online Exam 3 hours

Components	Marks
100 Objective Type Questions 100*1=100 Marks	100

Objective type Questions from Question Bank.

- Thepassingminimum forthis paper is40%
- Incase,thecandidatefailstosecure40%passingminimum,he/shemayhavetoreappear forthesamein the subsequent semesters.

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B.Sc-Statistics Syllabus LOCF-CBCS with effect from 2021-2022 Onwards								
Course Code	Course Title	Course Type	Sem	Hours	L	T	P	C
21M1USTC01	DESCRIPTIVE STATISTICS	CORE THEORY - I	I	6	4	2	0	4
Objective	Understand the origin, scope and know the significance of presenting data in the form of tables, diagrams, measures of central tendency, dispersion, skewness, kurtosis,moments, correlation and regression.							
Unit	Course Content						Knowledge Levels	Sessions
I	Collection and Presentation of Statistical Data: Nature, Scope, and Limitations of Statistics - Data sources - Methods of collection of statistical data - Census - Sample Survey - Measurement of Scales - Nominal, Ordinal, Interval, and Ratio scales - Classification and Tabulation - Formation of frequency distribution - Cumulative frequency distribution - Diagrammatic and Graphical representation of Data.						K1-K3	15
II	Measures of Central Tendency and Dispersion: Arithmetic mean, Median, Mode, Geometric mean and Harmonic mean for raw and grouped data - Properties - Quartiles, Deciles and Percentiles - Absolute and relative measures of Dispersion - Range - Quartile deviation - Mean deviation - Standard deviation - Coefficient of Variation - Lorenz Curve.						K2-K4	15
III	Measures of Skewness, Kurtosis, and Moments: Definition - Calculation of Karl Pearson's, Bowley's, and Kelly's coefficient of Skewness - Moments - Raw and Central Moments - Relation between raw and central moments - Measures of Skewness and Kurtosis based on Moments.						K2-K4	15
IV	Correlation: Definition of Correlation - Types of correlation - Methods of correlation - Scatter diagram - Karl Pearson's correlation coefficient - Spearman's rank correlation coefficient - Properties - Concurrent deviation method - Correlation coefficient for ungrouped and grouped bivariate data.						K1-K4	15
V	Regression: Meaning of Regression - Regression lines - Regression coefficients - Regression coefficients for ungrouped and grouped bivariate data - Properties of regression coefficient - Finding the two regression equations of X on Y and Y on X and estimating the unknown values of X and Y.						K1-K4	15
Course Outcome	CO1: Remembering the scope and necessity of Statistics, Tabulate and represent the data in diagrams and graphs.						K1	
	CO2: Understand the formula and calculate descriptive measures of central tendency and dispersion.						K2	
	CO3: Apply the formula and calculate descriptive measures of skewness, kurtosis, and moments.						K3	
	CO4: Analyze the nature of data and interpret the measures of correlation.						K4	
	CO5: Analyze the nature of data and interpret the measures of regression.						K4	
Learning Resources								
Text Books	1. Gupta, S.C., and Kappor, V. K. (2020). Fundamentals of Mathematical Statistics, 12th Edition, Sultan Chand & Sons (Publisher), New Delhi, India.							
Reference Books	1. Goon, A.M., Gupta, M. K., Dasgupta, B. (2016): Fundamentals of Statistics, Vol. I, World Press, Kolkata, India. 2. Holcomb, Z. C. (2017). Fundamentals of Descriptive Statistics, Routledge, New York, US.							
Website Link	1.https://www.tutorialspoint.com/class_11th_statistics_for_economics/index.asp 2.https://www.surveysystem.com/correlation.htm 3.https://www.investopedia.com/terms/r/regression.asp 4.https://www.bmj.com/about-bmj/resources-readers/publications/statistics-square-one/11-correlation-and-regression 5.https://course-notes.org/statistics/sampling_theory							

B.Sc-Statistics Syllabus LOCF-CBCS with effect from 2021-2022 Onwards								
Course Code	Course Title	Course Type	Sem	Hours	L	T	P	C
21M1USTC01	DESCRIPTIVE STATISTICS	CORE THEORY - I	I	6	4	2	0	4

CO-PO Mapping

CO Number	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	L	S	S	L	M	S	M	S	M	L
CO2	M	M	M	M	S	M	S	S	S	M
CO3	S	M	M	S	S	L	S	M	S	S
CO4	S	M	M	S	S	L	S	M	S	S
CO5	S	M	M	S	S	L	S	M	S	S
Level of Correlation between CO and PO	L-LOW	M-MEDIUM		S-STRONG						

Tutorial Schedule	Group Discussion, Quiz and Group Activities
Teaching and Learning Methods	Chalk and Board Teaching, Power Point Presentation and Virtual Learning
Assesment Methods	Attendance, Assignment, Seminar, Unit Test, CIA-I, CIA-II and ESE

Designed By	Verified By	Approved By
P. PONTAMILSELVI	DR. S. MOHAN PRABHU	

MUTHAYAMMAL COLLEGE OF ARTS & SCIENCE ★ RASIPURAM 637 408 Tamil Nadu

B.Sc., Statistics Syllabus LOCF - CBCS with Effect From 2021-2022 Onwards								
Course Code	**Course Title**	**Course Type**	**Semester**	**Hours**	**L**	**T**	**P**	**C**
21M2USTC02	**Probability and Random Variables**	**Core Theory - II**	**II**	**5**	**4**	**1**	**0**	**4**
Objective	Understand the concept of probability, random variables, distribution function, mathematical expectation, moment generating function and characteristic functions.							

Unit	Course Content	Knowledge Levels	Sessions
I	Probability: Concept of Random experiment – Trial, Sample point, Sample space, Event, Algebra of Events, Mutually exclusive events, Exhaustive events – Definition of Probability – Classical, Statistical and Axiomatic approach – Properties of Probability – Theorems on Probability – Addition and Multiplication theorem of probabilities – Conditional probability – Baye's theorem - Simple Problems.	K1-K3	15
II	Random Variables and Distribution Functions: Concept of Random variables – Discrete and Continuous random variables – Probability mass functions and Probability density functions – Distribution functions – Properties - Simple Problems.	K1-K3	15
III	Bivariate Random Variables and Distribution Functions: Joint probability functions - Joint probability mass functions - Joint probability density functions – Marginal and conditional probability functions – Distribution functions of bivariate random variables and its properties – Marginal, Conditional distribution functions and density functions – Independence of Random variables – Properties of joint distribution functions.	K1-K3	15
IV	Mathematical Expectation and Variance: Meaning and definitions of Expectation (Discrete and Continuous) – Properties – Moments – Variance – Properties – Conditional expectation and Conditional variance – Theorems on expectations – Chebychev's Inequality – Simple Problems.	K1-K3	15

V	Moment Generating Function and Characteristic Function: Definition of Moment generating function – Properties and uses – Characteristic functions – Cumulants - Properties – Simple problems – Inversion theorem on Characteristic function (statement only) – Statement and Applications of Weak Law of Large Numbers.	**K1-K3**	**15**
Course Outcome	CO1: Remembering to match the real-life situations with probability concepts.	**K1**	
	CO2: Understand the basic probability theorems and their applications.	**K2**	
	CO3: Apply the demonstrate of moment generating and characteristic function.	**K3**	
	CO4: Analyze the central limit theorem and its applications.	**K4**	
	CO5: Analyze the discrete and continuous random variables.	**K5**	
Learning Resources			
Text Books	1. Gupta, S.C., and Kappor, V. K. (2020). Fundamentals of Mathematical Statistics, 12th Edition, Sultan Chand & Sons (Publisher), New Delhi, India.		
Reference Books	1. Kapur J.N and Saxena, H. C (1999), Mathematical Statistics – S.Chand and Company Ltd., New Delhi. 2. Feller, W. (2008), An Introduction to Probability Theory and its Applications, Volume I (Third Edition), John Wiley & Sons, New York.		
Website Link	1. https://seeing-theory.brown.edu/probability-distributions/index.html 2. https://www.kullabs.com/classes/subjects/units/lessons/notes/note-detail/9557 3. https://www.statisticssolutions.com/mathematical-expectation/ 4. http://itfeature.com/statistics/measure-of-dispersion/moments-in-statistics 5. https://rmd.ac.in/dept/cse/notes/4/PQT/unit2.pdf		

B.Sc., Statistics Syllabus LOCF - CBCS with Effect From 2021 - 2022 Onwards								
Course Code	**Course Title**	**Course Type**	**Sem**	**Hours**	**L**	**T**	**P**	**C**
21M2USTC02	**Probability and Random Variables**	**Core Theory - II**	**II**	**5**	**4**	**1**	**0**	**4**

CO-PO Mapping

CO Number	P01	P02	P03	P04	P05	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	M	S	S	L	L	S	M	S	M	L
CO2	M	S	S	M	S	S	S	M	S	M
CO3	M	S	S	M	S	S	S	M	S	M
CO4	S	L	L	S	S	L	M	L	S	S
CO5	S	L	L	S	S	L	M	L	S	S

Level of Correlation between CO and PO	L - Low	M - Medium	S - Strong

Tutorial Schedule	Group Discussion, Quiz and Group Activities
Teaching and Learning Methods	Chalk and Board Teaching, Power Point Presentation and Virtual Learning
Assessment Methods	Attendance, Assignment, Seminar, Unit Test, CIA-I, CIA-II and ESE

Designed By	Verified By	Approved By

Curriculum Development Cell MCAS (Autonomous) Rasipuram

B.Sc., Statistics Syllabus LOCF - CBCS with Effect From 2021-2022 Onwards								
Course Code	**Course Title**	**Course Type**	**Semester**	**Hours**	**L**	**T**	**P**	**C**
21M2USTP01	**Practical Statistics - I**	**Core Practical - I**	**I & II**	**3+3=6**	**0**	**0**	**6**	**4**
Objective	To enable the students to gain practical knowledge about the concepts of statistics measures of descriptive statistics and probability in real life situations, practica knowledge in random variables, probability distributions, expectation, momer generating function and characteristic function.							

Unit	**List of Experiments / Programmes By Using MS Excel**	**Knowledge Levels**	**Sessi ns**
I	Presentation of Statistical Data: 1. To construct of Univariate Frequency Distribution. 2. To construct of Bivariate Frequency Distribution. 3. To draw line, Vertical and Horizondal, Multiple, Sub-Divided and Percentage Bar Diagram. 4. To draw Histogram, Frequency Polygon and Frequency Curve. 5. To draw O-give and Lorenz Curve.	**K1-K4**	**6**
II	Measures of Averages and Dispersion: 6. To calculate Arithmetic Mean, Median, Mode, Geometric and Harmonic Mean (Raw Data) 7. To calculate Arithmetic Mean, Median, Mode, Geometric and Harmonic Mean (Discrete Type) 8. To calculate Arithmetic Mean, Median, Mode, Geometric and Harmonic Mean (Continuous Type) 9. To calculate Range, M.D, Q.D, S.D and Coefficient of Variation (Raw Data) 10. To calculate Range, M.D, Q.D, S.D and Coefficient of Variation (Discrete Type) 11. To calculate Range, M.D, Q.D, S.D and Coefficient of Variation (Continuous Type)	**K1-K4**	**6**
III	Skewness and Kurtosis: 12. To calculate Karl Pearson's coefficient of Skewness – Bowley's coefficient of Skewness (Raw Data) 13. To calculate Karl Pearson's coefficient of Skewness – Bowley's coefficient of Skewness (Discrete Type) 14. To calculate Karl Pearson's coefficient of Skewness – Bowley's coefficient of Skewness (Continuous Type) 15. To calculate Kurtosis based on Moments (Raw Data) 16. To calculate Kurtosis based on Moments (Discrete Type) 17. To calculate Kurtosis based on Moments (Continuous Type)	**K1-K4**	**6**

IV	Correlation and Regression: 18. To find Karl-Karl Pearson's correlation coefficient for ungrouped data 19. To find Karl-Karl Pearson's correlation coefficient for bivariate data 20. To find Spearman's Rank correlation coefficient (Direct Ranks are Given) 21. To find Spearman's Rank correlation coefficient (Indirect Ranks are Given) 22. To find Spearman's Rank correlation coefficient (Repeated Ranks are Given) 23. To calculate Regression coefficients Regression coefficients and Regression equations.	**K1-K4**	**6**
V	Probability Density and Distribution Functions: 24. To find Joint Probability Density and Distribution Functions (Discrete Case) 25. To find Joint Probability Density and Distribution Functions (Discrete Case) 26. To find Marginal and Conditional Probability Density and Distribution Functions (Discrete Case) 27. To find Marginal and Conditional Probability Density and Distribution Functions (Continuous Case)	**K1-K4**	**6**
Course Outcome	CO1: Remembering the scope and necessity of Statistics, Tabulate and represent the data in diagrams and graphs.	**K1**	
	CO2: Understand the formula and calculate descriptive measures of central tendency and dispersion.	**K2**	
	CO3: Apply the formula and calculate descriptive measures of skewness, kurtosis, and moments.	**K3**	
	CO4: Analyze the nature of data and interpret the measures of correlation and regression.	**K4**	
	CO5: Analyze the nature of data and interpret the Probability Density and Distribution Functions.	**K5**	
Learning Resources			
Text Books	1. Gupta, S.C., and Kappor, V. K. (2020). Fundamentals of Mathematical Statistics, 12 Edition, Sultan Chand & Sons (Publisher), New Delhi, India.		
Reference Books	1. Goon, A.M., Gupta, M. K., Dasgupta, B. (2016): Fundamentals of Statistics, Vol. I, World Press, Kolkata, India. 2. Holcomb, Z. C. (2017). Fundamentals of Descriptive Statistics, Routledge, New York US.		
Website Link	1.https://www.tutorialspoint.com/class_11th_statistics_for_economics/index.asp 2.https://www.surveysystem.com/correlation.htm 3.https://www.investopedia.com/terms/r/regression.asp 4.https://www.bmj.com/about-bmj/resources-readers/publications/statistics-square-one/11-correlation-and-regression 5.https://course-notes.org/statistics/sampling_theory		

B.Sc., Statistics Syllabus LOCF - CBCS with Effect From 2021 - 2022 Onwards								
Course Code	Course Title	Course Type	Sem	Hours	L	T	P	C
21M2USTP01	Practical Statistics - I	Core Practical - I	I & II	3 + 3	0	0	6	4

CO-PO Mapping

CO Number	P01	P02	P03	P04	P05	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	L	S	M	M	S	M	M	S	S	S
CO2	M	S	S	M	M	M	S	S	M	M
CO3	S	S	M	M	M	M	L	S	S	M
CO4	L	S	M	M	M	L	M	M	M	M
CO5	L	S	M	M	M	M	M	M	M	M

Level of Correlation between CO and PO	L - Low	M - Medium	S - Strong

Tutorial Schedule	Group Discussion, Quiz and Group Activities
Teaching and Learning Methods	Chalk and Board Teaching, Power Point Presentation and Virtual Learning
Assessment Methods	Attendance, Observation, Record Note, Unit Test, CIA-I, CIA-II and ESE

Designed By	Verified By	Approved By
P. Ramesh		A. L. Sons

Curriculum Development Cell MCAS Autonomous Rasipuram

B.Sc-Statistics Syllabus LOCF-CBCS with effect from 2021-2022 Onwards								
Course Code	Course Title	Course Type	Sem	Hours	L	T	P	C
21M3USTC03	DISTRIBUTION THEORY	CORE THEORY - III	III	5	4	1	0	4
Objective	To impart essential knowledge in discrete and continuous distributions and an enable the students to understand the properties and applications of discrete and continuous distributions.							
Unit	Course Content						Knowledge Levels	Sessions
I	Binomial Distribution: Introduction - Bernoulli's Distribution - Moments - Recurrence relation for the moments - Mean deviation about mean - Mode - Moment Generating Function - Additive property - Cumulants - Recurrence relation for cumulants - Fitting of Binomial Distribution - Simple Problems.						K1-K4	12
II	Poisson Distribution: Introduction - Moments - Mode - Recurrence relation for the moments - Moment Generating Function - Characteristic function - Cumulants - Additive property - Fitting of Poisson Distribution - Simple Problems.						K1-K4	12
III	Normal Distribution: Introduction, Limiting form of Binomial Distribution, Chief characteristics - Mean, Median, Mode, M.G.F, Moments and Cumulants - Importance and Fitting of Normal Distribution (Area Method and Ordinate Method) - Simple Problems.						K1-K4	12
IV	Rectangular Distribution: Introduction, M.G.F, Moments, Beta Distribution: First kind and Second kind - M.G.F, Mean, Moments. Gamma Distribution: M.G.F, Mean, Moments, Relationship between Beta and Gamma Distributions.						K1-K4	12
V	Sampling Distributions: t-distribution: Derivations of Constants and Limiting form. Chi-Square distribution: Derivation of pdf, Constants, MGF and additive property. F-distribution: Derivations of Constants - MGF - Relationships between t and F distributions and F and Chi-Square distributions.						K1-K4	12
Course Outcome	CO1: To remembering the discrete probability distributions with real life situations.						K1	
	CO2: To understand the moment generating functions of the discrete probability distributions.						K2	
	CO3: To acquire the knowledge of important Continuous distributions.						K3	
	CO4: To acquire the knowledge about memory less property of rectangular distribution.						K4	
	CO5: To Analyze the relationship between discrete and continuous probability distributions						K4	
Learning Resources								
Text Books	1. Gupta, S.C., and Kappor, V. K. (2020). Fundamentals of Mathematical Statistics, 12th Edition, Sultan Chand & Sons (Publisher), New Delhi, India.							
Reference Books	1. Johnson, N.L. and Kotz, S, Discrete Distributions, John Wiley and sons, 1969. 2. Johnson, N.L. and Kotz,S, Continuous univariate Distributions, Vol.I & Vol.II, John Wiley and sons, 1970.							
Website Link	1. https://www.statisticshowto.datasciencecentral.com/ 2. https://online.stat.psu.edu/stat504/node/209/ 3. https://www.colorado.edu/amath/sites/default/files/attached-files/ch4.pdf 4. https://www.cimt.org.uk/projects/mepres/alevel/stats_ch7.pdf 5. https://www.investopedia.com/terms/c/chi-square-statistic.asp							

B.Sc-Statistics Syllabus LOCF-CBCS with effect from 2021-2022 Onwards								
Course Code	Course Title	Course Type	Sem	Hours	L	T	P	C
21M3USTC03	DISTRIBUTION THEORY	CORE THEORY - III	III	5	4	1	0	4

CO-PO Mapping

CO Number	P01	P02	P03	P04	P05	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	L	S	S	M	M	S	M	S	M	L
CO2	M	M	M	M	S	M	S	S	S	M
CO3	S	M	M	S	S	L	S	M	S	S
CO4	S	M	M	S	S	L	S	M	S	S
CO5	M	M	L	S	S	L	S	M	S	S
Level of Correlation between CO and PO	L-LOW	M-MEDIUM		S-STRONG						

Tutorial Schedule	Group Discussion, Quiz and Group Activities
Teaching and Learning Methods	Chalk and Board Teaching, Power Point Presentation and Virtual Learning
Assesment Methods	Attendance, Assignment, Seminar, Unit Test, CIA-I, CIA-II and ESE

Designed By	Verified By	Approved By
A. SATHYA	DR. S. MOHAN PRABHU	

MOTHILAL NEHRU COLLEGE OF ARTS & SCIENCE RASIPURAM 637 408 Tamil Nadu

B.Sc., Statistics Syllabus LOCF-CBCS with effect from 2021-2022 Onwards								
Course Code	Course Title	Course Type	Semester	Hours	L	T	P	C
21M3USTSP1	DATA ANALYSIS WITH ADVANCED EXCEL	SBEC - I (PRACTICAL)	III	3	0	0	3	2
Objective	To impart essential knowledge in mathematical functions and statistical analysis in advanced functions in excel.							
Unit	Course Content						Knowledge Levels	Sessions
I	Introduction, An overview of the screen, navigation and basic spreadsheet concepts and Using Functions						K1-K4	6
II	Functions – Sum, Average, Max, Min, Count, Counta, SumIf, SumIfs CountIf, CountIfs AverageIf, AverageIfs, Nested IF, IFERROR Statement, AND, OR, NOT						K1-K4	6
III	Lookup Functions: Vlookup / HLookup, Index and Match, Creating Smooth User Interface Using Lookup, Nested VLookup, Reverse Lookup using Choose Function, Worksheet linking using Indirect, Vlookup with Helper Column.						K1-K4	6
IV	Pivot Tables: Creating Simple Pivot Tables, Basic and Advanced Value Field Setting, Classic Pivot table, Choosing Field, Filtering PivotTables, Modifying PivotTable Data.						K1-K4	6
V	Charts and slicers: Various Charts, Using SLICERS, Filter data with Slicers, Manage Primary and Secondary Axis.						K1-K4	6
Course Outcome	CO1: Remembering the mathematical functions in excel with real-life situations.						K1	
	CO2: Understand the advanced functions in excel with real-life situations.						K2	
	CO3: To acquire the knowledge of charts in excel.						K3	
	CO4: To acquire the knowledge of pivot tables.						K4	
	CO5: To acquire the knowledge of slicers.						K5	

B.Sc., Statistics Syllabus LOCF - CBCS with Effect From 2021 - 2022 Onwards								
Course Code	Course Title	Course Type	Semester	Hours	L	T	P	C
21M3USTSP1	DATA ANALYSIS WITH ADVANCED EXCEL	SBEC - I (PRACTICAL)	III	3	0	0	3	2

CO-PO Mapping

CO Number	P01	P02	P03	P04	P05	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	M	S	S	L	M	S	M	S	M	L
CO2	M	M	M	M	S	M	S	S	S	M
CO3	S	M	M	S	S	L	S	M	S	S
CO4	S	M	M	S	S	L	S	M	S	S
CO5	M	M	M	S	S	M	S	M	S	S

Level of Correlation between CO and PO	L - Low	M - Medium	S - Strong

Tutorial Schedule	Practical Activities
Teaching and Learning Methods	Practical with system (Computer Lab)
Assessment Methods	Observation, Practical Note, CIA-I, CIA-II and ESE

Designed By	Verified By	Approved By

Learning Resources	
Text Books	1. Statistical Analysis with Excel Fourth Edition (Paperback, Joseph Schmuller), Publisher: Wiley
Reference Books	1. Excel Statistics: A Quick Guide Third Edition, Neil J. Salkind
Website Link	1. https://www.tutorialspoint.com/advanced_excel_functions /advanced_excel_statistical_functions.htm

B.Sc., Statistics Syllabus LOCF - CBCS with Effect From 2021-2022 Onwards								
Course Code	**Course Title**	**Course Type**	**Semester**	**Hours**	**L**	**T**	**P**	**C**
21M4USTC04	**STATISTICAL INFERENCE**	**CORE THEORY - IV**	**IV**	**5**	**4**	**1**	**0**	**4**
Objective	To learn and identify both the parameter and statistic in the hypothetical study, Large sample tests, Small sample tests, extend the statistical test with interpretation.							

Unit	Course Content	Knowledge Levels	Sessions
I	Concept of Hypothesis – Null and Alternative Hypothesis – Critical Region – Type I and Type II Errors – Level of Significance – Size and Power of the Test – Most Powerful (MP) Test – UMP Test – Neymann – Pearson Fundamental Lemma (State and Prove) - Concept of LR Test – Properties and Uses - Simple Problems.	K1-K3	15
II	Test of Significance – Sampling Distributions, Standard Error – Large Sample Tests based on Mean, Proportion - Difference between Means, Difference between Proportions and Standard Deviation - Simple Problems.	K1-K3	15
III	Student's – t – test based on Mean, Difference of Two Means, Paired – t – test - Test for coefficient of correlation – F test for variance ratio.	K1-K4	15
IV	Chi-Square test – Applications of chi-square distribution – Test for independence of attributes – Yates Correction for 2x2 contingency table – Test for goodness of fit.	K1-K3	15
V	Estimation, Estimator - Characteristics of an Estimator - Consistency and Unbiasedness - Cramer-Rao Inequality. Efficiency - Asymptotic Efficiency of an Estimator – Sufficiency - Estimators based on Sufficient Statistics - Neyman's Factorization Theorem (without proof) - Rao-Blackwell Theorem. Concept of Point and Interval Estimation.	K1-K3	15

Course Outcome	CO1: Understand the concepts of testing hypothesis and to develop null and alternative hypothesis.	**K2**	
	CO2: Get information about the population on the basis of a random sample taken from that population.	**K1**	
	CO3: Choose an appropriate test procedure under the test of significance.	**K2**	
	CO4: To analyze the t-test and Chi-Square Test.	**K4**	
	CO5: To understand the concept of estimation.	**K2**	
Learning Resources			
Text Books	1. Gupta, S.C., and Kappor, V. K. (2020). Fundamentals of Mathematical Statistics, 12th Edition, Sultan Chand & Sons (Publisher), New Delhi, India.		
Reference Books	1. Kapur J.N and Saxena, H. C (1999), Mathematical Statistics – S Chand and Company Ltd., New Delhi. 2. Hogg, R.V. and Craig, A.T. (1972) Introduction to Mathematical Statistics, Macmillan Publishing Co., Inc. New York.		
Website Link	1. http://www.sci.utah.edu/~arpaiva/classes/UT_ece3530/hypothesis_testing.pdf 2. https://stats.libretexts.org/Bookshelves/Introductory_Statistics/Book%3A_Introductory_Statistics_(Shafer_and_Zhang)/08%3A_Testing_Hypotheses/8.2%3A_Large_Sample_Tests_for_a_Population 3. https://www.itl.nist.gov/div898/handbook/apr/section2/apr233.htm		

B.Sc., Statistics Syllabus LOCF - CBCS with Effect From 2021 - 2022 Onwards								
Course Code	Course Title	Course Type	Semester	Hours	L	T	P	C
21M4USTC04	STATISTICAL INFERENCE	CORE THEORY - IV	IV	5	4	1	0	4

CO-PO Mapping

CO Number	P01	P02	P03	P04	P05	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	M	S	S	M	L	S	M	S	M	L
CO2	S	S	S	M	S	S	S	M	S	M
CO3	M	S	S	M	S	S	S	M	S	M
CO4	S	M	L	S	S	L	M	M	S	S
CO5	S	M	L	S	S	M	M	L	S	S

Level of Correlation between CO and PO	L - Low	M - Medium	S - Strong

Tutorial Schedule	Group Discussion, Quiz and Group Activities
Teaching and Learning Methods	Chalk and Board Teaching, Power Point Presentation and Virtual Learning
Assessment Methods	Attendance, Assignment, Seminar, Unit Test, CIA-I, CIA-II and ESE

Designed By	Verified By	Approved By

Curriculum Development Cell MCAS Autonomous Rasipuram

B.Sc., Statistics Syllabus LOCF - CBCS with Effect From 2021-2022 Onwards								
Course Code	**Course Title**	**Course Type**	**Semester**	**Hours**	**L**	**T**	**P**	**C**
21M4USTP02	**Practical Statistics - II**	**Core Practical - II**	**III & IV**	**3+3=6**	**0**	**0**	**6**	**3**
Objective	To enable the students to gain practical knowledge about the binomial distribution, poisson distribution, normal distribution, large sample test and small sample test.							
Unit	**List of Experiments / Programmes By Using MS Excel**						**Knowledge Levels**	**Sessions**
I	Discrete Probability Distributions: 1. Fitting of binomial distributions for n and p = q = ½. 2. Fitting of binomial distributions for given n and p 3. Fitting of binomial distributions after computing mean and variance. 4. To Fitting of Binomial Distributions and Test for the Goodness of Fit.						**K1-K4**	**6**
II	Discrete Probability Distributions: 5. Fitting of Poisson distributions for given value of lambda. 6. Fitting of Poisson distributions after computing mean. 7. Fitting of Poisson Distributions and Test for the Goodness of Fit.						**K1-K4**	**6**
III	Continuous Probability Distributions : 8. Fitting of Normal Distribution – Area Method – Test for the Goodness of Fit. 9. Fitting of Normal Distribution – Ordinate Method – Test for the Goodness of Fit.						**K1-K4**	**6**
IV	10. To find the values of Large Sample Tests based on Mean 11. To find the values of Large Sample Tests based on Difference of Two Means 12. To find the values of Large Sample Tests based on Proportion 13. To find the values of Large Sample Tests based on Difference of Two Proportions 14. To find the values of Large Sample Tests based on Standard Deviation 15. To find the values of Large Sample Tests based on Difference of Two Standard Deviation						**K1-K4**	**6**

V	16. To find the values of Student's – t – test based on Mean 17. To find the values of Student's – t – test based on Difference of Two Means 18. To find the values of Paired – t – test 19. To find the values of test for coefficient of correlation 20. To find the values of F test for variance ratio (Equal) 21. To find the values of F test for variance ratio (Not Equal) 22. Goodness fit for Chi-Square Test (Two Methods)	**K1-K4**	**6**
Course Outcome	CO1: Remembering the concepts of Discrete Probability Distributions	**K1**	
	CO2: Understand the concepts of Continuous Probability Distributions	**K2**	
	CO3: Apply the statistical data for Large Sample Tests	**K3**	
	CO4: Analyze the statistical data for Student's t-Tests	**K4**	
	CO5: Analyze the statistical data for Chi-Square Tests	**K5**	
Learning Resources			
Text Books	1. Gupta, S.C., and Kappor, V. K. (2020). Fundamentals of Mathematical Statistics, 12th Edition, Sultan Chand & Sons (Publisher), New Delhi, India.		
Reference Books	1. Goon, A.M., Gupta, M. K., Dasgupta, B. (2016): Fundamentals of Statistics, Vol. I, World Press, Kolkata, India. 2. Holcomb, Z. C. (2017). Fundamentals of Descriptive Statistics, Routledge, New York, US.		
Website Link	1.https://www.tutorialspoint.com/class_11th_statistics_for_economics/index.asp 2.https://www.surveysystem.com/correlation.htm 3.https://www.investopedia.com/terms/r/regression.asp 4.https://www.bmj.com/about-bmj/resources-readers/publications/statistics-square-one/11-correlation-and-regression 5.https://course-notes.org/statistics/sampling_theory		

B.Sc., Statistics Syllabus LOCF - CBCS with Effect From 2021 - 2022 Onwards								
Course Code	Course Title	Course Type	Semester	Hours	L	T	P	C
21M4USTP02	Practical Statistics - II	Core Practical - II	III & IV	3 + 3	0	0	6	3

CO-PO Mapping

CO Number	P01	P02	P03	P04	P05	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	M	L	M	M	S	M	M	S	S	S
CO2	M	S	S	M	M	M	S	S	M	M
CO3	S	S	M	M	M	M	L	S	S	M
CO4	L	S	M	M	M	L	M	M	M	M
CO5	M	S	M	M	M	M	M	M	M	M

Level of Correlation between CO and PO	L - Low	M - Medium	S - Strong

Tutorial Schedule	Group Discussion, Quiz and Group Activities
Teaching and Learning Methods	Chalk and Board Teaching, Power Point Presentation and Virtual Learning
Assessment Methods	Attendance, Observation, Record Note, Unit Test, CIA-I, CIA-II and ESE

Designed By	Verified By	Approved By

Curriculum Development Cell MCAS Autonomous Rasipuram

B.Sc., Statistics Syllabus LOCF-CBCS with effect from 2021-2022 Onwards								
Course Code	**Course Title**	**Course Type**	**Semester**	**Hours**	**L**	**T**	**P**	**C**
21M4USTSP2	**DATA ANALYSIS WITH TABLEAU**	**SBEC - II**	**IV**	**3**	**0**	**0**	**3**	**2**
Objective	To impart essential knowledge in mathematical functions and statistical analysis in advanced functions in excel.							

S.No.	**Practical Exercises for Tableau**	**Knowledge Levels**	**Sessions**
I	1. To Connect to your data with tableau 2. To Create Sales Forecast Analysis Dashboard 3. To Create Marketing Campaign Dashboard 4. To Create Product Availability Dashboard 5. To Create Flight Price Analysis Dashboard 6. To Create Crime Analysis Dashboard 7. To Create Air Quality and Pollution Analysis Dashboard 8. To Create Sales Pipeline Dashboard 9. To Create Stock Exchange Analysis Dashboard 10. To Create Covid-19 Analysis Dashboard	**K1-K4**	**60L**
Course Outcome	CO1: Remembering the statistical analysis dashboard in tableau with real-life situations.	**K1**	
	CO2: Understand the different statistical analysis dashboard in tableau with real-life situations.	**K2**	
	CO3: To acquire the knowledge of charts in tableau.	**K3**	
	CO4: To acquire the knowledge of tableau with reports.	**K4**	
	CO5: To acquire the knowledge of statistical analysis.	**K6**	

Learning Resources	
Text Books	1. Tableau for Dummies, Publisher: Wiley, Genre: Academic and Professional, Edition: 2020.
Reference Books	1. Tableau Desktop Pocket Reference: Essential Features, Syntax and Data Visualizations, Shroff Publishers and Distributors Private Limited.
Website Link	1. https://www.youtube.com/watch?v=Wh4sCCZjOwo 2. https://www.youtube.com/watch?v=zE8eRoOHjOY

B.Sc., Statistics Syllabus LOCF - CBCS with Effect From 2021 - 2022 Onwards								
Course Code	Course Title	Course Type	Semester	Hours	L	T	P	C
21M4USTSP2	DATA ANALYSIS WITH TABLEAU	SBEC - II	IV	3	0	0	3	2

CO-PO Mapping

CO Number	P01	P02	P03	P04	P05	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	M	S	S	L	M	S	M	S	M	L
CO2	M	M	M	M	S	M	S	S	S	M
CO3	S	M	M	S	M	L	S	M	M	S
CO4	M	M	M	M	S	L	S	M	M	S
CO5	M	M	M	S	S	M	S	M	S	S

Level of Correlation between CO and PO	L - Low	M - Medium	S - Strong

Tutorial Schedule	Practical Activities
Teaching and Learning Methods	Practical with system (Computer Lab)
Assessment Methods	Observation, Practical Note, CIA-I, CIA-II and ESE

Designed By	Verified By	Approved By

Curriculum Development Cell MCAS Autonomous Rasipuram

B.Sc., Statistics Syllabus LOCF-CBCS With Effect From 2021-2022 Onwards								
Course Code	Course Title	Course Type	Sem	Hours	L	T	P	C
21M5USTC05	OPERATIONS RESEARCH	CORE THEORY - V	V	6	5	1	0	5
Objective	1. To impart essential knowledge in linear programming Problems. 2. To learn and solve the problem of Simplex Methods. 3. To impart knowledge about the basis of Transportation Problems. 4. To expose students to the concepts and solve Assignment Problems. 5. To enable the students to understand and solve the Network Analysis.							
Unit	Course Content						Knowledge Levels	Sessions
I	Origin – Nature of OR – Characteristics of OR – Models in OR – Phases of OR – Uses and Limitations of OR – Mathematical Formulation of LPP – Solution of LPP by Graphical Method – Simple Problems.						K1-K4	11L+1T
II	Solution of LPP by Simplex Method – Big-M method – Duality in LPP – Dual Simplex Method - Simple Problems						K1-K4	12L
III	Transportation Problem – Formulation – Balanced, Unbalanced Transportation Problem – Initial Basic Feasible Solution – Northwest Corner Rule – Least Cost Method – Vogel's Approximation Method – Optimum Solution – MODI Method – Simple Problems.						K1-K4	12L
IV	Assignment Problems: Balanced, Unbalanced, and Sequencing Problem – Simple Problems.						K1-K4	12L
V	Network Analysis – Basic Concepts – Construction of Network – Time Calculations – Critical Path Method (CPM) – Program Evaluation Review Technique (PERT) – Finding optimum project duration and cost consideration in project scheduling – Simple Problems.						K1-K4	12L
Course Outcome	CO1: To gain knowledge about various optimization techniques.						K1	
	CO2: To solve the problems related to business and industries by using linear programming techniques.						K2	
	CO3: To acquire knowledge of important LPP.						K3	
	CO4: Execute operations research techniques for finding the optimum solution in real-life situations.						K4	
	CO5: To understand and solve the networking problems.						K5	

Learning Resources	
Text Books	1. Kanti Swarup, Gupta, P.K. and Man Mohan (2008) Operations Research (3rd Edition), Sultan Chand & Co, New Delhi.
Reference Books	1. Taha, H.A (2011). Operations Research: An Introduction, Ninth Edition, Prentice Hall Publishing Company 2. Sharma, S. D. (2010). Operations Research, Kedar Nath, Ram Nath and Co, Meerut.
Website Link	1. http://www.pondiuni.edu.in/storage/dde/downloads/mbaii_qt.pdf 2. http://www.uky.edu/~dsianita/300/online/LP.pdf 3. http://web.tecnico.ulisboa.pt/mcasquilho/compute/_linpro/TaylorB_module_b.pdf 4. https://link.springer.com/chapter/10.1007%2F978-3-662-08011-5_10 5. http://ecoursesonline.iasri.res.in/mod/resource/view.php?id=90038

B.Sc., Statistics Syllabus LOCF-CBCS With Effect From 2021-2022 Onwards								
Course Code	Course Title	Course Type	Sem	Hours	L	T	P	C
21M5USTC05	OPERATIONS RESEARCH	CORE THEORY - V	V	6	5	1	0	5

CO-PO Mapping

CO Number	P01	P02	P03	P04	P05	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	L	S	S	L	M	S	M	S	M	L
CO2	M	M	M	M	S	M	S	S	S	M
CO3	S	M	M	S	S	L	S	M	S	S
CO4	S	M	M	S	S	L	S	M	S	S
CO5	M	M	M	S	S	L	S	M	S	S
Level of Correlation between CO and PO	L LOW	M MEDIUM		S STRONG						

Tutorial Schedule	Chalk and Board Teaching, PowerPoint Presentation, Group Discussion, and Virtual Learning
Teaching and Learning Methods	Chalk and Board Teaching, PowerPoint Presentation, and Virtual Learning
Assessment Methods	Assignments, Seminars, Group Discussions, Unit Tests, Internal Examinations, and Semester Examinations

Designed By	Verified By	Approved By
(A. SATHYA)	(DR. S. MOHAN PRABHU)	[illegible]

Development Cell MCAS Autonomous Rasipuram Curric...

B.Sc., Statistics Syllabus LOCF-CBCS With Effect From 2021-2022 Onwards								
Course Code	Course Title	Course Type	Sem	Hours	L	T	P	C
21M5USTC06	SAMPLING TECHNIQUES	CORE THEORY - VI	V	6	5	1	0	5
Objective	1. To introduce the concept, methods, and analysis of sampling techniques. 2. To enable the students to understand and apply the sampling procedures to different situations. 3. To learn the importance of Sampling and different methods of sampling techniques. 4. To equip students with sampling techniques and enable them to conduct sample surveys. 5. To collect the desired information from the universe in minimum time and estimate the sampling techniques.							

Unit	Course Content	Knowledge Levels	Sessions
I	Population, Census Method - Need for Sampling -Basic Concepts of Sample Surveys -Sampling Unit - Sampling Frame - Principal Steps Involved in Sample Surveys - Preparation of Schedules and Questionnaires.	K1-K3	11L+1L
II	Sampling Errors -Bias and Standard Errors - Mean Squared Error - Determination of Sample Size with Reference to Sampling Errors - Non-Sampling Errors, Sources and Types of Non-Sampling Errors -Non-Response and Response Errors.	K1-K3	12L
III	Simple Random Sampling Method with and Without Replacement (Lottery Method and Random Number Table) - Estimation of Population Parameters - Mean, Variance and Proportion - Simple Random Sampling for Attributes; Confidence Limits - Determination of Sample Size.	K2-K4	12L
IV	Stratified Random Sampling-Principles of Stratification - Estimation Of Population Mean And Its Variance - Allocation Techniques (Equal Allocation, Proportional Allocation, Neyman Allocation And Optimum Allocation) - Estimation Of Gain Due To Stratification	K1-K3	12L
V	Systematic Sampling - Estimation of Population Mean and its Variance - Comparison of Simple Random, Stratified Random and Systematic Sampling.	K1-K3	12L

Course Outcome	CO1: To understand the concepts of testing hypotheses and to develop null and alternative hypotheses. Understand the importance of sampling and different methods of sampling techniques.	K1	
	CO2: Get information about an estimate for the method of stratification.	K2	
	CO3: Choose an appropriate test procedure under the sample estimates and their properties for simple random sampling and systematic sampling.	K3	
	CO4: To analyze and understand the principles of census and sample surveys and to become competent in conducting sample surveys.	K4	
	CO5: To understand and compare the efficiency of various estimation strategies resulting from different sampling techniques.	K5	
Learning Resources			
Text Books	1. William G. Cochran (1990) Sampling Techniques (Third Edition), John Wiley Sons, New York.		
Reference Books	1. Gupta S. C and Kapoor V. K, Fundamentals of Applied Statistics, Sultan Chand & Sons, New Delhi. 2. Goon, A. M, Gupta, M. K and Dasgupta, B. (2008). Fundamentals of Statistics, Volume - I, World Press Ltd, Calcutta.		
Website Link	1. https://course-notes.org/statistics/sampling_theory 2. http://www.statstutor.ac.uk/resources/uploaded/13samplingtechniques.pdf 3. http://www.ph.ucla.edu/epi/rapidsurveys/RScourse/RSbook_ch3.pdf 4. https://www.investopedia.com/terms/stratified_random_sampling.asp 5. http://conflict.lshtm.ac.uk/page_35.htm		

B.Sc., Statistics Syllabus LOCF-CBCS With Effect From 2021-2022 Onwards								
Course Code	Course Title	Course Type	Sem	Hours	L	T	P	C
21M5USTC06	SAMPLING TECHNIQUES	CORE THEORY - VI	V	6	5	1	0	5

CO-PO Mapping

CO Number	P01	P02	P03	P04	P05	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	M	S	S	M	L	S	M	S	M	L
CO2	S	S	S	M	S	S	S	M	S	M
CO3	M	S	S	M	S	S	S	M	S	M
CO4	S	M	L	S	S	L	M	M	S	S
CO5	S	M	L	S	S	M	M	L	S	S
Level of Correlation between CO and PO	L LOW	M MEDIUM		S STRONG						

Tutorial Schedule	Chalk and Board Teaching, PowerPoint Presentation, Group Discussion, and Virtual Learning
Teaching and Learning Methods	Chalk and Board Teaching, PowerPoint Presentation, and Virtual Learning
Assessment Methods	Assignments, Seminar, Group Discussions, Unit Tests, Internal Examinations and Semester Examinations

Designed By	Verified By	Approved By
(P. Gomathi)	(DR.S. MOHAN PRABHU)	

Curriculum Development Cell MCAS (Autonomous) Rasipuram

B.Sc., Statistics Syllabus LOCF-CBCS With Effect From 2021-2022 Onwards								
Course Code	Course Title	Course Type	Sem	Hours	L	T	P	C
21M5USTP03	PRACTICAL STATISTICS - III	CORE PRACTICAL - III	V	3	0	0	3	2
Objective	To enable the students to gain practical knowledge in software for data analysis.							
Ex. No.	Based on Core Theory - V (Operations Research) List of Experiments (Programmes by Using Tora/Solver)						Knowledge Levels	Sessions
1	To Solve Maximization Problem using the Graphical Method						K2-K4	
2	To Solve Minimization Problem using the Graphical Method						K2-K4	
3	To Solve Maximization Problem using the Simplex Method						K2-K4	
4	To Solve Minimization Problem using the Simplex Method						K2-K4	
5	To Solve Maximization Problem using the Big-M Method						K2-K4	
6	To Find the Initial Basic Feasible Solution to the Transportation of the Problem using the NWCR (Balanced)						K2-K4	
7	To Find the Initial Basic Feasible Solution to the Transportation of the Problem using the NWCR (Unbalanced)						K2-K4	
8	To Find the Initial Basic Feasible Solution to the Transportation of the Problem using the LCM (Balanced)						K2-K4	
9	To Find the Initial Basic Feasible Solution to the Transportation of the Problem using the LCM (Unbalanced)						K2-K4	
10	To Find the Initial Basic Feasible Solution to the Transportation of the Problem using the VAM (Balanced)						K2-K4	
11	To Find the Initial Basic Feasible Solution to the Transportation of the Problem using the VAM (Unbalanced)						K2-K4	
12	To Find the Initial Basic Feasible Solution to the Transportation of the Problem using the MODI Method						K2-K4	
13	Assignment Problem (Balanced and Unbalanced)						K2-K4	
14	Assignment Problem using the Hungarian Method						K2-K4	
15	Problems with CPM/PERT						K2-K4	

Course Outcome	CO1: To apply the concepts of Discrete Probability Distributions	K4	
	CO2: To apply the concepts of Continuous Probability Distributions	K4	
	CO3: To Analyse statistical data for Large Sample Tests	K4	
	CO4: To Analyse statistical data for Student's t-Tests	K4	
	CO5: To Analyse statistical data for Chi-Square Tests	K4	
Learning Resources			
Text Books	1.Kanti Swarup, Gupta P. K, Man Mohan (1980), Operations Research, Sultan Chand and sons, New Delhi.		
Reference Books	1. Goon, A.M., Gupta, M. K., Dasgupta, B. (2016): Fundamentals of Statistics, Vol. I, World Press, Kolkata, India. 2. Holcomb, Z. C. (2017). Fundamentals of Descriptive Statistics, Routledge, New York, US		
Website Link	1. https://www.statisticshowto.datasciencecentral.com/ 2. https://online.stat.psu.edu/stat504/node/209/ 3. https://www.itl.nist.gov/div898/handbook/apr/section2/apr233.htm 4. https://www.cimt.org.uk/projects/mepres/alevel/stats_ch7.pdf 5. https://www.investopedia.com/terms/c/chi-square-statistic.asp		

B.Sc., Statistics Syllabus LOCF-CBCS With Effect From 2021-2022 Onwards								
Course Code	Course Title	Course Type	Sem	Hours	L	T	P	C
21M5USTP03	PRACTICAL STATISTICS - III	CORE PRACTICAL - III	V	3	0	0	3	2

CO-PO Mapping

CO Number	P01	P02	P03	P04	P05	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	M	L	M	M	S	M	M	S	S	S
CO2	M	S	S	M	M	M	S	S	M	M
CO3	S	S	M	M	M	M	L	S	S	M
CO4	L	S	M	M	M	L	M	M	M	M
CO5	M	S	M	M	M	M	M	M	M	M
Level of Correlation between CO and PO	L-LOW	M-MEDIUM		S-STRONG						

Tutorial Schedule	Chalk and Board Teaching, PowerPoint Presentation, Group Discussion, and Virtual Learning
Teaching and Learning Methods	Chalk and Board Teaching, PowerPoint Presentation, and Virtual Learning
Assessment Methods	Assignments, Seminar, Group Discussions, Unit Tests, Internal Examinations and Semester Examinations

Designed By	Verified By	Approved By
(DR. S. MOHAN PRABHU)	(DR. S. MOHAN PRABHU)	Dr. S. Shanthi

Curriculum Development Cell MCAS (Autonomous) Rasipuram

B.Sc., Statistics Syllabus LOCF-CBCS With Effect From 2021-2022 Onwards								
Course Code	Course Title	Course Type	Sem	Hours	L	T	P	C
21M5USTP04	PRACTICAL STATISTICS - IV	CORE PRACTICAL - IV	V	3	0	0	3	2
Objective	To enable the students to gain practical knowledge in R Programming for data analysis.							

S. No.	List of Experiments (Programmes by Using R)	Knowledge Levels	Sessions
1	Write an R program to create a sequence of numbers from 20 to 50 and find the mean of numbers from 20 to 60 and the sum of numbers from 51 to 91.	K2-K4	
2	Write an R program to get the first 10 Fibonacci numbers.	K2-K4	
3	Write an R program to create a list of elements using vectors, matrices, and functions. Print the content of the list.	K2-K4	
4	Write a R program to draw an empty plot and an empty plot specify the axes limits of the graphic.	K2-K4	
5	Write an R program to create a simple bar plot of five subject marks.	K2-K4	
6	Write an R program to create a bell curve of a random normal distribution.	K2-K4	
7	Write an R program to create a two-dimensional 5x3 array of sequences of even integers greater than 50.	K2-K4	
8	Write an R program to create a matrix taking a given vector of numbers as input. Display the matrix.	K2-K4	
9	Write an R program to get the statistical summary and nature of the data of a given data frame.	K2-K4	
10	Write an R program to create Diagrams (Bar and Pie).	K2-K4	
11	Write an R program to create Graphs (Histogram).	K2-K4	
12	Write an R program for t-Test and Paired t-Test.	K2-K4	
13	Write an R program for the Chi-Square Test of Independence.	K2-K4	
14	Write an R program for the One-way ANOVA.	K2-K4	
15	Write an R program for the Two- way ANOVA.	K2-K4	

16	Write an R program for Correlation.	K2-K4	
17	Write an R program for Linear Regression.	K2-K4	
18	Write an R program for Multiple Linear Regression.	K2-K4	
19	Write an R program for Logistic Regression.	K2-K4	
20	Write an R program for Fitting Binomial Distribution.	K2-K4	
21	Write an R program for Fitting of Poisson Distribution	K2-K4	
22	Write an R program for Fitting of Normal Distribution	K2-K4	
23	Write an R program for the Fitting of Exponential Distribution.	K2-K4	
24	Write an R program for the Hierarchical Cluster Analysis.	K2-K4	
25	Write an R program for the Significance Test for Kendall's Tau-b.	K2-K4	
Course Outcome	CO1: To apply the concepts of Discrete Probability Distributions	K1	
	CO2: To apply the concepts of Continuous Probability Distributions	K2	
	CO3: To Analyse statistical data for Large Sample Tests	K3	
	CO4: To Analyse statistical data for Student's t-Tests	K4	
	CO5: To Analyse statistical data for Chi-Square Tests	K5	

Learning Resources	
Text Books	1. Kanti Swarup, Gupta P. K, Man Mohan (1980), Operations Research, Sultan Chand and Sons, New Delhi.
Reference Books	1. Goon, A.M., Gupta, M. K., Dasgupta, B. (2016): Fundamentals of Statistics, Vol. I, World Press, Kolkata, India. 2. Holcomb, Z. C. (2017). Fundamentals of Descriptive Statistics, Routledge, New York, US.
Website Link	1. https://www.statisticshowto.datasciencecentral.com/ 2. https://online.stat.psu.edu/stat504/node/209/ 3. https://www.itl.nist.gov/div898/handbook/apr/section2/apr233.htm 4. https://www.cimt.org.uk/projects/mepres/alevel/stats_ch7.pdf 5. https://www.investopedia.com/terms/c/chi-square-statistic.asp

B.Sc., Statistics Syllabus LOCF-CBCS With Effect From 2021-2022 Onwards								
Course Code	Course Title	Course Type	Sem	Hours	L	T	P	C
21M5USTP04	PRACTICAL STATISTICS - IV	CORE PRACTICAL - IV	V	3	0	0	3	2

CO-PO Mapping

CO Number	P01	P02	P03	P04	P05	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	M	L	M	M	S	M	M	S	S	S
CO2	M	S	S	M	M	M	S	S	M	M
CO3	S	S	M	M	M	M	L	S	S	M
CO4	L	S	M	M	M	L	M	M	M	M
CO5	M	S	M	M	M	M	M	M	M	M
Level of Correlation between CO and PO	L-LOW	M-MEDIUM		S-STRONG						

Tutorial Schedule	Chalk and Board Teaching, PowerPoint Presentation, Group Discussion, and Virtual Learning
Teaching and Learning Methods	Chalk and Board Teaching, PowerPoint Presentation, and Virtual Learning
Assessment Methods	Assignments, Seminar, Group Discussions, Unit Tests, Internal Examinations and Semester Examinations

Designed By	Verified By	Approved By

(DR. S. MOHAN PRABHU)

(Dr. S. SHANTHI)

Curriculum Development Cell MCAS (Autonomous) Rasipuram

B.Sc., Statistics Syllabus LOCF-CBCS With Effect From 2021-2022 Onwards								
Course Code	Course Title	Course Type	Sem	Hours	L	T	P	C
21M5USTS01	ECONOMETRICS	SEC THEORY - I	V	2	2	0	0	2
Objective	1. Know the scope and objectives of econometrics. 2. Understand models of econometrics and estimation of parameters of econometric models. 3. Understand multicollinearity and autocorrelation.							
Unit	Course Content						Knowledge Levels	Sessions
I	Definition-Scope-Objectives of Econometrics-Limitations-Divisions of Econometrics.						K1-K4	4L
II	Single Equation Model Two Variable Case-Reasons for Introducing Error Term in the Model-Least Square Method of Estimation and Testing of Parameters of the Model-Estimation of Error Variance –Simple Problems.						K1-K4	4L
III	General Linear Model-Assumptions –Least Square Method of Estimation and Testing of the Parameters of the Models – Problems under Failure of Assumptions.						K1-K4	4L
IV	Multicollinearity- Effects of Multicollinearity – Detecting Multicollinearity – Remedies – Autocorrelation-Sources of Autocorrelation- Dubin-Watson Test-Dummy Variables (Concept Only)- Specification Errors.						K1-K4	4L
V	Econometric Models in Planning: Mahalanobis Four Sector Model-Criticism of the Model-Problems Relating to Three Variable Linear Model and Test for Autocorrelation.						K1-K4	4L
Course Outcome	CO1: To know the scope and objectives of econometrics.						K1	
	CO2: To know the models of econometrics.						K2	
	CO3: To estimate the parameters of models of econometrics.						K3	
	CO4: To know multicollinearity.						K4	
	CO5: To understand the autocorrelation.						K5	

Learning Resources	
Text Books	1. Johnson, A.C., Johnson, M. B., and Buse, R. C. (1987). Econometrics: Basic and Applied, Maxmillan (Publisher).
Reference Books	1.Johnston. J. (1997). Econometric Methods, McGraw-Hill International Editions. 2.Koutsoyannis. A (2001). Theory of Econometrics, Palgrave Macmillan. 3.Singh, S. P., Parashar, A. K., and Singh, H. P. (1999) Econometrics and Mathematical Economics, S.Chand & Co., Private Limited, New Delhi, India.
Website Link	1.https://www.dynamictutorialsandservices.org/2014/05/business-economics-meaning-naturescope.html 2.https://en.wikipedia.org/wiki/Instrumental_variables_estimation#Interpretation_as_twostage_least_squares

B.Sc., Statistics Syllabus LOCF-CBCS With Effect From 2021-2022 Onwards								
Course Code	Course Title	Course Type	Sem	Hours	L	T	P	C
21M5USTS01	ECONOMETRICS	SEC THEORY - I	V	2	2	0	0	2

CO-PO Mapping

CO Number	P01	P02	P03	P04	P05	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	L	S	S	L	M	S	M	S	M	L
CO2	M	M	M	M	S	M	S	S	S	M
CO3	S	M	M	S	S	L	S	M	S	S
CO4	S	M	M	S	S	L	S	M	S	S
CO5	M	M	M	S	S	L	S	M	S	S
Level of Correlation between CO and PO	L-LOW	M-MEDIUM		S-STRONG						

Tutorial Schedule	Chalk and Board Teaching, PowerPoint Presentation, Group Discussion, and Virtual Learning
Teaching and Learning Methods	Chalk and Board Teaching, PowerPoint Presentation, and Virtual Learning
Assessment Methods	Assignments, Seminar, Group Discussions, Unit Tests, Internal Examinations and Semester Examinations

Designed By	Verified By	Approved By

CDR. S. MOHAN PRABHU

Dr. S. [illegible]

B.Sc., Statistics Syllabus LOCF-CBCS With Effect From 2021-2022 Onwards								
Course Code	Course Title	Course Type	Sem	Hours	L	T	P	C
21M5USTIS1	INTERNSHIP	INTERNSHIP	IV	-	-	-	-	-
Objective	An internship offers a large number of benefits to young minds who actually want to expand their horizon. It enables them to get their job easily. It also offers a platform for them to know their potential and a sense of confidence. An internship helps them to equip their domain knowledge with analytical intelligence. It is highly useful for interns who want to train their minds.							
Unit	Course Content						Knowledge Levels	Sessions
1	The student should undergo 15 Days of Internship training any individual students have to identify the Institution / Industry / University of their choice during the vacation which falls at the end of the 4th Semester.							
2	The training bridges the gap between the theoretical knowledge gained in college and the practical application of the same in the industry / company / stores. The student will have a better exposure about the workplace and its nuances.							
3	Schedule of visit to be made by the staff is to be prepared by the HOD / Staff-in-charge.							
4	The trainees should strictly adhere to the rules and regulations and office timings of the institutions to which they are attached.							
5	A Staff member of a Department (Guide) will be monitoring the performance of the Candidate.							
6	The students should maintain notes where the student should record his details of the training.							
7	The trainees have to obtain a certificate on successful completion of the internship from the chief executive of an organization.							
8	The student should submit an attendance certificate to the institution for 15 days internship training from an organization.							
9	Internship Training Report (30 – 50 Pages) should be prepared by the student and submitted in a month's time and at the end of the semester student should present the report with a power point presentation.							
10	Industrial training reports shall be prepared by the students under the supervision of the faculty of the department.							

11	Industrial training report must contain the following: Cover page Copy of training certificate, Profile of an industry report about the work undertaken by them during the tenure of training observation about the concern findings.		
12	Practical Viva – Voce examination will be conducted with internal & external examiners at the end of the 5th semester. Report Evaluation: External Viva-Voce examination will be conducted, and the Report Evaluation is Highly Commended/ Commended.		
Course Outcome	CO1: Apply new techniques and ideas in the analysis field of Statistics.	K1	
	CO2: Analyse the results of new initiatives.	K2	
	CO3: Create a new work plan with greater output	K3	
	CO4: Create a framework of work execution ideas	K4	
	CO5: Create a detailed technical work plan and terminologies to be followed in the industry.	K5	

B.Sc., Statistics Syllabus LOCF-CBCS With Effect From 2021-2022 Onwards								
Course Code	Course Title	Course Type	Sem	Hours	L	T	P	C
21M5USTIS1	INTERNSHIP	INTERNSHIP	IV	-	-	-	-	-

CO-PO Mapping

CO Number	P01	P02	P03	P04	P05	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S	S	S	S	M	S	M	S	M	S
CO2	M	S	S	M	S	M	S	S	S	S
CO3	S	S	S	S	S	S	S	S	S	S
CO4	S	S	S	S	S	S	S	S	S	S
CO5	M	S	M	S	S	S	S	S	S	S
Level of Correlation between CO and PO	L LOW	M MEDIUM		S STRONG						

Tutorial Schedule	-
Teaching and Learning Methods	-
Assessment Methods	CIA: Highly Commended/Commended. 1. Notes and Training Report / Viva-Voce

Designed By	Verified By	Approved By
(DR. S. MOHAN PRABHU)		Dr. S. [illegible]

B.Sc., Statistics Syllabus LOCF-CBCS With Effect From 2021-2022 Onwards								
Course Code	Course Title	Course Type	Sem	Hours	L	T	P	C
21M6USTC07	DESIGN OF EXPERIMENTS	CORE THEORY - VII	VI	6	4	2	0	5
Objective	1. To learn the basic principles of the design of statistical experiments and models. 2. To acquire knowledge in the analysis of variance in statistical field experiments. 3. To impart knowledge about CRD, RBD, LSD, and factorial design with suitable real-life examples. 4. To Study the interaction effect among factors through factorial experiments. 5. To analyze the data relating to agriculture, biological sciences, and industry.							
Unit	Course Content						Knowledge Levels	Sessions
I	Definition and Assumptions – Concept of Cochran's Theorem – ANOVA – One-way and Two-way classifications with one observation per cell – Experimental error.						K1-K4	11L+1T
II	Need, Terminology, Randomization, Replication, and Local Control Techniques – Size of experimental unit – Methods of determination of experimental units – Completely Randomized Design (CRD) and its analysis – Randomized Block Design (RBD) and its analysis – Latin Square Design (LSD) and its analysis.						K1-K4	12L
III	Multiple Range Tests – Newman-Keul's Test, Duncan's Multiple Range Test, Tukey's Test – Transformation – Square root, Angular and Log Transformations.						K1-K4	12L
IV	Concept of Missing Plot Techniques - Estimation of missing values in RBD and LSD – Least square method of estimating one missing observation in RBD and LSD – Two missing observations in RBD and LSD.						K1-K4	12L
V	Main and Interaction Effects – Definitions of contrast and orthogonal contrast – Analysis of 2^2, 2^3 and 3^2 Factorial experiments – Principles of Confounding – Partial and complete confounding in 2^3 and its analysis.						K1-K4	12L

Course Outcome	CO1: To gain knowledge about the principles of experimentation and employ suitable designs in experiments.	K1	
	CO2: To solve the problems related to getting basic knowledge of the one-way way and two-way analysis of variance and to compare more than two treatments with the help of F distribution.	K2	
	CO3: To acquire the knowledge of post-ANOVA tests and to use appropriate experimental designs for analyzing experimental data.	K3	
	CO4: An executed Estimate of the missing observations in RBD and real-life situations.	K4	
	CO5: To understand the advantages, disadvantages, and efficiency of various designs.	K5	

Learning Resources	
Text Books	1. Montgomery, D.C. (2012). Design and analysis of Experiments. John Wiley & Sons, New Delhi.
Reference Books	1. Montgomery, D.C. (2012). Design and analysis of Experiments. John Wiley & Sons, New Delhi. 2. Kapoor V. K and Gupta S. P (1978), Fundamentals of Applied Statistics, Sultan Chand & Sons, New Delhi. 3. Goon A. M, Gupta M. K and Das Gupta B (1994), Fundamentals of Statistics V-II, The World Press Ltd., Calcutta.
Website Link	1. http://users.stat.umn.edu/~gary/book/fcdae.pdf 2. https://www.mi.fu-berlin.de/inf/groups/agtech/teaching/2012_SS/L_19540_Modeling_and_Performance_Analysis_with_Simulation/13.pdf 3. http://www.stat.tugraz.at/courses/files/DoE.pdf 4. https://www3.nd.edu/~jnahas/DoE_I_Experimental_Design_V3.pdf 5. https://www.itl.nist.gov/div898/handbook/pmd/section3/pmd31.htm

B.Sc., Statistics Syllabus LOCF-CBCS With Effect From 2021-2022 Onwards								
Course Code	Course Title	Course Type	Sem	Hours	L	T	P	C
21M6USTC07	DESIGN OF EXPERIMENTS	CORE THEORY - VII	VI	6	4	2	0	5

CO-PO Mapping

CO Number	P01	P02	P03	P04	P05	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	L	S	S	L	M	S	M	S	M	L
CO2	M	M	M	M	S	M	S	S	S	M
CO3	S	M	M	S	S	L	S	M	S	S
CO4	S	M	M	S	S	L	S	M	S	S
CO5	M	M	M	S	S	L	S	M	S	S
Level of Correlation between CO and PO	L- LOW	M- MEDIUM		S- STRONG						

Tutorial Schedule	Chalk and Board Teaching, PowerPoint Presentation, Group Discussion, and Virtual Learning
Teaching and Learning Methods	Chalk and Board Teaching, PowerPoint Presentation, and Virtual Learning
Assessment Methods	Assignments, Seminar, Group Discussions, Unit Tests, Internal Examinations and Semester Examinations

Designed By	Verified By	Approved By
(P. GOMATHI)	(DR.S. MOHAN PRABHU)	

Curriculum Development Cell MCAS Autonomous Rasipuram

B.Sc., Statistics Syllabus LOCF-CBCS With Effect From 2021-2022 Onwards								
Course Code	Course Title	Course Type	Sem	Hours	L	T	P	C
21M6USTC08	STATISTICAL QUALITY CONTROL	CORE THEORY - VIII	VI	6	4	2	0	5
Objective	1. To enable the students to understand the concept of quality, process, and product control using control chart techniques and sampling inspection plan. 2. To have an idea about quality management, quality of conformance, quality movement and standardization of quality. 3. To learn the principle of acceptance sampling, single, double and sequential sampling plan. 4. To reduce the number of rejects and save the cost of material. 5. To apply various sampling plans in industrial environment to study, analyze and control the quality of products							
Unit	Course Content						Knowledge Levels	Sessions
I	Need for SQC – Role of frequency distribution – Statistical basis for SQC – variable control charts – , R and charts.						K1-K3	12L
II	Control Chart for attributes – np, p, c and u chart – Group control chart, OC and ARL of control charts, CUSUM charts using V- mark and decision intervals (concepts only)						K1-K3	12L
III	Acceptance sampling for Attributes – Single sampling plan – Double sampling plan – OC, AOQ, ASN and ATI curves – sequential sampling plan and their properties.						K2-K4	12L
IV	Quality system standards – ISO 9000- Elements of ISO – 9000 – Benefits of ISO 9000- Elements of a quality system – Documentation ISO 9000 accreditation.						K1-K3	12L
V	Reliability concepts and measures, components and systems, reliability function, hazard rate, common life distribution viz, exponential, gamma and weibull.						K1-K3	12L
Course Outcome	CO1: To understand the concepts of the basic of Statistical Quality Control and its tools.						K1	
	CO2: To evaluate the methods and processes of production and suggest further improvements in their functioning.						K2	
	CO3: To know about the practical applications of quality control techniques and apply them in industry.						K3	
	CO4: To analyze and understand the principles of quality, specification limits, tolerance limits and concepts of SQC.						K4	
	CO5: To understand and compare the control charts for variables and attributes and interpret them.						K5	

Learning Resources	
Text Books	1. Gupta, S.C., and Kappor, V. K. (2019). Fundamentals of Applied Statistics, Fourth Edition, Sultan Chand & Sons (Publisher), New Delhi, India.
Reference Books	1. William G. Cochran (1990) Sampling Techniques (Third Edition), John Wiley Sons, New York. 2. Goon, A. M, Gupta, M. K and Dasgupta, B. (2008). Fundamentals of Statistics, Volume - I, World Press Ltd, Calcutta.
Website Link	1.http://bmepedia.weebly.com/uploads/2/6/6/8/26683759/unit_4_quality_control.pdf 2.https://www.win.tue.nl/~adibucch/2WS10/SPClecturenotes.pdf 3.https://nptel.ac.in/courses/116/102/116102019/ 4.https://nptel.ac.in/content/storage2/courses/112101005/downloads/Module_5_Lecture_3_fina l.pdf

B.Sc., Statistics Syllabus LOCF-CBCS With Effect From 2021-2022 Onwards								
Course Code	Course Title	Course Type	Sem	Hours	L	T	P	C
21M6USTC08	STATISTICAL QUALITY CONTROL	CORE THEORY - VIII	VI	6	4	2	0	4

CO-PO Mapping

CO Number	P01	P02	P03	P04	P05	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	M	S	S	M	L	S	M	S	M	L
CO2	S	S	S	M	S	S	S	M	S	M
CO3	M	S	S	M	S	S	S	M	S	M
CO4	S	M	L	S	S	L	M	M	S	S
CO5	S	M	L	S	S	M	M	L	S	S
Level of Correlation between CO and PO	L- LOW	M- MEDIUM		S- STRONG						

Tutorial Schedule	Chalk and Board Teaching, PowerPoint Presentation, Group Discussion and Virtual Learning
Teaching and Learning Methods	Chalk and Board Teaching, PowerPoint Presentation, and Virtual Learning
Assessment Methods	Assignments, Seminar, Group Discussion, Unit Test, Internal Examinations and Semester Examinations

Designed By	Verified By	Approved By
CA. SATHYA)	CDR. S. MOHAN PRABHU)	DD. S. SHANTHI

Curriculum Development Cell MCAS (Autonomous) Rasipuram

B.Sc., Statistics Syllabus LOCF-CBCS With Effect From 2021-2022 Onwards								
Course Code	Course Title	Course Type	Sem	Hours	L	T	P	C
21M6USTP05	PRACTICAL STATISTICS - V	CORE PRACTICAL - V	VI	3	0	0	3	2
Objective	To enable the students to gain practical knowledge in R Programming for data analysis.							

S.No.	List of Experiments (By Using SPSS)	Knowledge Levels	Sessions
1	Analysis of Variance- One Way (Equal)	K2-K4	
2	Analysis of Variance- One Way (Unequal)	K2-K4	
3	Analysis of Variance- Two Way	K2-K4	
4	Completely Randomized Design	K2-K4	
5	Randomized Block Design	K2-K4	
6	Latin Square Design	K2-K4	
7	Missing Observations in CRD	K2-K4	
8	Missing Observations in RBD	K2-K4	
9	Missing Observations in LSD	K2-K4	
10	Factorial Experimental Design	K2-K4	
Course Outcome	CO1: To gain knowledge about the principles of experimentation and employ suitable designs in experiments.		
	CO2: To solve the problems related to get basic knowledge of one way and two-way analysis of variance and to compare more than two treatments with the help of F distribution.		
	CO3: To acquire the knowledge of post ANOVA tests and to use appropriate experimental designs for analyzing experimental data.		
	CO4: An executed Estimate the missing observations in RBD and LSD in real life situations.		
	CO5: To understand the advantages, disadvantages, and efficiency of various designs.		

Learning Resources	
Text Books	1. Kanti Swarup, Gupta P. K, Man Mohan (1980), Operations Research, Sultan Chand and sons, New Delhi.
Reference Books	1. Goon, A.M., Gupta, M. K., Dasgupta, B. (2016): Fundamentals of Statistics, Vol. I, World Press, Kolkata, India. 2. Holcomb, Z. C. (2017). Fundamentals of Descriptive Statistics, Routledge, New York, US.
Website Link	1. https://www.statisticshowto.datasciencecentral.com/ 2. https://online.stat.psu.edu/stat504/node/209/ 3. https://www.itl.nist.gov/div898/handbook/apr/section2/apr233.htm 4. https://www.cimt.org.uk/projects/mepres/alevel/stats_ch7.pdf 5. https://www.investopedia.com/terms/c/chi-square-statistic.asp

B.Sc., Statistics Syllabus LOCF-CBCS With Effect From 2021-2022 Onwards								
Course Code	Course Title	Course Type	Sem	Hrs	L	T	P	C
21M6USTP05	PRACTICAL STATISTICS - V	CORE PRACTICAL - V	VI	3	0	0	3	2

CO-PO Mapping

CO Number	P01	P02	P03	P04	P05	PSO1	PSO2	PSO 3	PSO4	PSO5
CO1	M	L	M	M	S	M	M	S	S	S
CO2	M	S	S	M	M	M	S	S	M	M
CO3	S	S	M	M	M	M	L	S	S	M
CO4	L	S	M	M	M	L	M	M	M	M
CO5	M	S	M	M	M	M	M	M	M	M
Level of Correlation between CO and PO	L-LOW	M-MEDIUM		S-STRONG						

Tutorial Schedule	Chalk and Board Teaching, PowerPoint Presentation, Group Discussion, and Virtual Learning
Teaching and Learning Methods	Chalk and Board Teaching, PowerPoint Presentation, and Virtual Learning
Assessment Methods	Assignments, Seminar, Group Discussion, Unit Test, Internal Examinations and Semester Examinations

Designed By	Verified By	Approved By

CDR. S. MOHAN PRABHU

Curriculum Development Cell MCAS (Autonomous) Rasipuram

B.Sc., Statistics Syllabus LOCF-CBCS With Effect From 2021-2022 Onwards								
Course Code	Course Title	Course Type	Sem	Hours	L	T	P	C
21M6USTP06	PRACTICAL STATISTICS - VI	CORE PRACTICAL - VI	VI	3	0	0	3	2
Objective	To enable the students to gain practical knowledge in R Programming for data analysis.							

S. No.	List of Experiments (Programmes By Using R)	Knowledge Levels	Sessions
1	Construct the Xbar chart	K2-K4	
2	Construct the R chart	K2-K4	
3	Construct the control chart for the number of defectives (np or d – chart)	K2-K4	
4	Construct the control chart for the number of defects per unit (c – chart)	K2-K4	
5	Construct the OC Curve	K2-K4	
6	Construct the Average Outgoing Quality Limit	K2-K4	
7	Construct and interpret a Pareto chart	K2-K4	
8	Construct and interpret a fishbone diagram	K2-K4	
9	Construct and interpret a mean and range chart	K2-K4	
10	Construct and interpret a percent defective and a c-bar chart	K2-K4	
11	Construct and interpret a percent defective and a c-bar chart	K2-K4	
12	Construct an operating characteristic curve for various sampling plans.	K2-K4	
Course Outcome	CO1: To understand the concepts of the basic of Statistical Quality Control and its tools.		
	CO2: To evaluate the methods and processes of production and suggest further improvements in their functioning.		
	CO3: To know about the practical applications of quality control techniques and apply them in industry.		
	CO4: To analyze and an understand the principles of quality, specification limits, tolerance limits and concepts of SQC.		
	CO5: To understand and compare the control charts for variables and attributes and interpret them.		

Learning Resources	
Text Books	1. Kanti Swarup, Gupta P. K, Man Mohan (1980), Operations Research, Sultan Chand and Sons, New Delhi.
Reference Books	1. Goon, A.M., Gupta, M. K., Dasgupta, B. (2016): Fundamentals of Statistics, Vol. I, World Press, Kolkata, India. 2. Holcomb, Z. C. (2017). Fundamentals of Descriptive Statistics, Routledge, New York, US.
Website Link	1. https://www.statisticshowto.datasciencecentral.com/ 2. https://online.stat.psu.edu/stat504/node/209/ 3. https://www.itl.nist.gov/div898/handbook/apr/section2/apr233.htm 4. https://www.cimt.org.uk/projects/mepres/alevel/stats_ch7.pdf 5. https://www.investopedia.com/terms/c/chi-square-statistic.asp

B.Sc., Statistics Syllabus LOCF-CBCS With Effect From 2021-2022 Onwards								
Course Code	Course Title	Course Type	Sem	Hours	L	T	P	C
21M6USTP06	PRACTICAL STATISTICS - VI	CORE PRACTICAL - VI	VI	3	0	0	3	2

CO-PO Mapping

CO Number	P01	P02	P03	P04	P05	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	M	L	M	M	S	M	M	S	S	S
CO2	M	S	S	M	M	M	S	S	M	M
CO3	S	S	M	M	M	M	L	S	S	M
CO4	L	S	M	M	M	L	M	M	M	M
CO5	M	S	M	M	M	M	M	M	M	M
Level of Correlation between CO and PO	L-LOW	M-MEDIUM		S-STRONG						

Tutorial Schedule	Chalk and Board Teaching, Power Point Presentation, Group Discussion and Virtual Learning
Teaching and Learning Methods	Chalk and Board Teaching, Power Point Presentation and Virtual Learning
Assessment Methods	Assignment, Seminar, Group Discussion, Unit Test, Internal Examinations and Semester Examinations

Designed By	Verified By	Approved By
(DR. S. MOHAN PRABHU)		Dr. S. Shanthi

Curriculum Development Cell MCAS Autonomous Rasipuram

B.Sc., Statistics Syllabus LOCF-CBCS With Effect From 2021-2022 Onwards								
Course Code	Course Title	Course Type	Sem	Hours	L	T	P	C
21M6USTPR1	PROJECT WORK	PROJECT	VI	-	-	-	-	3
Objective	To demonstrate a piece of technical knowledge in their selected project topic. Undertake problem identification, formulation, and solution. Develop plans with relevant people to achieve the goals of the project.							
Unit	Course Content						Knowledge Levels	Sessions
Cover Page & Title Page	Cover Page & Title Page: The fonts and locations of various items on this page should be exactly as shown in a specimen copy.							
Inside cover page	Inside cover page Same as a cover page.							
Bonafide Certificate	Bonafide Certificate: The bonafide Certificate shall be in double line spacing using Font Style Times New Roman and Font Size 14.							
Acknowledgment	Acknowledgment: This should not exceed one page.							
Abstract	Abstract: The abstract should be one-page synopsis of the project report typed with double line spacing, Font Style Times New Roman, and Font Size 14.							
Contents	Table of Contents: The table of contents should list all headings, and subheadings after the table of contents page, as well as any titles preceding it. The title page and Bonafide Certificate will not find a place among the items listed in the Table of Contents. One-and-a-half spacing should be adopted for typing the matter under this head.							
Tables	List of Tables: The list should use exactly the same captions as they appear above the tables in the text. 1.5 spacing should be adopted for typing the matter under this head.							
Figures	List of Figures: The list should use exactly the same captions as they appear below the figures in the body of the text. One-and-a-half spacing should be adopted for typing the matter under this head. All charts, graphs, maps, photographs, and diagrams should be designated as figures. X and Y axes titles are mandatory for all the graphs.							
Symbols	List of Symbols, Abbreviations, and Nomenclature: 1.5 spacing should be adopted or typing the matter under this head. Standard symbols, abbreviations, etc. should be used.							

Chapter	Chapter I Introduction: Statement of the Problem, Significance, Need for the Study, Objectives		
Chapter	Chapter II Review of Literature		
Chapter	Chapter III Methodology: Tools Used, Procedures, Hypothesis.		
Chapter	Chapter IV Results and Discussion: Tables and Figures, Statistical Presentations, Hypothesis Testing.		
Chapter	Chapter V Summary and Conclusion		
Chapter	Chapter VI Scope of the Project		
References	References		
Guidelines For Project Preparation			
Numbering	Every page in the project report, except the project report title page, must be accounted for and numbered. The page numbering, starting from acknowledgments and till the beginning of the introductory chapter, should be printed in small Roman Letters, i.e, i, ii, iii, iv, ... The page number of the first page of each chapter should not be printed (but must be accounted for). All page numbers from the second page of each chapter should be printed using Arabic numerals, i.e. 1,2,3,4,5, ... All printed page numbers should be located at the right corner at the bottom of the page.		
Chapters	Use only Arabic numerals. Chapter numbering should be centered on the top of the page using a large bold print. <Size 14><Times New Roman>		
Text			
Regular Text	Regular Text: Times Roman 12 pts and normal print.		
Chapter Heading	Chapter Heading: Times Roman 14 pts. Bold and capital.		
Section Headings	Section Headings: Times Roman 12 pts. Bold and capital.		
Subsection Headings	Subsection Headings: Times Roman 12 pts. bold print and Leading capitals i.e, only the first letter in each word should be in the capital.		

	Provide double spaces between: (a) From top of page to chapter title, (b) Chapter title and first sentence of a chapter, Use single spacing. (a) In footnotes and endnotes for text. (b) In explanatory notes for tables and figures. (c) In text corresponding to bullets, listings, and quotations in the main body of seminar/project report. (d) Use single space in references and double space between references.		
Tables	All tables should have sharp lines, drawn in black ink, to separate rows/columns as and when necessary. Tables should follow immediately after they are referred to for the first time in the text. Splitting of paragraphs, for including tables on a page, should be avoided. Provide double spaces on the top and the bottom of all tables to separate them from the regular text, wherever applicable. The title of the table etc. should be placed on the top of the table. The title should be centered with respect to the table. The titles must be in the same font as the regular text and should be single spaced.		
Figures	All figures, drawings, and graphs should be drawn in black ink with sharp lines and adequate contrast between different plots if more than one plot is present in the same graph. The title of the figure etc. should be placed on the bottom of the figure. Figures should follow immediately after they are referred to for the first time in the text. Splitting of paragraphs, for including figures on a page, should be avoided. Provide double spaces on the top and the bottom of all figures to separate them from the regular text, wherever applicable. Figures should be centered with respect to the figure. The titles must be in the same font as the regular text and should be single-spaced. The title format is given below: Fig. <blank><chapter number>. <serial number><left indent><figure		

Special Text	Special Text- Italics/Superscript /Subscript/Special symbols, etc., as per necessity. Special text may include footnotes, endnotes, physical or chemical symbols, mathematical notations, etc.		
Sections	Sections: Use only Arabic numerals with decimals. Section numbering should be left justified using bold print. Example: 1.1, 1.2, 1.3, etc.		
Sub Sections	Sub Sections: Use only Arabic numerals with two decimals. Subsection numbering should be left Justified using bold print. Example: 1.1.1, 1.1.2, 1.1.3, etc.		
References	Use only Arabic numerals. Serial numbering should be carried out based on the Alphabetical order of surname or last name of the first author. The format is written like the author's name followed by the year followed by the title of the work followed by details of the journal. Same font as regular text, serial number and all author's names to be in bold print. Title and Journal names should be in italics. One Author: Williams, G. State and Society in. Onco State, Nigeria, Afrographika, 1980. Two Authors: Phizacklea, A & Miles, R. Labour and Racism. London, Routledge & Kegan Paul, 1980. More than Three Authors: O'Donovan, P., et al. The United States. Amsterdam, Time-Life International, 1966.		
Typing Instructions	Typing Instructions: The impression on the typed copies should be black in color. One-and-a-half spacing should be used for typing the general text. The general text shall be typed in the Font style 'Times New Roman' and Font size 12. Use A4 (210 mm X 297 mm) bond un-ruled paper (80 gsm) for all copies submitted. Use one side of the paper for all printed/typed matter.		
Justification	Justification: The text should be fully justified		
Margins	Margins: The margins for the regular text are as follows LEFT - 1.5" RIGHT - 1" TOP - 1" BOTTOM - 1"		
Paragraph Spacing	Use 6 pts before & 6 pts after paragraphs. All paragraphs in the seminar/project report should be left justified completely, from the first line to the last line. Use 1.5 spacing between the regular text and quotations.		

Page Dimension & Binding Specifications	The project report should be prepared in A4 size. The dissertation shall be properly bound; The bound front cover should indicate in Silver and embossed letter.		
Course Outcome	Co:1 Identification of research idea	K1	
	Co:2 Analyze problem-solving skills	K2	
	Co:3 Analyze sources for the conduct of Research	K3	
	Co:4 Evaluate the research report	K4	
	Co:5 Create the research report	K5	

B.Sc., Statistics Syllabus LOCF-CBCS With Effect From 2021-2022 Onwards								
Course Code	Course Title	Course Type	Sem	Hours	L	T	P	C
21M6USTPR1	PROJECT WORK	PROJECT	VI	-	-	-	-	4

CO-PO Mapping

CO Number	P01	P02	P03	P04	P05	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	M	S	S	M	S	S	M	S	M	S
CO2	S	S	S	S	S	S	S	M	S	S
CO3	M	S	S	S	S	S	S	S	S	S
CO4	S	M	S	S	S	S	M	S	S	S
CO5	S	S	S	S	S	S	S	S	S	S
Level of Correlation between CO and PO	L LOW	M MEDIUM		S STRONG						

Tutorial Schedule	-
Teaching and Learning Methods	-
Assessment Methods	1. Internal Assessment : 40 Marks 2. External Assessment : 60 Marks 3. Total : 100 Marks

Designed By	Verified By	Approved By

(DR. S. MOHAN PRABHU)

Curriculum Development Cell MCAS Autonomous Rasipuram

B.Sc., Statistics Syllabus LOCF-CBCS With Effect From 2021-2022 Onwards								
Course Code	Course Title	Course Type	Sem	Hrs	L	T	P	C
21M6USTOE1	STATISTICS FOR COMPETITIVE EXAMINATION	SELF-STUDY ONLINE - COMPETITIVE EXAMINATION	VI	-	-	-	-	2
Objective	Creating awareness of competitive examinations among students. Imparting knowledge about appearing for Competitive Examination and impacts and developing an attitude toward appearing for such exams.							
	Course Content						Knowledge Levels	Sessions
	An assemblage of different topics related to Statistics in particular, Descriptive Statistics, Probability Theory, Distribution Theory, Statistical Inference, Operations Research, Sampling Techniques, Time Series and Index Number, Econometrics, Design Of Experiments, Statistical Quality Control, Bio-Statistics, and Survival Analysis. A major emphasis has been put forth to include recent developments in the subjects. This course aims to give a holistic view of all the topics which comprised of some factual text points, and multiple choice questions (MCQ), it is extremely suitable for students pursuing the r higher degree in University/institute for their entrance exams, students preparing for various national and state level competitive entrance exams such as TNPSC, IBPS, UPSC, RRB, SSC, GATE, TRB.						K1-K6	
Rules for Creating MCQ Patterns								
1	Objective-type online examinations will be conducted at the end of the 6th semester.						K1-K6	
2	Questions must be taken from all previous question papers of TNPSC, IBPS, UPSC, RRB, SSC, GATE, and TRB.						K1-K6	
3	Test critical thinking: Multiple choice questions to test superficial knowledge. Learners interpret facts, evaluate situations, explain cause and effect, make inferences, and predict results.						K1-K6	

4	Emphasize Higher-Level Thinking: Use memory-plus application-oriented questions. These questions require students to recall principles, rules, or facts in a real-life context.	K1-K6	
	Ex.1 Ability to Justify Methods and Procedures: Find the median of the call received on 7 consecutive days 11, 13, 17, 13, 23, 25, 19. a. 13 b.23 c. 25 d. 17 Ex.2 Ability to Interpret Cause-and-Effect Relationships Primary data and_____data are the same. a. Grouped b. Secondary data c. Ungrouped d. None of these	K1-K6	
5	Mix up the order of the correct answers. Keep correct answers in random positions and don't let them fall into a pattern that can be detected.	K1-K6	
6	Use a Question Format: Multiple-choice items to be prepared as questions. (Rather than incomplete statements) Incomplete Statement Format: The capital of California is in Direct Question Format_____ Less Effective. In which of the following cities is the capital of California? -This is the best format.	K1-K6	
7	Keep Option Lengths Similar: Avoid making your correct answer the long or short answer.	K1-K6	
8	Avoid the "All the Above" and "None of the Above" Options: Students merely need to recognize two correct options to get the answer correct.	K1-K6	
9	HODs instruct to the faculty to prepare a minimum 500 questions booklet (cumulatively for each programme) with solutions and circulate it among the students.	K1-K6	
10	Each Department to prepare the Questions (MCQ pattern with four answers) and submit to ICT.	K1-K6	

B.Sc., Statistics Syllabus LOCF-CBCS With Effect From 2021-2022 Onwards								
Course Code	Course Title	Course Type	Sem	Hrs	L	T	P	C
21M6USTOE1	STATISTICS FOR COMPETITIVE EXAMINATION	SELF-STUDY ONLINE - COMPETITIVE EXAMINATION	VI	-	-	-	-	-

CO-PO Mapping

CO Number	P01	P02	P03	P04	P05	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S	S	S	S	M	S	M	S	M	S
CO2	M	S	S	M	S	M	S	S	S	S
CO3	S	S	S	S	S	S	S	S	S	S
CO4	S	S	S	S	S	S	S	S	S	S
CO5	M	S	M	S	S	S	S	S	S	S
Level of Correlation between CO and PO	L LOW	M MEDIUM		S STRONG						

Tutorial Schedule	-
Teaching and Learning Methods	Self-Study
Assessment Methods	100 Multiple choice questions through a computer-based online examination. Passing Minimum Marks:50%

Designed By	Verified By	Approved By
Anbarasan. M.		
[ANBARASAN. M]	(DR. S. MOHAN PRABHU)	

Curriculum Development Cell MCAS (Autonomous) Rasipuram

Course Outcome	CO1: Able to attend competitive examinations.	K1	
	CO2: Able to attend computer-based examinations.	K2	
	CO3: Understand the TNPSC, UPSC, and RRB statistics related to exams.	K3	
	CO4: Analyse all concepts in one examination.	K4	
	CO5: Apply the statistics concepts in Real Life.	K5	
Learning Resources	UG Level Textbooks		
Website Link	1.https://itfeature.com/statistics/mcqs-basic-statistics-1 2.https://itfeature.com/statistics/mcqs-basic-statistics-with-answers-2 3.https://www.javatpoint.com/statistics-mcq		

B.Sc., Statistics Syllabus LOCF-CBCS With Effect From 2021-2022 Onwards								
Course Code	Course Title	Course Type	Sem	Hrs	L	T	P	C
21M6USTS02	Biostatistics and Survival Analysis	SEC THEORY - 2	VI	2	2	0	0	2
Objective	1. To analyse censored data and its application in public health. 2. Estimate death probabilities by using the theory of competing risks in a cause-specific mortality study. 3. Need of conducting clinical trials for introducing new drug. 4. To compute probability of gametes in different generations under random mating.							
Unit	Course Content						Knowledge Levels	Sessions
I	Survival Analysis: Functions of survival times, survival distributions and their applications exponential, gamma, Weibull, Rayleigh, lognormal, death density function for a distribution having bath-tub shaped hazard function.						K1-K4	4L
II	Censoring Schemes: Type I, Type II and progressive or random censoring with biological examples.						K1-K4	4L
III	Estimation of mean survival time and variance of the estimator for Type I and Type II censored data with numerical examples. Non-parametric methods: Actuarial and Kaplan-Meier methods for estimating survival function and variance of the Estimator.						K1-K4	4L
IV	Competing Risk Theory: Indices for measurement of the probability of death under competing risks and their inter-relations. Estimation of probabilities of death using maximum likelihood principle and modified minimum Chi-square methods.						K1-K4	4L
V	Distribution of genotypes under random mating. Clinical Trials: Planning and design of clinical trials, Phase I, II and III trials. Blinding: Single, Double, Triple.						K1-K4	4L
Course Outcome	CO1: The fundamental concepts of survival functions and their interrelationship and Survival distributions and their applications.						K1	
	CO2: To solve the problems related handling censored data and estimating mean survival time.						K2	
	CO3: To acquire the knowledge of an actuarial and Kaplan-Meier methods (non-parametric methods).						K3	
	CO4: Competing Risk Theory. Dependent and independent risk and Simple Stochastic epidemic model.						K4	
	CO5: To basic concept of genetics and need of clinical drug trials.						K5	

Learning Resources	
Text Books	1. Biswas, S. (2007). Applied Stochastic Processes: A Biostatistical and Population Oriented Approach, Reprinted 2nd Ed., New Central Book Agency.
Reference Books	1. Elandt-Johnson R.C (1971). Probability model and Statistical Methods in Genetics, John Wiley & Sons. 2. Indrayan, A. (2008). Medical Biostatistics, 2nd Ed., Chapman and Hall/CRC.
Website Link	1. https://www.itl.nist.gov/div898/handbook/pmc/section4/pmc4.htm 2. https://stat.ethz.ch/education/semesters/ss2015/atsa/ATSA_Scriptum_v1_SS15.pdf 3. https://www.civilserviceindia.com/subject/Management/notes/index-numbers.html 4. https://thefactfactor.com/facts/management/statistics/index-number/1576/ 5. https://www.undp.org/content/dam/india/docs/human-development/Introduction%20to%20Indian%20Statistical%20System.pdf

B.Sc., Statistics Syllabus LOCF-CBCS With Effect From 2021-2022 Onwards								
Course Code	Course Title	Course Type	Sem	Hours	L	T	P	C
21M6USTS02	Biostatistics and Survival Analysis	SEC THEORY - II	VI	2	2	0	0	2

CO-PO Mapping

CO Number	P01	P02	P03	P04	P05	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	L	S	S	L	M	S	M	S	M	L
CO2	M	M	M	M	S	M	S	S	S	M
CO3	S	M	M	S	S	L	S	M	S	S
CO4	S	M	M	S	S	L	S	M	S	S
CO5	M	M	M	S	S	L	S	M	S	S
Level of Correlation between CO and PO	L-LOW	M-MEDIUM		S-STRONG						

Tutorial Schedule	Chalk and Board Teaching, PowerPoint Presentation, Group Discussion and Virtual Learning
Teaching and Learning Methods	Chalk and Board Teaching, PowerPoint Presentation and Virtual Learning
Assessment Methods	Assignments, Seminar, Group Discussion, Unit Test, Internal Examinations and Semester Examinations

Designed By	Verified By	Approved By
(P. PAINTAMIL SELVI)	(DR. S. MOHAN PRABHU)	(Dr. S. SUNDARAM)

Curriculum Development Cell MCAS (Autonomous) Rasipuram

B.B.A Allied Syllabus LOCF-CBCS with effect from 2021-2022 Onwards								
Course Code	Course Title	Course Type	Sem	Hours	L	T	P	C
21M1USTA01	BUSINESS MATHEMATICS AND STATISTICS - I	ALLIED - I	I	5	4	1	0	3
Objective	To introduce the mathematical, and statistical concepts and problems of measures of central tendency, dispersion and their development of analytical skills in business management.							
Unit	Course Content						Knowledge Levels	Sessions
I	Sequence and Series: Definition of Sequence - Series - Arithmetic Progression - Geometric Progression - Harmonic progression - Simple Problems.						K1-K4	12
II	Matrix: Definition of Matrices - Types of Matrices - Operations on Matrix - Determinant of Matrix - Inverse of a Matrix - Solving of linear equations - Matrix inverse method and Cramer's rule.						K1-K4	12
III	Collection Presentation of Statistical Data: Definition of Statistics - Scope and Limitations - Sources and Collection of data - Classification and Tabulation of data - Diagrams and graphs.						K1-K4	12
IV	Measures of Central Tendency: Definitions - Mean - Median - Mode - Geometric Mean - Harmonic Mean and Combined Mean - Merits and Demerits - Simple Problems.						K1-K4	12
V	Measures of Dispersion: Definition - Absolute and Relative Measures - Range - Quartile deviation - Mean Deviation and their Coefficients - Standard Deviation and Co-efficient of Variation.						K1-K4	12
Course Outcome	CO1: Remembering the basic concepts of sequence and series.						K1	
	CO2: Understand the formula and calculate matrix problems.						K2	
	CO3: Apply the nature of data and interpret the statistical data.						K3	
	CO4: Analyze the nature of data and interpret the measures of central tendency.						K4	
	CO5: Analyze the nature of data and interpret the measures of dispersion.						K4	
Learning Resources								
Text Books	1. Gupta. S. P & Gupta. M. P, Business Statistics, Sultan Chand & Sons, New Delhi.							
Reference Books	1. Pillai. R. S. N. And Bagavathi. V. (2005), Statistics, S. Chand & Company Ltd., New Delhi. 2. Sancheti. D. C. and Kapoor. V. K, Statistics - Theory, Methods & Applications, Sultan Chand & Sons, New Delhi.							
Website Link	1. https://www.maths.ed.ac.uk/~v1ranick/papers/matrices.pdf 2. http://www.cimt.org.uk/projects/mepres/alevel/fpure_ch6.pdf 3. https://www.tutorialspoint.com/statistics/ 4. https://www3.nd.edu/~dgalvin1/10120/10120_S17/Topic15_8p2_Galvin_2017_short.pdf 5. https://www3.nd.edu/~dgalvin1/10120/10120_S16/Topic16_8p3_Galvin.pdf							

B.B.A Allied Syllabus LOCF-CBCS with effect from 2021-2022 Onwards								
Course Code	Course Title	Course Type	Sem	Hours	L	T	P	C
21M1USTA01	BUSINESS MATHEMATICS AND STATISTICS - I	ALLIED - I	I	5	4	1	0	3

CO-PO Mapping

CO Number	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S	S	M	S	L	S	M	S	M	L
CO2	M	M	M	M	S	M	S	S	S	M
CO3	L	M	M	S	M	M	S	M	S	S
CO4	M	M	M	M	M	S	M	M	S	S
CO5	M	M	M	S	S	L	S	M	S	S
Level of Correlation between CO and PO	L LOW	M MEDIUM		S STRONG						

Tutorial Schedule	Group Discussion, Quiz and Group Activities
Teaching and Learning Methods	Chalk and Board Teaching, Power Point Presentation and Virtual Learning
Assesment Methods	Attendance, Assignment, Seminar, Unit Test, CIA-I, CIA-II and ESE

Designed By	Verified By	Approved By
P. Gomathi	DR-S. MOHAN PRABHU	

B.B.A Allied Syllabus LOCF-CBCS with effect from 2021-2022 Onwards								
Course Code	**Course Title**	**Course Type**	**Semester**	**Hours**	**L**	**T**	**P**	**C**
21M2USTA02	**BUSINESS MATHEMATICS AND STATISTICS - II**	**ALLIED - II**	**II**	**5**	**4**	**1**	**0**	**4**
Objective	To enable the students to understand the mathematical finance, interpolation problems, correlation and regression, methods of time series and methods of index numbers.							
Unit	**Course Content**						**Knowledge Levels**	**Sessions**
I	Mathematics in Finance: Simple and Compound Interest – Annuity – Present Value of Annuity – Sinking Fund – Percentages – Discounts.						**K1-K4**	**11+1**
II	Interpolation: Binomial Expansion Method, Newton's Forward, Backward Method and Lagrange's Method – Simple problems.						**K1-K4**	**12**
III	Correlation and Regression: Definition –Types and measures of Correlation – Scatter Diagram – Karl Pearson's Coefficient of Correlation – Spearman's Rank Correlation Coefficient – Regression - Regression Lines – Regression Equations.						**K2-K3**	**11+1**
IV	Time Series: Definition – Time Series Analysis – Components of Time Series – Measures of Secular Trend – Free Hand Method , Semi Average Method ,Moving Average Method and Method of Least Square – Measures of Seasonal Variation - Simple Average Method.						**K1-K4**	**12**
V	Index Numbers: Definition – Construction of Index Number – Unweighted and Weighted Index Number – Fixed and Chain Base Index Number – Test for Time Reversal and Factor Reversal Tests – Cost of Living Index Number.						**K1-K4**	**12**
Course Outcome	CO1: Understand the scope and necessity of mathematical finance.						**K2**	
	CO2: Apply the formula and calculate interpolation problem.						**K3**	
	CO3: Understand the scope and necessity of correlation and regression problems.						**K2**	
	CO4: Analyze the nature of data and interpret the time series problems.						**K4**	
	CO5: Analyze the nature of data and interpret the index number problems.						**K4**	

Learning Resources	
Text Books	1. Gupta. S. P. and Gupta. P.K. Business Statistics and Business Mathematics, Sultan Chand & Company Ltd., New Delhi.
Reference Books	1. Gupta. S. P. (2001), Statistical Methods, Sultan Chand & Sons. 2. Vittal P. R., Business Mathematics and Statistics, Margham Publications, Chennai. 3. Navaneetham. P, Business Mathematics and Statistics, Jai Publishers.
Website Link	1. https://www.surveysystem.com/correlation.htm 2. https://www.academia.edu/2191454/Chapter5_Index_number 3. https://www.itl.nist.gov/div898/handbook/pmc/section4/pmc4.htm

B.B.A Allied Syllabus LOCF-CBCS with effect from 2021-2022 Onwards								
Course Code	Course Title	Course Type	Semester	Hours	L	T	P	C
21M2USTA02	BUSINESS MATHEMATICS AND STATISTICS - II	ALLIED - II	II	5	4	1	0	4

CO-PO Mapping

CO Number	P01	P02	P03	P04	P05	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	L	S	S	S	M	S	M	S	M	L
CO2	M	M	M	M	S	M	S	S	S	M
CO3	L	M	M	S	M	M	S	M	S	S
CO4	M	M	M	M	M	L	M	M	S	S
CO5	S	M	M	S	S	M	S	M	S	S

Level of Correlation between CO and PO	L - Low	M - Medium	S - Strong

Tutorial Schedule	Group Discussion, Quiz and Group Activities
Teaching and Learning Methods	Chalk and Board Teaching, Power Point Presentation and Virtual Learning
Assessment Methods	Attendance, Assignment, Seminar, Unit Test, CIA-I, CIA-II and ESE

Designed By	Verified By	Approved By
P. Leomathy		A. L. Sam

Curriculum Development Cell MCAS Autonomous Rasipuram

B.Com and B.Com Computer Application Allied Syllabus LOCF-CBCS with effect from 2021-2022 Onwards								
Course Code	Course Title	Course Type	Sem	Hours	L	T	P	C
21M3USTA03	BUSINESS STATISTICS - I	ALLIED - I	III	4	3	1	0	4
Objective	To expose and familiarize the students with basic concepts of statistics and measures of central tendency, measures of dispersion, correlation,regression, methods of index numbers and tme series.							
Unit	Course Content						Knowledge Levels	Sessions
I	Collection, Presentation of Data & Measures of Central Tendency: Introduction - Types of Data - Classification and Tabulation of Statistical Data - Definitions - Mean - Median - Mode - Geometric Mean - Harmonic Mean and Combined Mean and Simple Problems.						K1-K4	12
II	Measures of Dispersion: Definitions - Range - Quartile Deviation - Mean Deviation and their Co-efficient - Standard Deviation and Coefficient of Variation - Measure of Skewness - Karl Pearson's and Bowley's Coefficient of Skewness and Simple Problems.						K2-K4	12
III	Correlation and Regression: Definitions - Types and Measures of Correlation - Scatter Diagram - Karl Pearson's Coefficient of Correlation - Spearman's Rank Correlation Coefficient - Regression Analysis - Regression Lines and Regression Equations and Simple Problems.						K2-K4	12
IV	Index Numbers: Definition and Uses of Index Numbers - Construction of Index Numbers - Simple and Weighted Index Numbers - Time Reversal and Factor Reversal Tests - Fixed and Chain Base Index - Cost of Living Index Numbers and Simple Problems.						K1-K4	12
V	Time Series: Definition - Components and Uses of Time Series - Measures of Secular Trend -Measure of Seasonal Variation - Method of Simple Average only and Simple Problems.						K1-K4	12
Course Outcome	CO1: Remembering the scope and necessity of statistics and measures of central tendency.						K1	
	CO2: Understand the formula and calculate measures of dispersion.						K2	
	CO3: Analyze the nature of data and interpret the correlation and regression.						K3	
	CO4: Analyze the nature of data and interpret the concept of index numbers.						K4	
	CO5: Analyze the nature of data and interpret the concept of time series.						K4	
Learning Resources								
Text Books	1. Gupta. S. P & Gupta. M. P, Business Statistics, Sultan Chand & Sons, New Delhi.							
Reference Books	1. Pillai. R. S. N. And Bagavathi. V. (2005), Statistics, S. Chand & Company Ltd., New Delhi. 2. Sancheti. D. C. and Kapoor. V. K, Statistics - Theory, Methods & Applications, Sultan Chand & Sons, New Delhi. 3. Kapoor. V. K, Fundamentals of Statistics for Business and Economics, Sultan Chand & Sons, New Delhi.							
Website Link	1. https://www.tutorialspoint.com/statistics/ 2.https://www.surveysystem.com/correlation.htm 3. https://www.investopedia.com/terms/r/regression.asp 4. https://www.academia.edu/2191454/Chapter5_Index_number 5. https://www.itl.nist.gov/div898/handbook/pmc/section4/pmc4.htm							

B.Com and B.Com Computer Application Allied Syllabus LOCF-CBCS with effect from 2021-2022 Onwards								
Course Code	Course Title	Course Type	Sem	Hours	L	T	P	C
21M3USTA03	BUSINESS STATISTICS - I	ALLIED - I	III	4	3	1	0	4

CO-PO Mapping

CO Number	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	L	S	S	S	M	S	M	S	M	L
CO2	M	M	M	M	S	M	S	S	S	M
CO3	L	M	M	S	M	M	S	M	S	S
CO4	M	M	M	M	M	S	M	M	S	S
CO5	S	M	M	S	S	L	S	M	S	S
Level of Correlation between CO and PO	L-LOW	M-MEDIUM		S-STRONG						

Tutorial Schedule	Group Discussion, Quiz and Group Activities
Teaching and Learning Methods	Chalk and Board Teaching, Power Point Presentation and Virtual Learning
Assesment Methods	Attendance, Assignment, Seminar, Unit Test, CIA-I, CIA-II and ESE

Designed By	Verified By	Approved By
P. KEERTHANA	DR. S. MOHAN PRABHU	

B.Com and B.Com Computer Application Allied Syllabus LOCF-CBCS with effect from 2021-2022 Onwards								
Course Code	**Course Title**	**Course Type**	**Semester**	**Hours**	**L**	**T**	**P**	**C**
21M4USTA04	**BUSINESS STATISTICS - II**	**ALLIED - II**	**IV**	**4**	**4**	**0**	**0**	**4**
Objective	To expose and familiarize the students with basic concepts of matrix, sequence and series, concept of probability, methods of linear programming problems, methods of transportation and assignment problem.							

Unit	Course Content	Knowledge Levels	Sessions
I	Matrix: Definitions – Operation on Matrices – Determinant of Matrix – Inverse of a Matrix – Solving of linear equations – Matrix inverse method and Cramer's rule.	K1-K4	10
II	Sequence, Series and Interpolation: Sequence and Series – Arithmetic Progression and Geometric Progression – Interpolation - Binomial Expansion Method, Newton's Forward and Backward Method and Lagrange's Method.	K2-K4	10
III	Probability: Definition of Probability – Addition and Multiplication Theorems – Conditional Probability – Simple Problems.	K2-K4	10
IV	Nature of OR and LPP Definition of OR – Nature of OR – Uses of OR – Linear Programming Problem – Formation of LPP – Solution to LPP -Graphical method – Simplex method (two variables only).	K1-K4	10
V	Transportation and Assignment Problem: Transportation Problem – Initial Basic Feasible Solution – North West Corner Method – Least Cost Method – Vogel's Approximation Method – Assignment Problem – Balanced and Unbalanced Assignment Problem - Hungarian Method.	K1-K4	10

Course Outcome	CO1: Understand the scope and necessity of statistics and measures of central tendency.	**K2**	
	CO2: Apply the formula and calculate measures of sequence and series.	**K3**	
	CO3: Understand the scope and necessity of probability.	**K2**	
	CO4: Analyze the nature of data and interpret the linear programming problem.	**K4**	
	CO5: Analyze the nature of data and interpret the transportation and assignment problem.	**K4**	
Learning Resources			
Text Books	1. Gupta. S. P, Gupta. P.K, Manmohan, Elements of Business Statistics and Operations Research, Sultan Chand & Sons, New Delhi.		
Reference Books	1. Gupta. S. P. (2001), Statistical methods, Sultan Chand & Sons, 2. P.A. Navanithan (2007), Business Statistics, Jai Publishers, Trichy. 3. Pillai. R. S. N. and Bagavathi. V. (2005), Statistics, S. Chand & Company Ltd., New Delhi.		
Website Link	1. https://www.maths.ed.ac.uk/~v1ranick/papers/matrices.pdf 2. http://www.cimt.org.uk/projects/mepres/alevel/fpure_ch6.pdf 3. https://www.dartmouth.edu/~chance/teaching_aids/books_articles/probability_book/amsbook.mac.pdf 4. http://www.pondiuni.edu.in/storage/dde/downloads/mbaii_qt.pdf 5. http://www.maths.unp.ac.za/coursework/MATH331/2012/transportation_assignment.pdf		

B.Com and B.Com Computer Application Allied Syllabus LOCF-CBCS with effect from 2021-2022 Onwards								
Course Code	**Course Title**	**Course Type**	**Semester**	**Hours**	**L**	**T**	**P**	**C**
21M4USTA04	BUSINESS STATISTICS - II	ALLIED - II	IV	4	4	0	0	4

CO-PO Mapping

CO Number	P01	P02	P03	P04	P05	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	L	S	S	S	M	S	M	S	M	L
CO2	M	M	M	M	S	M	S	S	S	M
CO3	M	M	M	S	M	M	S	M	S	S
CO4	M	M	M	M	M	L	M	M	S	S
CO5	S	M	M	S	S	M	S	M	S	S

Level of Correlation between CO and PO	L - Low	M - Medium	S - Strong

Tutorial Schedule	Group Discussion, Quiz and Group Activities
Teaching and Learning Methods	Chalk and Board Teaching, Power Point Presentation and Virtual Learning
Assessment Methods	Attendance, Observation, Record Note, Unit Test, CIA-I, CIA-II and ESE

Designed By	Verified By	Approved By

B.Sc: Biochemistry, Microbiology and Biotechnology Allied Syllabus LOCF-CBCS with effect from 2021-2022 Onwards								
Course Code	Course Title	Course Type	Sem	Hours	L	T	P	C
21M3USTA05	BIOSTATISTICS	ALLIED	III	5	4	1	0	4
Objective	To expose and familiarize the students with basic concepts of biostatistics and the collection and presentation, measures of central tendency, measures of dispersion, correlation,regression, test of significance for large and small sample tests of biostatistical data.							
Unit	Course Content						Knowledge Levels	Sessions
I	Collection and Presentation of Statistical Data: Biostatistics - Definition - Types of data - Primary and secondary data - Methods of Collection of data - Sources of data in life science - Limitations and Uses of Statistics - Classification and Tabulation of data - Diagrammatic and Graphical representation of data.						K1-K4	12
II	Measures of Central Tendency: Definitions - Mean - Median - Mode - Geometric mean - Harmonic mean - Characteristics of a good average - Merits and demerits- Simple Problems.						K2-K4	12
III	Measures of Dispersion: Range - Quartile deviation - Mean deviation and their coefficients - Standard deviation - Co-efficient of variation - Merits and demerits- Simple Problems.						K2-K4	12
IV	Correlation and Regression: Definitions - Types and Methods of Correlation -Karl Pearson's coefficient of correlation - Spearman's Rank correlation coefficient - Regression: Simple regression equations (two variables) - Simple Problems.						K1-K4	12
V	Test of Significance Sampling distribution - Standard error - Test of Hypothesis: Simple hypothesis, Null hypothesis, and Alternative Hypothesis - Test of significance: large sample tests based on Mean, Differences of Means, Proportion, and Difference of Proportions - Small sample test based on Mean, Difference of Means, Paired 't' test - F-test - Chi-square test - Simple Problems.						K1-K4	12
Course Outcome	CO1: Remembering the scope and necessity of biotatistics, tabulate and represent the data in diagrams and graphs.						K1	
	CO2: Understand the formula and calculate descriptive measures of central tendency.						K2	
	CO3: Apply the formula and calculate descriptive measures of dispersion.						K3	
	CO4: Analyze the nature of data and interpret the measures of correlation and regression.						K4	
	CO5: Analyze the nature of data and interpret the for large and small sample tests.						K4	
Learning Resources								
Text Books	1. Gupta, S.C., and Kappor, V. K. (2020). Fundamentals of Mathematical Statistics, 12th Edition, Sultan Chand & Sons (Publisher), New Delhi, India.							
Reference Books	1. Goon, A.M., Gupta, M. K., Dasgupta, B. (2016): Fundamentals of Statistics, Vol. I, World Press, Kolkata, India. 2. Holcomb, Z. C. (2017). Fundamentals of Descriptive Statistics, Routledge, New York, US.							
Website Link	1. https://faculty.franklin.uga.edu/dhall/sites/faculty.franklin.uga.edu.dhall/files/lec1.pdf 2. https://www.tutorialspoint.com/statistics/ 3. http://www.stat.yale.edu/Courses/1997-98/101/sigtest.htm 4. http://biostat.jhsph.edu/~jleek/teaching/2011/754/lecture1.pdf 5. http://homepage.divms.uiowa.edu/~dzimmer/applied-multivariate/lecturenotesold.pdf							

B.Sc-Biochemistry, Microbiology and Biotechnology Allied Syllabus LOCF-CBCS with effect from 2021-2022 Onwards								
Course Code	Course Title	Course Type	Sem	Hours	L	T	P	C
21M3USTA05	BIOSTATISTICS	ALLIED	III	5	4	1	0	4

CO-PO Mapping

CO Number	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	L	S	S	S	M	S	M	S	M	L
CO2	M	M	M	M	S	M	S	S	S	M
CO3	S	M	M	S	S	M	S	M	S	S
CO4	M	M	M	M	M	S	M	M	S	S
CO5	S	M	M	S	S	L	S	M	S	S
Level of Correlation between CO and PO	L-LOW	M-MEDIUM		S-STRONG						

Tutorial Schedule	Group Discussion, Quiz and Group Activities
Teaching and Learning Methods	Chalk and Board Teaching, Power Point Presentation and Virtual Learning
Assesment Methods	Attendance, Assignment, Seminar, Unit Test, CIA-I, CIA-II and ESE

Designed By	Verified By	Approved By

DR. S. MOHAN PRABHU.

B.Sc: Computer Science and BCA Allied Syllabus LOCF-CBCS with effect from 2021-2022 Onwards								
Course Code	Course Title	Course Type	Sem	Hours	L	T	P	C
21M3USTA08	APPLIED STATISTICS - I	ALLIED - I	III	4	3	1	0	4
Objective	To expose and familiarize the students with basic concepts of statistics and measures of central tendency, measures of dispersion,skewness, kurtosis, and moments, correlation, regression, and concept of probability.							
Unit	Course Content						Knowledge Levels	Sessions
I	Collection and Presentation of Statistical Data: Nature and Scope of Statistics - Limitations - Types of data - Classification and Tabulation of Data - Construction of Frequency Distribution - Diagrammatic and Graphical Representation of Data.						K1-K4	9
II	Measures of Central Tendency Mean, Median, Mode, Geometric mean, Harmonic mean - Characteristics of a good average - merits and demerits.						K2-K4	9
III	Measures of Dispersion: Range - Quartile deviation - Mean deviation and their coefficients - Standard deviation - Coefficient of variation - Merits and Demerits. Skewness and Kurtosis: Karl Pearson's coefficient of Skewness and Bowley's coefficient of Skewness, Kurtosis based on Moments.						K2-K4	9
IV	Correlation and Regression Types and Methods for Measuring Correlation - Scatter diagram - Karl Pearson's co-efficient of correlation - Spearman's rank correlation coefficient - Regression equations of two variables - Simple Problems.						K1-K4	9
V	Probability: Definition of Probability - Addition and Multiplication Theorems - Conditional Probability - Simple Problems.						K1-K3	9
Course Outcome	CO1: Remembering the scope and necessity of Statistics, Tabulate and represent the data in diagrams and graphs.						K1	
	CO2: Understand the formula and calculate descriptive measures of central tendency.						K2	
	CO3: Apply the formula and calculate descriptive measures of dispersion, skewness, kurtosis, and moments.						K3	
	CO4: Analyze the nature of data and interpret the measures of correlation and regression.						K4	
	CO5: Analyze the nature of data and interpret the probability.						K4	
Learning Resources								
Text Books	1. Gupta, S.C., and Kappor, V. K. (2020). Fundamentals of Mathematical Statistics, 12th Edition, Sultan Chand & Sons (Publisher), New Delhi, India.							
Reference Books	1. Goon, A.M., Gupta, M. K., Dasgupta, B. (2016): Fundamentals of Statistics, Vol. I, World Press, Kolkata, India. 2. Holcomb, Z. C. (2017). Fundamentals of Descriptive Statistics, Routledge, New York, US.							
Website Link	1. https://www.tutorialspoint.com/statistics/data_collection.htm 2. https://www.surveysystem.com/correlation.htm https://www.investopedia.com/terms/r/regression.asp 3. https://www.bmj.com/about-bmj/resources-readers/publications/statistics-square-one/11- correlation-and-regression 4. https://course-notes.org/statistics/sampling_theory							

B.Sc: Computer Science and BCA Allied Syllabus LOCF-CBCS with effect from 2021-2022 Onwards								
Course Code	Course Title	Course Type	Sem	Hours	L	T	P	C
21M3USTA08	APPLIED STATISTICS - I	ALLIED - I	III	4	3	1	0	4

CO-PO Mapping

CO Number	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	L	S	S	L	M	S	M	S	M	L
CO2	M	M	M	M	S	M	S	S	S	M
CO3	S	M	M	S	S	L	S	M	S	S
CO4	S	M	M	S	M	S	S	M	S	S
CO5	S	M	M	S	S	L	S	M	S	S
Level of Correlation between CO and PO	L-LOW	M-MEDIUM		S-STRONG						

Tutorial Schedule	Group Discussion, Quiz and Group Activities
Teaching and Learning Methods	Chalk and Board Teaching, Power Point Presentation and Virtual Learning
Assesment Methods	Attendance, Assignment, Seminar, Unit Test, CIA-I, CIA-II and ESE

Designed By	Verified By	Approved By
L. Pe		A. Hisam
[L. THANGARAJ]	DR. S. MOHAN PRABHU	

B.Sc-Computer Science and BCA Allied Syllabus LOCF-CBCS with effect from 2021-2022 Onwards								
Course Code	**Course Title**	**Course Type**	**Semester**	**Hours**	**L**	**T**	**P**	**C**
21M4USTA09	**APPLIED STATISTICS - II**	**ALLIED - II**	**IV**	**6**	**4**	**0**	**2**	**4**
Objective	To know the curve fitting and the knowledge of Point and Interval Estimation, know the hypothesis testing and large sample test and small sample test.							

Unit	Course Content	Knowledge Levels	Sessions
I	Curve Fitting: Method of least square – Fitting of a straight line and second degree Parabola, Fitting of Power Curve and Exponential Curves – Simple Problems.	K1-K4	12
II	Point and Interval Estimation: Population and Sample – Parameter and Statistic – Point Estimation – Consistency – Unbiasedness – Efficiency (Cramer – Rao Inequality) and Sufficiency (Rao – Blackwell Theorem) and Interval estimation (Concept Only).	K1-K4	12
III	Concept of Statistical Hypothesis – Simple and Composite Hypothesis – Null and Alternative Hypothesis – Critical region – Type I and Type II Errors – Power of a test – Neyman-Pearson Lemma.	K1-K4	12
IV	Test of Significance (Large Sample Tests) Z-Test: Single Mean and Difference Between Two Means, F-Test: Equal and Unequal - Simple Problems.	K1-K4	12
V	Test of Significance (Small Sample Test) t-Test, Paired t-Test: Single Mean and Difference Between Two Means, Chi-square test, Goodness of fit and independence of attributes - Simple Problems.	K1-K4	12

Course Outcome	CO1: Remembering the real-life situations with curve fitting.	**K6**	
	CO2: Understand estimation concepts in real-life situations.	**K2**	
	CO3: Analysis the concept of statistical hypothesis.	**K1**	
	CO4: Analysis the tools of large sample tests.	**K3**	
	CO5: Analysis the tools of small sample tests.	**K3**	
Learning Resources			
Text Books	1. Gupta, S.C., and Kappor, V. K. (2020). Fundamentals of Mathematical Statistics, 12th Edition, Sultan Chand & Sons (Publisher), New Delhi, India.		
Reference Books	1. Kapur J.N and Saxena, H. C (1999), Mathematical Statistics – S.Chand and Company Ltd., New Delhi. 2. Feller, W. (2008), An Introduction to Probability Theory and its Applications, Volume I (Third Edition), John Wiley & Sons, New York.		
Website Link	1. http://www.sjsu.edu/faculty/gerstman/StatPrimer/estimation.pdf 2. https://www.tutorialspoint.com/statistics/ 3. https://www.statisticshowto.datasciencecentral.com/ 4. https://www.investopedia.com/terms/c/chi-square-statistic.asp 5. http://onlinestatbook.com/2/introduction/inferential.html		

B.Sc-Computer Science and BCA Allied Syllabus LOCF-CBCS with effect from 2021-2022 Onwards								
Course Code	Course Title	Course Type	Semester	Hours	L	T	P	C
21M4USTA09	APPLIED STATISTICS - II	ALLIED - II	IV	6	4	0	2	4

CO-PO Mapping

CO Number	P01	P02	P03	P04	P05	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	L	S	S	L	S	S	M	S	M	L
CO2	M	S	S	M	S	S	S	M	S	M
CO3	M	S	S	M	S	S	S	M	S	M
CO4	S	L	L	S	S	L	M	S	S	S
CO5	S	S	L	S	S	L	M	L	S	S

Level of Correlation between CO and PO	L - Low	M - Medium	S - Strong

Tutorial Schedule	Group Discussion, Quiz and Group Activities
Teaching and Learning Methods	Chalk and Board Teaching, Power Point Presentation and Virtual Learning
Assessment Methods	Attendance, Assignment, Seminar, Unit Test, CIA-I, CIA-II and ESE

Designed By	Verified By	Approved By

B.Sc-Computer Science and BCA Allied Syllabus LOCF-CBCS with effect from 2021-2022 Onwards								
Course Code	**Course Title**	**Course Type**	**Semester**	**Hours**	**L**	**T**	**P**	**C**
21M4USTAP2	**PRACTICAL STATISTICS**	**ALLIED PRACTICAL**	**III & IV**	**2+2**	**0**	**0**	**4**	**4**
Objective	To enable the students to gain practical knowledge about the concepts of presentation of statistical data, measures of descriptive statistics, correlation and regression large sample test and small sample test.							
Unit	**List of Experiments / Programmes By Using MS Excel**						**Knowledge Levels**	**Sessions**
I	Presentation of Statistical Data: 1. To construct of Univariate Frequency Distribution. 2. To construct of Bivariate Frequency Distribution. 3. To draw line, Vertical and Horizondal, Multiple, Sub-Divided, Percentage and Pie Diagrams. 4. To draw Histogram, Frequency Polygon and Frequency Curve. 5. To draw O-give and Lorenz Curve.						**K2-K4**	**6**
II	Measures of Averages and Dispersion: 6. To calculate Arithmetic Mean, Median, Mode, Geometric and Harmonic Mean (Raw Data) 7. To calculate Arithmetic Mean, Median, Mode, Geometric and Harmonic Mean (Discrete Type) 8. To calculate Arithmetic Mean, Median, Mode, Geometric and Harmonic Mean (Continuous Type) 9. To calculate Range, M.D, Q.D, S.D and Coefficient of Variation (Raw Data) 10. To calculate Range, M.D, Q.D, S.D and Coefficient of Variation (Discrete Type) 11. To calculate Range, M.D, Q.D, S.D and Coefficient of Variation (Continuous Type) Skewness and Kurtosis: 12. To calculate Karl Pearson's coefficient of Skewness – Bowley's coefficient of Skewness (Raw Data) 13. To calculate Karl Pearson's coefficient of Skewness – Bowley's coefficient of Skewness (Discrete Type) 14. To calculate Karl Pearson's coefficient of Skewness – Bowley's coefficient of Skewness (Continuous Type) 15. To calculate Kurtosis based on Moments (Raw Data) 16. To calculate Kurtosis based on Moments (Discrete Type) 17. To calculate Kurtosis based on Moments (Continuous Type)						**K2-K4**	**6**

III	Correlation and Regression: 18. To find Karl-Karl Pearson's correlation coefficient for ungrouped data 19. To find Karl-Karl Pearson's correlation coefficient for bivariate data 20. To find Spearman's Rank correlation coefficient (Direct Ranks are Given) 21. To find Spearman's Rank correlation coefficient (Indirect Ranks are Given) 22. To find Spearman's Rank correlation coefficient (Repeated Ranks are Given) 23. To calculate Regression coefficients Regression coefficients and Regression equations.	**K2-K4**	**6**
IV	Curve Fitting: 24. Fitting of straight line and parabola by the method of least squares. 25. Fitting of power curves of the type $y = ax^b$ (By the Method of Least Squares) 26. Fitting of power curves of the type $y = ab^x$ (By the Method of Least Squares) 27. Fitting of power curves of the type $y = ae^{bx}$ (By the Method of Least Squares)	**K2-K4**	**6**
V	28. Z-Test: Single Mean and Difference Between Two Means. 29. F-Test: Equal and Unequal Problems. 30. Comparing means: Independent Sample Test and Paired t - Test Problems. 31. Cross Tabulation and Chi-Square – Test Problems	**K2-K4**	**6**
Course Outcome	CO1: Remembering the concepts of Presentation of Statistics	**K1**	
	CO2: Understand the concepts of Measures of Location and Dispersion.	**K2**	
	CO3: Analysis of Statistical data for Correlation and Regression.	**K3**	
	CO4: Analysis of Statistical data for Large Sample Tests	**K4**	
	CO5: Analysis of statistical data for Small Sample Tests	**K5**	

Learning Resources	
Text Books	1. Gupta, S.C., and Kappor, V. K. (2020). Fundamentals of Mathematical Statistics, 12th Edition, Sultan Chand & Sons (Publisher), New Delhi, India.
Reference Books	1. Goon, A.M., Gupta, M. K., Dasgupta, B. (2016): Fundamentals of Statistics, Vol. I, World Press, Kolkata, India. 2. Holcomb, Z. C. (2017). Fundamentals of Descriptive Statistics, Routledge, New York, US.
Website	1. https://www.tutorialspoint.com/class_11th_statistics_for_economics/index.asp

Link	2. https://www.surveysystem.com/correlation.htm 3. https://www.investopedia.com/terms/r/regression.asp 4. https://www.bmj.com/about-bmj/resources-readers/publications/statistics-square-one/11-correlation-and-regression 5. https://course-notes.org/statistics/sampling_theory

B.Sc-Computer Science and BCA Allied Syllabus LOCF-CBCS with effect from 2021-2022 Onwards								
Course Code	Course Title	Course Type	Semester	Hours	L	T	P	C
21M4USTAP2	PRACTICAL STATISTICS	ALLIED PRACTICAL	III & IV	2+2	0	0	4	4

CO-PO Mapping

CO Number	P01	P02	P03	P04	P05	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	L	S	M	M	S	M	M	S	S	S
CO2	M	S	S	M	M	M	S	S	M	M
CO3	S	S	M	M	M	M	L	S	S	M
CO4	S	S	M	M	M	L	M	M	M	M
CO5	L	S	M	M	M	M	M	M	M	M

Level of Correlation between CO and PO	L - Low	M - Medium	S - Strong

Tutorial Schedule	Group Discussion, Quiz and Group Activities
Teaching and Learning Methods	Chalk and Board Teaching, Power Point Presentation and Virtual Learning
Assessment Methods	Attendance, Observation, Record Note, Unit Test, CIA-I, CIA-II and ESE

Designed By	Verified By	Approved By

B.Sc-Mathematics Allied Syllabus LOCF-CBCS with effect from 2021-2022 Onwards								
Course Code	Course Title	Course Type	Sem	Hours	L	T	P	C
21M3USTA06	MATHEMATICAL STATISTICS - I	ALLIED - I	III	5	4	1	0	4
Objective	Understand the origin, scope and know the significance of presenting data in the form of tables and diagrams, measures of central tendency, dispersion, skewness, kurtosis,moments, correlation, regression, concept of curve fitting and concept of probability, random variable and mathematical expectation.							
Unit	Course Content						Knowledge Levels	Sessions
I	Statistics, Collection and Presentation of Statistical Data: Nature, Scope, and Limitations of Statistics - Data sources - Methods of collection of statistical data - Census - Sample Survey - Measurement of Scales - Nominal, Ordinal, Interval, and Ratio scales - Classification and Tabulation - Formation of frequency distribution - Cumulative frequency distribution - Diagrammatic and Graphical representation of Data.						K1-K4	12
II	Measures of Central Tendency, Measures of Dispersion and Skewness: Definitions - Mean, Median, Mode, Geometric mean, Harmonic mean - Merits and demerits - Range, Quartile deviation, Mean deviation, and their coefficients - Standard deviation - Co-efficient of Variation - Merits and demerits - Measure of Skewness - Karl Pearson's and Bowley's Coefficient of Skewness.						K1-K4	12
III	Correlation and Regression: Definition - Types and methods of measuring correlation - Scatter diagram, Karl Pearson's correlation coefficient, and Spearman's rank correlation coefficient - Regression lines - Regression coefficients - Properties - Regression equations.						K2-K4	12
IV	Curve Fitting: Method of least square - Fitting of a straight-line second-degree Fitting of Power Curve and Exponential Curves - Simple Problems.						K2-K4	12
V	Probability, Random Variable and Mathematical Expectation: Definitions - Addition and Multiplication Theorem of Probability - Conditional probability - Random variable (discrete and continuous) - Distribution Functions - Marginal and Conditional Distributions - Mathematical Expectation - Moment generating function - Characteristic function (concept only) - Tchebychev's Inequality - Simple Problems.						K1-K4	12
Course Outcome	CO1: Remembering the scope and necessity of Statistics, Tabulate and represent the data in diagrams and graphs.						K1	
	CO2: Understand the formula and calculate descriptive measures of central tendency and dispersion.						K2	
	CO3: Apply the formula and calculate descriptive measures of skewness, kurtosis, and moments.						K3	
	CO4: Analyze the nature of data and interpret the measures of correlation.						K4	
	CO5: Analyze the nature of data and interpret the measures of regression.						K4	
Learning Resources								
Text Books	1. Gupta, S.C., and Kappor, V. K. (2020). Fundamentals of Mathematical Statistics, 12th Edition, Sultan Chand & Sons (Publisher), New Delhi, India.							
Reference Books	1. Goon, A.M., Gupta, M. K., Dasgupta, B. (2016): Fundamentals of Statistics, Vol. I, World Press, Kolkata, India. 2. Holcomb, Z. C. (2017). Fundamentals of Descriptive Statistics, Routledge, New York, US.							
Website Link	1.https://www.tutorialspoint.com/class_11th_statistics_for_economics/index.asp 2.https://www.surveysystem.com/correlation.htm 3.https://www.investopedia.com/terms/r/regression.asp 4.https://www.bmj.com/about-bmj/resources-readers/publications/statistics-square-one/11-correlation-and-regression 5.https://course-notes.org/statistics/sampling_theory							

B.Sc-Mathematics Allied Syllabus LOCF-CBCS with effect from 2021-2022 Onwards								
Course Code	Course Title	Course Type	Sem	Hours	L	T	P	C
21M3USTA06	MATHEMATICAL STATISTICS - I	ALLIED - I	III	5	4	1	0	4

CO-PO Mapping

CO Number	P01	P02	P03	P04	P05	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	L	S	S	L	M	S	M	S	M	L
CO2	M	M	M	M	S	M	S	S	S	M
CO3	S	M	M	S	S	L	S	M	S	S
CO4	S	M	M	S	S	L	S	M	S	S
CO5	S	M	M	S	S	L	S	M	S	S
Level of Correlation between CO and PO	L-LOW	M-MEDIUM		S-STRONG						

Tutorial Schedule	Group Discussion, Quiz and Group Activities
Teaching and Learning Methods	Chalk and Board Teaching, Power Point Presentation and Virtual Learning
Assesment Methods	Attendance, Assignment, Seminar, Unit Test, CIA-I, CIA-II and ESE

Designed By	Verified By	Approved By
S. Manimekalai	Dr. S. Mohan	

PRABHU

B.Sc-Mathematics Allied Syllabus LOCF-CBCS with effect from 2021-2022 Onwards								
Course Code	**Course Title**	**Course Type**	**Semester**	**Hours**	**L**	**T**	**P**	**C**
21M4USTA07	**MATHEMATICAL STATISTICS - II**	**ALLIED - II**	**IV**	**5**	**5**	**0**	**2**	**4**
Objective	To know the discrete distribution, continuous distribution, concept of estimation hypothesis testing and large sample tests and small sample test							

Unit	Course Content	Knowledge Levels	Session
I	Discrete Distributions: Binomial and Poisson Distributions – Derivations For Mean, Variance, Moment Generating Functions, Characteristics Function – Properties and Applications - Simple Problems.	K1-K3	12
II	Continuous Distributions: Normal Distribution – Derivations For Mean, Variance, Moment Generating Functions, Characteristics Function – Properties and Applications - Simple Problems.	K1-K3	12
III	Estimation Population and Sample – Parameter and Statistic – Point Estimation – Consistency – Unbiasedness – Efficiency (Cramer – Rao inequality) and Sufficiency (Rao – Blackwell Theorem), Interval estimation (Concept only).	K2-K4	12
IV	Concept of Statistical Hypothesis – Simple and Composite Hypothesis – Null and Alternative Hypothesis – Critical region – Type I and Type II Errors – Power of a test – Neyman-Pearson Lemma.	K1-K3	12
V	Test of Significance (Large Sample Tests and Small Sample Test) Z-Test: Single Mean and Difference Between Two Means, F-Test: Equal and Unequal, t-Test, Paired t-Test: Single Mean and Difference Between Two Means, Chi-square test, Goodness of fit and independence of attributes.	K1-K3	12

Course Outcome	CO1: To match real-life situations with distribution.	**K6**	
	CO2: To understand the normal distribution and its applications.	**K2**	
	CO3: To understand estimation concepts in real-life situations.	**K2**	
	CO4: To know the concept of statistical hypothesis.	**K1**	
	CO5: To apply the tools of large and small sample tests.	**K3**	
Learning Resources			
Text Books	1. Gupta, S.C., and Kappor, V. K. (2020). Fundamentals of Mathematical Statistics, 12t Edition, Sultan Chand & Sons (Publisher), New Delhi, India.		
Reference Books	1. Kapur J.N and Saxena, H. C (1999), Mathematical Statistics – S Chand and Company Ltd., New Delhi. 2. Feller, W. (2008), An Introduction to Probability Theory and its Applications, Volume I (Third Edition), John Wiley & Sons, New York.		
Website Link	1. https://seeing-theory.brown.edu/probability-distributions/index.html 2. https://www.kullabs.com/classes/subjects/units/lessons/notes/note-detail/9557		

B.Sc-Mathematics Allied Syllabus LOCF-CBCS with effect from 2021-2022 Onwards								
Course Code	Course Title	Course Type	Semester	Hours	L	T	P	C
21M4USTA07	MATHEMATICAL STATISTICS - II	ALLIED - II	IV	5	5	0	2	4

CO-PO Mapping

CO Number	P01	P02	P03	P04	P05	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	M	S	S	L	L	S	M	S	M	L
CO2	M	S	S	M	S	S	S	M	S	M
CO3	M	S	S	M	S	S	S	M	S	M
CO4	S	L	L	S	S	L	M	L	S	S
CO5	S	L	L	S	S	L	M	L	S	S

Level of Correlation between CO and PO	L - Low	M - Medium	S - Strong

Tutorial Schedule	Group Discussion, Quiz and Group Activities
Teaching and Learning Methods	Chalk and Board Teaching, Power Point Presentation and Virtual Learning
Assessment Methods	Attendance, Assignment, Seminar, Unit Test, CIA-I, CIA-II and ESE

Designed By	Verified By	Approved By

Curriculum Development Cell MCAS Autonomous Rasipuram

B.Sc-Mathematics Allied Syllabus LOCF-CBCS with effect from 2021-2022 Onwards								
Course Code	**Course Title**	**Course Type**	**Semester**	**Hours**	**L**	**T**	**P**	**C**
21M4USTAP1	**PRACTICAL STATISTICS**	**ALLIED PRACTICAL**	**III & IV**	**2+2**	**0**	**0**	**2**	**2**
Objective	To enable the students to gain practical knowledge about the concepts of presentation statistical data, measures of descriptive statistics, correlation and regression, the binomi distribution, poisson distribution, normal distribution curve fitting discrete ar continuous probability distributions.							

S.No.	List of Experiments	Knowledge Levels	Sessi ns
I	Presentation of Statistical Data: 1. To construct of Univariate Frequency Distribution. 2. To construct of Bivariate Frequency Distribution. 3. To draw line, Vertical and Horizondal, Multiple, Sub-Divided, Percentage and Pie Diagrams. 4. To draw Histogram, Frequency Polygon and Frequency Curve. 5. To draw O-give and Lorenz Curve.	**K2-K4**	**6**
II	Measures of Averages and Dispersion: 6. To calculate Arithmetic Mean, Median, Mode, Geometric and Harmonic Mean (Raw Data) 7. To calculate Arithmetic Mean, Median, Mode, Geometric and Harmonic Mean (Discrete Type) 8. To calculate Arithmetic Mean, Median, Mode, Geometric and Harmonic Mean (Continuous Type) 9. To calculate Range, M.D, Q.D, S.D and Coefficient of Variation (Raw Data) 10. To calculate Range, M.D, Q.D, S.D and Coefficient of Variation (Discrete Type) 11. To calculate Range, M.D, Q.D, S.D and Coefficient of Variation (Continuous Type) Skewness and Kurtosis: 12. To calculate Karl Pearson's coefficient of Skewness – Bowley's coefficient of Skewness (Raw Data) 13. To calculate Karl Pearson's coefficient of Skewness – Bowley's coefficient of Skewness (Discrete Type) 14. To calculate Karl Pearson's coefficient of Skewness – Bowley's coefficient of Skewness (Continuous Type) 15. To calculate Kurtosis based on Moments (Raw Data) 16. To calculate Kurtosis based on Moments (Discrete Type) 17. To calculate Kurtosis based on Moments (Continuous Type)	**K2-K4**	**6**

III	Correlation and Regression: 18. To find Karl-Karl Pearson's correlation coefficient for ungrouped data 19. To find Karl-Karl Pearson's correlation coefficient for bivariate data 20. To find Spearman's Rank correlation coefficient (Direct Ranks are Given) 21. To find Spearman's Rank correlation coefficient (Indirect Ranks are Given) 22. To find Spearman's Rank correlation coefficient (Repeated Ranks are Given) 23. To calculate Regression coefficients Regression coefficients and Regression equations.	**K2-K4**	**6**
IV	Curve Fitting: 24. Fitting of straight line and parabola by the method of least squares. 25. Fitting of power curves of the type $y = a^x b$ (By the Method of Least Squares) 26. Fitting of power curves of the type $y = ab^x$ (By the Method of Least Squares) 27. Fitting of power curves of the type $y = ae^{bx}$ (By the Method of Least Squares)	**K2-K4**	**6**
V	Fitting of Distribution: 28. Fitting of Binomial distribution - Direct Method. 29. Fitting of Binomial distribution - Recurrence Relation Method. 30. Fitting of Poisson distribution - Direct Method 31. Fitting of Poisson distribution - Recurrence Relation Method. 32. Fitting of Normal distribution - Areas Method. 33. Fitting of Normal distribution - Ordinates Method. 34. Z-Test: Single Mean and Difference Between Two Means. 35. F-Test: Equal and Unequal Problems. 36. Comparing means: Independent Sample Test and Paired t - Test Problems. 37. Cross Tabulation and Chi-Square – Test Problems	**K2-K4**	**6**
Course Outcome	CO1: Remembering the statistical data using frequency distribution diagrams and graphs.	**K1**	
	CO2: Understand the formula and calculate descriptive measures of central tendency and dispersion.	**K2**	
	CO3: Apply the formula and calculate descriptive measures of skewness, kurtosis, and moments.	**K3**	
	CO4: Analyze the nature of data and interpret the measures of correlation and regression.	**K4**	
	CO5: Analyze the statistical data using probability density and fitting of distribution functions.	**K5**	

Learning Resources	
Text Books	1. Gupta, S.C., and Kappor, V. K. (2020). Fundamentals of Mathematical Statistics, 12th Edition, Sultan Chand & Sons (Publisher), New Delhi, India.
Reference Books	1. Goon, A.M., Gupta, M. K., Dasgupta, B. (2016): Fundamentals of Statistics, Vol. I, World Press, Kolkata, India. 2. Holcomb, Z. C. (2017). Fundamentals of Descriptive Statistics, Routledge, New York US.
Website Link	1. https://www.tutorialspoint.com/class_11th_statistics_for_economics/index.asp 2. https://www.surveysystem.com/correlation.htm 3. https://www.investopedia.com/terms/r/regression.asp 4. https://www.bmj.com/about-bmj/resources-readers/publications/statistics-square-one/11-correlation-and-regression 5. https://course-notes.org/statistics/sampling_theory

B.Sc-Mathematics Allied Syllabus LOCF-CBCS with effect from 2021-2022 Onwards								
Course Code	Course Title	Course Type	Semester	Hours	L	T	P	C
21M4USTAP1	PRACTICAL STATISTICS	ALLIED PRACTICAL	III & IV	2+2	0	0	2	2

CO-PO Mapping

CO Number	P01	P02	P03	P04	P05	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	L	S	M	M	S	M	M	S	S	S
CO2	M	S	S	M	M	M	S	S	M	M
CO3	S	S	M	M	M	M	L	S	S	M
CO4	L	S	M	M	M	L	M	M	M	M
CO5	L	S	M	M	M	M	M	M	M	M

Level of Correlation between CO and PO	L - Low	M - Medium	S - Strong

Tutorial Schedule	Group Discussion, Quiz and Group Activities
Teaching and Learning Methods	Chalk and Board Teaching, Power Point Presentation and Virtual Learning
Assessment Methods	Attendance, Observation, Record Note, Unit Test, CIA-I, CIA-II and ESE

Designed By	Verified By	Approved By

B.Sc., Statistics Syllabus LOCF-CBCS With Effect From 2021-2022 Onwards								
Course Code	Course Title	Course Type	Sem	Hours	L	T	P	C
21M5USTE01	R PROGRAMMING FOR DATA ANALYSIS	CORE THEORY - VI	V	5	3 4	2 1	0	4
Objective	1. To impart essential knowledge of statistics in R programming to initiate the beneficiaries of R in statistical data analysis. 2. To learn knowledge about efficient data handling techniques, the practice of graphical interpretation, and Statistical inference by using R programming. 3. To equip the students with statistical programming skills based on real-life examples and data sets							
Unit	Course Content						Knowledge Levels	Sessions
I	Overview of R environment – R Editor – workspace – R as a calculator - Statistical Software and a Programming Language - R Preliminaries - Getting Help, Data Inputting Methods (Direct and Importing From Other Spread Sheet Applications Like Excel), Data Accessing and Indexing, Graphics in R, Built-in Functions, Saving, Storing, and Retrieving Work.						K1-K4	9L+1T
II	Bar Diagram – Pie Diagram - Plot a Graph - Histograms – Frequency Polygon – Ogive Curves.						K1-K4	10L
III	Measures of Central Tendency, Partition Values, Measures of Dispersion, Skewness, and Kurtosis.						K1-K4	10L
IV	Testing of Hypothesis - Large Sample Test - Z-test – Compute p-values - Small Sample Tests - t-Test, Paired t-Test, F-Test, Chi-Square Test of Independence and Goodness of Fit.						K1-K4	10L
V	One-way ANOVA and Two- way ANOVA - Simple Correlation - Linear Regression.						K1-K4	10L
Course Outcome	CO1: To understand the preliminaries about R language.						K1	
	CO2: To write R programs for statistical tools.						K2	
	CO3: To acquire knowledge of data and write R programs for sampling distribution.						K3	
	CO4: An executed test of the hypothesis, p-value, and confidence interval to apply in real-life situations.						K4	
	CO5: To understand and draw inferential conclusions by using data.						K5	

Learning Resources	
Text Books	1. Gardener M (2012), Beginning R: The Statistical Programming Language, Wiley Publications.
Reference Books	1. Garrett Grolemund, Hands-On programming with R, O'Reilly Media Publications. 2. Norman Matloff, The Art of R programming by Norman, No Starch Press, US. 3. Hadley Wickham, R Packages: Organize Test, Document, and Share Your Code, Shroff/O'Reilly Publications. 4. Peter Dalgaard, Introductory Statistics with R, Springer Publications.
Website Link	1. https://www.coursera.org/course/statistics 2. https://www.coursera.org/course/stats1 3. https://www.coursera.org/course/compdata 4. https://learningstatisticswithr.com/ 5. https://www.statmethods.net/stats/index.html

B.Sc., Statistics Syllabus LOCF-CBCS With Effect From 2021-2022 Onwards								
Course Code	Course Title	Course Type	Sem	Hours	L	T	P	C
21M5USTE01	R PROGRAMMING FOR DATA ANALYSIS	CORE THEORY - VI	V	5	3	2	0	4

CO-PO Mapping

CO Number	P01	P02	P03	P04	P05	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	L	S	S	L	M	S	M	S	M	L
CO2	M	M	M	M	S	M	S	S	S	M
CO3	S	M	M	S	S	L	S	M	S	S
CO4	S	M	M	S	S	L	S	M	S	S
CO5	M	M	M	S	S	L	S	M	S	S
Level of Correlation between CO and PO	L- LOW	M- MEDIUM		S- STRONG						

Tutorial Schedule	Chalk and Board Teaching, PowerPoint Presentation, Group Discussion, and Virtual Learning
Teaching and Learning Methods	Chalk and Board Teaching, PowerPoint Presentation, and Virtual Learning
Assessment Methods	Assignments, Seminars, Group Discussions, Unit Tests, Internal Examinations, and Semester Examinations

Designed By	Verified By	Approved By

(DR. S. MOHAN PRABHU)

(Dr. S. SHANTHI)

Curriculum Development Cell MCAS Autonomous Rasipuram

B.Sc., Statistics Syllabus LOCF-CBCS With Effect From 2021-2022 Onwards								
Course Code	Course Title	Course Type	Sem	Hours	L	T	P	C
21M5USTE02	TIME SERIES AND INDEX NUMBERS	CORE ELECTIVE - II	V	5	3	2	0	4
Objective	1. To enable the students to understand index numbers, time series and apply them to various fields. 2. To introduce the basic statistical tools in time-related variables and economic variables. 3. To learn the concepts of time series, evaluation of trends, and measurement of seasonal variations by various methods. 4. To educate students about the importance of cost-of-living index numbers in real-life problems. 5. To acquire knowledge about the applications of statistics in Agriculture, Industries, Ministry, and Financial Statistics in India.							

Unit	Course Content	Knowledge Levels	Sessions
I	Concept of Time Series - Components of Time Series - Additive and Multiplicative Models – Definitions of Secular Trend, Seasonal Variation, Cyclic Variations, and Irregular Fluctuations – Measurement of Trend – Graphic Method - Simple Problems.	K1-K4	11L+1T
II	Method of Semi-Average – Method of Moving Averages and Method of Least Squares - Simple Problems.	K1-K4	12L
III	Measurement of Seasonal Variations – Method of Simple Average – Ratio to Moving Average – Ratio to Trend – Link Relative Method – Cyclical Variation – Measurement of Cyclical Variation - Simple Problems	K1-K4	12L
IV	Definition – Types of Index Numbers – Problems in the Construction of Index Numbers – Construction of Simple Index Numbers – Simple Aggregate Method and Simple Average of Price Relatives Using A.M, G.M – Construction of Weighted Index Numbers – Laspeyre's, Paasche's, Dorbish Bowley's, Marshall Edge Worth and Fisher's Ideal Index Numbers - Simple Problems. Tests of the Adequacy of a Good Index Number – Time Reversal Test, Factor Reversal Test – Uses of Index Numbers.	K1-K4	12L
V	Cost of Living Index Number: Methods for Construction of Cost-of-Living Index Number – Aggregate Method – Family Budget Method – Uses of Cost-of-Living Index Number – Fixed Base Index Numbers and Chain Base Index Numbers – Conversion of F.B.I to C.B.I and C.B.I to F.B.I - Simple Problems.	K1-K4	12L

Course Outcome	CO1: To gain knowledge about various Time Series.	K1	
	CO2: To solve the problems related to business and industries by using the method of averages.	K2	
	CO3: To acquire knowledge of important time series.	K3	
	CO4: Execute the techniques for finding an index number in real-life situations.	K4	
	CO5: To understand and solve the price index problems.	K5	

Learning Resources	
Text Books	1. Kapoor V. K and Gupta S. P (1978), Fundamentals of Applied Statistics, Sultan Chand & Sons, New Delhi.
Reference Books	1. Goon A. M, Gupta M. K and Das Gupta B (1994), Fundamentals of Statistics V-II, The World Press Ltd., Calcutta 2. Agarwal B. L (1988), Basic Statistics, Wiley Eastern Ltd. New Delhi.
Website Link	1. https://www.itl.nist.gov/div898/handbook/pmc/section4/pmc4.htm 2. https://stat.ethz.ch/education/semesters/ss2015/atsa/ATSA_Scriptum_v1_SS15.pdf 3. https://www.civilserviceindia.com/subject/Management/notes/index-numbers.html 4. https://thefactfactor.com/facts/management/statistics/index-number/1576/ 5. https://www.undp.org/content/dam/india/docs/human-development/Introduction%20to%20Indian%20Statistical%20System.pdf

B.Sc., Statistics Syllabus LOCF-CBCS With Effect From 2021-2022 Onwards								
Course Code	Course Title	Course Type	Sem	Hours	L	T	P	C
21M5USTE02	TIME SERIES AND INDEX NUMBERS	CORE ELECTIVE - II	V	5	3	2	0	4

CO-PO Mapping

CO Number	P01	P02	P03	P04	P05	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	L	S	S	L	M	S	M	S	M	L
CO2	M	M	M	M	S	M	S	S	S	M
CO3	S	M	M	S	S	L	S	M	S	S
CO4	S	M	M	S	S	L	S	M	S	S
CO5	M	M	M	S	S	L	S	M	S	S
Level of Correlation between CO and PO	L-LOW	M-MEDIUM		S-STRONG						

Tutorial Schedule	Chalk and Board Teaching, PowerPoint Presentation, Group Discussion and Virtual Learning
Teaching and Learning Methods	Chalk and Board Teaching, PowerPoint Presentation and Virtual Learning
Assessment Methods	Assignments, Seminar, Group Discussions, Unit Tests, Internal Examinations and Semester Examinations

Designed By	Verified By	Approved By
(P. PAINTAMILSELVI)	(DR.S. MOHAN PRABHU)	(Dr.S. SHANTHI)

Curriculum Development Cell MCAS Autonomous Rasipuram

B.Sc., Statistics Syllabus LOCF-CBCS With Effect From 2021-2022 Onwards								
Course Code	Course Title	Course Type	Sem	Hours	L	T	P	C
21M6USTE03	POWER BI IN DATA VISUALIZATION	CORE ELECTIVE - III	VI	5	3	2	0	4
Objective	1. To impart essential knowledge of statistics and initiate the beneficiaries of POWERBI in statistical data analysis. 2. To learn knowledge about efficient data handling techniques, the practice of graphical interpretation, and Statistical inference by using POWERBI. 3. To equip the students with statistical programming skills based on real-life examples and data sets							
Unit	Course Content						Knowledge Levels	Sessions
I	Introduction, installation steps, architecture, supported datasources, comparison with other bi tools: power bi vs tableau.						K1-K4	9L+1T
II	POWER BI – Data Modeling: Using Data Modeling And Navigation, Creating Calculated Columns, Creating Calculated Tables Managing Time-Based Data.						K1-K4	10L
III	POWER BI – DASHBOARD OPTIONS: Exploring Different Datasets, Creating Dashboards, Sharing Dashboards, Tiles in Dashboard Data Gateway.						K1-K4	10L
IV	POWER BI – VISUALIZATION OPTIONS: Creating Simple Visualizations, Creating Map Visualizations, Using Combinations, Charts, Using Tables, Modify Colors in Charts, Adding Shapes, Images, and Text boxes, Styling Reports Duplicating Reports.						K1-K4	10L
V	POWER BI – EXCEL INTEGRATION: Using Excel Data, Importing xls Files. POWER BI – SHARING POWER BI DASHBOARDS: Using Power BI Desktop for Report Sharing, Printing Power BI Dashboards, Export Options, Publishing Report to Web, Using Content Pack, Editing Content Pack						K1-K4	10L
Course Outcome	CO1: To understand the preliminaries about POWERBI.						K1	
	CO2: To analyze for statistical tools.						K2	
	CO3: To acquire the knowledge of data and analysis ofPOWER BI						K3	
	CO4: An executed visualization to apply in real-life situations.						K4	
	CO5: To understand and draw diagrammatical conclusionsby using data.						K5	

Learning Resources	
Text Books	1. Microsoft Power Bi for beginners 2022: A to Z mastery guide on Microsoft business intelligence tool for data modelling, analysis, and visualization, By Joe Webinar (Author) Format: Kindle Edition.
Reference Books	1. Power BI: A Complete Step-by-Step Guide for Beginners in Understanding Power BI by Mike Morris (Author) Format: Kindle Edition.
Website Link	1. https://www.datacamp.com/tutorial/tutorial-power-bi-for-beginners 2. https://www.tutorialspoint.com/power_bi/index.htm

B.Sc., Statistics Syllabus LOCF-CBCS With Effect From 2021-2022 Onwards								
Course Code	Course Title	Course Type	Sem	Hours	L	T	P	C
21M6USTE03	POWER BI IN DATA VISUALIZATION	CORE ELECTIVE-III	VI	5	3	2	0	4

CO-PO Mapping

CO Number	P01	P02	P03	P04	P05	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	L	S	S	1	M	S	M	S	M	L
CO2	M	M	M	M	S	M	S	S	S	M
CO3	S	M	M	S	S	L	S	M	S	S
CO4	S	M	M	S	S	L	S	M	S	S
CO5	M	M	M	S	S	L	S	M	S	S
Level of Correlation between CO and PO	L-LOW	M-MEDIUM		S-STRONG						

Tutorial Schedule	Chalk and Board Teaching, PowerPoint Presentation, Group Discussion and Virtual Learning
Teaching and Learning Methods	Chalk and Board Teaching, PowerPoint Presentation and Virtual Learning
Assessment Methods	Assignments, Seminar, Group Discussion, Unit Test, Internal Examinations and Semester Examinations

Designed By	Verified By	Approved By

(DR. S. MOHAN PRABHU)

Curriculum Development Cell MCAS Autonomous Rasipuram

B.Sc., Statistics Syllabus LOCF-CBCS With Effect From 2021-2022 Onwards								
Course Code	Course Title	Course Type	Sem	Hrs	L	T	P	C
21M6USTE04	MYSQL FOR DATA ANALYSIS	CORE ELECTIVE - IV	VI	5	3	2	0	4
Objective	1. To enable the students to understand data to apply them to various fields. 2. To introduce the basic statistical tools in time-related real-time situations. 3. To learn the concepts of programming MySQL. 4. To educate students about the importance of MySQL. 5. To acquire knowledge about the applications of statistics in MySQL.							
Unit	Course Content						Knowledge Levels	Sessions
I	Interacting with MySQL using PHP: MySQL Versus MySQL Functions.						K1-K4	9L+1T
II	Connecting to MySQL with PHP, Working with MySQL Data.						K1-K4	10L
III	Creating an Online Address Book: Planning and Creating Database Tables						K1-K4	10L
IV	Creating Menu, Creating Record Addition Mechanism, Viewing Records.						K1-K4	10L
V	Creating the Record Deletion Mechanism, Adding Sub-entities to a Record.						K1-K4	10L
Course Outcome	CO1: To gain knowledge about various MySQL.						K1	
	CO2: To solve the problems related to business and industries by using the method of averages.						K2	
	CO3: To acquire knowledge of important functions.						K3	
	CO4: Execute the techniques for finding solutions to real-life situations.						K4	
	CO5: To understand and solve problems.						K5	
Learning Resources								
Text Books	1. Mathematics and Statistics Hacks For MySQL 1st Edition by Jeremy Lane (Author)							
Reference Books	1. MySQL MADE EASY: A beginners handbook to easily learn MySQL. (Learn MySQL easily) (Programming Ebooks 9) by MAGIGE ROBI (Author) Format: Kindle Edition							
Website Link	1.https://downloads.mysql.com/docs/mysql-tutorial-excerpt-5.7-en.pdf							

B.Sc., Statistics Syllabus LOCF-CBCS With Effect From 2021-2022 Onwards								
Course Code	Course Title	Course Type	Sem	Hrs	L	T	P	C
21M6USTE04	MYSQL FOR DATA ANALYSIS	CORE ELECTIVE - IV	VI	5	3	2	0	4

CO-PO Mapping

CO Number	P01	P02	P03	P04	P05	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	L	S	S	L	M	S	M	S	M	L
CO2	M	M	M	M	S	M	S	S	S	M
CO3	S	M	M	S	S	L	S	M	S	S
CO4	S	M	M	S	S	L	S	M	S	S
CO5	M	M	M	S	S	L	S	M	S	S
Level of Correlation between CO and PO	L-LOW	M-MEDIUM		S-STRONG						

Tutorial Schedule	Chalk and Board Teaching, PowerPoint Presentation, Group Discussion and Virtual Learning
Teaching and Learning Methods	Chalk and Board Teaching, PowerPoint Presentation and Virtual Learning
Assessment Methods	Assignment, Seminar, Group Discussion, Unit Test, Internal Examinations and Semester Examinations

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Development Cell MCAS Autonomous Rasipuram

B.Sc., Statistics Syllabus LOCF-CBCS With Effect From 2021-2022 Onwards								
Course Code	Course Title	Course Type	Sem	Hours	L	T	P	C
21MXUSTE05	STOCHASTIC PROCESS AND QUEUING THEORY	ELECTIVE-V		5	4	2	0	4
Objective	1. To learn the basic principles of Stochastic Process and Markov chain. 2. To acquire knowledge of Markov Chains Theorems. 3. To impart knowledge about stochastic processes in real-life examples. 4. To study and solve the problem of queuing theory. 5. To analyze the queuing problems.							
Unit	Course Content						Knowledge Levels	Sessions
I	Stochastic Process: Introduction, Stationary Process.						K1-K3	12L
II	Markov Chains: Definition of Markov Chain, Examples including 2-state chain, random walk, etc., Transition probability matrix, order of a Markov chain, Markov chain as graphs,						K1-K3	12L
III	Classification of states of a Markov Chain, Stationary distribution, Limiting distribution, Period of a Markov Chain, Convergence theorem.						K1-K3	12L
IV	Poisson Process: postulates of Poisson process, properties of Poisson process, inter-arrival time, pure birth process, Yule Furry process, birth and death process, pure death process.						K1-K4	12L
V	Queuing System: General concept, steady-state distribution, queuing model, M/M/1 with finite and infinite system capacity, waiting time distribution (without proof).						K1-K4	12L
Course Outcome	CO1: Idea of stochastic processes.						K1	
	CO2: Markov chains including the notion of transition probability matrix.						K2	
	CO3: various other stochastic processes such as generalized Bernoulli process, Poisson process, birth, and death processes.						K3	
	CO4: Queuing theory, finite and infinite system capacity, waiting time distribution.						K4	
	CO5: application of these processes in real-life problems						K5	
Learning Resources								
Text Books	1. P. G. Hoel, S. C. Port and C. J. Stone: Introduction to Stochastic Processes. Medhi, J. (2009): Stochastic Processes, New Age International Publishers.							
Reference Books	1.S. Karlin and H.M.Taylor: A first course in stochastic process. 2. R. N. Bhattacharya and E. Waymire: Stochastic Process and Applications 3. Bhat B. R (2000): Stochastic Models: Analysis and Applications, New Age International Publishers.							
Website Link	1. https://web.ma.utexas.edu/users/gordanz/notes/introduction_to_stochastic_processes.pdf							

B.Sc., Statistics Syllabus LOCF-CBCS With Effect From 2021-2022 Onwards								
Course Code	Course Title	Course Type	Sem	Hours	L	T	P	C
21MXUSTE05	STOCHASTIC PROCESS AND QUEUING THEORY	ELECTIVE-V		5	4	2	-	4

CO-PO Mapping

CO Number	P01	P02	P03	P04	P05	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	L	S	S	L	M	S	M	S	M	L
CO2	S	M	S	M	S	M	S	S	S	M
CO3	S	S	S	S	S	L	S	M	S	S
CO4	S	S	S	S	S	L	S	S	S	S
CO5	S	M	S	S	S	S	S	S	S	S
Level of Correlation between CO and PO	L LOW	M MEDIUM		S STRONG						

Tutorial Schedule	Chalk and Board Teaching, PowerPoint Presentation, Group Discussion, and Virtual Learning
Teaching and Learning Methods	Chalk and Board Teaching, PowerPoint Presentation, and Virtual Learning
Assessment Methods	Assignments, Seminars, Group Discussions, Unit Tests, Internal Examinations, and Semester Examinations

Designed By	Verified By	Approved By
L.R		
[L.THOMAS]	(DR. S. MOHAN PRABHU)	

Curriculum Development Cell MCAS (Autonomous) Rasipuram

B.Sc., Statistics Syllabus LOCF-CBCS With Effect From 2021-2022 Onwards								
Course Code	Course Title	Course Type	Sem	Hours	L	T	P	C
21MXUSTE06	ADVANCED STATISTICAL METHODS	ELECTIVE-VI		5	4	2	0	4
Objective	1. To learn the basic principles of regression models. 2. To acquire knowledge of prediction error in regression models. 3. To impart knowledge about density estimation in real-life examples. 4. To study and solve the problem of circular data. 5. To analyze the circular distribution.							

Unit	Course Content	Knowledge Levels	Sessions
I	Review of linear regression models, Two goals – Prediction and Inference, and Comparison of parametric and Non-parametric regression models in this context. Concept of smoothing, Bias and Variance trade-off, Linear regression as linear smoothers - criticism, Other linear smoothers - Nearest Neighbour Regression, Kernel Regression and Spline with one covariate (only statements of results).	K1-K3	12L
II	Prediction error in regression models, in-sample error and generalization error, splitting of dataset (training set and test set) and idea of cross-validation. Selection of tuning parameters (degree of polynomial for polynomial regression, choice of K in K-NN and bandwidth in kernel regression) through cross-validation.	K1-K3	12L
III	Density estimation: Histogram, Empirical Distribution function and Glivenko-Cantelli Lemma (Statement only), Kernel density estimates- Bias and Variance, Choice of band width. Introduction to Jackknife and Bootstrap, Bias reduction using Jackknife, Estimate of bias of standard statistics, Bootstrap sampling distribution of standard statistics, Bootstrap in regression models. Missing data analysis: MCAR, MAR and NMAR, Brief discussion on Imputation techniques, EM algorithm and properties (statement only), application to mixture models.	K1-K3	12L
IV	Circular Data: Applications and Background, Measure of Centre, Circular Distance and Measure of Dispersion, Higher Moments. Circular Correlation and Regression: Circular Correlation Measure, Rank Correlation, Circular- Linear Correlation, Circular-Circular Regression, Linear-Circular Regression.	K1-K4	12L

V	Circular Probability Distributions: Some Methods of Obtaining Circular Distributions, Uniform Distribution, Cardioid Distribution, Circular Normal (CN) Distribution, Wrapped Normal (WN) Distribution, Wrapped Cauchy (WC) Distribution. Sampling Distribution (Statement and Use only) and Estimation of Parameters for Circular Normal (CN) Distribution.	K1-K4	12L
Course Outcome	Co1: smoothing, nearest-neighbor regression, prediction error, in-sample error, splitting of data-set, cross-validation.	K1	
	Co: 2 idea of density estimation and methods, Jackknife and Bootstrap, missing data analysis.	K2	
	Co: 3 Circular data, different characteristics and measures.	K3	
	Co: 4 Circular correlation and regression.	K4	
	Co:5 Circular probability distributions - Uniform, Cardioid, Circular Normal (CN), Wrapped Normal (WN), Wrapped Cauchy (WC) and associated sampling distributions.	K5	
Learning Resources			
Text Books	1. Larry Wasserman: All of Non-parametric Statistics. Gareth James et.al.: Introduction to Statistical Learning (with applications in R).		
Reference Books	1. Györfi, László, et. al.: A Distribution-Free Theory of Nonparametric Regression. Simonoff, 2.Jeffrey S. (1996). Smoothing Methods in Statistics. 3. Davison, A. C. and D. V. Hinkley (1997). Bootstrap Methods and their Applications. 4. B.Efron : The Jackknife, the Bootstrap and other Sampling Plans.		
Website Link	1.https://pages.mtu.edu/~tbco/cm3215/StatisticsNotes.pdf		

B.Sc., Statistics Syllabus LOCF-CBCS With Effect From 2021-2022 Onwards								
Course Code	Course Title	Course Type	Sem	Hours	L	T	P	C
21MXUSTE06	ADVANCED STATISTICAL METHODS	ELECTIVE-VI		5	4	2	-	4

CO-PO Mapping

CO Number	P01	P02	P03	P04	P05	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	L	S	S	L	M	S	M	S	M	L
CO2	S	M	S	M	S	M	S	S	S	M
CO3	S	S	S	S	S	L	S	M	S	S
CO4	S	S	S	S	S	L	S	S	S	S
CO5	S	M	S	S	S	S	S	S	S	S
Level of Correlation between CO and PO	L LOW	M MEDIUM		S STRONG						

Tutorial Schedule	Chalk and Board Teaching, PowerPoint Presentation, Group Discussion, and Virtual Learning
Teaching and Learning Methods	Chalk and Board Teaching, PowerPoint Presentation, and Virtual Learning
Assessment Methods	Assignments, Seminars, Group Discussions, Unit Tests, Internal Examinations, and Semester Examinations

Designed By	Verified By	Approved By
[P. KEERTHANA]		[Dr. J. ...]

Curriculum Development Cell MCAS Autonomous Kasipuram

B.Sc., Statistics Syllabus LOCF-CBCS With Effect From 2021-2022 Onwards								
Course Code	Course Title	Course Type	Sem	Hours	L	T	P	C
21M3USTN01	BASIC STATISTICS – I	NME THEORY - I	III	2	2	-	-	2
Objective	1. To impart essential knowledge in basic concepts of statistics and collection of data. 2. To learn the presentation of data and analysis of data. 3. To impart knowledge about frequency distribution. 4. To expose students to the concepts and diagrammatical presentation. 5. To enable the students to understand graphical presentation.							

Unit	Course Content	Knowledge Levels	Sessions
I	Introduction Meaning and Scope: Statistics – Definition – Scope – Limitations – Population and Sample – Concepts of Random sampling and Non-random sampling – Basic concepts only.	K1-K3	4L
II	Collection of Data: Primary and Secondary data – Methods of collecting primary and secondary data - sources of data – Preparation of Questionnaire and Schedule.	K1-K3	4L
III	Presentation of Data: Classification of data – Types – Frequency distributions for discrete and continuous data – Construction of tables with one, two factors of classification.	K1-K3	4L
IV	Diagrammatic Representation of Data: Bar Diagrams: Types of one dimensional and two-dimensional bar diagrams - Pie-diagrams – Uses.	K1-K4	4L
V	Graphical Representation of Statistical Data: Histogram – Frequency Polygon – Frequency curve and Cumulative frequency curve – Ogive curves – Lorenz curve – Uses.	K1-K4	4L
Course Outcome	CO1: To gain knowledge about basic statistical techniques.	K1	
	CO2: To learn collection of data.	K2	
	CO3: To acquire knowledge of important of frequency distribution.	K3	
	CO4: Execute diagrammatic presentation techniques in real-life situations.	K4	
	CO5: To understand graphical presentation techniques in real-life situations.	K5	

Learning Resources	
Text Books	1.Gupta. S. P. (2001), Statistical Methods, Sultan Chand & Company Ltd., New Delhi.
Reference Books	1.Pillai. R. S. N. And Bagavathi. V. (2005), Statistics, S. Chand & Company Ltd., New Delhi. 2.Sancheti. D. C. and Kapoor. V. K, Statistics (7th Edition), Sultan Chand & Sons, New Delhi. 3.Arora P. N, Comprehensive Statistical Methods, Sultan Chand & Sons, New Delhi. 4.Agarwal B. L, Basic Statistics, Wiley Eastern Ltd., Publishers, New Delhi. 5.Vittal P. R, Business Statistics, Margham Publications, Chennai.
Website Link	1.https://www.tutorialspoint.com/statistics/ 2.https://www.emathzone.com/tutorials/basic-statistics/collection-of-statistical-data.html

B.Sc., Statistics Syllabus LOCF-CBCS With Effect From 2021-2022 Onwards								
Course Code	Course Title	Course Type	Sem	Hours	L	T	P	C
21M3USTN01	BASIC STATISTICS – I	NME THEORY - I	III	2	2	-	-	2

CO-PO Mapping

CO Number	P01	P02	P03	P04	P05	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	L	S	S	L	M	S	M	S	M	L
CO2	S	M	S	M	S	M	S	S	S	M
CO3	S	M	S	S	S	L	S	M	S	S
CO4	S	S	S	S	S	L	S	S	S	S
CO5	S	M	S	S	S	L	S	S	S	S
Level of Correlation between CO and PO	L LOW	M MEDIUM		S STRONG						

Tutorial Schedule	Chalk and Board Teaching, PowerPoint Presentation, Group Discussion, and Virtual Learning
Teaching and Learning Methods	Chalk and Board Teaching, PowerPoint Presentation, and Virtual Learning
Assessment Methods	Assignments, Seminars, Group Discussions, Unit Tests, Internal Examinations, and Semester Examinations

Designed By	Verified By	Approved By
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Curriculum Development Cell MCAS (Autonomous) Rasipuram

B.Sc., Statistics Syllabus LOCF-CBCS With Effect From 2021-2022 Onwards								
Course Code	Course Title	Course Type	Sem	Hours	L	T	P	C
21M4USTN02	BASIC STATISTICS – II	NME THEORY - IV	IV	2	2	-	-	2
Objective	1. To introduce the concept and methods of measures of location. 2. To enable the students to understand and solve the problems of measures of dispersion. 3. To learn the importance and different methods of correlation. 4. To equip students with time series techniques. 5. To collect the desired information from index numbers.							
Unit	Course Content						Knowledge Levels	Sessions
I	Measures of Central Tendency: Definitions and concepts of Arithmetic mean Median and Mode – Merits and Demerits – Uses - Simple Problems.						K1-K4	4L
II	Measures of Dispersion: Range, Quartile deviation and their relative measures - Standard deviation and Coefficient of variation						K1-K4	4L
III	Correlation: Karl Pearson's coefficient of correlation and Spearman's rank correlation coefficient – Simple Problems.						K1-K4	4L
IV	Time Series: Measures of trend – Graphic method – Semi average method and Moving average method - Simple Problems.						K1-K4	4L
V	Index Numbers: Unweighted and Weighted Index Numbers: Laspeyre's, Paasche's and Fisher's method – Cost of living index numbers – Simple Problems.						K1-K4	4L
Course Outcome	CO1: To gain knowledge about measures of location.						K1	
	CO2: To learn and solve measures of dispersion.						K2	
	CO3: To acquire knowledge of the importance of and solve the correlation.						K3	
	CO4: To execute time series techniques in real-life situations.						K4	
	CO5: To understand an index number of techniques in real-life situations.						K5	

Learning Resources	
Text Books	1.Gupta. S. P. (2001), Statistical Methods, Sultan Chand & Company Ltd., New Delhi.
Reference Books	1. Pillai. R. S. N. And Bagavathi. V. (2005), Statistics, S. Chand & Company Ltd., New Delhi. 2. Sancheti. D. C. and Kapoor. V. K, Statistics (7th Edition), Sultan Chand & Sons, New Delhi. 3. Arora P. N, Comprehensive Statistical Methods, Sultan Chand & Sons, New Delhi. 4.Agarwal B. L, Basic Statistics, Wiley Eastern Ltd., Publishers, New Delhi. 5.Vittal P. R, Business Statistics, Margham Publications, Chennai.
Website Link	1.https://www.tutorialspoint.com/statistics/ 2.https://www.emathzone.com/tutorials/basic-statistics/collection-of-statistical-data.html

B.Sc., Statistics Syllabus LOCF-CBCS With Effect From 2021-2022 Onwards								
Course Code	Course Title	Course Type	Sem	Hours	L	T	P	C
21M4USTN02	BASIC STATISTICS – II	NME THEORY - IV	IV	2	2	-	-	2

CO-PO Mapping

CO Number	P01	P02	P03	P04	P05	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	M	S	S	S	L	S	M	S	M	L
CO2	S	S	S	S	S	S	S	M	S	S
CO3	M	S	S	M	S	S	S	S	S	S
CO4	S	L	L	S	S	L	M	M	S	S
CO5	S	M	L	S	S	M	S	L	S	S
Level of Correlation between CO and PO	L LOW	M MEDIUM		S STRONG						

Tutorial Schedule	Chalk and Board Teaching, PowerPoint Presentation, Group Discussion, and Virtual Learning
Teaching and Learning Methods	Chalk and Board Teaching, PowerPoint Presentation, and Virtual Learning
Assessment Methods	Assignments, Seminar, Group Discussions, Unit Tests, Internal Examinations and Semester Examinations

Designed By	Verified By	Approved By
L. R		
[L. THAMARAI]	(DR. S. MOHAN PRABHU)	[Dr. S. ...]

Curriculum Development Cell MCAS Autonomous Pasipuram

B.Sc., Statistics Syllabus LOCF-CBCS With Effect From 2021-2022 Onwards								
Course Code	Course Title	Course Type	Sem	Hours	L	T	P	C
21M3USTN01	STATISTICS FOR COMPETITIVE EXAMINATIONS - I	NME-III	IV	2	2	0	0	2
Objective	1. To enable the students to understand the basic concepts of statistics, collection of data, presentation of data, and analysis of data. 2. To acquire knowledge of statistics and its scope and importance in various areas such as Medical, Engineering, Agricultural, and Social Sciences, etc.,							
Unit	Course Content						Knowledge Levels	Sessions
I	Definition and Uses of Statistics- Scope and Limitation of Statistics - Collection of data-Primary data and secondary data-Classification and tabulation of data.						K1-K3	4L
II	Diagrammatic Presentation and Graphical Representation-simple problems.						K1-K3	4L
III	Measures of location-Arithmetic Mean, Median, Mode Geometric mean –Harmonic Mean- Combined Mean-simple problems.						K1-K3	4L
IV	Measures of dispersion-Range-Quartile Deviation-Mean Deviation-Standard deviation and Coefficient of variation Skewness and Kurtosis-simple problems.						K1-K4	4L
V	Definition of Correlation-Types –Regression Lines and Regression Equations-Difference between correlation and regression- simple problems.						K1-K4	4L
Course Outcome	CO1: Distinguish between population and sample.						K1	
	CO2: Know the concepts of random sampling and non-random sampling.						K2	
	CO3: Frame a questionnaire and collect primary and secondary data.						K3	
	CO4: Analyze statistical data and draw graphs, histograms, frequency polygons, and Ogives.						K4	
	CO5: To understand correlation and regression techniques in real-life situations.						K5	

Learning Resources	
Text Books	1.Gupta. S. P. (2001), Statistical Methods, Sultan Chand & Company Ltd., New Delhi.
Reference Books	1. Pillai. R. S. N. And Bagavathi. V. (2005), Statistics, S. Chand & Company Ltd., New Delhi. 2. Sancheti. D. C. and Kapoor. V. K, Statistics (7th Edition), Sultan Chand & Sons, New Delhi. 3. Arora P. N, Comprehensive Statistical Methods, Sultan Chand & Sons, New Delhi. 4. Agarwal B. L, Basic Statistics, Wiley Eastern Ltd., Publishers, New Delhi. 5. Vittal P. R, Business Statistics, Margham Publications, Chennai.
Website Link	1. https://www.tutorialspoint.com/statistics/ 2. https://www.emathzone.com/tutorials/basic-statistics/collection-of-statistical-data.html

B.Sc., Statistics Syllabus LOCF-CBCS With Effect From 2021-2022 Onwards								
Course Code	Course Title	Course Type	Sem	Hours	L	T	P	C
21M3USTN01	STATISTICS FOR COMPETITIVE EXAMINATIONS - I	NME-III	IV	2	2	-	-	2

CO-PO Mapping

CO Number	P01	P02	P03	P04	P05	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	L	S	S	L	M	S	M	S	M	L
CO2	S	M	S	M	S	M	S	S	S	M
CO3	S	S	S	S	S	L	S	M	S	S
CO4	S	S	S	S	S	L	S	S	S	S
CO5	S	M	S	S	S	S	S	S	S	S
Level of Correlation between CO and PO	L LOW	M MEDIUM		S STRONG						

Tutorial Schedule	Chalk and Board Teaching, PowerPoint Presentation, Group Discussion, and Virtual Learning
Teaching and Learning Methods	Chalk and Board Teaching, PowerPoint Presentation, and Virtual Learning
Assessment Methods	Assignments, Seminars, Group Discussions, Unit Tests, Internal Examinations, and Semester Examinations

Designed By	Verified By	Approved By
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Curriculum Development Cell MCAS Autonomous Rasipuram

B.Sc., Statistics Syllabus LOCF-CBCS With Effect From 2021-2022 Onwards								
Course Code	Course Title	Course Type	Sem	Hours	L	T	P	C
21M4USTN02	STATISTICS FOR COMPETITIVE EXAMINATIONS - II	NME THEORY - IV	IV	2	2	-	-	2
Objective	1. To introduce the concept and methods of measures of location. 2. To enable the students to understand the concept of probability. 3. To learn the concepts of random variables, distribution function, mathematical expectation							
Unit	Course Content						Knowledge Levels	Sessions
I	Probability - Addition, Multiplication, and Bay's Theorems and Their Application- Simple Problems.						K1-K4	4L
II	Random Variables: Discrete Case and Continuous Case - Simple Problems.						K1-K4	4L
III	Probability Distributions - Discrete Case -Continuous Case and Simple Problems.						K1-K4	4L
IV	Marginal and Conditional Distributions -Definition and Simple Problems.						K1-K4	4L
V	Distribution Function: Binomial, Poisson, and Normal – Definition-Properties and Simple Problems						K1-K4	4L
Course Outcome	CO1: To gain knowledge about probability.						K1	
	CO2: To learn and solve the random variable.						K2	
	CO3: To acquire knowledge of the importance of and solve the probability distribution.						K3	
	CO4: To execute marginal conditional distribution techniques in real-life situations.						K4	
	CO5: To understand the distribution function of techniques in real-life situations.						K5	

Learning Resources	
Text Books	1.Gupta. S. P. (2001), Statistical Methods, Sultan Chand & Company Ltd., New Delhi.
Reference Books	1. Kapur J.N and Saxena, H. C (1999), Mathematical Statistics – S.Chand and Company Ltd., New Delhi. 2. Feller, W. (2008), An Introduction to Probability Theory and its Applications, Volume I (Third Edition), John Wiley & Sons, New York.
Website Link	1. https://seeing-theory.brown.edu/probability-distributions/index.html 2. https://www.kullabs.com/classes/subjects/units/lessons/notes/note-detail/9557 3. https://www.statisticssolutions.com/mathematical-expectation/ 4. http://itfeature.com/statistics/measure-of-dispersion/moments-in-statistics 5. https://rmd.ac.in/dept/cse/notes/4/PQT/unit2.pdf

B.Sc., Statistics Syllabus LOCF-CBCS With Effect From 2021-2022 Onwards								
Course Code	Course Title	Course Type	Sem	Hours	L	T	P	C
21M4USTN02	STATISTICS FOR COMPETITIVE EXAMINATIONS - II	NME THEORY - IV	IV	2	2	-	-	2

CO-PO Mapping

CO Number	P01	P02	P03	P04	P05	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S	S	S	S	L	S	M	S	M	L
CO2	S	S	S	S	S	S	S	M	S	S
CO3	M	S	S	M	S	S	S	S	S	S
CO4	S	L	L	S	S	S	M	M	S	S
CO5	S	M	S	S	S	M	S	L	S	S
Level of Correlation between CO and PO	L LOW	M MEDIUM		S STRONG						

Tutorial Schedule	Chalk and Board Teaching, PowerPoint Presentation, Group Discussion, and Virtual Learning
Teaching and Learning Methods	Chalk and Board Teaching, PowerPoint Presentation, and Virtual Learning
Assessment Methods	Assignments, Seminar, Group Discussions, Unit Tests, Internal Examinations and Semester Examinations

Designed By	Verified By	Approved By
[P. KEERTHANA]	(DR. S. MOHAN PRABHU)	[Dr. S. Sivakumar]

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