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)
A UNIT OF VANETRA GROUP
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DEGREE OF BACHELOR OF SCIENCE

Learning Outcomes - Based Curriculum Framework

- Choice Based Credit System

Syllabus for B.Sc., Statistics

(Semester Pattern)

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)

S.No.	DEG/BRANCH	SEM	PART	STUDY COMPONENTS	COURSE_CODE	TITLE OF THE COURSE	Hrs./W		CREDIT POINTS	MAX.MARKS		
							Lect.	Lab.		CIA	ESE	TOTAL
SEMESTER - I												
1	B.Sc-Statistics	I	I	LANGUAGE-I	21M1UFTA01	TAMIL - I	5		3	25	75	100
2	B.Sc-Statistics	I	II	LANGUAGE-II	21M1UCEN01	COMMUNICATIVE ENGLISH - I	5		3	25	75	100
3	B.Sc-Statistics	I	III	DSC THEORY - I	21M1USTC01	DESCRIPTIVE STATISTICS	6		4	25	75	100
4	B.Sc-Statistics	I	III	GEC THEORY - I	21M1UMAA01	ALLIED: ALGEBRA AND CALCULUS	5		4	25	75	100
5	B.Sc-Statistics	I	III	DSC PRACTICAL - I	21M2USTP01	PRACTICAL: STATISTICS - I		3				
6	B.Sc-Statistics	I	IV	GEC PRACTICAL - I	21M2UMAAP1	PRACTICAL : MATHAMETICS - I		2				
7	B.Sc-Statistics	I	IV	AECC - VALUE EDUCATION	21M1UVED01	YOGA	1		2	100		
8	B.Sc-Statistics	I	IV	PROFESSIONAL ENGLISH - I	21M1UPES01	PROFESSIONAL ENGLISH FOR PHYSICAL SCIENCE - I	3		2	25	75	100
	B.Sc-Statistics	I				TOTAL	25	5	18	225	375	500
SEMESTER - II												
1	B.Sc-Statistics	II	I	LANGUAGE - I	21M2UFTA02	TAMIL - II	5		3	25	75	100
2	B.Sc-Statistics	II	II	LANGUAGE - II	21M2UCEN02	COMMUNICATIVE ENGLISH - II	5		3	25	75	100
3	B.Sc-Statistics	II	III	DSC THEORY - II	21M2USTC02	PROBABILITY AND RANDAM VARIABLES	5		4	25	75	100
4	B.Sc-Statistics	II	III	GEC THEORY - II	21M2UMAA02	DIFFERENTIAL EQUATIONS AND LAPLACE TRANSFORMS	5		4	25	75	100
5	B.Sc-Statistics	II	III	DSC PRACTICAL - I	21M2USTP01	PRACTICAL : STATISTICS - I		3	4	40	60	100
6	B.Sc-Statistics	II	III	GEC PRACTICAL - I	21M2UMAAP1	PRACTICAL : MATHAMETICS - I		2	2	40	60	100
7	B.Sc-Statistics	II	IV	AECC - ENVIRONMENTAL STUDIES	21M2UEVS01	ENVIRONMENTAL STUDIES	2		2	100		
8	B.Sc-Statistics	II	IV	PROFESSIONAL ENGLISH - II	21M2UPES02	PROFESSIONAL ENGLISH- PHYSICAL SCIENCE - II	3		2	25	75	100
	B.Sc-Statistics	II				TOTAL	25	5	24	305	495	700
SEMESTER - III												
1	B.Sc-Statistics	III	I	LANGUAGE - I	21M3UFTA03	TAMIL - III	5		3	25	75	100
2	B.Sc-Statistics	III	II	LANGUAGE - II	21M3UCEN03	COMMUNICATIVE ENGLISH - III	5		3	25	75	100
3	B.Sc-Statistics	III	III	DSC THEORY - III	21M3USTC03	DISTRIBUTIONS THEORY	5		4	25	75	100
4	B.Sc-Statistics	III	III	GEC THEORY - III	21M3UCSA02	C PROGRAMMING	4		4	25	75	100
5	B.Sc-Statistics	III	III	DSC PRACTICAL - II	21M4USTP02	PRACTICAL : STATISTICS - II		3				
6	B.Sc-Statistics	III	III	GEC PRACTICAL - II	21M3UCSAP2	PRACTICAL : ALLIED - II C PROGRAMMING		3	2	40	60	100
6	B.Sc-Statistics	III	III	SEC - I	21M3USTSP1	DATA ANALYSIS WITH ADVANCED EXCEL		3	2	40	60	100
7	B.Sc-Statistics	III	IV	NMEC - I	21M3UCSN02	OFFICE AUTOMATION	2		2	25	75	100
	B.Sc-Statistics	III				TOTAL	21	9	20	205	495	700
SEMESTER - IV												
1	B.Sc-Statistics	IV	I	LANGUAGE - I	21M4UFTA04	TAMIL - IV	5	-	3	25	75	100
2	B.Sc-Statistics	IV	II	LANGUAGE - II	21M4UCEN04	COMMUNICATIVE ENGLISH - IV	5	-	3	25	75	100
3	B.Sc-Statistics	IV	III	DSC THEORY - IV	21M4USTC04	STATISTICAL INFERENCE	5		4	25	75	100
4	B.Sc-Statistics	IV	III	GEC THEORY - IV	21M4UCSA06	PYTHON PROGRAMMING	4		4	25	75	100
5	B.Sc-Statistics	IV	III	DSC PRACTICAL - II	21M4USTP02	PRACTICAL : STATISTICS - II		3	3	40	60	100
6	B.Sc-Statistics	IV	III	GEC PRACTICAL - II	21M4UCSAP4	ALLIED PRACTICAL : PYTHON PROGRAMMING		3	2	40	60	100
7	B.Sc-Statistics	IV	IV	SEC - II	21M4USTSP2	DATA ANALYSIS WITH TABLEAU		3	2	40	60	100
8	B.Sc-Statistics	IV	IV	NMEC - II	21M4UCSN03	IMAGE EDITING TOOL	2		2	25	75	100
	B.Sc-Statistics	IV				TOTAL	21	9	23	245	555	800

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Scheme of Examinations LOCF-CBCS Pattern

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

S.No.	DEG/BRANCH	SEM	PART	STUDY COMPONENTS	COURSE_CODE	TITLE OF THE COURSE	Hrs./W		CREDIT POINTS	MA	
							Lect.	Lab.		CIA	E
SEMESTER - V											
1	B.Sc-Statistics	V	III	DSC THEORY - V	21M5USTC05	OPERATIONS RESEARCH	6		5	25	
2	B.Sc-Statistics	V	III	DSC THEORY - VI	21M5USTC06	SAMPLING THEORY	6		4	25	
3	B.Sc-Statistics	V	III	DSC PRACTICAL - III	21M5USTP03	PRACTICAL : STATISTICS - III		3	2	40	
4	B.Sc-Statistics	V	III	DSC PRACTICAL - IV	21M5USTP04	PRACTICAL : STATISTICS - IV		3	2	40	
5	B.Sc-Statistics	V	III	DSE - I	21M5USTE01	R PROGRAMMING FOR DATA ANALYSIS	5		4	25	
6	B.Sc-Statistics	V	III	DSE - II	21M5USTE02	TIME SERIES AND INDEX NUMBERS	5		4	25	
7	B.Sc-Statistics	V	IV	SEC - THEORY- I	21M5USTS01	ACTUARIAL STATISTICS	2		2	25	
8	B.Sc-Statistics	V	IV	INTERNSHIP					2	100	
	B.Sc-Statistics	V				TOTAL	24	6	25	305	
SEMESTER - VI											
1	B.Sc-Statistics	VI	III	DSC THEORY - VII	21M6USTC07	DESIGN OF EXPERIMENTS	6		5	25	
2	B.Sc-Statistics	VI	III	DSC THEORY - VIII	21M6USTC08	STATISTICAL QUALITY CONTROL	6		4	25	
3	B.Sc-Statistics	VI	III	DSE - III	21M6USTE03	POWER BI IN DATA VISUALIZATION	5		4	25	
4	B.Sc-Statistics	VI	III	DSE - IV	21M6USTE04	MYSQL FOR DATA ANALYSIS	5		4	25	
5	B.Sc-Statistics	VI	III	DSC PRACTICAL - V	21M6USTP05	PRACTICAL : STATISTICS - V		3	2	40	
6	B.Sc-Statistics	VI	III	DSC PRACTICAL - VI	21M6USTP06	PRACTICAL : STATISTICS - VI		3	2	40	
7	B.Sc-Statistics	VI	III	PROJECT WORK	21M6USTPR1	PROJECT WORK			4	40	
8	B.Sc-Statistics	VI	III	ONLINE - COMPETITIVE EXAMINATION	21M6USTOE1	STATISTICS FOR COMPETITIVE EXAMINATION			2	100	
9	B.Sc-Statistics	VI	IV	SEC - THEORY- II	21M6USTS02	BIOSTATISTICS AND SURVIVAL ANALYSIS	2		2	25	
10	B.Sc-Statistics	VI	V	EXTENSION ACTIVITY	21M6UEXA01	EXTENSION ACTIVITIES			1	100	
	B.Sc-Statistics	VI				TOTAL	24	6	30	445	
	B.Sc-Statistics	VI				OVERALL TOTAL	140	40	140	1730	
	B.Sc-Statistics	VI		EXTRA CREDIT COURSE	21M6USTEC1	MOOC COURSES OFFERED IN SWAYAM / NPTEL	-	-	2	-	

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637 408.

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

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.		A. L. S

Curriculum Development Cell MCAS Autonomous Rasipuram

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	PO1	PO2	PO3	PO4	PO5	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. SAVNYA	DR. S. MOHAN PRABHU	

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**	

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
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

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: Remembering the concepts of testing hypothesis and to develop null and alternative hypothesis.	K1	
	CO2:ToUnderstand and get information about the population on the basis of a random sample taken from that population.	K2	
	CO3: To Apply appropriate test procedure under the test of significance.	K3	
	CO4: To analyze the t-test and Chi-Square Test.	K4	
	CO5:To acquire the Knowledge about the concept of estimation.	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. 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

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.	K4	

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

Allied Course for any Degree offered by the B.Sc.,Statistics
LOCF-CBCS Pattern
EFFECTIVE FROM THE ACADEMIC YEAR 2021-2022 Onwards
LIST OF GEC - ALLIED COURSES

S.No.	Sem	COURSE_CODE	TITLE OF THE COURSE
1	I	21M1USTA01	BUSINESS MATHEMATICS AND STATISTICS - I
2	II	21M2USTA02	BUSINESS MATHEMATICS AND STATISTICS - II
3	III	21M3USTA03	BUSINESS STATISTICS - I
4	IV	21M4USTA04	BUSINESS STATISTICS - II
5	III	21M3USTA05	BIOSTATISTICS
6	III	21M3USTA08	APPLIED STATISTICS - I
7	IV	21M4USTA09	APPLIED STATISTICS - II
8	IV	21M4USTAP2	PRACTICAL STATISTICS
9	III	21M3USTA06	MATHEMATICAL STATISTICS - I
10	IV	21M4USTA07	MATHEMATICAL STATISTICS - II
11	IV	21M4USTAP1	PRACTICAL STATISTICS

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

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	

P. GOMATHI

Curriculum Development Cell MCAS Autonomous Pollachi

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: To remembering the scope and necessity of mathematical finance.	K1	
	CO2: Understand the concept and calculate interpolation problem.	K2	
	CO3: Apply the formula and calculate of correlation and regression problems.	K3	
	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. Leomathi		A. L. S

Curriculum Development Cell MCAS Autonomous Rasipuram

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	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	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: Remembering the scope and necessity of statistics and measures of central tendency.	**K1**	
	CO2: Understand the formula and calculate measures of sequence and series.	**K2**	
	CO3: To acquire the knowledge about the scope &necessity of probability.	**K3**	
	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

Curriculum Development Cell MCAS Autonomous Rasipuram

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	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	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.

Curriculum Development Cell MCAS (Autonomous) Rasipuram

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 [EL.THANGARAJ]	DR.S.MOHAN PRABHU	A. L. Sam

Curriculum Development Cell MCAS (Autonomous) Rasipuram

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.	**K1**	
	CO2: Understand estimation concepts in real-life situations.	**K2**	
	CO3: Apply the concept of statistical hypothesis.	**K3**	
	CO4: Analyze the tools of large sample tests.	**K4**	
	CO5: Analyze the tools of 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. 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

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

Curriculum Development Cell MCAS (Autonomous) Rasipuram

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

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
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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	Sessions
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 Remembering the concept of distribution to match with real-life situations.	**K1**	
	CO2: To understand the normal distribution and its applications.	**K2**	
	CO3: To Apply estimation concepts in real-life situations.	**K3**	
	CO4: To acquire knowledge about the concept of statistical hypothesis.	**K4**	
	CO5: To Analyze the nature of data with the tools of large and 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. 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

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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	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 $y = a^x b$ (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, 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-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
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