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
Learn. Lead

ESTD-1994

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 2023-2024 and onwards)

Regulation and Syllabus for B.Sc., Statistics

(With effect from the Academic Year 2023-24)

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.

QUALITY POLICY

- To Seek-To Strive-To Achieve greater heights in Arts and Science, Engineering, Technological and Management and Medical Education without compromising on the Quality of Education.

DEPARTMENT OF STATISTICS

Vision:

- Creating a Amiable environmental to learn statistical design and to use statistical Knowledge for problem solving and soft skills.

Mission:

- Playing a vibrant a role in the newly emerging fields of statistical soft skills, a economics, finance and bio informatics.
- Preparing the students to venture in to the dynamic programmes in mathematical sciences.
- Offering more flexible and diverse tracks / double major.
- Enhancing student's competitive skills to establish themselves in the job markets/ work-parts.

PREAMBLE:

Statistics is a science which deals with numerical data in which raw data is converted into useful information. Statistics as a subject is an important branch of knowledge and is devoted to various techniques of collection, presentation, analysis and interpretation of data. It is a science of learning from data. In the modern times where large amount of data can be collected through the use of information technology, Statistics has become a very useful tool to analyze these data and extract useful information which primarily helps people in making decision in the most beneficial way. Hence Statistical tools and techniques are used in almost all fields which are indispensable for people working in fields like agriculture, business, management, economics, finance, insurance, education, biotechnology and medical science, etc. This will help the students for pursuing higher studies and simultaneously can apply statistical tools judiciously to a variety of data sets related to different fields.

PROGRAMME LEARNING OUT COME:

NATURE AND EXTENT OF THE PROGRAMME:

The B.Sc. (General) Statistics Programme has some unique features such as independent projects, a number of elective courses including practical training on realistic problems, and extensive insight into statistical computations using standard statistical packages. Standard statistical packages, namely, MINITAB, MATLAB, R, MATHEMATICA, SAS, S-SPLUS, STATISTIKA, etc. are used in all practical courses and project work. The course has been designed in such a way that besides the core courses, a student can opt for outcome based elective courses from the streams such as Actuarial Statistics, Biostatistics, Applied Statistics, Time Series, Clinical Trials and Computational Statistics. The independent project work is one of the important components of this program me which will focus on one of the streams opted by the candidate. B.Sc. (General) Statistics programme is of three years duration, with semester pattern. Besides, they are supposed to take up a Project Work preferably on a problem related to industries.

AIM OF THE PROGRAMME:

To prepare graduates who are not only statistically sound but also capable of using their appropriate statistical skills in interdisciplinary areas such as finance, health, agriculture, government, business, industry, telecommunication, and bio-statistics. As a result, they can pursue their future career either in the core field or in the applied field of Statistics. To familiarize students with computational techniques and software used in the statistical area.

GRADUATE ATTRIBUTES:

A graduate with a B.Sc. in Statistics possesses a diverse and valuable skill set that is highly sought after in various industries. With a strong foundation in mathematical concepts and technical skills in statistical software such as R, SAS, and SPSS, as well as programming languages like Python, they are well-equipped for technical tasks. These graduates excel in data management, including the collection, organization, and maintenance of data.

They have the ability to present complex statistical findings clearly and effectively, making them excellent communicators. Their research skills are robust, with experience in designing and conducting experiments and surveys. Adaptable and versatile, statistics graduates can apply their expertise to a wide range of fields, including finance, healthcare, marketing, and more, making them valuable assets to any organization.

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 EDUCATIONAL OBJECTIVES (PEOs):

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.

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

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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.

REGULATIONS (2023-2024)

1. DURATION OF THE PROGRAME

1.1. Three years (six semesters)

1.2. Each academic year shall be divided into two semesters. The odd semesters shall consist of the period from June to November of each year and the even semesters from December to May of each year.

1.3. There shall be not less than 90 working days for each semester.

2. ELIGIBILITY FOR ADMISSION

2.1. Candidate for admission to the first year of B.Sc. Degree Course in Statistics shall be required to have passed the Higher Secondary Examination with Pass Mathematics and Business Mathematics as per norms set by the Government of Tamilnadu or an Examination Accepted as equivalent there to by the syndicate.

3. CREDIT REQUIRMENTS AND ELIGIBILITY FOR AWARD OF DEGREE

3.1. A Candidate shall be eligible for the award of the Degree only if he/she has undergone the prescribed course of study in a College affiliated to the University for a period of not less than three academic years and passed the examinations of all the Six Semesters prescribed earning a minimum of 140 credits as per the distribution given in Regulation for Part I, II, III, IV & V and also fulfilled such other conditions as have been prescribed there of.

4. COURSE OF STUDY, CREDITS AND SCHEME OF EXAMINATION

4.1. The Course Components and Credit Distribution shall consist of the following:

(Minimum Number of Credits to be obtained)

Part Wise Distribution	Study Components	Credit Distribution
PART I	Tamil or Other Languages	12
PART II	English	12
PART III	Core, Allied, Elective and Project Courses	91
PART IV	i. Basic Tamil/Advanced Tamil/NME	04
	ii. Soft Skill Courses/SBEC	10
	iii. Environmental Studies	02
	iv. Value Education	02
	v. Internship	02
	vi. Foundation Course	02
	vii. Professional Competency Skills	02
PARTV	Extension Activity	01
Total Credits		**140**

4.2 DETAILS OF COURSE OF STUDY OF PARTS I – V

4.2.1 PART I: Tamil and Other Languages Hindi or French at the option of candidatesand according to the syllabus and text-books prescribed from time to time:

4.2.2 PART II: English: According to the syllabus and text-books prescribed from timeto time

4.2.3 PART III: Core, Allied Project and Elective Courses: As prescribed by the concerned Board of Studies

4.2.4 PART IV:

i. Basic Tamil / Advanced Tamil/NME:

a. Students who have not studied Tamil up to XII STD and have taken anyLanguage other than Tamil in Part I shall take Basic Tamil comprising of Two Courses (level will be at 6th Standard).
b. Students who have studied Tamil up to XII STD and have taken any Language other than Tamil in Part – I shall take Advanced Tamil comprising of Two Courses.
c. Students who have studied Tamil up to XII STD and also have taken Tamil in Part – I shall take Non-Major Elective comprising of Two Courses.

i. Soft Skill Courses/SBEC
ii. Environmental Studies
iii. Value Education
iv. Internship
v. Foundation Course
vi. Professional Competency Skills (Online)

4.2.5 PART V: Extension Activity:

Students shall be awarded a maximum of 1 Credit for Compulsory Extension Service. All the Students shall have to enroll for NSS /NCC/ NSO (Sports & Games) Retract / Youth Red Cross or any other Service Organizations in the College and shall have to put in compulsory minimum attendance of 40 hours which shall be duly certified by the Principal of the College before 31st March in a year. If a student lacks40 hours attendance in the first year, he or she shall have to compensate the same during the subsequent years.

Those students who complete minimum attendance of 40 hours in one year will get ‘half a credit and those who complete the attendance of 80 or more hours in Two Years will get ‘one credit’. Literacy and Population Education and Field Work shall be compulsory components in the above extension service activities.

4.3. Inclusion of the Massive Open Online Courses (MOOCs) available on SWAYAM and NPTEL

4.3.1 Students can choose the MOOC Course Available on SWAYAM and NPTEL under Core, Elective or Soft skill category. He/ she will be awarded degree only after producing valid certificate of the MOOC course for credit Mobility

5. REQUIREMENTS FOR PROCEEDING TO SUBSEQUENT SEMESTER

5.1. Eligibility: Students shall be eligible to go to subsequent semester only if they earn sufficient attendance as prescribed by the Periyar University.

5.2. Attendance: All Students must earn 75% and above of attendance for appearing for the End Semester Examination.(Theory/Practical)

5.3. Condonation of shortage of attendance: If a Student fails to earn the minimum attendance (Percentage stipulated), the Principals shall condone the shortage of attendance up to a maximum limit of 10% (i.e. between 65% and above and less than 75%) after collecting the prescribed fee for Theory/Practical examination separately, towards the condonation of shortage of attendance. Such fees collected and should beremitted to the University.

5.4. Non-eligibility for condonation of shortage of attendance: Students who have secured less than 65% but more than 50% of attendance are NOT ELIGIBLE for condonation of shortage of attendance and such Students will not be permitted to appear for the regular examination, but will be allowed to proceed to the next year/next semester of the program and they may be permitted to take next University examination by paying the prescribed condonation fee

5.5. Detained students for want of attendance: Students who have earned less than 50% of attendance shall not be permitted to proceed to the next semester and to complete the Program of study. Such Students shall have to repeat the semester, whichthey have missed by rejoining after completion of final semester of the course, by paying the fee for the break of study as prescribed by the College from time to time.

5.6. Condonation of shortage of attendance for married women students: In respect of married women students undergoing UG programs, the minimum attendance for condonation (Theory/Practical) shall be relaxed and prescribed as 55% instead of 65% if they conceive during their academic career. Medical certificate from the Doctor (D.G.O) from the Government Hospital and the prescribed fee along with attendance details shall be forwarded to the college to consider the condonation of attendance mentioning the category

5.7. Zero Percent (0%) Attendance: The Students, who have earned 0% of attendance, have to repeat the program (by rejoining) without proceeding to succeeding semester and they have to obtain prior permission from the College/University immediately to rejoin the program.

5.8 Transfer of Students and Credits: The strength of the credits system is that it permits inter Institutional transfer of students. By providing mobility, it enables individual students to develop their capabilities fully by permitting them to move from one Institution to another in accordance with their aptitude and abilities by obtaining necessary permission from the university.

5.8.1 Transfer of Students is permitted from one Institution to another Institution forthe same program with same nomenclature.

Provided, there is a vacancy in the respective program of Study in theInstitution where the transfer is requested.

Provided the Student should have passed all the courses in the Institution fromwhere the transfer is requested.

5.8.2 The marks obtained in the courses will be converted and grades will be assigned as per the College norms.

5.8.3 The transfer students are eligible for classification.

5.8.4 The transfer students are not eligible for Ranking, Prizes and Medals.

5.8.5 Students who want to go to foreign Universities up to two semesters or Project Work with the prior approval of the Departmental/College Committee are allowed to get transfer of credits and marks which will be converted in to Grades as per the University norms and are eligible to get CGPA and Classification; they are not eligible for Ranking, Prizes and Medals.

5.9 Students are exempted from attendance requirements for online courses of the College and MOOC's.

6. EXAMINATION AND EVALUATION

6.1. Register for all subjects: Students shall be permitted to proceed from the First Semester up to Final Semester irrespective of their failure in any of the Semester Examination. For this purpose, Students shall register for all the arrear subjects of earlier semesters along with the current (subsequent) Semester Subjects.

6.2. Marks for Internal and End Semester Examinations for PART I, II, III, and IV

Category	Theory	Practical
Internal Assessment	25	**40**
End semester Examination	**75**	**60**

6.3. Procedure for Awarding Internal Marks

Internal Examination Marks – Theory

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

6.4 Awarding Marks for Attendance (out of 5)

Percentage of Attendance	Marks
Below 60%	0 marks
60% to 75%	3 marks
75% to 90%	4 marks
Above 90%	5 marks

6.5 Components for Practical CIA.

Components	Marks
CIA –I	**15**
CIA - II	**15**
Observation Note	**05**
Attendance	**5**
Total	**40**

6.6 Components for Practical ESE.

Components	Marks
Completion of Experiments	**50**
Record	**05**
Viva voce	**05**
Total	**60**

6.7 Guidelines for Value Education Yoga and Environmental Studies (Part IV)

6.7.1. The Course Value Education Yoga is to be treated as 100% CIA course whichis offered in V Semester for I year UG students.

6.7.2. The Course Environmental Studies is to be treated as 100% CIA course whichis offered in IV Semester for I year UG students.

6.7.3. Total Marks for the Course = 100

Components	Marks
Two Tests(2 x30)	**60**
Field visit and report (10+10)	**20**
Two assignments (2 x10)	**20**
Total	**100**

The passing minimum for this course is 40%

6.7.4 In case, the candidate fails to secure 40% passing minimum,he/she may haveto reappear for the same in the subsequent odd/even semesters.

6.8 . Internship/ Industrial Training, Mini Project and Major Project Work

Internship/Industrial Training		Mini Project	Major Project Work		
Components	**Marks**	**Marks**	**Components**		Marks
CIA* 2			**CIA** a) Attendance **b)** Review / Work Diary***1**	10 Marks 30 Marks	**40**
Work Diary	25	-			
Report	50	50			
Viva–voce	25	50			
Examination					
Total	**100**	**100**	**ESE*2** a) Final Report- 40 Marks b)Viva-voce 20- Marks		**60**
			Total		100

*1. Review is for Individual Project and Work Diary is for Group Projects (Group consisting of minimum 3 and maximum 5)

*2 Evaluation of report and conduct of viva voce will be done jointly by Internal andExternal Examiners

6.9 Guidelines for Professional Competency Skill- Online Mode (Part IV)- OnlineExam 3 hours

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

Objective type Questions from Question Bank.

- The passing minimum for this paper is 40%
- In case, the candidate fails to secure 40% passing minimum, he/ she may haveto reappear for the same in the subsequent semesters.

QUESTION PAPER PATTERN FOR CIA I, II AND ESE	
(3 HOURS)	**MAXIMUM: 75 Marks**
SECTION-A (**Objective Type**) **Answer ALL Questions** ALL Questions Carry EQUAL Marks	(10 x1=10 marks)
SECTION-B **(Either or Type)** **Answer ALL Questions** ALL Questions Carry EQUAL Marks	(5 x 5 = 25 marks)
SECTION-C **(Either or Type)** **Answer ALL Questions** ALL Questions Carry EQUAL Marks	(5 x 8 = 40 marks)
(Syllabus for CIA-I 2.5 Unit, Syllabus for CIA-II All 5 Unit)	

6.10. PASSING MINIMUM

6.10.1. There shall be no passing minimum for Internal.

6.10.2. For external examination, passing minimum shall be 40% [Forty Percentage] of the maximum marks prescribed for the course for each Course/Practical/Project and Viva-Voce.

6.10.3. In the aggregate [External/Internal] the passing minimum shall be of 40%.

6.10.4. He / She shall be declared to have passed the whole examination, if He / she passes in all the Courses and Practical wherever prescribed as per the scheme of the examinations by earning 140 CREDITS in Part I, II, III, IV & V. He/she shall also fulfill the extension activities prescribed earning a minimum of 1 credit to qualify for the Degree.

6.11. SUPPLIMENTARY EXAMINATION:

Supplementary Examinations is conducted for the students who appeared in the final semester examinations. Eligible criteria for appearing in the Supplementary Examinations are as follows:

6.11.1. Eligibility: A Student who is having arrear of only one theory course in any of the semester or two theory course in the Final semester of the UG degree programme alone is eligible for Supplementary Examinations.

6.11.2. Non-eligibility for those completed the program: Students who have completed their Program duration but having arrears are not eligible to appear forSupplementary Examinations.

6.12. RETOTALLING, REVALUATION AND PHOTOCOPY OF THE ANSWER SCRIPTS:

6.12.1. Re-totaling: All UG Students who appeared for their Semester Examinations are eligible for applying for re-totaling of their answer scripts.

6.12.2. Revaluation: All current batch Students who have appeared for their Semester Examinations are eligible for Revaluation of their answer scripts. Passed out candidates are not eligible for Revaluation.

6.12.3. Photo copy of the answer scripts: Students who have applied for revaluation can apply for the Photocopy of answer scripts by paying prescribed fee.

7. CLASSIFICATION OF SUCCESSFUL STUDENTS

RANGE OF MARKS	GRADE POINTS	LETTER GRADE	DESCRIPTION
90-100	9.0-10.0	O	**Outstanding**
80-89	8.0-8.9	D+	**Excellent**
75-79	7.5-7.9	D	**Distinction**
70-74	7.0-7.4	A+	**Very Good**
60-69	6.0-6.9	A	**Good**
50-59	5.0-5.9	B	**Average**
40-49	4.0-4.9	C	**Satisfactory**
00-39	0.0	U	**Re-appear**
ABSENT	0.0	AAA	**ABSENT**

7.1 Computation of Grade Point Average (GPA) in a Semester, Cumulative Grade PointAverage (CGPA) and Classification

GPA for a Semester: = ∑iCiGi ,∑iCi

That is, GPA is the sum of the multiplication of grade points by the credits of the courses divided by the sum of the credits of the courses in a semester.

CGPA for the entire programme: = ∑n∑iCniGni ,∑n∑iCni That is, CGPA is the sumof the multiplication of grade points by the credits of the entire programme divided by the sum of the credits of the courses of the entire programme

Where,

Ci= Credits earned for course I in any semester,

Gi=GradePointsobtainedforcourseiinanysemestern=Semesterinwhichsuchcourseswere credited.

7.2 Letter Grade and Classification

CGPA	GRADE	CLASSIFICATION OFFINAL RESULT
9.5-10.0	O+	**First Class -Exemplary***
9.0 and above but below9.5	O	
8.5 and above but below 9.0	D++	**First Class with Distinction***
8.0 and above but below 8.5	D+	
7.5 and above but below 8.0	D	
7.0 and above but below 7.5	A++	**First Class**
6.5 and above but below 7.0	A+	
6.0 and above but below 6.5	A	
5.5 and above but below 6.0	B+	**Second Class**
5.0 and above but below 5.5	B	
4.5 and above but below 5.0	C +	**Third Class**
4.0 and above but below 4.5	C	
0.0 and above but below 4.0	**U**	**Re-appear**

*The Students who have passed in the first appearance and within the prescribedsemester of the UG Programme (Major, Allied and Elective courses only) are eligible.

8. RANKING

Students who pass all the examinations prescribed for the Program in the FIRST APPEARANCE IT SELF ALONE are eligible for Ranking I, II and III.

9. MAXIMUM PERIOD FOR COMPLETION OF THE PROGRAM TO QUALIFY FOR A DEGREE

9.1. A Student who for whatever reasons is not able to complete the program within the normal period (N) or the Minimum duration prescribed for the programme,may be allowed two years period beyond the normal period to clear the backlog tobe qualified for the degree. (Time Span =N+2years for the completion of programme)

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MUTHAYAMMAL COLLEGE OF ARTS AND SCIENCE (Autonomous)
A UNIT OF VANETRA GROUP | Learn. Lead

B.Sc., STATISTICS abstract under LOCF- CBCS Pattern with effect from 2023 -2024

Onwards Structure of Credit Distribution as per the TANSCHE / UGC Guidelines

S. No.	Study Components	Part	Sem. I		Sem. II		Sem. III		Sem. IV		Sem. V		Sem. VI		No .of Paper	Total Credit
			No. of Paper	Credit	No. of Paper	Credit	No. of Paper	Credit	No. of Paper	Credit	No. of Paper	Credit	No. of Paper	Credit		
1	LANGUAGE-I	I	1	3	1	3	1	3	1	3					4	12
2	LANGUAGE-II	II	1	3	1	3	1	3	1	3					4	12
3	DISCIPLINE SPECIFIC COURSE (DSC)-THEORY	III	2	10	2	8	2	6	2	6	2	9	2	10	12	49
4	DSC-PRACTICAL	III	0	0	1	2	1	2	1	2	1	4	1	4	5	14
5	GENERIC ELECTIVE COURSES (GEC)- THEORY	III	1	3	1	3	1	3	1	3	3	9	1	3	8	24
6	GEC PRACTICAL	III	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7	PROJECT WORK	III											1	4	1	4
8	INTERNSHIP	IV									1	2			1	2
9	PROFESSIONAL COMPETENCY SKILL	IV											1	2	1	2
10	SKILL ENHANCEMENT COURSES (SEC)	IV					1	2	1	2					2	4
11	SKILL ENHANCEMENT COURSES PRACTICAL	IV			1	2	1	2	1	2					3	6
12	NON MAJOR ELECTIVE COURSES (NMEC)	IV	1	2	1	2									2	4
13	FOUNDATION COURSE (FC)	IV	1	2											1	2
14	ABILITY ENHANCEMENT COMPULSORY COURSES(AECC) - EVS	IV							1	2					1	2
15	ABILITY ENHANCEMENT COMPULSORY COURSES (AECC) - VALUE EDUCATION - YOGA	IV									1	2			1	2
16	EXTENSION ACTIVITY	V											1	1	1	1
	Cumulative Credits		**7**	**23**	**8**	**23**	**8**	**21**	**9**	**23**	**8**	**26**	**7**	**24**	**42**	**140**
	Total No. of Subjects	47														
	Marks	**4600**														

PART	No. of Credits
PART-I	12
PART-II	12
PART-III	91
PART-IV	24
PART-V	1
Grand Total	**140**

Extra Credit	4
	144

MUTHAYAMMAL COLLEGE OF ARTS AND SCIENCE (Autonomous)
Rasipuram-637408
Scheme of Examinations LOCF - CBCS Pattern
(For the Students Admitted from the Academic Year: 2023 – 2024Onwards)
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	23M1UFTA01	TAMIL-I	6		3	25	75	100
2	II	LANGUAGE-II	23M1UFEN01	ENGLISH-I	6		3	25	75	100
3	III	DSC THEORY - I	23M1USTC01	DESCRIPTIVE STATISTICS	5		5	25	75	100
4	III	DSC THEORY - II	23M1USTC02	PROBABILITY THEORY	5		5	25	75	100
5	III	GEC THEORY - I	23M1UMAA05	MATHEMATICS FOR STATISTICS	4		3	25	75	100
6	IV	NME - I		NME - I	2		2	25	75	100
7	IV	FC THEORY - I	23M1USTFC1	ELEMENTARY STATISTICS	2		2	25	75	100
				TOTAL	**30**	**0**	**23**	**175**	**525**	**700**
SEMESTER - II										
1	I	LANGUAGE-I	23M2UFTA02	TAMIL-II	6		3	25	75	100
2	II	LANGUAGE-II	23M2UFEN02	ENGLISH-II	6		3	25	75	100
3	III	DSC THEORY - III	23M2USTC03	MATRIX AND LINEAR ALGEBRA	4		4	25	75	100
4	III	DSC THEORY - IV	23M2USTC04	DISTRIBUTION THEORY	4		4	25	75	100
5	III	GEC THEORY - II	23M2UMAA06	REAL ANALYSIS	4		3	25	75	100
6	III	DSC PRACTICAL - I	23M2USTP01	PRACTICAL: DATA ANALYSIS USING MS EXCEL		2	2	40	60	100
7	IV	NME - II		NME - II	2		2	25	75	100
8	IV	SEC PRACTICAL - I	23M2USTSP1	PRACTICAL: DATA ANALYSIS WITH ADVANCED EXCEL		2	2	40	60	100

				TOTAL	**26**	**4**	**23**	**230**	**570**	**800**	

S.No.	PART	STUDY COMPONENTS	COURSE_CODE	TITLE OF THE COURSE	Hrs./W		CREDIT POINTS	MAX. MARKS		
					Lect.	Lab.		CIA	ESE	TOTAL
SEMESTER - III										
1	I	LANGUAGE-I	23M3UFTA03	TAMIL-III	6		3	25	75	100
2	II	LANGUAGE-II	23M3UFEN03	ENGLISH-III	6		3	25	75	100
3	III	DSC THEORY - V	23M3USTC05	ESTIMATION THEORY	4		3	25	75	100
4	III	DSC THEORY - VI	23M3USTC06	SAMPLING TECHNIQUES	4		3	25	75	100
5	III	GEC THEORY - III	23M3UMAA13	NUMERICAL METHODS	4		3	25	75	100
6	III	DSC PRACTICAL - II	23M3USTP02	PRACTICAL: DATA ANALYSIS USING R		2	2	40	60	100
7	IV	SEC THEORY - II	23M3UCSS10	DATABASE MANAGEMENT SYSTEM	2		2	25	75	100
8	IV	SEC PRACTICAL - II	23M3USTSP2	PRACTICAL: DATA ANALYSIS USING SQL		2	2	40	60	100
				TOTAL	**26**	**4**	**21**	**230**	**570**	**800**
SEMESTER - IV										
1	I	LANGUAGE-I	23M4UFTA04	TAMIL-IV	6		3	25	75	100
2	II	LANGUAGE-II	23M4UFEN04	ENGLISH-IV	6		3	25	75	100
3	III	DSC THEORY - VII	23M4USTC07	TESTING OF STATISTICAL HYPOTHESIS	4		3	25	75	100
4	III	DSC THEORY - VIII	23M4USTC08	ACTUARIAL STATISTICS	4		3	25	75	100
5	III	GEC THEORY - I	23M4USTE01	ECONOMICS AND OFFICIAL STATISTICS	4		3	25	75	100
6	III	DSC PRACTICAL - III	23M4USTP03	PRACTICAL: DATA ANALYSIS USING R		2	2	40	60	100
7	IV	SEC THEORY - III	23M4USTS01	BIOSTATISTICS	2		2	25	75	100
8	IV	SEC PRACTICAL - III	23M4USTSP3	PRACTICAL: DATA ANALYSIS USING MYSQL		2	2	40	60	100
9	IV	AECC - I ENVIRONMENTAL STUDIES(EVS)*	23M4UEVS01	ENVIRONMENTAL STUDIES(EVS)			2	100		100

		Self-Study		**TOTAL**	**26**	**4**	**23**	**330**	**570**	**900**
S.No.	**PART**	**STUDY COMPONENTS**	**COURSE_CODE**	**TITLE OF THE COURSE**	**Hrs./W**		**CREDIT POINTS**	**MAX. MARKS**		
					Lect.	**Lab.**		**CIA**	**ESE**	**TOTAL**
SEMESTER - V										
1	III	DSC THEORY - IX	23M5USTC09	STOCHASTIC PROCESSES	6		5	25	75	100
2	III	DSC THEORY - X	23M5USTC10	REGRESSION ANALYSIS	5		4	25	75	100
3	III	DSC PRACTICAL - IV	23M5USTP04	PRACTICAL: DATA ANALYSIS USING R AND TORA		5	4	40	60	100
4	III	GEC THEORY - II	23M5USTE02	OPERATIONS RESEARCH	4		3	25	75	100
5	III	GEC THEORY - III	23M5USTE03	ECONOMETRICS	4		3	25	75	100
6	III	GEC THEORY - IV	23M5USTE04	TIME SERIES AND INDEX NUMBERS	4		3	25	75	100
7	IV	AECC - II VALUE EDUCATION	23M5UVED01	YOGA	2		2	100		100
8	IV	INTERNSHIP	23M5USTIS1	INTERNSHIP			2	100		100
				TOTAL	**25**	**5**	**26**	**365**	**435**	**800**
SEMESTER - VI										
1	III	DSC THEORY - XI	23M6USTC11	DESIGN OF EXPERIMENTS	6		5	25	75	100
2	III	DSC THEORY - XII	23M6USTC12	DEMOGRAPHY	6		5	25	75	100
3	III	DSC PRACTICAL - V	23M6USTP05	PRACTICAL: DATA ANALYSIS USING R		5	4	40	60	100
4	III	PROJECT WORK	23M6USTPR1	PROJECT WORK	5		4	40	60	100
5	III	GEC THEORY - V	23M6USTE05	STATISTICAL QUALITY CONTROL	6		3	25	75	100
6	III	PROFESSIONAL COMPETENCY SKILL	23M6USTOE1	STATISTICS FOR COMPETITIVE EXAMINATION	2		2	100		100
7	V	EXTENSION ACTIVITY	23M6UEXA01	EXTENSION ACTIVITY			1			
				TOTAL	**25**	**5**	**24**	**255**	**345**	**600**
				OVERALL TOTAL	**158**	**22**	**140**	**1585**	**3015**	**4600**
1		**EXTRA CREDIT**		MOOC COURSES SWAYAM / NPTEL	-	-	2	-	-	-
2		**VALUE ADED COURSE**		VAC	-	-	2	-	-	-

The students should undergo compulsory 2 weeks internship programs during the IV Semester vacation. The students should submit the report at the end of the V semester. Project report should be submitted at the end of the VI semester.

HOD **MEMBER SECRETARY ACADEMIC COUNCIL** **PRINCIPAL**

MUTHAYAMMAL COLLEGE OF ARTS AND SCIENCE
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B.Sc., -Statistics Syllabus LOCF - CBCS with effect from 2023-2024 Onwards								
Course Code	**Course Title**	**Course Type**	**Sem.**	**Hours**	**L**	**T**	**P**	**C**
23M1USTC01	**DESCRIPTIVE STATISTICS**	**DSC THEORY-I**	**I**	**5**	**5**	**-**	**-**	**5**

Objective	Students acquire the important concepts of statistical data and formulation of the visualization of frequency distribution.		
Unit	**Course Content**	**Knowledge Levels**	**Sessions**
I	**Introduction to statistics:** Introduction - collection of data: primary and secondary data - collecting primary data-sources of secondary data. Sampling: census and sample methods. Classification-type-formation of frequency distribution-tabulation -parts of a table types. Diagrammatic representation types. Graphical representation - graphs of frequency distributions. Merits and limitations of diagrams and graphs.	K1	12
II	**Measures of Central Tendency:** Introduction-Definitions-Types Mean-Median-Mode-Geometric mean-Harmonic Mean-Weighted mean - Merits and Demerits-Measures of Dispersion: Introduction – Definition – Types – Range - Quartile deviation - Mean deviation - Standard deviation - Co-efficient of variation.	K2	12
III	**Methods of Skewness and Kurtosis:** Introduction-Definition-Types-Karl Pearson ‘s – Bowley‘s - Kelly‘s methods – Their merits and demerits. Kurtosis: Introduction-Definition- Types-Its merits and demerits. Moments: Introduction - Definition- Types - Raw, Central moments and their applications.	K3	12
IV	**Correlation and Regression:** Introduction - Definition - Types – Ungrouped and Grouped data – Probable error – properties - Rank correlation –Regression analysis: Introduction - Definition – Regression Equations -Multiple regression.	K4	12
V	**Independence of Attributes:** Introduction – Definition-Classes and Class frequencies-Consistency of data-Independence of attributes-Association of attributes-Yule‘s coefficient and -Coefficient of Colligation.	K5	12
Course Outcome	**CO1:** Recall the knowledge about the scope and necessity of Statistics, tabulate and represent the data in diagrams and graphs.	K1	
	CO2: Interpret the formula and calculate descriptive measures of central tendency and dispersion.	K2	
	CO3: Applying 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: Evaluate the nature of data and interpret the measures of regression.	K5	

Learning Resources	
Text Books	1.Gupta, S.P. (2017): Statistical Methods, Sultan Chand & Sons Pvt Ltd, New Delhi, 35th Revised Edition.
Reference Books	1.Pillai, R.S., and Bagavathi (2003): Statistics, S.Chand and Company Ltd., New Delhi.
Website Link	1.e-books, tutorials on MOOC/SWAYAM courses on the subject 2.https://en.wikipedia.org/wiki/Statistics https://en.wikipedia.org/wiki/Descriptive_statistics 3.https://socialresearchmethods.net/kb/statdesc.php

	L-Lecture	T-Tutorial	P-Practical	C-Credit

B.Sc., -Statistics Syllabus LOCF - CBCS with effect from 2023-2024 Onwards

Course Code	Course Title	Course Type	Sem.	Hours	L	T	P	C
23M1USTC01	**DESCRIPTIVE STATISTICS**	**DSC THEORY-I**	**I**	**5**	**5**	**-**	**-**	**5**

CO-PO Mapping

CO Number	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S	S	S	S	S	S	M	S	M	S
CO2	S	M	M	S	S	S	S	S	S	S
CO3	S	S	M	S	S	S	S	S	M	S
CO4	S	S	S	M	S	S	S	S	M	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	Audio Video lecture, Chalk and Board class, Assignment, PPT Presentation and Video presentation
Assessment Methods	Class Test, Unit Test, Assignment, CIA-I, CIA-II and ESE

Designed By	**Verified By**	**Approved By Member Secretary**
Mrs.P.Keerthana	**Dr.S.Mohan Prabhu**	**Dr.S.Shahitha**

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B.Sc., -Statistics Syllabus LOCF - CBCS with effect from 2023-2024 Onwards								
Course Code	**Course Title**	**Course Type**	**Sem.**	**Hours**	**L**	**T**	**P**	**C**
23M1USTC02	**PROBABILITY THEORY**	**DSC THEORY - II**	**I**	**5**	**5**	**-**	**-**	**5**
Objective	Students acquire the importance and scope of probability theory and to predict the chance of an experimental outcome.							

Unit	Course Content	Knowledge Levels	Sessions
I	**Theory of Probability:** Introduction-Basic terminology- Definition - Axiomatic approach – Types of Events - Conditional Probability – Addition and Multiplication theorems of Probability for two‘ events (Statement and Proof) – Baye’s theorem of Probability (Statement and Proof)only.	K1	12
II	**Random variables and Distribution functions:** Introduction- Discrete random variable: Probability mass function- Discrete distribution function, Properties. Continuous random variable: Probability density function and properties.	K2	12
III	**Two dimensional random variables:** Joint probability mass function- Marginal probability function, Conditional probability function. Two dimensional distribution functions- Marginal distribution functions - Joint density function-Marginal density function - Conditional distribution function - Conditional probability density function only.	K3	12
IV	**MathematicalExpectations:** Introduction- Expected value of a random variable (Discrete and Continuous)-Expected value of function of a random variable - Properties of Expectation-Properties of variance- Covariance. Inequalities involving expectation.	K4	12
V	**Generating Functions:** M.G.F-Properties-Uniqueness theorem C.G.F-Properties - P.G.F- Properties. Characteristic Function: Properties– Inversion theorems (Statement only)- Uniqueness theorem (Statement only). Chebychev‘s Inequality (Statement and Proof).	K5	12
Course Outcome	**CO1:**Relate the knowledge and match real-life situations with probability concepts.	K1	
	CO2: Describe the basic probability theorems and their applications.	K2	
	CO3: Organize the demonstrate of moment generating and characteristic function.	K3	
	CO4: Categorize the central limit theorem and its applications.	K4	
	CO5: Evaluate and distinguish between discrete and continuous random variables.	K5	

Learning Resources				
Text Books	1. Gupta S.C. and Kapoor V.K (2015): Fundamentals of Mathematical Statistics, Sultan Chand & Sons.			
Reference Books	1.Sanjay Arora and Bansilal (1989): New Mathematical Statistics, Satyaprakashan, New Delhi			
Website Link	1.www.khanacademy.org/math/statistics-probability/random-variables-stats- library 2.https://ocw.mit.edu/courses/mathematics/18-440-probability-and-random- variables-spring-2014			
	L-Lecture	T-Tutorial	P-Practical	C-Credit

B.Sc., -Statistics Syllabus LOCF - CBCS with effect from 2023-2024 Onwards									
Course Code	**Course Title**	**Course Type**	**Sem.**	**Hours**	**L**	**T**	**P**	**C**	
23M1USTC02	**PROBABILITY THEORY**	**DSC THEORY - II**	**I**	**5**	**5**	**-**	**-**	**5**	

CO-PO Mapping

CO Number	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	M	S	S	L	M	S	S	S	M	M
CO2	S	S	S	M	S	M	S	S	S	S
CO3	S	M	S	S	S	L	S	M	S	S
CO4	S	S	S	S	S	M	M	S	S	S
CO5	M	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	Audio Video lecture, Chalk and Board class, Assignment, PPT Presentation and Video presentation
Assessment Methods	Class Test, Unit Test, Assignment, CIA-I, CIA-II and ESE

Designed By	Verified By	Approved By Member Secretary
Mr. L.Thangaraj	**Dr. S. Mohan Prabhu**	**Dr.S.Shahitha**

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B.Sc., -Statistics Syllabus LOCF - CBCS with effect from 2023-2024 Onwards								
Course Code	**Course Title**	**Course Type**	**Sem.**	**Hours**	**L**	**T**	**P**	**C**
23M2USTC03	**MATRIX AND LINEAR ALGEBRA**	**DSC THEORY-III**	**II**	**4**	**4**	**-**	**-**	**4**

Objective	Students acquire the knowledge basic operations of transpose and inverse of matrices.		
Unit	**Course Content**	**Knowledge Levels**	**Sessions**
I	**Introduction to matrix:** Matrices-Transpose-Conjugate transpose-Reversal law for the transpose and conjugate transpose. Adjoint of a matrix, Inverse of a matrix, Singular and Non -Singular matrices	K1	10
II	**Inverse of matrix:** Reversal law for the inverse of product of two matrices. Commutatively of inverse and transpose of matrix, Commutatively of inverse and conjugate transpose of matrix.	K2	10
III	**Rank of matrix:** Rank of a matrix, Echelon form, Rank of transpose, Elementary transformations, Elementary matrices, Invariance of rank through elementary transformations, Reduction to Normal form, Equivalent matrices.	K3	10
IV	**Basics of Vector Space:** Vector space – Linear Dependence - Basis of a vector space –Sub- space - Properties of Linearly Independent and Dependent systems, Row and Column spaces, Equality of Row and Column ranks, Rank of Sum and Product of matrices	K4	10
V	**Matrix Polynomials:** Matrix polynomials, Characteristic roots and vectors, Relation between characteristic roots and characteristic vectors, Algebraic and Geometric multiplicity, Cayley- Hamilton theorem.	K5	8
Course Outcome	**CO1:** Select the knowledge about the basic operations of matrices.	K1	
	CO2 Describe the various transactions of matrices and its applications.	K2	
	CO3: Experiment the applications of various properties of matrices.	K3	
	CO4: Categorize the vector space and its applications.	K4	
	CO5: Disprove the vector and matrix applications.	K5	

Learning Resources				
Text Books	1.Vasishtha.A.R (1972):Matrices, Krishna prakashan Mandir, Meerut.			
Reference Books	1.Shanthi Narayan, (2012): A Text Book of Matrices, S.Chand & Co, New Delhi.			
Website Link	1.https://www.sydney.edu.au/content/dam/students/documents/mathematics-learning-centre/linear-algebra-study-guide.pdf			
	L-Lecture	T-Tutorial	P-Practical	C-Credit

B.Sc., -Statistics Syllabus LOCF - CBCS with effect from 2023-2024 Onwards									
Course Code	**Course Title**	**Course Type**	**Sem.**	**Hours**	**L**	**T**	**P**	**C**	
23M2USTC03	**MATRIX AND LINEAR ALGEBRA**	**DSC THEORY-III**	**II**	**4**	**4**	**-**	**-**	**4**	

CO-PO Mapping

CO Number	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	M	S	S	L	M	S	S	S	M	S
CO2	S	S	S	M	S	M	S	S	S	S
CO3	S	M	S	S	S	L	S	M	M	S
CO4	S	S	M	S	S	S	M	S	S	S
CO5	M	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	Audio Video lecture, Chalk and Board class, Assignment, PPT Presentation and Video presentation	
Assessment Methods	Class Test, Unit Test, Assignment, CIA-I, CIA-II and ESE	
Designed By	**Verified By**	**Approved By Member Secretary**
Mrs. P. Keerthana	**Dr. S. Mohan Prabhu**	**Dr.S.Shahitha**

B.Sc., -Statistics Syllabus LOCF - CBCS with effect from 2023-2024 Onwards								
Course Code	**Course Title**	**Course Type**	**Sem.**	**Hours**	**L**	**T**	**P**	**C**
23M2USTC04	**DISTRIBUTION THEORY**	**DSC THEORY - IV**	**II**	**4**	**4**	**-**	**-**	**4**
Objective	Students learned discrete distributions and continuous distributions.							

Unit	Course Content	Knowledge Levels	Sessions
I	**Introduction to Binomial Distribution:** Binomial distribution – moments, recurrence relation, mean deviation, mode, moment generating function, characteristic function, cumulants. Fitting of Binomial Distribution. Poisson distribution – moments, mode, recurrence relation, moment generating function, characteristic function, cumulants. Fitting of Poisson distribution. Negative binomial distribution – m.g.f., cumulants. Fitting of Negativebinomial distribution (statement only).	K1	10
II	**Geometric Distribution:** Geometric distribution – lack of memory, moments, m.g.f.- Hyper geometric distribution – mean, variance, approximation to Binomial, recurrence relation – Multinomial distribution – m.g.f., meanand variance.	K2	10
III	**Normal Distribution:** Normal Distribution – chief characteristics of the normal distribution and normal probability curve, mean, median, mode, m.g.f. characteristic function, moments, points of inflexion, mean deviation.	K3	10
IV	**Exponential distribution**:Exponential distribution - m.g.f., characteristic function, memory less property – Gamma distribution – m.g.f., cumulants and central moments, reproductive property – Beta distribution – First kind and second kind – constants.	K4	10
V	**Concepts of t, f, Chi square distributions:** Functions of Normal random variables leading to t, Chi-square and F-distributions (derivations, properties and inter relationships).	K5	8
Course Outcome	**CO1:** Recall knowledge about identifying discrete distributions that appeared in real-life situations.	K1	
	CO2: Discuss about some continuous distributions and its applications.	K2	
	CO3: Illustrate the normal distribution and its properties.	K3	
	CO4: Explain the Exponential distribution and its properties.	K4	
	CO5: Estimate the sampling distributions and its applications in real life.	K5	

Learning Resources				
Text Books	1. Gupta, S.C. Kapoor, V.K. (2007) Fundamentals of Mathematical Statistics, Sultan Chand and Sons, New Delhi			
Reference Books	1. V.K. Kapoor and S.C. Gupta: Fundamentals of Mathematical Statistics, Sultan Chand & Sons, New Delhi.			
Website Link	1.https://www.studocu.com/en-gb/document/university-of-southampton/statistical-distribution-theory/statistical-distribution-theory-lecture-notes-chapter-1-6/608333 2.https://ebookcentral.proquest.com/lib/inflibnet-ebooks/detail.action?docID=1791152 3. https://ebookcentral.proquest.com/lib/inflibnet-ebooks/reader.action?docID=1791152&ppg=12			
	L-Lecture	T-Tutorial	P-Practical	C-Credit

B.Sc., -Statistics Syllabus LOCF - CBCS with effect from 2023-2024 Onwards									
Course Code	**Course Title**	**Course Type**	**Sem.**	**Hours**	**L**	**T**	**P**	**C**	
23M2USTC04	**DISTRIBUTION THEORY**	**DSC THEORY - IV**	**II**	**4**	**4**	**-**	**-**	**4**	

CO-PO Mapping

CO Number	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	M	S	S	L	M	S	S	S	M	S
CO2	S	S	S	M	S	M	S	S	S	S
CO3	S	M	S	S	S	L	S	M	M	S
CO4	S	S	M	S	S	S	M	S	S	S
CO5	M	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	Audio Video lecture, Chalk and Board class, Assignment, PPT Presentation and Video presentation	
Assessment Methods	Class Test, Unit Test, Assignment, CIA-I, CIA-II and ESE	
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B.Sc., -Statistics Syllabus LOCF - CBCS with effect from 2023-2024 Onwards								
Course Code	**Course Title**	**Course Type**	**Sem.**	**Hours**	**L**	**T**	**P**	**C**
23M3USTC05	**ESTIMATION THEORY**	**DSC THEORY - V**	**III**	**4**	**4**	**-**	**-**	**3**
Objective	Students emphasize on the concept of point estimation and interval estimation of a good estimator.							

Unit	Course Content	Knowledge Levels	Sessions
I	**Point Estimation:** Point estimation – Estimator – Consistency and Unbiasedness – Efficiency and asymptotic efficiency – Estimators based on sufficient statistics – Neyman Factorization theorem (statement only) – Simple Illustrations	K1	10
II	**Concepts of MVUE:** Minimum variance unbiased estimators – Cramer – Rao Inequality – Rao Blackwell theorem – Simple illustrations	K2	8
III	**Methods of Estimation:** Methods of Estimation – Methods of Maximum likelihood and moments – Properties of estimators obtained by these methods – Simple illustrations.	K3	10
IV	**Method of Minimum Chi-Square:** Method of Minimum Chi-Square-Method of Minimum Variance-Methods of moments -Methods of Least squares- Interval estimation.	K4	10
V	**Notion of Bayes Estimation:** Notion of Bayes estimation – concept of prior, posterior and conjugate priors. Simple problems involving quadratic error loss function- Simple illustrations. **Current Trends:*Minimum Variance Unbiased Estimator***	K5	10
	…… Self Study.		
Course Outcome	**CO1:** Recall population parameters.	K1	
	CO2: Classify good estimators and its properties	K2	
	CO3: Make use of interval estimators of a parameter	K3	
	CO4: Discover the parameters using various estimation methods and identify the best among the estimators	K4	
	CO5: Elaborate data and can estimate population parameters	K5	

Learning Resources				
Text Books	1. Gupta S.C. and Kapoor V.K. (2020), Fundamentals of Mathematical Statistics, 12th Edition Sultan Chand Sons, New Delhi.			
Reference Books	1. P.R. Vittal (2002), Mathematical Statistics, Margham Publications, Chennai.			
Website Link	1. https://www.studocu.com/row/document/university-of-sindh/statistics-i/estimation-lecture-notes-1/6732144 2. https://healy.econ.ohio-state.edu/kcb/Ma103/Notes/Lecture18.pdf 3.https://www.slideshare.net/BhattTushar1/statistical-estimation-and-testing-lecture-notespdf			
Self-Study Material	1. https://ebookcentral.proquest.com/lib/inflibnet-ebooks/detail.action?docID=7103860 2. https://ebookcentral.proquest.com/lib/inflibnet-ebooks/reader.action?docID=7103860&ppg=344			
	L-Lecture	T-Tutorial	P-Practical	C-Credit

B.Sc., -Statistics Syllabus LOCF - CBCS with effect from 2023-2024 Onwards									
Course Code	**Course Title**	**Course Type**	**Sem.**	**Hours**	**L**	**T**	**P**	**C**	
23M3USTC05	**ESTIMATION THEORY**	**DSC THEORY - V**	**III**	**4**	**4**	**-**	**-**	**3**	

CO-PO Mapping

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

Tutorial Schedule	-
Teaching and Learning Methods	Audio Video lecture, Chalk and Board class, Assignment, PPT Presentation and Video presentation
Assessment Methods	Class Test, Unit Test, Assignment, CIA-I, CIA-II and ESE

Designed By	Verified By	Approved By Member Secretary
Mrs.P.Keerthana	**Dr.S.Mohan Prabhu**	**Dr.S.Shahitha**

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B.Sc., -Statistics Syllabus LOCF - CBCS with effect from 2023-2024 Onwards								
Course Code	**Course Title**	**Course Type**	**Sem.**	**Hours**	**L**	**T**	**P**	**C**
23M3USTC06	**SAMPLING TECHNIQUES**	**DSC THEORY-VI**	**III**	**4**	**4**	**-**	**-**	**3**

Objective	Students gain the knowledge basic operations, theory and applications of simple random sampling.

Unit	Course Content	Knowledge Levels	Sessions
I	**Basis concepts of sample surveys**: Basic concepts of sample surveys – Advantages of Sampling –Principal steps in Sample survey, Sampling unit – Sampling frame Census Probability Sampling, Alternative probability sampling, Mean Square Error.	K1	10
II	**Simple random sampling:** Simple random sampling, Methods of selection, Sampling with and without replacement – Properties of estimates, Finite population correction, Estimation of Standard error, Confidence limits.	K2	10
III	**Stratified random sampling:** Stratified random sampling, principles of stratification, Notations –Estimation of population mean and its variance – Estimated variance and confidence limits, Allocation techniques-equal allocation proportional allocation.	K3	10
IV	**Systematic random sampling:** Systematic sampling –Relation to cluster sampling, Estimation of population mean and its sampling variance –Comparison of systematic sampling with stratified random samples.	K4	10
V	**PPS sampling** Varying Probability sampling, Selection of one unit with PPS, PPS Sampling with replacement, Estimator for population total and its variance. **Current Trends:*Sampling Unit***	K5	8
	…… Self Study.		
Course Outcome	**CO1:** Identify the difference between census and sampling.	K1	
	CO2: Explain the basic operations and advantages of sampling.	K2	
	CO3: Make use of widely used sampling techniques.	K3	
	CO4: Distinguish to estimate population information using sampling.	K4	
	CO5: Evaluating sampling techniques in real time problem.	K5	

Learning Resources				
Text Books	1. Thompson, Steven K.. Sampling, John Wiley & Sons, Incorporated, 2012.Pro Quest Ebook Central. 2.Cochran, W.G. (1978) : Sampling Techniques, John WileyEastern			
Reference Books	1. Singh. D. and Chaudry F.S. (1986) :Theory and Analysis of Sample Surveys Design Wiley Eastern Ltd. 2. Sampath.S, (2001), Sampling Theory and Methods, CRC Press.			
Website Link	1. http://ocw.jhsph.edu/courses/statmethodsforsamplesurveys/pdfs/lecture2.pdf 2. https://www.questionpro.com/blog/stratified-random-sampling/ 3. https://www.scribbr.com/methodology/systematic-sampling/ 4. http://home.iitk.ac.in/~shalab/sampling/chapter7-sampling-varying-probability-sampling.pdf			
Self-Study Material	1. https://ebookcentral.proquest.com/lib/inflibnet-ebooks/detail.action?docID=818503. 2.https://ebookcentral.proquest.com/lib/inflibnetebooks/reader.action?docID=818503&ppg=28			
	L-Lecture	T-Tutorial	P-Practical	C-Credit

B.Sc., -Statistics Syllabus LOCF - CBCS with effect from 2023-2024 Onwards									
Course Code	**Course Title**	**Course Type**	**Sem.**	**Hours**	**L**	**T**	**P**	**C**	
23M3USTC06	**SAMPLING TECHNIQUES**	**DSC THEORY-VI**	**III**	**4**	**4**	**-**	**-**	**3**	

CO-PO Mapping

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

Tutorial Schedule	-
Teaching and Learning Methods	Audio Video lecture, Chalk and Board class, Assignment, PPT Presentation and Video presentation
Assessment Methods	Class Test, Unit Test, Assignment, CIA-I, CIA-II and ESE

Designed By	Verified By	Approved By Member Secretary
Mrs.P.Gomathi	**Dr.S.Mohan Prabhu**	**Dr.S.Shahitha**

MUTHAYAMMAL COLLEGE OF ARTS AND SCIENCE
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B.Sc., -Statistics Syllabus LOCF - CBCS with effect from 2023-2024 Onwards								
Course Code	**Course Title**	**Course Type**	**Sem.**	**Hours**	**L**	**T**	**P**	**C**
23M4USTC07	**TESTING OF STATISTICAL HYPOTHESIS**	**DSC THEORY-VII**	**IV**	**4**	**4**	**-**	**-**	**3**
Objective	Students make familiar to acquire knowledge about the concepts of testing, most powerful test.							

Unit	Course Content	Knowledge Levels	Sessions
I	**Concept of Statistical Hypothesis :**Statistical Hypothesis – Null and Alternative Hypothesis – Simple and Composite hypothesis – Critical region – Type-I and Type-II error –Most Powerful test – Uniformly Most powerful test – Neyman Pearson Lemma – Simple problems.	K1	10
II	**Normal Population:** Likelihood ratio test – Tests of mean of a normal population – Equality of two means of normal populations – test for variance of a normal population – Equality of variances of two normal populations.	K2	10
III	**Analysis of Variance:** Chi-square tests, Distribution of quadratic forms, Test of equality of several means, Analysis of Variance. Correlation and Regression testing.	K3	10
IV	**t-distribution:** Exact tests based on t distribution – One sample tests - one sided and two sided tests – Variance known and Variance unknown – Two sample tests – One sided and two sided - Variance known and Variance unknown.	K4	10
V	**Nonparametric tests:** Non parametric methods – Confidence interval for distribution quantiles – Tolerance limits for distributions. Sign test, Wilcoxon test. **Current Trends: * Analysis of Variance ***	K5	8
	…… Self Study.		
Course Outcome	**CO1:** Identify the knowledge about to frame hypotheses about population in real life research.	K1	
	CO2: Predict the suitable testing procedure for given hypotheses.	K2	
	CO3: Develop the suitable formula for comparing two populations using samples taken from them.	K3	
	CO4: Differentiate populations in its means and variances separately.	K4	
	CO5: Judge the situations to apply parametric and nonparametric tests and interpret results of a hypothesis testing.	K5	

Learning Resources				
Text Books	1. Ning-Zhong Shi, Jian Tao · (2008) Statistical Hypothesis Testing Theory and Methods,World Scientific Publishing Company.			
Reference Books	1. Prakash S.Chougule · (2022) Statistical Inference:Testing of Hypothesis,Blue Rose Publishers. 2. Mayer Alvo, Philip L. H. Yu · (2018),A Parametric Approach to Nonparametric Statistics,SpringerInternatioal Publishing.			
Website Link	1. https://www.google.co.in/books/edition/Statistical_Inference_Testing_of_Hypothe/aj-VEAAAQBAJ?hl=en&gbpv=1&pg=PP6&printsec=frontcover 2.https://www.google.co.in/books/edition/Testing_Statistical_Hypotheses/K6t5qn-SEp8C?hl=en&gbpv=1&pg=PR11&printsec=frontcover			
Self-Study Material	1. https://ebookcentral.proquest.com/lib/inflibnet-ebooks/detail.action?docID=1602290 2. https://ebookcentral.proquest.com/lib/inflibnetebooks/reader.action?docID=1791152&ppg=12			
	L-Lecture	T-Tutorial	P-Practical	C-Credit

B.Sc., - Statistics Syllabus LOCF - CBCS with effect from 2023-2024 Onwards										
Course Code	**Course Title**		**Course Type**		**Sem.**	**Hours**	**L**	**T**	**P**	**C**
23M4USTC07	**TESTING OF STATISTICAL HYPOTHESIS**		**DSCTHEORY-VII**		**IV**	**4**	**4**	**-**	**-**	**3**
CO-PO Mapping										
CO Number	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PSO1**	**PSO2**	**PSO3**	**PSO4**	**PSO5**
CO1	M	S	S	L	M	S	S	S	S	S
CO2	S	M	S	S	S	S	S	M	S	S
CO3	S	S	S	S	M	L	M	S	S	M
CO4	S	S	M	S	S	S	S	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	Audio Video lecture, Chalk and Board class, Assignment, PPT Presentation and Video presentation									
Assessment Methods	Class Test, Unit Test, Assignment, CIA-I, CIA-II and ESE									
Designed By	**Verified By**					**Approved By Member Secretary**				
Mrs.S.Manimekalai	**Dr.S.Mohan Prabhu**					**Dr.S.Shahitha**				

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B.Sc., -Statistics Syllabus LOCF - CBCS with effect from 2023-2024 Onwards								
Course Code	**Course Title**	**Course Type**	**Sem.**	**Hours**	**L**	**T**	**P**	**C**
23M4USTC08	**ACTUARIAL STATISTICS**	**DSC THEORY - VIII**	**IV**	**4**	**4**	**-**	**-**	**3**
Objective	Students acquire knowledge of statistical principles and their application in actuarial statistics.							

Unit	Course Content	Knowledge Levels	Sessions
I	**Basic Interest:** Simple and compound interest- present value and accumulated values of fixed rate-varying rate of interest.	K1	10
II	**Mortality:** Gompertz - Markham laws of mortality - life tables. Annuities: Endowments - Annuities - Accumulations - Assurances - Family income benefits.	K2	10
III	**Policy Values:** Surrender values and paid up policies - industrial assurances - Joint life and last survivorship - premiums.	K3	10
IV	**Contingent Functions:** Contingent probabilities - assurances. Decrement tables. Pension funds: Capital sums on retirement and death.	K4	10
V	**Principles of Insurance:** Principles of insurance - pure endowment - whole life assurance - Net premium for assurance and annuity plans-level annual premium under temporary assurance. **Current Trends: *Principles of insurance ***	K5	8
	…… Self Study.		
Course Outcome	**CO1:** Identify the utility theory and insurance terminologies.	K1	
	CO2: Summarizing the articulate the insurance and annuity benefits through multiple life functions evaluation for special mortality laws	K2	
	CO3: Apply the various types of premium and their numerical evaluations.	K3	
	CO4: Select the Inspect a implementation of the Life insurance policies.	K4	
	CO5: Judgment of Insurance payable at the moment of death and at the end of the year of death-level benefit insurance.	K5	

Learning Resources				
Text Books	1. (2001 Alistair Neill (1977) : Life contingencies, Heinemann professional publishing.			
Reference Books	1. Hooker, P.F., Longley, L.H.-Cook (1957): Life and other contingencies, Cambridge 2. Hosack, I.B., Pollard, J.H. and Zehnwirth, B. (1999) : introductory statistics with applications in generalinsurance, Cambridge University.			
Website Link	https://mshaocong.github.io/actuarial.pdf https://www.stats.ox.ac.uk/~winkel/o13.pdf https://www.slideshare.net/MaryMontoya20/actuarial-statistics			
Self-Study Material	1 https://ebookcentral.proquest.com/lib/inflibnet-ebooks/detail.action?docID=1901281 2.https://ebookcentral.proquest.com/lib/inflibnet-ebooks/reader.action?docID=1901281&ppg=6			
	L-Lecture	T-Tutorial	P-Practical	C-Credit

B.Sc., - Statistics Syllabus LOCF - CBCS with effect from 2023-2024 Onwards										
Course Code	**Course Title**		**Course Type**		**Sem.**	**Hours**	**L**	**T**	**P**	**C**
23M4USTC08	**ACTUARIAL STATISTICS**		**DSC THEORY - VIII**		**IV**	**4**	**4**	**-**	**-**	**3**
CO-PO Mapping										
CO Number	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PSO1**	**PSO2**	**PSO3**	**PSO4**	**PSO5**
CO1	**M**	**S**	**S**	**L**	**M**	**S**	**S**	**M**	**M**	**M**
CO2	**S**	**S**	**S**	**S**	**S**	**S**	**S**	**S**	**S**	**M**
CO3	**S**	**S**	**S**	**S**	**S**	**S**	**S**	**S**	**M**	**S**
CO4	**S**	**S**	**M**	**S**	**S**	**S**	**S**	**S**	**M**	**S**
CO5	**S**	**M**	**S**	**S**	**S**	**S**	**S**	**M**	**S**	**M**
Level of Correlation between CO and PO	L-LOW					M-MEDIUM			S-STRONG	
Tutorial Schedule	-									
Teaching and Learning Methods	Audio Video lecture, Chalk and Board class, Assignment, PPT Presentation and Video presentation									
Assessment Methods	Class Test, Unit Test, Assignment, CIA-I, CIA-II and ESE									
Designed By	**Verified By**					**Approved By Member Secretary**				
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B.Sc., -Statistics Syllabus LOCF - CBCS with effect from 2023-2024 Onwards								
Course Code	**Course Title**	**Course Type**	**Sem.**	**Hours**	**L**	**T**	**P**	**C**
23M5USTC09	**STOCHASTIC PROCESSES**	**DSC THEORY - IX**	**V**	**6**	**4**	**2**	**-**	**5**
Objective	Students acquire the basic concepts of theory of stochastic processes, the most important types of Processes.							

Unit	Course Content	Knowledge Levels	Sessions
I	**Basis of Stochastic Process:** Notation and specification of Stochastic Processes – Stationary Process – Markov Chains – Definition and examples – Higher transition probabilities: Chapman – Kolmogorov equations. Classification of States and Chains.	K2	15
II	**Markov Chains:** Markov Chains – Determination of Stability of a Markov System–Limiting Behaviour – Ergodic theorem. One dimensional random walk.	K3	12
III	**Markov Process:** Markov Processes with discrete state space: Poisson Process – Postulates of Poisson process Properties of Poisson Process – Poisson process and related distributions. Pure Birth process – Yule-Furry process. Pure Death Process (Concept Only).	K4	15
IV	**Renewal Process:** Renewal Process – Definition, related concepts and examples – Renewal equation – Elementary Renewal Theorem – Basic Renewal Theorem.	K4	15
V	**Stochastic Models:** Applications in Stochastic Models: Queuing Systems and Models: Simple queuing models M/M/1, M/M/s queuing systems (finite and infinite) steady state solution-simple problems with finite and infinite capacities. **Current Trends-*Markov Chains***	K5	15
	…… Self Study.		
Course Outcome	**CO1:** Describe stochastic nature of random variable and different stochastic processes.	K1	
	CO2: Express about transition matrix and its calculations.	K2	
	CO3: Classify about transition matrix and its calculations.	K3	
	CO4: Examine renewal process and its applications.	K4	

	CO5: Appraise various stochastic modeling and its applications.	K5	

Learning Resources	
Text Books	1. Medhi, J. (2019): Stochastic Processes, New Age International Publishers. 2. Kanti Swarup, Gupra.P.K. Man Mohan.,(2010): Operations Research, Sultan Chand & Sons
Reference Books	1. Ross, S.M. (1983): Stochastic Processes. John Wiley Eastern Ltd., New York. 2. Medhi, J.. Stochastic Processes, New Academic Science, 2009.
Website Link	http://www.randomservices.org/random/ https://www.britannica.com/science/stochastic-process
Self-Study Material	1.https://ebookcentral.proquest.com/lib/inflibnet-ebooks/detail.action?docID=3382464# 2.https://ebookcentral.proquest.com/lib/inflibnet-ebooks/reader.action?docID=3382464&ppg=77

	L-Lecture	T-Tutorial	P-Practical	C-Credit

B.Sc., - Statistics Syllabus LOCF - CBCS with effect from 2023-2024 Onwards								
Course Code	**Course Title**	**Course Type**	**Sem.**	**Hours**	**L**	**T**	**P**	**C**
23M5USTC09	**STOCHASTIC PROCESSES**	**DSCTHEORY-IX**	**V**	**6**	**4**	**2**	**-**	**5**

CO-PO Mapping

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

Tutorial Schedule	Group Discussion, Quiz program, Model preparation
Teaching and Learning Methods	Audio Video lecture, Chalk and Board class, Assignment, PPT Presentation and Video presentation
Assessment Methods	Class Test, Unit Test, Assignment, CIA-I, CIA-II and ESE

Designed By	**Verified By**	**Approved By Member Secretary**
Mrs.P.Gomathi	**Dr.S.Mohan Prabhu**	**Dr.S.Shahitha**

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B.Sc., -Statistics Syllabus LOCF - CBCS with effect from 2023-2024 Onwards								
Course Code	**Course Title**	**Course Type**	**Sem.**	**Hours**	**L**	**T**	**P**	**C**
23M5USTC10	**REGRESSION ANALYSIS**	**DSC THEORY - X**	**V**	**5**	**3**	**2**	**-**	**4**
Objective	Students acquire the linear and nonlinear relationships between variables and training in applications.							

Unit	Course Content	Knowledge Levels	Sessions
I	**Simple Linear Regression**: Simple linear regression-Assumptions, estimation of model parameters, standard error of estimators, testing of hypotheses on slope and intercept (β , s), interval estimation of model parameters, prediction interval of a new observation.	K1	15
II	**Methods Least squares Estimator:** Standard Gauss Markov setup, least square estimation of model parameters, variance covariance of least squares estimators, estimation of error variance.	K2	10
III	**Model Adequacy Checking:** Model adequacy checking - residual plots for checking normality homo scedasticity and detection of outliers. Test for Lack of fit of the model. Durbin – Watson test for autocorrelation.	K3	15
IV	**Multicollinearity:** Multicollinearity – sources, effects, diagnostics, Methods of dealing.With multi co linearity (collection of additional data, mode respecification, Ridge regression).	K4	10
V	**Nonlinear Regression:** Nonlinear regression – transformation to a linear model, their use and limitations, initial estimates (starting values), parameter estimation using iterative procedures – Gauss-Newton, steepest Descent. **Current Trends-* Simple linear regression-Assumptions, parameters***	K5	10
	…… Self Study.		
Course Outcome	**CO1:** Choose model parameters and testing it.	K1	
	CO2: Outline linear and nonlinear models assumptions.	K2	
	CO3: Plan experiment with T check model adequacy.	K3	
	CO4: Contrast about variable selection.	K4	
	CO5: Elaborate nonlinear regression models.	K5	

Learning Resources				
Text Books	1. Montgomery, D. C., Peck, E. A. and Vining,G. G. (2007): Introduction to Linear regression analysis, third edition, John Wiley and Sons, Inc.			
Reference Books	1. A. Sen, M. Srivastava, 2011: Regression Analysis — Theory, Methods, and Applications, Springer-Verlag, Berlin.			
Website Link	1. http://www.mit.edu/~6.s085/notes/lecture3.pdf 2. https://ebookcentral.proquest.com/lib/inflibnet-ebooks/detail.actiondocID=1211887			
Self-Study Material	1. https://ebookcentral.proquest.com/lib/inflibnet-ebooks/detail.action?docID=7103682 2. .https://ebookcentral.proquest.com/lib/inflibnet-ebooks/reader.action?docID=7103682&ppg=54			
	L-Lecture	T-Tutorial	P-Practical	C-Credit

B.Sc., - Statistics Syllabus LOCF - CBCS with effect from 2023-2024 Onwards								
Course Code	**Course Title**	**Course Type**	**Sem**	**Hours**	**L**	**T**	**P**	**C**
23M5USTC10	**REGRESSION ANALYSIS**	**DSC THEORY - X**	**V**	**5**	**3**	**2**	**-**	**4**

CO-PO Mapping

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

Tutorial Schedule	Group Discussion, Quiz program, Model preparation	
Teaching and Learning Methods	Audio Video lecture, Chalk and Board class, Assignment, PPT Presentation and Video presentation	
Assessment Methods	Class Test, Unit Test, Assignment, CIA-I, CIA-II and ESE	
Designed By	**Verified By**	**Approved By Member Secretary**
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B.Sc., -Statistics Syllabus LOCF - CBCS with effect from 2023-2024 Onwards								
Course Code	**Course Title**	**Course Type**	**Sem.**	**Hours**	**L**	**T**	**P**	**C**
23M6USTC11	**DESIGN OF EXPERIMENTS**	**DSC THEORY - XI**	**VI**	**6**	**4**	**2**	**-**	**5**

Objective	Develop student's analytical thinking in problem solving skills.		
Unit	**Course Content**	**Knowledge Levels**	**Sessions**
I	**Principles of Experiments:** Fundamental Principles of Experiments – Replication, Randomization and Local Control techniques – Size of experimental unit – Methods of determination of experimental units.	K1	15
II	**Method of Classification:** Analysis of variance – One way, Two way, classification (without interaction) – Multiple range test; Newman-Keul's test – Duncan's multiple range test – Tukey's test .	K2	12
III	**Method of Design:** Completely Randomized Design (CRD) and its analysis – Randomized block design (RBD) – RBD – More than one but equal number of observations per cell – Latin Square Design (LSD) and its analysis.	K3	15
IV	**Least Square method Techniques:** Missing plot techniques – Meaning – Least Square method of estimating one missing observation – RBD and LSD – Two observations missing in RBD and LSD – Analysis of covariance technique in CRD and RBD (without derivation).	K4	15
V	**Method of Factorial experiment:** Factorial experiment defintion- 2^3,2^2and3^2factorial experiments and their analysis – Principles of confounding – Partial and complete confounding in 23 – Split plot design and its analysis. **Current Trends:*Fundamental Principles of Experiments***	K5	15
	…… Self Study.		
Course Outcome	**CO1:** Reproduce and understand analysis of variance and experimental designs.	K1	
	CO2: Examine and solve the problems related to getting basic, knowledge of the one way and two way analysis of variances and to compare more than a two treatments with the help of F distribution.	K2	
	CO3: Distinguish factorial and fractional factorial experiments, PIBD, inter and intra blocks, split plot, analysis co-variance.	K3	
	CO4: Generalize understand clinical trial concepts and Response surface methodology.	K4	
	CO5: Determine to understand the advantages, disadvantages and efficiency of various designs.	K5	

Learning Resources				
Text Books	1. Das, M.N. and Giri N.C (1979) : Design and Analysis of Experiments, Wiley Eastern, New Delhi.			
Reference Books	1. Kempthorne, (1956): Design and Analysis of Experiments, John Wiley, New York. 2. Montgomery. D. (1985): Design of Experiments, John Wiley and Sons.			
Website Link	1.https://www.jmp.com/en_my/statistics-knowledge-portal/what-is-design-of-experiments.html 2.https://home.iitk.ac.in/~shalab/anova/chapter4-anova-experimental-design-analysis.pdf			
Self-Study Material	1.https://ebookcentral.proquest.com/lib/inflibnet-ebooks/detail.action?docID=7104280 2.https://ebookcentral.proquest.com/lib/inflibnetbooks/reader.action?docID=7104280&ppg=2			
	L-Lecture	T-Tutorial	P-Practical	C-Credit

B.Sc., -Statistics Syllabus LOCF - CBCS with effect from 2023-2024 Onwards									
Course Code	**Course Title**	**Course Type**	**Sem.**	**Hours**	**L**	**T**	**P**	**C**	
23M6USTC11	**DESIGN OF EXPERIMENTS**	**DSC THEORY - XI**	**VI**	**6**	**4**	**2**	**-**	**5**	

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	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 program, Model preparation	
Teaching and Learning Methods	Audio Video lecture, Chalk and Board class, Assignment, PPT Presentation and Video presentation	
Assessment Methods	Class Test, Unit Test, Assignment, CIA-I, CIA-II and ESE	
Designed By	**Verified By**	**Approved By Member Secretary**
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B.Sc., -Statistics Syllabus LOCF - CBCS with effect from 2023-2024 Onwards								
Course Code	**Course Title**	**Course Type**	**Sem.**	**Hours**	**L**	**T**	**P**	**C**
23M6USTC12	**DEMOGRAPHY**	**DSC THEORY-XII**	**VI**	**6**	**4**	**2**	**-**	**5**
Objective	Students acquire knowledge population and demographic registration, learn fertility and mortality measurements.							

Unit	Course Content	Knowledge Levels	Sessions
I	**Demography :** Sources of demographic data – civil registration – population census registers – errors in demographic data.	K1	15
II	**Fertility and Mortality Measurements:** Fertility and mortality measurements – general and specific rates – standardized rates – age pyramid of sex composition gross and net reproduction rates.	K2	12
III	**Life Table:** Structure – construction – relationship between the function of a life table – abridged life table – population estimation – growth rates – forces of mortality – Gompertz and Makehams law – logistic curve fitting and its use.	K3	15
IV	**Spatial Distribution of Population:** Spatial distribution of population–migration – kinds of migration – factors important in migration analysis – migration defining period and boundary.	K4	15
V	**Components :**Components of population growth and change – Demographic transition theory – Methods of population projection – component method of projection, Leslie matrix. **Current Trends:** ***Statistics Fertility and Mortality of Demographic.***	K5	15
	…… Self Study.		
Course Outcome	**CO1:** List the need of population study and its registration system.	K1	
	CO2: Relate understand fertility and mortality effect on population.	K2	
	CO3: Solve the life table and its usage to real problems.	K3	
	CO4: Explain the Survey get effect of migration in population.	K4	
	CO5: Compare population growth and its effect.	K5	

Learning Resources				
Text Books	1. Berclay, G.W.(1959) : Techniques of Population Analysis 2. Benjamin, B (1968): Health and Vital Statistics, Allen & Unwin 60 Srivastava.			
Reference Books	1. Benjamin, B (1968) : Health and Vital Statistics, Allen & Unwin 60 Srivastava,			
Website Link	https://education.nationalgeographic.org/resource/demography/ https://www.britannica.com/topic/demography			
Self-Study Material	1.https://link.springer.com/chapter/10.1007/0-387-28392- 2.https://rdcu.be/dFogb			
	L-Lecture	T-Tutorial	P-Practical	C-Credit

B.Sc., -Statistics Syllabus LOCF - CBCS with effect from 2023-2024 Onwards									
Course Code	**Course Title**	**Course Type**	**Sem.**	**Hours**	**L**	**T**	**P**	**C**	
23M6USTC12	**DEMOGRAPHY**	**DSC THEORY-XII**	**VI**	**6**	**4**	**2**	**-**	**5**	

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

Tutorial Schedule	Group Discussion, Quiz program, Model preparation	
Teaching and Learning Methods	Audio Video lecture, Chalk and Board class, Assignment, PPT Presentation and Video presentation	
Assessment Methods	Class Test, Unit Test, Assignment, CIA-I, CIA-II and ESE	
Designed By	**Verified By**	**Approved By Member Secretary**
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B.Sc., -Statistics Syllabus LOCF - CBCS with effect from 2023-2024 Onwards								
Course Code	**Course Title**	**Course Type**	**Sem.**	**Hours**	**L**	**T**	**P**	**C**
23M2USTP01	**DATA ANALYSIS USING MS EXCEL**	**DSC PRACTICAL - I**	**II**	**2**	**-**	**-**	**2**	**2**
Objective	Students to gain practical knowledge about the concepts of statistics using MS Excel.							

Exercises	**Practical Experiments by Using MS Excel**	**Knowledge Levels**	**Sessions**
1 to 14	1. Computation of Measures of Central Tendency for discrete data using MS Excel (Mean, Median, Mode, Geometric Mean, Harmonic Mean) 2. Computation of Measures of Central Tendency for Continuous data using MS Excel (Mean, Median, Mode, Geometric Mean, Harmonic Mean) 3. Computation of Measures of dispersion for discrete data using MS Excel 4. Computation of Measures of dispersion for Continuous data using MS Excel 5. Graphical Presentation of data (Histogram, Frequency Polygon, Ogives) Using MS Excel. 6. Computation of Co-efficient of Skewness and Kurtosis – Karl Pearson‘s and Bowley‘s data using MS Excel 7. Fitting of Binomial distribution – Direct Method using MS Excel. 8. Fitting of Poisson distribution – Direct Method using MS Excel. 9. Fitting of Exponential distribution – Direct Method using MS Excel. 10. Problems based on univariate probability distributions. 11. Problems based on probability. 12. Calculating Inverse matrix in Excel.	K5	24

	13. Calculating the Transpose matrix in Excel. 14. Calculating Rank matrix in Excel.		
Course Outcome	**CO1:** Illustrate and learn the scope and necessity of Statistics, Tabulate and represent the data in diagrams and graphs	K1	
	CO2: Interpret the formula and calculate descriptive measures of central tendency and dispersion.	K2	
	CO3: Solve the formula and calculate descriptive measures of skewness, kurtosis, and moments.	K3	
	CO4: Correlate the nature of data and interpret the distributions.	K4	
	CO5: Appraise the nature of data and interpret the Distribution functions	K5	

Learning Resources				
Text Books	1. Swarup Das (Author) 2020.Advanced Excel with VBA Macros Paperback.			
Reference Books	1. Excel for Beginners (Excel Essentials Book 1) Kindle Editionby M.L. Humphrey (Author) Format: Kindle Edition			
Website Link	1. https://ccsuniversity.ac.in/bridge-library/pdf/DHA_Shikha_BHI_204_Unit4.pdf 2. https://www.mcrhrdi.gov.in/4th_mesfc2022/material/Microsoft%20Office(Ms-Excel%202016).pdf			
	L-Lecture	T-Tutorial	P-Practical	C-Credit

B.Sc., -Statistics Syllabus LOCF - CBCS with effect from 2023-2024 Onwards									
Course Code	**Course Title**	**Course Type**	**Sem.**	**Hours**	**L**	**T**	**P**	**C**	
23M2USTP01	**DATA ANALYSIS USING MS EXCEL**	**DSC PRACTICAL - I**	**II**	**2**	**-**	**-**	**2**	**2**	

CO-PO Mapping										
CO Number	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PSO1**	**PSO2**	**PSO3**	**PSO4**	**PSO5**
CO1	S	S	S	L	M	S	S	S	S	S
CO2	S	S	S	S	S	M	S	S	S	S
CO3	S	S	S	S	S	S	S	S	S	S
CO4	S	S	M	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	Audio Video Lecture, PPT Presentation and Video Presentation
Assessment Methods	CIA-I, CIA-II and ESE

Designed By	**Verified By**	**Approved By Member Secretary**
Dr. S. Mohan Prabhu	**Dr. S. Mohan Prabhu**	**Dr.S.Shahitha**

MUTHAYAMMAL COLLEGE OF ARTS AND SCIENCE
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B.Sc., -Statistics Syllabus LOCF - CBCS with effect from 2023-2024 Onwards								
Course Code	**Course Title**	**Course Type**	**Sem.**	**Hours**	**L**	**T**	**P**	**C**
23M3USTP02	**DATA ANALYSIS USING R**	**DSC PRACTICAL - II**	**III**	**2**	**-**	**-**	**2**	**2**
Objective	Students to gain practical knowledge about the concepts of statistics using R programming.							

Exercises	**Practical Experiments by Using R and R-Studio**	**Knowledge Levels**	**Sessions**
1 to 10	1. R Programming Language: Data Types Exercises a) R Data Types b) Data Type Conversion in R c) Getting different data types in R Programming – a type of the () Function. 2. R Programming Language: String Exercises a) Convert Character String to Variable Name in R b) Count the Number of Characters in the String in R c) Count Number of Occurrences of Certain Character in String in R d) Extract Numbers from the Character String Vector in R e) Count the Number of Words in a String using R 3. R Programming Language: Functions Exercises a) Function to Check if a Number is Divisible by 5 b) A function in R Programming Language can have multiple arguments too. Below is an implementation of a function with multiple arguments. 4. Creating Multiple Plots within for Loop in R. 5. Write a programme to find point estimate of the population proportion by using R. 6. Write a programme to find point estimate of a population mean by using R. 7. Simulate standard Normal random numbers with mean 0 and standard deviation 1 by using R. 8. Generate Random Number Seed in R 9. Generate Random Sampling in R 10. Newton Forward and Backward Interpolation by using R.	K6	24
Course Outcome	**CO1:** Label and learn the scope and necessity of basis of estimation in R.	K1	
	CO2: Interpret to write the programme in R.	K2	
	CO3: Solve and draw the plots in R.	K3	
	CO4: Correlate the nature of data and interpret the sampling technique.	K4	
	CO5: Disprove the nature of data and interpret the numerical analysis.	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.
Website Link	1. https://kccollege.edu.in/wp-content/uploads/2022/04/R-software-book.pdf

	L-Lecture	T-Tutorial	P-Practical	C-Credit

B.Sc., Statistics Syllabus LOCF - CBCS with effect from 2023-2024 Onwards									
Course Code	**Course Title**	**Course Type**	**Sem.**	**Hours**	**L**	**T**	**P**	**C**	
23M3USTP02	**DATA ANALYSIS USING R**	**DSC PRACTICAL - II**	**III**	**2**	**-**	**-**	**2**	**2**	

CO-PO Mapping

CO Number	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S	S	S	M	M	S	S	S	S	S
CO2	S	S	S	S	S	M	S	S	S	S
CO3	S	S	S	S	S	S	S	S	S	S
CO4	S	S	M	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	Audio Video Lecture, PPT Presentation and Video Presentation
Assessment Methods	CIA-I, CIA-II and ESE

Designed By	**Verified By**	**Approved By Member Secretary**
Dr. S. Mohan Prabhu	**Dr. S. Mohan Prabhu**	**Dr.S.Shahitha**

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B.Sc., -Statistics Syllabus LOCF - CBCS with effect from 2023-2024 Onwards								
Course Code	**Course Title**	**Course Type**	**Sem.**	**Hours**	**L**	**T**	**P**	**C**
23M4USTP03	**DATA ANALYSIS USING R**	**DSC PRACTICAL - III**	**IV**	**2**	**-**	**-**	**2**	**2**

Objective	Students to gain practical knowledge about the concepts and methods of statistics using R programming.

Exercises	**Practical Experiments by Using R and R-Studio**	**Knowledge Levels**	**Sessions**
1 to 10	1. Write a programme for Descriptive of Statistics for the given data. 2. Write a programme for Correlation for the given data. 3. Write a programme for Regression Line for the given data. 4. Write a programme for One-sample t-test for the given data. 5. Write a programme for Two-sample t-test for the given data. 6. Write a programme for Paired t-test for the given data. 7. Write a programme for Chi-squared test for the given data. 8. Write a programme for F- test for the given data. 9. Write a programme for Z- test for the given data. 10. Write a programme for Normal Probability Plot in R using ggplot2.	K6	24
Course Outcome	**CO1:** Illustrate and learn the scope and necessity of basis of descriptive of Statistics in R.	K1	
	CO2: Interpret to write the programme in R.	K2	
	CO3: Solve and draw the plots in R.	K3	
	CO4: Correlate the nature of data and interpret the testing of statistical hypothesis.	K4	
	CO5: Appraise the nature of data and interpret the numerical analysis.	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.
Website Link	1. https://makemeanalyst.com/statistics-with-r/.

	L-Lecture	T-Tutorial	P-Practical	C-Credit

B.Sc., Statistics Syllabus LOCF - CBCS with effect from 2023-2024 Onwards									
Course Code	**Course Title**	**Course Type**	**Sem.**	**Hours**	**L**	**T**	**P**	**C**	
23M4USTP03	**DATA ANALYSIS USING R**	**DSC PRACTICAL - III**	**IV**	**2**	**-**	**-**	**2**	**2**	

CO-PO Mapping

CO Number	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S	S	S	M	M	S	S	S	S	S
CO2	S	S	S	S	S	M	S	S	S	S
CO3	S	S	S	S	S	S	S	S	S	S
CO4	S	S	M	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	Audio Video Lecture, PPT Presentation and Video Presentation		
Assessment Methods	CIA-I, CIA-II and ESE		
Designed By	**Verified By**	**Approved By Member Secretary**	
Dr. S. Mohan Prabhu	**Dr. S. Mohan Prabhu**	**Dr.S.Shahitha**	

B.Sc., -Statistics Syllabus LOCF - CBCS with effect from 2023-2024 Onwards								
Course Code	**Course Title**	**Course Type**	**Sem.**	**Hours**	**L**	**T**	**P**	**C**
23M5USTP04	**DATA ANALYSIS USING R & TORA**	**DSC PRACTICAL - IV**	**V**	**5**	**-**	**-**	**5**	**4**
Objective	Students to gain practical knowledge about the methods of statistics using R and Tora programming.							

Exercises	**Practical Experiments by Using R and R-Studio**	**Knowledge Levels**	**Sessions**
1 to 20	1. Write a programme for Line Plots, Bar Plots, Histograms, Box plots, and scatter plot with R. 2. How to Conduct Linear Regression in R. 3. Creating a Multiple Linear Regression in R. 4. Creating a Log transformation in R. 5. Creating a Robust regression in R. 6. To Solve Maximization Problem using the Graphical Method. 7. To Solve Minimization Problem using the Graphical Method. 8. To Solve Maximization Problem using the Simplex Method. 9. To Solve Minimization Problem using the Simplex Method. 10. To Solve Maximization Problem using the Big-M Method. 11. To Find the Initial Basic Feasible Solution to the Transportation of the Problem using the NWCR (Balanced). 12. To Find the Initial Basic Feasible Solution to the Transportation of the Problem using the NWCR (Unbalanced). 13. To Find the Initial Basic Feasible Solution to the Transportation of the Problem using the LCM (Balanced). 14. To Find the Initial Basic Feasible Solution to the Transportation of the Problem using the LCM (Unbalanced). 15. To Find the Initial Basic Feasible Solution to the Transportation of the Problem using the VAM (Balanced). 16. To Find the Initial Basic Feasible Solution to the Transportation of the Problem using the VAM (Unbalanced). 17. To Find the Initial Basic Feasible Solution to the Transportation of	K6	60

	the Problem using the MODI Method. 18. Assignment Problem (Balanced and Unbalanced). 19. Assignment Problem using the Hungarian Method. 20. Problems with CPM/PERT.		
Course Outcome	**CO1:** Illustrate and learn the scope and necessity of basis of regression in R.	K1	
	CO2: Interpret to write the programme in R.	K2	
	CO3: Solve and draw the plots in R.	K3	
	CO4: Correlate the nature of data and interpret the regression analysis.	K4	
	CO5: Analyse the nature of data and interpret the operation research analysis.	K5	

Learning Resources	
Text Books	1. Gardener M (2012), Beginning R: The Statistical Programming Language, Wiley Publications. 2. Hamdy A. Taha Beginning Tora, Operations Research an Introduction 10th Edition.
Reference Books	1. Garrett Grolemund, Hands-On programming with R, O'Reilly Media Publications. 2. P.Rama Muruthy, Operations Research an Introduction 2ndEdition.
Website Link	1. https://www.datacamp.com/tutorial/linear-regression-R 2. https://www.datacamp.com/tutorial/multiple-linear-regression-r-tutorial 3. https://zalamsyah.staff.unja.ac.id/wp-content/uploads/sites/286/2019/11/9-Operations-Research-An-Introduction-10th-Ed.-Hamdy-A-Taha.pdf 4. https://dl.icdst.org/pdfs/files3/7e932ab65f9aa3de7122b4cea3587377.pdf

	L-Lecture	T-Tutorial	P-Practical	C-Credit

B.Sc., Statistics Syllabus LOCF - CBCS with effect from 2023-2024 Onwards									
Course Code	**Course Title**	**Course Type**	**Sem.**	**Hours**	**L**	**T**	**P**	**C**	
23M5USTP04	**DATA ANALYSIS USING R & TORA**	**DSC PRACTICAL - IV**	**V**	**5**	**-**	**-**	**5**	**4**	

CO-PO Mapping

CO Number	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S	S	S	M	M	S	S	S	S	S
CO2	S	S	S	S	S	M	S	S	S	S
CO3	S	S	S	S	S	S	S	S	S	S
CO4	S	S	M	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	Audio Video Lecture, PPT Presentation and Video Presentation
Assessment Methods	CIA-I, CIA-II and ESE

Designed By	Verified By	Approved By Member Secretary
Dr. S. Mohan Prabhu	**Dr. S. Mohan Prabhu**	**Dr.S.Shahitha**

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B.Sc., -Statistics Syllabus LOCF - CBCS with effect from 2023-2024 Onwards								
Course Code	**Course Title**	**Course Type**	**Sem.**	**Hours**	**L**	**T**	**P**	**C**
23M6USTP05	**DATA ANALYSIS USING R**	**DSC PRACTICAL - V**	**VI**	**5**	**-**	**-**	**5**	**4**

Objective	Students to gain practical knowledge about the field in design of experiments using R programming.

Exercises	**Practical Experiments by Using R and R-Studio**	**Knowledge Levels**	**Sessions**
1 to 17	1. Analysis of Variance- One Way (Equal) 2. Analysis of Variance- One Way (Unequal) 3. Analysis of Variance- Two Way 4.Completely Randomized Design 5.Randomized Block Design 6. Latin Square Design 7. Missing Observations in CRD 8. Missing Observations in RBD 9. Missing Observations in LSD 10.Factorial Experimental Design 11.Construct the X bar chart 12.Construct the R chart 13. Construct the control chart for the number of defectives(np or d – chart) 14. Construct the control chart for the number of defects per unit (c – chart) 15. Construct the OC Curve 16. Construct the Average Outgoing Quality Limit 17. Construct an operating characteristic curve for various Sampling plans.	K6	60
Course Outcome	**CO1:** Illustrate and learn the scope and necessity of basis of regression in R.	K1	
	CO2: Interpret to write the programme in R.	K2	
	CO3: Solve and draw the plots in R.	K3	
	CO4: Correlate the nature of data and interpret the regression analysis.	K4	

	CO5: Appraise the nature of data and interpret the statistical quality control analysis.	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.
Website Link	1. https://www.datacamp.com/tutorial/linear-regression-R 2. https://www.datacamp.com/tutorial/multiple-linear-regression-r-tutorial 3. https://www.econometrics-with-r.org/6.3-mofimr.html 4. https://libguides.princeton.edu/c.php?g=1315411&p=9671574#s-lg-box-wrapper-36293256

	L-Lecture	T-Tutorial	P-Practical	C-Credit

B.Sc., Statistics Syllabus LOCF - CBCS with effect from 2023-2024 Onwards

Course Code	Course Title	Course Type	Sem.	Hours	L	T	P	C
23M6USTP05	**DATA ANALYSIS USING R**	**DSC PRACTICAL - V**	**VI**	**5**	**-**	**-**	**5**	**4**

CO-PO Mapping

CO Number	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S	S	S	M	M	S	S	S	S	S
CO2	S	S	S	S	S	M	S	S	S	S
CO3	S	S	S	S	S	S	S	S	S	S
CO4	S	S	M	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	Audio Video Lecture, PPT Presentation and Video Presentation
Assessment Methods	CIA-I, CIA-II and ESE

Designed By	Verified By	Approved By Member Secretary
Dr. S. Mohan Prabhu	**Dr. S. Mohan Prabhu**	**Dr.S.Shahitha**

List of Foundation Course (FC) offered by the B.Sc., Statistics
SYLLABUS - LOCF-CBCS Pattern
EFFECTIVE FROM THE ACADEMIC YEAR 2023-2024 Onwards

S.No.	SEM	COURSE_CODE	TITLE OF THE COURSE
1	I	23M1USTFC1	ELEMENTARY STATISTICS

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B.Sc., -Statistics Syllabus LOCF - CBCS with effect from 2023-2024 Onwards								
Course Code	**Course Title**	**Course Type**	**Sem.**	**Hours**	**L**	**T**	**P**	**C**
23M1USTFC1	**ELEMENTARY STATISTICS**	**FC THEORY-I**	**I**	**2**	**2**	**-**	**-**	**2**

Objective	Students acquire knowledge the sequence and series of arithmetic and geometric progression.

Unit	Course Content	Knowledge Levels	Sessions
I	**Introduction to Set Theory:** Set Theory – Subset, Types of Sets, Relations, Functions – Simple problems.	K1	4
II	**Sequence and Series:** Sequence and Series of Arithmetic and Geometric Progressions – Introduction to Sequence, Series, Arithmetic Progression, Geometric Progression – Simple Problems.	K2	5
III	**Permutation and Combination:** Basic Concepts of Permutations & Combination – Fundamental Principles of Counting, Factorial, Permutations, Circular Permutations, Permutation with Restrictions, Combinations Simple Problems.	K3	5
IV	**Logical Reasoning:** Logical Reasoning – Number Series, Coding and decoding and odd man out.	K4	5
V	**Basic Statistics:** Statistics – Importance of statistics, concept of statistical population and a sample – quantitative and qualitative data. Collection of primary and secondary data, measurement scales – nominal, ordinal interval, and ratio.	K5	5
Course Outcome	**CO1:** Recall and remember the scope and necessity of set theory.	K1	
	CO2: Explain and understanding the formula and calculate sequence and series.	K2	
	CO3: Examine the formula and calculate permutation and combinations.	K3	
	CO4: Interpret and analyze the coding and decoding.	K4	
	CO5: Estimate the nature of data and interpret the statistics.	K5	

Learning Resources	
Text Books	1. V.K. Kapoor and S.C. Gupta (2017): Fundamentals of Mathematical Statistics, Sultan Chand & Sons, New Delhi.
Reference Books	1. Dr. R.S. Aggarwal (2018): A Modern Approach to Logical Reasoning, Sultan &Chand.

Website Link	1.https://en.wikipedia.org/wiki/Statistics https://en.wikipedia.org/wiki/Descriptive_statistics 2.https://socialresearchmethods.net/kb/statdesc.php 3.http://onlinestatbook.com/2/introduction/descriptive.html			
	L-Lecture	T-Tutorial	P-Practical	C-Credit

B.Sc., -Statistics Syllabus LOCF - CBCS with effect from 2023-2024 Onwards

Course Code	Course Title	Course Type	Sem.	Hours	L	T	P	C
23M1USTFC1	ELEMENTARY STATISTICS	FC THEORY-I	I	2	2	-	-	2

CO-PO Mapping

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

Tutorial Schedule	Group Discussion, Quiz program, Model preparation
Teaching and Learning Methods	Audio Video lecture, Chalk and Board class, Assignment, PPT Presentation and Video presentation
Assessment Methods	Class Test, Unit Test, Assignment, CIA-I, CIA-II and ESE

Designed By	Verified By	Approved By Member Secretary
Mr. Naveen Anand	**Dr. S. Mohan Prabhu**	**Dr.S.Shahitha**

List of Generic Elective Courses (GEC) Details for B.Sc., Statistics SYLLABUS - LOCF-CBCS Pattern EFFECTIVE FROM THE ACADEMIC YEAR 2023-2024 Onwards			
S.No.	**SEM**	**COURSE_CODE**	**TITLE OF THE COURSE**
1	IV	23M4USTE01	ECONOMICS AND OFFICIAL STATISTICS
2	V	23M5USTE02	OPERATIONS RESEARCH
3	V	23M5USTE03	ECONOMETRICS
4	V	23M5USTE04	TIME SERIES AND INDEX NUMBERS
5	VI	23M6USTE05	STATISTICAL QUALITY CONTROL

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B.Sc., -Statistics Syllabus LOCF - CBCS with effect from 2023-2024 Onwards								
Course Code	**Course Title**	**Course Type**	**Sem.**	**Hours**	**L**	**T**	**P**	**C**
23M4USTE01	**ECONOMICS AND OFFICIAL STATISTICS**	**GEC THEORY - I**	**IV**	**4**	**2**	**2**	**-**	**3**
Objective	Students acquire the knowledge Indian official statistics and economic concepts.							

Unit	Course Content	Knowledge Levels	Sessions
I	**Concept of Indian Statistical System:** Indian Statistical System: Data Collection for Governance – NSSO and its role in national data collection. NSSO reports and publications.	K1	9
II	**Economic Statistics:** Information collection for Socio-Economic Survey – Agricultural, Industrial, Crime Statistics and Statistical methods applied to analyse large volumes of data.	K2	10
III	**Index numbers:** Basic problems in construction of index numbers Methods- Simple and Weighted aggregate-Average of price relatives Chain base method. Criteria of goodness-Unittest,Time Reversal Factor Reversal and Circular tests.	K3	10
IV	**Time Series:** Measurement of Trend, Graphic, Semi-averages, Moving averages .Least Squares Straight-line, Second degree parabola, Exponential curve, Modified Exponential curve, Gompertz curve and Logistic curve. Measurement of Seasonal variation by Ratio-to-Moving average method.	K4	10
V	**Demand Analysis:** Introduction-Demand and Supply Price Elasticity of demand and supply, partial and cross elasticity's demand. **Current Trends :*Time series-Measurement of Trend***	K5	9
Course Outcome	**CO1:** Observe Indian official statistics and offices related to it.	K1	
	CO2: Select Indian surveys for collecting official statistics.	K2	
	CO3: Illustrate the uses of index numbers.	K3	
	CO4: Analyze demand analysis and its need.	K4	
	CO5: Summarize the economic India by knowing agricultural and economic surveys to know the time series and prediction.	K5	

Learning Resources				
Text Books	1. Reimund Mink(2024),Official Statistics—A Plaything of Politics? On the Interaction of Politics, Official Statistics, and Ethical Principles, Springer International Publishing.			
Reference Books	1. Trevor Williams and Victoria Turton (2014),Trading Economics : A Guide to Economic Statistics for Practitioner sand Students,Chichester,WestSussex, United Kingdom: JohnWiley&Sons Publisher. 2. Panik,MichaelJ.(2014) Growth curve modeling:theory and applications, Hoboken,NewJersey:John Wiley& Sons, Inc.,Publisher			
Website Link	1. https://ebookcentral.proquest.com/lib/inflibnetebooks/detail.action?docID=1676654 2.https://ebookcentral.proquest.com/lib/inflibnetebooks/detail.action?docID=4834063 3.https://ebookcentral.proquest.com/lib/inflibnetebooks/detail.action?docID=1577052			
Self-Study Material	1. https://ebookcentral.proquest.com/lib/inflibnet-ebooks/detail.action?docID=5183772 2. https://link.springer.com/chapter/10.1007/978-1-4614-0391-3_1			
	L-Lecture	T-Tutorial	P-Practical	C-Credit

B.Sc., - Statistics Syllabus LOCF - CBCS with effect from 2023-2024 Onwards								
Course Code	**Course Title**	**Course Type**	**Sem.**	**Hours**	**L**	**T**	**P**	**C**
23M4USTE01	**ECONOMICS AND OFFICIAL STATISTICS**	**GEC THEORY-I**	**V**	**4**	**2**	**2**	**-**	**3**

CO-PO Mapping

CO Number	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S	M	S	L	S	M	S	S	S	S
CO2	S	S	S	S	M	S	S	M	S	S
CO3	S	S	M	M	S	L	S	S	S	M
CO4	S	S	S	S	S	M	S	S	M	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	Group Discussion, Quiz program, Model preparation	
Teaching and Learning Methods	Audio Video lecture, Chalk and Board class, Assignment, PPT Presentation and Video presentation	
Assessment Methods	Class Test, Unit Test, Assignment, CIA-I, CIA-II and ESE	
Designed By	**Verified By**	**Approved By Member Secretary**
Mrs.S.Manimekalai	**Dr.S.Mohan Prabhu**	**Dr.S.Shahitha**

MUTHAYAMMAL COLLEGE OF ARTS AND SCIENCE
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B.Sc.,-Statistics Syllabus LOCF - CBCS with effect from 2023-2024 Onwards								
Course Code	**Course Title**	**Course Type**	**Sem.**	**Hours**	**L**	**T**	**P**	**C**
23M5USTE02	**OPERATIONS RESEARCH**	**GEC THEORY-II**	**V**	**4**	**2**	**2**	**-**	**3**
Objective	Students emphasize on the concept of optimization techniques and solve the transportation problems.							

Unit	Course Content	Knowledge Levels	Sessions
I	**Concept of operations research** :Formulation of Linear programming models – Graphical solution LPP in two variables – LPP in standard form – Principles of Simplex method – Algorithm – Need for artificial variables - Charne's M Technique – Concept of degeneracy.	K1	10
II	**Method of Transportation problem :** Transportation problem(TP) – TP formulation- North-West Corner, Least cost, Vogel's Approximation method – UV-method – Assignment problem and algorithm.	K2	10
III	**Method of game theory:** Theory of Games – Basic definition – Maximin and Minimax criterion– Solution of Games with saddle points – Two–by–Two (2x2) Games without saddle point – principle of dominance – problems based on dominance rule – Graphical method for (2xn) and (mx2) games.	K3	10
IV	**Concept of replacement problem:** Replacement problems – Replacement policy for items whose maintenance cost increases with time and the value of money remains constant – Replacement policy for items whose maintenance cos increases with time and the value of money also changes with time.	K4	10
V	**Concept of Network analysis :** Network analysis by CPM/PERT: Basic Concept – Constraints in Network – Construction of the Network – Time calculations –Concept of slack and float in Network Analysis – Finding optimum project duration and minimum project cost. **Current Trends:* Linear Programming Problem ***	K5	8
	…… Self Study.		
Course Outcome	**CO1:** Understand optimization techniques and solving set of equations with constraints.	K1	
	CO2: Rephrase problems of linear programming.	K2	
	CO3: Build transportation problems and its applications.	K3	
	CO4: Analyze problems using games theory.	K4	
	CO5: Critize network analysis and get problem solving skills.	K5	

Learning Resources				
Text Books	1. Kanti Swarup, P.K. Gupta and Manmohan (2007) Operations Research, Sultan Chand Sons, New Delhi.			
Reference Books	1. F.S. Hiller and Liberman (1994): Operations Research, CBS Publishers and Distributions, New Delhi.			
Website Link	https://old.mu.ac.in/wp-content/uploads/2017/10/dormsem1linearprogramming.pdf https://www.acsce.edu.in/acsce/wp-content/uploads/2020/03/1585041316993_Module-4.pdf https://faculty.sites.iastate.edu/tesfatsi/files/inline-files/GameDef.pdf https://gacbe.ac.in/pdf/ematerial/18BMA46S-U4.pdf https://vardhaman.org/wp-content/uploads/2021/03/Network-Analysis.pdf			
Self-Study Material	1 https://ebookcentral.proquest.com/lib/inflibnet-ebooks/detail.action?docID=3017405 2 https://ebookcentral.proquest.com/lib/inflibnet-ebooks/reader.action?docID=3017405&ppg=33			
	L-Lecture	T-Tutorial	P-Practical	C-Credit

B.Sc.,-Statistics Syllabus LOCF - CBCS with effect from 2023-2024 Onwards									
Course Code	**Course Title**	**Course Type**	**Sem.**	**Hours**	**L**	**T**	**P**	**C**	
23M5USTE02	**OPERATIONS RESEARCH**	**GEC THEORY-II**	**V**	**4**	**2**	**2**	**-**	**3**	

CO-PO Mapping

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

Tutorial Schedule	Group Discussion, Quiz program, Model preparation	
Teaching and Learning Methods	Audio Video lecture, Chalk and Board class, Assignment, PPT Presentation and Video presentation	
Assessment Methods	Class Test, Unit Test, Assignment, CIA-I, CIA-II and ESE	
Designed By	**Verified By**	**Approved By Member Secretary**
Mr.L.Thangaraj	**Dr.S.Mohan Prabhu**	**Dr.S.Shahitha**

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B.Sc., -Statistics Syllabus LOCF - CBCS with effect from 2023-2024 Onwards								
Course Code	**Course Title**	**Course Type**	**Sem.**	**Hours**	**L**	**T**	**P**	**C**
23M5USTE03	**ECONOMETRICS**	**GEC THEORY-III**	**V**	**4**	**2**	**2**	**-**	**3**

Objective	Students identify the appropriate models for econometrics.		
Unit	**Course Content**	**Knowledge Levels**	**Sessions**
I	**Concept of Econometrics:** Definition – Scope – Objectives of Econometrics – Limitations – Divisions of Econometrics.	K1	8
II	**Estimation of error variance:** Single equation model two variable case – Reasons for introducing error term in the model – Estimation of error variance – Simple problems.	K2	10
III	**Least square method of estimation:** General Linear model - Assumptions- Least square method of estimation and testing of parameters of the model – problems under failure of assumptions.	K3	10
IV	**Concepts of price and demand:** Concepts of price, Demand, supply, elasticity of demand, elasticity of price, elasticity of supply – simple problems.	K4	10
V	**Multicollinearity:** Introduction and concepts, detection multicollinearity of multicollinearity. Consequences, tests and solutions of specification error. **Current Trends- *Econometrics ***	K5	10
	…… Self Study.		
Course Outcome	CO1: Enumerate the scope and objective of econometrics.	K1	
	CO2: Differeniate name the models of econometrics.	K2	
	CO3: Conclude estimate the parameters of models of econometrics.	K3	
	CO4: Compute the know multicollinearity.	K4	
	CO5: Express and understand the autocorrelation.	K5	

Learning Resources	
Text Books	1. Gujarati, D. and Sangeetha, S. (2007): Basic Econometrics, 4th Edition, McGraw Hill Companies. 2. Jhonbson,M.B and Buse, R (1987) Econometrics: Basic and Applied, Maxmillan (publisher)
Reference Books	1. Gujarati, D. and Sangeetha S. (2007): Basic Econometrics, 4th Edition, McGraw Hill Companies. 2. Johnston, J. (1972): Econometric Methods, 2nd Edition, McGraw Hill International

Website Link	1.https://doonuniversity.ac.in/admin/assets/uploads/docs/econometrics%20513.pdf			
Self-Study Material	https://ebookcentral.proquest.com/lib/inflibnet-ebooks/detail.action?docID=422365 https://ebookcentral.proquest.com/lib/inflibnet-ebooks/reader.action?docID=422365&ppg=8			
	L-Lecture	T-Tutorial	P-Practical	C-Credit

B.Sc., -Statistics Syllabus LOCF - CBCS with effect from 2023-2024 Onwards									
Course Code	**Course Title**	**Course Type**	**Sem.**	**Hours**	**L**	**T**	**P**	**C**	
23M5USTE03	**ECONOMETRICS**	**GEC THEORY-III**	**V**	**4**	**2**	**2**	**-**	**3**	

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	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 program, Model preparation
Teaching and Learning Methods	Audio Video lecture, Chalk and Board class, Assignment, PPT Presentation and Video presentation
Assessment Methods	Class Test, Unit Test, Assignment, CIA-I, CIA-II and ESE

Designed By	**Verified By**	**Approved By Member Secretary**
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B.Sc., -Statistics Syllabus LOCF - CBCS with effect from 2023-2024 Onwards								
Course Code	**Course Title**	**Course Type**	**Sem.**	**Hours**	**L**	**T**	**P**	**C**
23M5USTE04	**TIMES SERIES AND INDEX NUMBERS**	**GEC THEORY-IV**	**V**	**4**	**2**	**2**	**-**	**3**
Objective	Students to understand index numbers, Industries, Ministry, and Financial Statistics in India.							

Unit	Course Content	Knowledge Levels	Sessions
I	**Concept of Time Series:** 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	10
II	**Methods of Averages:** Method of Semi-Average – Method of Moving Averages andMethod of Least Squares - Simple Problems	K2	10
III	**Concept of Trends**: 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	K3	10
IV	**Types of Index Numbers:** 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 IndexNumbers - Simple Problems. Tests of the Adequacy of a Good Index Number – Time Reversal Test, Factor Reversal Test –Uses of Index Numbers.	K4	10
V	**Construction Of Index Number Simple Problems**: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. **Current Trends: *Measurement of Seasonal Variations ***	K5	8
	…… Self Study.		

Course Outcome	CO1: Observe the knowledge about various of Time Series.	K1
	CO2: Classify the problems related to business and industries by using the method of averages.	K2
	CO3: Illustrate knowledge the important of time series.	K3
	CO4: Categorize the techniques for finding an index number in real-life situations.	K4
	CO5: Evaluate the price index number 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://www.civilserviceindia.com/subject/Management/notes/index-numbers.html 3. https://thefactfactor.com/facts/management/statistics/index-number/1576/
Self-Study Material	1 https://ebookcentral.proquest.com/lib/inflibnet-ebooks/detail.action?docID=7103907 2 https://ebookcentral.proquest.com/lib/inflibnet-books/reader.action?docID=7103907&ppg=1

	L-Lecture	T-Tutorial	P-Practical	C-Credit

B.Sc., -Statistics Syllabus LOCF - CBCS with effect from 2023-2024 Onwards									
Course Code	**Course Title**	**Course Type**	**Sem.**	**Hours**	**L**	**T**	**P**	**C**	
23M5USTE04	**TIMES SERIES AND INDEX NUMBERS**	**GEC THEORY-IV**	**V**	**4**	**2**	**2**	**-**	**3**	

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	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 program, Model preparation
Teaching and Learning Methods	Audio Video lecture, Chalk and Board class, Assignment, PPT Presentation and Video presentation
Assessment Methods	Class Test, Unit Test, Assignment, CIA-I, CIA-II and ESE

Designed By	**Verified By**	**Approved By Member Secretary**
Ms.P. Paintamilselvi	**Dr.S.Mohan Prabhu**	**Dr.S.Shahitha**

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B.Sc.,-Statistics Syllabus LOCF - CBCS with effect from 2023-2024 Onwards								
Course Code	**Course Title**	**Course Type**	**Sem.**	**Hours**	**L**	**T**	**P**	**C**
23M6USTE05	**STATISTICAL QUALITY CONTROL**	**GEC THEORY -V**	**VI**	**6**	**3**	**3**	**-**	**3**
Objective	Students impart basic theoretical knowledge about terminologies, need of control charts.							

Unit	Course Content	Knowledge Levels	Sessions
I	**Basic of SQC:** Importance and need for Statistical Quality Control techniques in Industry – Causes of variations in Quality – Uses of Shewart_s Control charts –Terminologies: Specification limits, Tolerance limits 3σ limits. Advantages and Limitations of SQC - Control charts variables Control Chart for Mean (Xbar- Chart) ,Range Chart (R- Chart) , Standard Deviation Chart (S-Chart)	K1	15
II	**Control Charts for Attributes:** Control Chart for Fraction Defective (p Chart),p-Chart for Variable Sample Size , Control Chart fo Number of Defectives (np-Chart). Control Charts for Defects: Contro Chartfor Number Of Defects (C-Chart) and Control Chart for Number Of Defects Per Unit (U-Chart).	K2	15
III	**Acceptance sampling plans:** Acceptance sampling plans for attributes – Types of Acceptance Sampling plans, Methods of Inspection: 100% Inspection and Sampling Inspection, Advantages and Limitations of Acceptance Sampling. Terms used in acceptance sampling plans: Lot, Lot Size, Sample Size, Lot Quality, Acceptance Number , Probability of accepting a lot (Pa) ,Acceptance Quality Level (AQL), Lot Tolerance Percent Defective (LTPD), Producer_s Risk, Consumer_s Risk, AOQ, AOQL, ATI and ASN.	K3	15
IV	**Concept Of Sampling Plans:** Rectifying Sampling Plans. Single and Double sampling plans. OC, AOQ, ATI and ASN curves for Single and Double sampling plans.	K4	12
V	**Concept of Acceptance sampling:** Acceptance sampling for variables known and unknown sampling plans (one sided specification only) - Determination of n and k for one sided specification of OC curve **Current Trends:* Sampling Unit ***	K5	15
	…… Self Study.		

Course Outcome	**CO1:** Memorize the concepts of the basic of Statistical Quality Control and its tools.				K1
	CO2: Interpret the methods and processes of production and suggest further improvements in their functioning.				K2
	CO3: Solve about the practical applications of quality control techniques and apply them in industry.				K3
	CO4: Correlate the principles of quality, specification limits, tolerance limits and concepts of SQC.				K4
	CO5: Appraise 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, FourthEdition, 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_Lectur e_3_fina l.pdf				
Self-Study Material	https://ebookcentral.proquest.com/lib/inflibnet-ebooks/detail.action?docID=818503. https://ebookcentral.proquest.com/lib/inflibnet-ebooks/reader.action?docID=818503&ppg=28				
	L-Lecture	T-Tutorial	P-Practical	C-Credit	

B.Sc., - Statistics Syllabus LOCF - CBCS with effect from 2023-2024 Onwards										
Course Code	**Course Title**		**Course Type**	**Sem.**	**Hours**	**L**	**T**	**P**	**C**	
23M6USTE05	**STATISTICAL QUALITY CONTROL**		**GEC THEORY -V**	**VI**	**6**	**3**	**3**	**-**	**3**	
CO-PO Mapping										
CO Number	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**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 program, Model preparation									
Teaching and Learning Methods	Audio Video lecture, Chalk and Board class, Assignment, PPT Presentation and Video presentation									
Assessment Methods	Class Test, Unit Test, Assignment, CIA-I, CIA-II and ESE									
Designed By	**Verified By**						**Approved By Member Secretary**			
Dr. S. Mohan Prabhu	**Dr.S.Mohan Prabhu**						**Dr.S.Shahitha**			

List of Skill Based Elective Course (SBEC) offered by the B.Sc., Statistics
SYLLABUS - LOCF-CBCS Pattern
EFFECTIVE FROM THE ACADEMIC YEAR 2023-2024 Onwards

S.No.	SEM	COURSE_CODE	TITLE OF THE COURSE
1	II	23M2USTSP1	PRACTICAL: DATA ANALYSIS WITH ADVANCED EXCEL
2	III	23M3USTSP2	PRACTICAL: DATA ANALYSIS USING SQL
3	IV	23M4USTS01	BIOSTATISTICS
4	IV	23M4USTSP3	PRACTICAL: DATA ANALYSIS USING MYSQL

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B.Sc., -Statistics Syllabus LOCF - CBCS with effect from 2023-2024 Onwards								
Course Code	**Course Title**	**Course Type**	**Sem.**	**Hours**	**L**	**T**	**P**	**C**
23M2USTSP1	**PRACTICAL: DATA ANALYSIS WITH ADVANCED EXCEL**	**SEC PRACTICAL -I**	**II**	**2**	**-**	**-**	**2**	**2**
Objective	Students acquire knowledge about mathematical functions and statistical analysis 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	5
II	Functions – Sum, Average, Max, Min, Count, Counta, SumIf, SumIfs CountIf, CountIfs AverageIf, AverageIfs, Nested IF, IFERROR Statement, AND, OR, NOT	K2	5
III	Lookup Functions: Vlookup / HLookup, Index and Match, Creating Smooth User Interface Using Lookup, Nested VLookup, Reverse Lookup using Choose Function.	K3	5
IV	Pivot Tables: Creating Simple Pivot Tables, Basic and Advanced Value Field Setting, Classic Pivot table, Choosing Field, Filtering PivotTables	K4	5
V	Charts and Slicers: Various Charts, Using SLICERS, Filter data with Slicers.	K5	4
Course Outcome	**CO1:** Illustrate the mathematical functions in excel with real-life situations.	K1	
	CO2: Interpret the advanced functions in excel with real-life situations.	K2	
	CO3: Solve the data and create the charts in excel.	K3	
	CO4: Correlate the data by using pivot tables.	K4	

	CO5: Appraise the data by using 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

	L-Lecture	T-Tutorial	P-Practical	C-Credit

B.Sc., -Statistics Syllabus LOCF - CBCS with effect from 2023-2024 Onwards

Course Code	Course Title	Course Type	Sem.	Hours	L	T	P	C
23M2USTSP1	**PRACTICAL: DATA ANALYSIS WITH ADVANCED EXCEL**	**SEC PRACTICAL -I**	**II**	**2**	**-**	**-**	**2**	**2**

CO-PO Mapping

CO Number	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S	S	S	L	M	S	S	S	S	S
CO2	S	S	S	S	S	M	S	S	S	S
CO3	S	S	S	S	S	S	S	S	S	S
CO4	S	S	M	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	Audio Video Lecture, PPT Presentation and Video Presentation
Assessment Methods	CIA-I, CIA-II and ESE

Designed By	**Verified By**	**Approved By Member Secretary**
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B.Sc., -Statistics Syllabus LOCF - CBCS with effect from 2023-2024 Onwards								
Course Code	**Course Title**	**Course Type**	**Sem.**	**Hours**	**L**	**T**	**P**	**C**
23M3USTSP2	**PRACTICAL ANALYSIS USING SQL**	**SEC PRACTICAL-II**	**III**	**2**	**-**	**-**	**2**	**2**

Objective	Students to gain practical knowledge in software SQL for data analysis.		
Exercises	**Course Content**	**Knowledge Levels**	**Sessions**
1 to 15	1. Find the names of all items for given list. 2. Find the name, item ID, and price of all items for given list. 3. Find all items for given list. 4. Find the names of items that cost ₹ 0.99 or less for given data. 5. Find the ID and food group of ingredients named Cheese. 6. Find the food items added after 1999. 7. Find the name of all of the food items other than salads 8. Find all of the ingredients from the Fruit food group with an inventory greater than 100 9. Find the name of all ingredients with unit price over ₹ 0.40 or with a unit of glass 10. Find the food items costing between $2.50 and $3.50 11. Find the ingredient ID, name, and unit of items not sold in pieces or strips 12. Find the ingredient ID, food group, and inventory for fruits or ingredients with inventory not less than or equal to 200 13. Find the food groups served by your restaurant. 14. Arithmetic literal example 15. Find the inventory value of each ingredient in both dollars and Euros.	K5	24
Course Outcome	**CO1:** Illustrate the concepts of Discrete Probability Distributions.	K5	
	CO2: Summarize the concepts of Continuous Probability Distributions.	K5	
	CO3: Solve statistical data for Large Sample Tests.	K5	
	CO4: Correlate statistical data for Student's t-Tests.	K5	
	CO5: Appraise statistical data for Chi-Square Tests.	K5	

Learning Resources				
Text Books	1. Adrienne Watt & Nelson Eng: Structured Query Language (SQL) Second Edition.			
Reference Books	1. Paul Weinberg James Groff Andrew Oppel (2009): SQL The Complete Reference, Third Edition.			
Website Link	1. https://ncert.nic.in/textbook/pdf/keip108.pdf 2. https://ncert.nic.in/textbook/pdf/lecs109.pdf 3. http://160592857366.free.fr/joe/ebooks/ShareData/SQL%20%20The%20Complete%20Reference.pdf 4. https://opentextbc.ca/dbdesign01/chapter/sql-structured-query-language/			
	L-Lecture	T-Tutorial	P-Practical	C-Credit

B.Sc., -Statistics Syllabus LOCF - CBCS with effect from 2023-2024 Onwards										
Course Code	**Course Title**		**Course Type**		**Sem.**	**Hours**	**L**	**T**	**P**	**C**
23M3USTSP2	**PRACTICAL ANALYSIS USING SQL**		**SEC PRACTICAL -II**		**III**	**2**	**-**	**-**	**2**	**2**

CO-PO Mapping											
CO Number	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PSO1**	**PSO2**	**PSO3**	**PSO4**	**PSO5**	
CO1	S	S	M	S	S	S	M	S	S	S	
CO2	S	S	S	S	S	S	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	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	Audio Video Lecture, PPT Presentation and Video Presentation	
Assessment Methods	CIA-I, CIA-II and ESE	
Designed By	**Verified By**	**Approved By Member Secretary**
Dr.S.Mohan Prabhu	**Dr.S.Mohan Prabhu**	**Dr.S.Shahitha**

MUTHAYAMMAL COLLEGE OF ARTS AND SCIENCE
(Autonomous)
Rasipuram - 637408.

B.Sc., -Statistics Syllabus LOCF - CBCS with effect from 2023-2024 Onwards								
Course Code	**Course Title**	**Course Type**	**Sem.**	**Hours**	**L**	**T**	**P**	**C**
23M4USTS01	**BIOSTATISTICS**	**SEC THEORY-I**	**IV**	**2**	**2**	**-**	**-**	**2**
Objective	Students acquire knowledge about initiate the awareness of Biostatistics and its need.							

Unit	Course Content	Knowledge Levels	Sessions
I	**Introduction to Biostatistics:** Introduction to Bio statistics – Various types of studies – Ethics – Measures of disease frequency and disease burden. Clinical trials – Goals of Clinical trials – Phases of clinical trials – Classification of clinical trials	K1	5
II	**Randomization :** Fixed Allocation, Simple, Blocked, Stratified, Baseline Adaptive and Response Adaptive – Blinding: Single, Double and triple- Designs for clinical Trials: Parallel Groups Design, Cluster Randomization Designs, and Crossover Designs.	K2	5
III	**Regression:** Multiple Regression – Assumptions – Uses – Estimation and interpretation of regression coefficients – Testing the regression coefficients – Coefficient of determination	K3	5
IV	**Logistic Regression :** Introduction – Logistic regression model – Relative risk – Logit – odds Ratio – Properties of odds ratio – the relationship between the odds ratio and relative risk.	K4	5
V	**Maximum Likelihood Estimator:**Maximum likelihood estimates and interpretation of coefficients – Test for coefficients – Test for overall regression and goodness of fit using Maximum Likelihood technique – Deviance Statistics. **Current Trent : * Test for Regression Methods ***	K5	4
	*** Self Study ***		

Course Outcome	**CO1**: List the concepts and statistical tools used in Biostatistics.	K1	
	CO2: Describe effectively apply these tools on solving the biological problems occurring in real life.	K2	
	CO3: Solve the given Biostatistician data as per the objectives of the problem.	K3	
	CO4: Analyse Interpret the outcomes of the analyses meaningfully.	K4	
	CO5: Create research problems of his own and able to proceed with them.	K5	

Learning Resources

Text Books	1. Chow, S. C., and Liu, J. P. (2013). Design and Analysis of Clinical Trials: Concepts and Methodologies, Third Edition, Wiley – Interscience, John Wiley & Sons, NJ.
Reference Books	1. Hosmer, Jr. D. W., Lemeshow, S., and Sturdivant, R. X. (2013). Applied Logistic Regression, Third Edition, John Wiley & Sons, Inc., NY. 2. Rossi, R. J. (2010). Applied Biostatistics for Health Sciences, John Wiley & Sons, Inc., NY 3. Friedman, l. M., Furberg, C. D., and Demets, D. L. (2015), Fundamentals of Clinical Trials, Fifth edition, Springer – Verlag,NY 99.
Website Link	1. Prof.Shamik Sen, Department of Bioscience and Bioengineering, IIT Bombay, ―Introduction to Biostatistics‖, NPTEL. [https://99wayam.gov.in/nd1_noc20_bt28/preview] 2. Dr.Felix Bast, Central University of Punjab, Bathinda, 2020, ―Biostatistics and Mathematical Biology‖, (NPTEL). [https://99wayam.gov.in/nd2_cec20_ma05/preview]
Self-Study Material	1.https://ebookcentral.proquest.com/lib/inflibnet-ebooks/reader.action?docID=3386956&ppg=155 2.https://ebookcentral.proquest.com/lib/inflibnet-ebooks/detail.action?docID=3386956

	L-Lecture	T-Tutorial	P-Practical	C-Credit

B.Sc., -Statistics Syllabus LOCF - CBCS with effect from 2023-2024 Onwards									
Course Code	**Course Title**	**Course Type**	**Sem.**	**Hours**	**L**	**T**	**P**	**C**
23M4USTS01	**BIOSTATISTICS**	**SEC THEORY-I**	**IV**	**2**	**2**	**-**	**-**	**2**

CO-PO Mapping

CO Number	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S	S	M	M	S	M	M	S	M	S
CO2	S	M	S	S	S	M	S	S	M	S
CO3	S	S	S	S	M	M	S	S	S	M
CO4	M	S	M	M	S	S	S	M	M	M
CO5	S	S	M	S	M	S	M	S	M	M

Level of Correlation between CO and PO	L-LOW	M-MEDIUM	S-STRONG

Tutorial Schedule	Group Discussion, Quiz program, Model preparation
Teaching and Learning Methods	Audio Video lecture, Chalk and Board class, Assignment, PPT Presentation and Video presentation
Assessment Methods	Class Test, Unit Test, Assignment, CIA-I, CIA-II and ESE

Designed By	**Verified By**	**Approved By Member Secretary**
Ms.S.Aarthi	**Dr.S.Mohan Prabhu**	**Dr.S.Shahitha**

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B.Sc., -Statistics Syllabus LOCF - CBCS with effect from 2023-2024 Onwards								
Course Code	**Course Title**	**Course Type**	**Sem.**	**Hours**	**L**	**T**	**P**	**C**
23M4USTSP3	**PRACTICAL: DATA ANALYSIS USING MYSQL**	**SEC PRACTICAL -III**	**V**	**2**	**-**	**-**	**2**	**2**
Objective	To enable the students to gain practical knowledge in software for data analysis.							

Exercises	Course Content	Knowledge Levels	Sessions
1 to 15	1. Create a mailing label for each store 2. UPPER and LOWER, POSITION, CHARACTER_LENGTH Examples and Combining string functions 3. Find how long each item has been on the menu as of midnight January 2, 2005 4. Find all items from least to most expensive 5. Find items added in 2001 or later in decreasing order of price 6. Find the name and inventory value of all ingredients ordered by value 7. $e^{\ln x} = x$. Write a query to test these SQL functions. 8. Find the average and total price for all items 9. Find the total number of ingredient units in inventory 10. Find the smallest price of all items 11. Find the date on which the last item was added and Find the number of slogans 12. Find the number of ingredients with non-NULL inventories 13. Find the total sales at FIRST store 14. Aggregates and *NULL* example 15. Find the managers of stores with greater than average sale.	K4	24

Course Outcome	**CO1:** Illustrate the concepts of Discrete Probability Distributions	K4	
	CO2: Interpret the concepts of Continuous Probability Distributions	K4	
	CO3: Solve statistical data for Large Sample Tests	K4	
	CO4: Correlate statistical data for Student's t-Tests	K4	
	CO5: Appraise statistical data for Chi-Square Tests	K4	

Learning Resources	
Text Books	1. Seyed M.M. "Saied" Tahaghoghi and Hugh E. Williams(2006): Learning MySQL, First Edition.
Reference Books	1. Daniel Nichter(2022): Efficient MySQL Performance: Best Practices and Techniques First Edition
Website Link	1. http://160592857366.free.fr/joe/ebooks/ShareData/Learning%20MySQL.pdf 2. https://no2imphal.kvs.ac.in/sites/default/files/Class%20XIIUNIT%20III%20%20SQL%20and%20MySQL%20Notes_0.pdf 3. https://ncert.nic.in/textbook/pdf/lecs109.pdf

	L-Lecture	T-Tutorial	P-Practical	C-Credit

B.Sc., -Statistics Syllabus LOCF - CBCS with effect from 2023-2024 Onwards

Course Code	Course Title	Course Type	Sem.	Hours	L	T	P	C
23M4USTSP3	**PRACTICAL: DATA ANALYSIS USING MYSQL**	**SEC PRACTICAL -III**	**V**	**2**	**-**	**-**	**2**	**2**

CO-PO Mapping

CO Number	PO1	PO2	PO3	PO4	PO5	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	-
Teaching and Learning Methods	Audio Video Lecture, PPT Presentation and Video Presentation
Assessment Methods	CIA-I, CIA-II and ESE

Designed By	Verified By	Approved By Member Secretary
Dr.S.Mohan Prabhu	**Dr.S.Mohan Prabhu**	**Dr.S.Shahitha**

List of Non Major Elective Course (NMEC) offered by the B.Sc., Statistics
SYLLABUS - LOCF-CBCS Pattern
EFFECTIVE FROM THE ACADEMIC YEAR 2023-2024 Onwards

S.No.	SEM	COURSE_CODE	TITLE OF THE COURSE
1	III	23M3USTN01	BASIC STATISTICS – I
2	IV	23M4USTN02	BASIC STATISTICS – II

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B.Sc., -Statistics Syllabus LOCF - CBCS with effect from 2023-2024 Onwards								
Course Code	**Course Title**	**Course Type**	**Sem.**	**Hours**	**L**	**T**	**P**	**C**
23M3USTN01	**BASIC STATISTICS – I**	**NME THEORY - I**	**III**	**2**	**2**	**-**	**-**	**2**

Objective	Students acquire knowledge in basic concepts of statistics and collection of data, the presentation of data and analysis of data.

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	5
II	**Collection of Data:** Primary and Secondary data – Methods of collecting primaryand secondary data - sources of data – Preparation of Questionnaire and Schedule.	K2	5
III	**Presentation of Data:** Classification of data – Types – Frequency distributions forDiscrete and continuous data – Construction of tables with one, two factors of classification.	K3	5
IV	**Diagrammatic Representation of Data:**Bar Diagrams: Types of one dimensional and two- dimensional bar diagrams - Pie-diagrams – Uses.	K4	5
V	**Graphical Representation of Statistical Data:** Histogram – Frequency Polygon – Frequency curve and Cumulative frequency curve – Ogive curves – Lorenz curve– Uses**.** **Current Trends:* Descriptive Statistics ***	K5	4
	…… Self Study.		
Course Outcome	**CO1:** Observe the concept of statistics	K1	
	CO2: Classify the methods of collection of data.	K2	
	CO3: Apply the classification of data.	K3	
	CO4: Differentiate the methods of frequency and diagrams.	K4	
	CO5: Evaluate the graphical representation of data.	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.
Website Link	1. https://www.tutorialspoint.com/statistics/ 2. https://www.emathzone.com/tutorials/basic-statistics/collection-of-statistical- data.html
Self-Study Material	1. https://link.springer.com/book/10.1007/978-1-4614-0391-3 2.https://link.springer.com/chapter/10.1007/978-1-4614-0391-3_1

	L-Lecture	T-Tutorial	P-Practical	C-Credit

B.Sc., -Statistics Syllabus LOCF - CBCS with effect from 2023-2024 Onwards										
Course Code	**Course Title**		**Course Type**		**Sem.**	**Hours**	**L**	**T**	**P**	**C**
23M3USTN01	**BASIC STATISTICS – I**		**NME THEORY - I**		**III**	**2**	**2**	**-**	**-**	**2**

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	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	Group Discussion, Quiz program, Model preparation
Teaching and Learning Methods	Audio Video lecture, Chalk and Board class, Assignment, PPT Presentation and Video presentation
Assessment Methods	Class Test, Unit Test, Assignment, CIA-I, CIA-II and ESE

Designed By	**Verified By**	**Approved By Member Secretary**
Dr.S.Mohan Prabhu	**Dr.S.Mohan Prabhu**	**Dr.S.Shahitha**

B.Sc., -Statistics Syllabus LOCF - CBCS with effect from 2023-2024 Onwards								
Course Code	**Course Title**	**Course Type**	**Sem.**	**Hours**	**L**	**T**	**P**	**C**
23M4USTN02	**BASIC STATISTICS – II**	**NME THEORY - II**	**IV**	**2**	**2**	**-**	**-**	**2**

Objective	Students equip the measures of location, measures of dispersion, methods of correlation, times series analysis and index numbers.		
Unit	**Course Content**	**Knowledge Levels**	**Sessions**
I	**Measures of Central Tendency:** Definitions and concepts of Arithmetic mean Median andMode – Merits and Demerits – Uses - Simple Problems.	K1	5
II	**Measures of Dispersion**: Range, Quartile deviation and their relative measures -Standard deviation and Coefficient of variation	K2	5
III	**Correlation:** Karl Pearson's coefficient of correlation and Spearman's rankcorrelation coefficient – Simple Problems.	K3	5
IV	**Time Series:** Seasures of trend – Graphic method – Semi average method and Moving average method - Simple Problems.	K4	5
V	**Index Numbers:** Unweighted and Weighted Index Numbers: Laspeyre's,Paasche's and Fisher's method – Cost of living index numbers– Simple Problems. **Current Trends:* Descriptive Statistics ***	K5	4
	…… Self Study.		
Course Outcome	**CO1:** Identify the Measures of Central Tendency in business.	K1	
	CO2: Describe the Measures of dispersion.	K2	
	CO3: Calculate the Correlation Problem.	K3	
	CO4: Explain the Time Series Analysis.	K4	
	CO5: Evaluate the Index Numbers.	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.
Website Link	1.https://www.tutorialspoint.com/statistics/ 2.https://www.emathzone.com/tutorials/basic-statistics/collection-of-statistical-data.html
Self-Study Material	1.https://ebookcentral.proquest.com/lib/inflibnetebooks/detail.action?docID=4877113&query=BUSINESS%20STATISTICS 2.https://ebookcentral.proquest.com/lib/inflibnet-ebooks/detail.action?docID=4877113

	L-Lecture	T-Tutorial	P-Practical	C-Credit

B.Sc., -Statistics Syllabus LOCF - CBCS with effect from 2023-2024 Onwards										
Course Code	**Course Title**		**Course Type**	**Sem.**	**Hours**	**L**	**T**	**P**	**C**	
23M4USTN02	**BASIC STATISTICS – II**		**NME THEORY - II**	**IV**	**2**	**2**	**-**	**-**	**2**	
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	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	Group Discussion, Quiz program, Model preparation									
Teaching and Learning Methods	Audio Video lecture, Chalk and Board class, Assignment, PPT Presentation and Video presentation									
Assessment Methods	Class Test, Unit Test, Assignment, CIA-I, CIA-II and ESE									
Designed By	**Verified By**					**Approved By Member Secretary**				
Dr.S.Mohan Prabhu	**Dr.S.Mohan Prabhu**					**Dr.S.Shahitha**				

Allied Course for any Degree offered by the B.Sc.,Statistics
LOCF-CBCS Pattern
EFFECTIVE FROM THE ACADEMIC YEAR 2023-2024 Onwards
LIST OF GEC - ALLIED COURSES

S.No.	Sem	COURSE_CODE	TITLE OF THE COURSE
1	III	23M3USTA01	BUSINESS STATISTICS
2	IV	23M4USTA02	OPERATIONS RESEARCH
3	III	23M3USTA03	BUSINESS MATHEMATICS AND STATISTICS
4	IV	23M4USTA04	OPERATIONS RESEARCH
5	III	23M3USTA05/ 23M4USTA05	BIOSTATISTICS
6	III	23M3USTA06	ALLIED: STATISTICAL METHODS – I
7	IV	23M4USTA07	ALLIED: STATISTICAL METHODS - II
8	IV	23M4USTAP1	PRACTICAL : ALLIED STATISTICS
9	III	23M3USTA08	STATISTICAL METHODS AND ITS APPLICATIONS – I
10	IV	23M4USTA09	STATISTICAL METHODS AND ITS APPLICATIONS – II
11	IV	23M4USTAP2	PRACTICAL : ALLIED STATISTICS
12	III	23M3UMAS02	STATISTICS WITH EXCEL PROGRAMMING
13	V	21M5UZOE01	BIOSTATISTICS
14	I	23M1PCME01	OPERATIONS RESEARCH
15	III	23M3PBCE09	BIOSTATISTICS AND DATA SCIENCE
16	III	23M3PSTED1	RESEARCH METHODOLOGY AND STATISTICS
17	III	23M3PMAC08	PROBABILITY THEORY (HANDLE BY STATISTICS VALUED BY MATHS)

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B.B.A Allied Syllabus LOCF - CBCS with effect from 2023-2024 Onwards								
Course Code	**Course Title**	**Course Type**	**Sem.**	**Hours**	**L**	**T**	**P**	**C**
23M3USTA01	**BUSINESS STATISTICS**	**GEC THEORY-I**	**III**	**4**	**2**	**2**	**-**	**3**

Objective	Students acquire knowledge about measures of central tendency in business.		
Unit	**Course Content**	**Knowledge Levels**	**Sessions**
I	**Measures of Central Tendency :** Introduction – Meaning and Definition of Statistics – Collection and Tabulation of Statistical Data – Presentation of Statistical Data – Graphs and Diagrams- Measures of Central Tendency – Arithmetic Mean, Median and Mode – Harmonic Mean and Geometric Mean.	K1	12
II	**Measures of Variation :** Measures of Variation – Standard Deviation –Mean deviation – Quartile deviation- Skewness and kurtosis – Lorenz Curve –Simple Correlation – Scatter Diagram – Karl Pearson's Correlation – Rank Correlation – Regression.	K2	12
III	**Time Series: Analysis** of Time Series – Methods of Measuring Trend and Seasonal Variations.	K3	12
IV	**Understand Index Numbers: Index** Numbers – Consumer Price Index – And Cost of Living Indices.	K4	6
V	**Test Hypothesis:** Testing of hypothesis – Chi-Square test, T Test, F Test, and ANOVA.	K5	6
	Current Trends: *Measures of Central Tendency*		
Course Outcome	**CO1:** Define the Measures of Central Tendency in business.	K1	
	CO2: Explain the Measures of Variation.	K2	
	CO3: Solve of the Time Series.	K3	
	CO4: Analyze Index Numbers and Statistical quality control.	K4	
	CO5: Develop the Testing of hypothesis.	K5	

Learning Resources				
Text Books	1. David M.Levine, David F.Stephanetal. Business Statistics : A first Course, 7 th edition 2. Hazarika Padmalochan,A textbook of Business Statistics , S.Chand Publications			
Reference Books	1. Vohra ND, Business Statistics 2021 : Text and Problems – With Introduction to Business Analytics, Mc Graw Hill. 2. Alexander Holmes, Barbara Illowsky and Susan Dean, 2017: Introductory Business Statistics , 12th Media Services.			
Website Link	https://statisticsbyjim.com/basics/measures-central-tendency-mean-median-mode/ https://www.toppr.com/guides/business-mathematics-and-statistics/index-numbers/			
Self-Study Material	https://ebookcentral.proquest.com/lib/inflibnet-ebooks/detail.action?docID=4877113&query=BUSINESS%20STATISTICS https://ebookcentral.proquest.com/lib/inflibnet-ebooks/detail.action?docID=4877113			
	L-Lecture	T-Tutorial	P-Practical	C-Credit

B.B.A Allied Syllabus LOCF - CBCS with effect from 2023-2024 Onwards									
Course Code	**Course Title**	**Course Type**	**Sem.**	**Hours**	**L**	**T**	**P**	**C**	
23M3USTA01	**BUSINESS STATISTICS**	**GEC THEORY-I**	**III**	**4**	**2**	**2**	**-**	**3**	

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

Tutorial Schedule	Group Discussion, Quiz program, Model preparation	
Teaching and Learning Methods	Audio Video lecture, Chalk and Board class, Assignment, PPT Presentation and Video presentation	
Assessment Methods	Class Test, Unit Test, Assignment, CIA-I, CIA-II and ESE	
Designed By	**Verified By**	**Approved By Member Secretary**
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B.B.A Allied Syllabus LOCF - CBCS with effect from 2023-2024 Onwards								
Course Code	**Course Title**	**Course Type**	**Sem.**	**Hours**	**L**	**T**	**P**	**C**
23M4USTA02	**OPERATIONS RESEARCH**	**GEC THEORY-II**	**IV**	**4**	**2**	**2**	**-**	**4**
Objective	Students acquire the knowledge about operations research and linear programming problem.							

Unit	Course Content	Knowledge Levels	Sessions
I	**Linear Programming :** Linear Programming problem -Concept and scope of OR, general mathematical model of LPP, steps of L.P model formulation, Graphical method of the solution of LPPsimple problems.	K2	12
II	**Transportation problem :**Transportation problem- Basic definitions, formulation of transportation problem as LPP, finding an initial basic feasible solution- North -west corner rule, row minima method, column minima method, least cost entry methodVogel's approximation method to find the optimal solution.	K3	12
III	**Assignment problem :**Assignment problem-Hungarian method-Minimization and Maximization case, unbalanced assignment problem. Sequencing Problem-Processing n jobs on 2 machines, processing n jobs on 3 machines, processing n jobs on m machines.	K3	12
IV	**Network model :**Network models-PERT and CPM — difference between PERT and CPM- constructing network- critical path, various floats.	K4	6
V	**Game Theory and Decision Theory :**Game Theory- Maximin-Minmax criterion, Saddle point, Dominance property, Graphical method for solving 2xn and mx2 game. Decision Theory –statement of Baye‘s theorem application - decision trees.	K5	6
	Current Trends : * Transportation problem*		

Course Outcome	CO1: Introduction to Operations Research definition and concept Essential features of LPP.	K1	
	CO2: Formulation of Transportation problem and finding an initial basic feasible solution.	K2	
	CO3:Expressing Assignment problem, Hungarian method-Minimization and Maximization case and Sequencing Problem.	K3	
	CO4: Analyses Network models and constructing network- critical path, various floats.	K4	
	CO5: Analyses Game Theory and Decision Theory	K5	

Learning Resources				
Text Books	1. P. Gupta, N. Aruna Rani, M. Haritha (2018), Operations Research and Quantitative Techniques, First edition, Himalaya Publishing House.			
Reference Books	1. P.R. Vittal& V. Malini, Operative Research – Margham Publications – Chennai – 17. 2. P.K. Gupta& Man Mohan, Problems in Operations Research – Sultan Chand & sons – New Delhi			
Website Link	1 https://research.com/journal/operational-research-1 2 https://pubsonline.informs.org/journal/opre 3 https://www.kellogg.northwestern.edu/			
Self-Study Material	1. https://ebookcentral.proquest.com/lib/inflibnet-ebooks/detail.action?docID=1574350. 2. https://ebookcentral.proquest.com/lib/inflibnet-ebooks/detail.action?docID=1574350#			
	L-Lecture	T-Tutorial	P-Practical	C-Credit

B.B.A Allied Syllabus LOCF - CBCS with effect from 2023-2024 Onwards									
Course Code	**Course Title**	**Course Type**	**Sem.**	**Hours**	**L**	**T**	**P**	**C**	
23M4USTA02	**OPERATIONS RESEARCH**	**GEC THEORY-II**	**IV**	**4**	**2**	**2**	**-**	**4**	

CO-PO Mapping

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

Tutorial Schedule	Group Discussion, Quiz program, Model preparation
Teaching and Learning Methods	Audio Video lecture, Chalk and Board class, Assignment, PPT Presentation and Video presentation
Assessment Methods	Class Test, Unit Test, Assignment, CIA-I, CIA-II and ESE

Designed By	**Verified By**	**Approved By Member Secretary**
Ms.S.Aarthi	**Dr.S.Mohan Prabhu**	**Dr.S.Shahitha**

B.Com., B.Com CA., and B.Com (Professional Accounting) Allied Statistics Syllabus LOCF - CBCS with effect from 2023-2024 Onwards								
Course Code	**Course Title**	**Course Type**	**Sem.**	**Hours**	**L**	**T**	**P**	**C**
23M3USTA03	**BUSINESS MATHEMATICS AND STATISTICS**	**GEC THOERY - III**	**III**	**4**	**2**	**2**	**-**	**3**

Objective	Students impart knowledge on the basics of ratio, proportion, indices and proportions.		
Unit	**Course Content**	**Knowledge Levels**	**Sessions**
I	**Ratio :** Ratio, Proportion and Variations, Indices and Logarithms.	K1	6
II	**Interest and Annuity:** Banker's Discount – Simple and Compound Interest - Arithmetic, Geometric and Harmonic Progressions. Annuity - Meaning - Types of Annuity Applications.	K2	12
III	**Business Statistics Measures of Central Tendency :** Arithmetic Mean, Geometric Mean - Harmonic Mean - Mode and Median – Measures of Variation – Range - Quartile Deviation and Mean Deviation - Variance and Standard Deviation & Co-efficient.	K3	12
IV	**Correlation and Regression: Correlation** - Karl Pearson's Coefficient of Correlation – Spearmen's Rank Correlation – Regression Lines and Coefficients.	K4	6
V	**Time Series Analysis and Index Numbers :** Time Series Analysis: Secular Trend – Seasonal Variation – Cyclical variations - Index Numbers – Aggregative and Relative Index – Chain and Fixed Index – Wholesale Index – Cost of Living Index. **Current Trends:* Descriptive Statistics ***	K5	12
	…… Self Study.		
Course Outcome	**CO1:** Understand learn the basics of ratio, proportion, indices and logarithm.	K1	
	CO2: Interpret Familiarise with calculations of simple and compound interest and arithmetic, geometric and harmonic progressions.	K2	
	CO3: Solve the various measures of central tendency	K3	
	CO4: Analyze the correlation and regression co-efficient.	K4	
	CO5: Estimate problems on time series analysis.	K5	
Learning Resources			

Text Books	1. Dr. B.N. Gupta, Business Mathematics & Statistics (2021), Shashibhawan publishing house, Chennai.			
Reference Books	1. Agawam B M, Business Mathematics & Statistics (2009), Ane Book Pvt. Ltd., New Delhi. 2. R.S. Hardwar, Business Mathematics & Statistics (2006), Excel Books Publisher, New Delhi.			
Website Link	https://www.britannica.com/biography/Henry-Briggs https://corporatefinanceinstitute.com/resources/data-science/central-tendency/ https://www.expressanalytics.com/blog/time-series-analysis/			
Self-Study Material	1.https://link.springer.com/book/10.1007/978-1-4614-0391-3 2.https://link.springer.com/chapter/10.1007/978-1-4614-0391-3_1			
	L-Lecture	T-Tutorial	P-Practical	C-Credit

B.Com., B.Com CA., and B.Com (Professional Accounting) Allied Statistics Syllabus LOCF - CBCS with effect from 2023-2024 Onwards									
Course Code	**Course Title**	**Course Type**	**Sem.**	**Hours**	**L**	**T**	**P**	**C**	
23M3USTA03	**BUSINESS MATHEMATICS AND STATISTICS**	**GEC THOERY - III**	**III**	**4**	**2**	**2**	**-**	**3**	

CO-PO Mapping

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

Tutorial Schedule	Group Discussion, Quiz program, Model preparation		
Teaching and Learning Methods	Audio Video lecture, Chalk and Board class, Assignment, PPT Presentation and Video presentation		
Assessment Methods	Class Test, Unit Test, Assignment, CIA-I, CIA-II and ESE		
Designed By	**Verified By**	**Approved By Member Secretary**	
Mr.L.Thangaraj	**Dr.S.Mohan Prabhu**	**Dr.S.Shahitha**	

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B.Com and B.Com (Professional Accounting) Allied Statistics Syllabus LOCF - CBCS with effect from 2023-2024 Onwards								
Course Code	**Course Title**	**Course Type**	**Sem.**	**Hours**	**L**	**T**	**P**	**C**
23M4USTA04	**OPERATIONS RESEARCH**	**GEC THOERY - IV**	**IV**	**4**	**2**	**2**	**-**	**3**

Objective	Students acquire the knowledge about operations research and linear programming problem.		
Unit	**Course Content**	**Knowledge Levels**	**Sessions**
I	**Introduction to Operations research and Linear Programming Problem :** Operations research – Origin and development - Role in decision making - Phases and approaches to OR - Linear programming problem – Applications and limitations - Formulation of LPP- Graphical method - Simplex Method.	K1	10
II	**Transportation and Assignment problem :** Transportation Problem – methods - North West corner method - Least cost method - Vogel's approximation method - Moving towards optimality - MODI methods - Assignment problem.	K2	10
III	**Game Theory and Simulation :** Game Theory- different strategies followed by the players in a game - Optimal strategies of a game using maxi-min criterion - Dominance property - Graphical method – Simulation.	K3	10
IV	**Inventory Management:** Introduction to inventory systems, inventory classification. Economic order quantity (EOQ) model, Single period probabilistic inventory models with discrete and continuous demand, determination of reorder point for deterministic and probabilistic Inventory System.	K4	10
V	**Network Analysis :** Network models- CPM and PERT Determination of Critical Path Method (CPM)- PERT cost- Crashing a project- Scheduling of a project- Application of PERT and CPM. **Current Trends:* Linear Programming Problem ***	K5	8
	…… Self Study.		
Course Outcome	**CO1:** Understand Frame a linear programming problem for quantitative decisions in business planning.	K1	
	CO2: Interpret Optimise economic factors by applying transportation and assignment problems.	K2	
	CO3: Apply the concept of game theory and simulation for optimal decision making.	K3	
	CO4: Analyse and manage inventories to meet the changes in market demand.	K4	
	CO5: Estimate problems PERT, CPM for strategic management of business projects.	K5	

Learning Resources				
Text Books	1. Kanti Swarup, P.K. Gupta and Manmohan (2007) Operations Research, Sultan Chand Sons, New Delhi.			
Reference Books	1. Taha : Operations Research, PHI. 2. F.S. Hiller and Liberman (1994): Operations Research, CBS Publishers and Distributions, New Delhi.			
Website Link	https://old.mu.ac.in/wp-content/uploads/2017/10/dormsem1linearprogramming.pdf https://www.acsce.edu.in/acsce/wp-content/uploads/2020/03/1585041316993_Module-4.pdf https://faculty.sites.iastate.edu/tesfatsi/files/inline-files/GameDef.pdf https://vardhaman.org/wp-content/uploads/2021/03/Network-Analysis.pdf			
Self-Study Material	1.https://ebookcentral.proquest.com/lib/inflibnet-ebooks/detail.action?docID=3017405 2.https://ebookcentral.proquest.com/lib/inflibnet-ebooks/reader.action?docID=3017405&ppg=33			
	L-Lecture	T-Tutorial	P-Practical	C-Credit

B.Com and B.Com (Professional Accounting) Allied Statistics Syllabus LOCF - CBCS with effect from 2023-2024 Onwards										
Course Code	**Course Title**		**Course Type**		**Sem.**	**Hours**	**L**	**T**	**P**	**C**
23M4USTA04	**OPERATIONS RESEARCH**		**GEC THOERY - IV**		**IV**	**4**	**2**	**2**	**-**	**3**
CO-PO Mapping										
CO Number	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PSO1**	**PSO2**	**PSO3**	**PSO4**	**PSO5**
CO1	M	S	S	L	M	S	S	M	S	M
CO2	S	S	S	S	S	S	S	S	S	M
CO3	S	S	S	S	S	S	S	S	S	S
CO4	S	S	M	S	S	S	S	S	M	S
CO5	S	M	S	S	S	S	S	S	M	M
Level of Correlation between CO and PO	L-LOW					M-MEDIUM			S-STRONG	
Tutorial Schedule	Group Discussion, Quiz program, Model preparation									
Teaching and Learning Methods	Audio Video lecture, Chalk and Board class, Assignment, PPT Presentation and Video presentation									
Assessment Methods	Class Test, Unit Test, Assignment, CIA-I, CIA-II and ESE									
Designed By	**Verified By**					**Approved By Member Secretary**				
Mr.L.Thangaraj	**Dr.S.MohanPrabhu**					**Dr.S.Shahitha**				

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B.Sc., -Biochemistry, Biotechnology Allied Syllabus LOCF - CBCS with effect from 2023-2024 Onwards								
Course Code	**Course Title**	**Course Type**	**Sem.**	**Hours**	**L**	**T**	**P**	**C**
23M3USTA05/ 23M4USTA05	**BIO STATISTICS**	**GEC THOERY - III & IV**	**III & IV**	**4**	**4**	**-**	**-**	**4**
Objective	Students acquire the knowledge about the basic concepts of Statistics.							

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	10
II	**Measures of Central Tendency:** Definitions – Mean – Median – Mode – Geometric mean – Harmonic mean – Characteristics of a good average – Merits and demerits– Simple Problems.	K2	10
III	**Measures of Dispersion:** Range – Quartile deviation – Mean deviation and their coefficients – Standard deviation – Co-efficient of variation – Merits and demerits– Simple Problems.	K3	10
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.	K4	8
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. **Current Trends:* Descriptive Statistics ***	K5	10
	…… Self Study.		
Course Outcome	**CO1:** Recall the methods of data collection and classification of data.	K1	
	CO2: Discuss the measures of locations and dispersions.	K2	
	CO3: Apply the methods of frequency and diagrams.	K3	
	CO4: Classify the correlation between the variables and to fit the regression lines.	K4	
	CO5: Evaluate the sample sizes and used for real life data used for the tests.	K5	

Learning Resources				
Text Books	1. Basics of Biostatistics Second Edition, Kindle Edition (2019) CBS Publishers and Distributors Pvt Ltd.			
Reference Books	1. Gupta, S. C and Kapoor, V. K (2002), Fundamentals of Mathematical Statistics, Sultan Chand and Sons, New Delhi. 2. An Introduction to Biostatistics Kindle Edition (2015). 3. Gupta S. C and Kapoor V. K, Fundamentals of Mathematical Statistics, Sultan Chand and Sons, New Delhi.			
Website Link	https://www.tutorialspoint.com/statistics/data_collection.htm https://course-notes.org/statistics/sampling_theory			
Self-Study Material	1.https://link.springer.com/book/10.1007/978-1-4614-0391-3 2.https://link.springer.com/chapter/10.1007/978-1-4614-0391-3_1			
	L-Lecture	T-Tutorial	P-Practical	C-Credit

B.Sc., -Biochemistry, Biotechnology Allied Syllabus LOCF - CBCS with effect from 2023-2024 Onwards										
Course Code	**Course Title**		**Course Type**	**Sem.**	**Hours**	**L**	**T**	**P**	**C**	
23M3USTA05/ 23M4USTA05	**BIO STATISTICS**		**GEC THOERY - III & IV**	**III & IV**	**4**	**4**	**-**	**-**	**4**	
CO-PO Mapping										
CO Number	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PSO1**	**PSO2**	**PSO3**	**PSO4**	**PSO5**
CO1	**S**	**M**	**S**	**L**	**S**	**M**	**S**	**S**	**S**	**S**
CO2	**S**	**S**	**S**	**S**	**M**	**S**	**S**	**M**	**S**	**S**
CO3	**S**	**S**	**M**	**M**	**S**	**L**	**S**	**S**	**S**	**M**
CO4	**S**	**S**	**S**	**S**	**S**	**M**	**S**	**S**	**M**	**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	Group Discussion, Quiz program, Model preparation									
Teaching and Learning Methods	Audio Video lecture, Chalk and Board class, Assignment, PPT Presentation and Video presentation									
Assessment Methods	Class Test, Unit Test, Assignment, CIA-I, CIA-II and ESE									
Designed By	**Verified By**					**Approved By Member Secretary**				
Mr.L.Thangaraj	**Dr.S.Mohan Prabhu**					**Dr.S.Shahitha**				

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B.Sc., -Mathematics Allied Syllabus LOCF - CBCS with effect from 2023-2024 Onwards								
Course Code	**Course Title**	**Course Type**	**Sem.**	**Hours**	**L**	**T**	**P**	**C**
23M3USTA06	**ALLIED: STATISTICAL METHODS -I**	**GEC THOERY - VI**	**III**	**4**	**2**	**2**	**-**	**3**

Objective	Students acquire the knowledge about the basic concepts of probability theory and probability distribution		
Unit	**Course Content**	**Knowledge Levels**	**Sessions**
I	**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	12
II	**Discrete and Continuous Distributions:** Binomial and Poisson Distributions – Derivations – Properties and Applications - Simple Problems – Normal distribution – Derivations – Properties and Applications - Simple Problems.	K2	6
III	**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.	K3	12
IV	**Curve Fitting:** Method of least square – Fitting of a straight line and second degree Parabola, Fitting of Power Curve and Exponential Curves – Simple Problems.	K4	6
V	**Correlation and Regression:** Definition – Types and methods of measuring correlation – Scatter diagram , Karl Pearsons correlation coefficient and Spearman's rank correlation coefficient - Regression lines - Regression coefficients – Properties – Regression equations .coefficient – Chi-square test , Goodness of fit and independence of attributes. **Current Trends:*Methods of measuring Correlation***	K5	12
	…… Self Study.		
Course Outcome	**CO1:** Identify the random experiments in real life situations.	K1	
	CO2: Discuss the axioms of probability in real life situations.	K2	
	CO3: Construct Bernoulli trials and understand the rare case population.	K3	
	CO4: Explain the usage of central tendencies, dispersion and skewness.	K4	
	CO5: Compare the relationship between two random variables.	K5	

Learning Resources	
Text Books	1. S.C. Gupta, V.K. Kapoor(2020),Fundamentals of Mathematical Statistics Sultan Chand &Sons, New Delhi
Reference Books	1. S.C. Gupta(2021), Statistical Methods, Sultan Chand & Sons 2. Shao, Jun.(2005) ,Mathematical Statistics: Exercises and Solutions,New York, NY : Springer New York 3. Rohatgi V. K, An Introduction to Probability theory and Mathematical Statistics, Wiley Eastern Ltd., Publishers, New Delhi.
Website Link	1. https://books.google.co.in/books/about/Fundamentals_of_Mathematical_Statistics.html?id=Y2D8DwAAQBAJ&redir_esc=y 2. https://www.sultanchandandsons.com/book/59/statistical-methods
Self-Study Material	1. https://www.sultanchandandsons.com/book/59/statistical-methods 2. https://link.springer.com/chapter/10.1007/978-1-4614-0391-3_1

	L-Lecture	T-Tutorial	P-Practical	C-Credit

B.Sc., -Mathematics Allied Syllabus LOCF - CBCS with effect from 2023-2024 Onwards										
Course Code	**Course Title**			**Course Type**		**Sem.**	**Hours**	**L**	**T**	**P**	**C**
23M3USTA06	**ALLIED: STATISTICAL METHODS -I**			**GEC THOERY - VI**		**III**	**4**	**2**	**2**	**-**	**3**
CO-PO Mapping											
CO Number	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PSO1**	**PSO2**	**PSO3**	**PSO4**	**PSO5**	
CO1	S	M	S	L	S	M	S	S	S	S	
CO2	S	S	S	S	M	S	S	M	S	S	
CO3	S	S	M	M	S	L	S	S	S	M	
CO4	S	S	S	S	S	M	S	S	M	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	Group Discussion, Quiz program, Model preparation	
Teaching and Learning Methods	Audio Video lecture, Chalk and Board class, Assignment, PPT Presentation and Video presentation	
Assessment Methods	Class Test, Unit Test, Assignment, CIA-I, CIA-II and ESE	
Designed By	**Verified By**	**Approved By Member Secretary**
Mrs.S.Manimekalai	**Dr.S.Mohan Prabhu**	**Dr.S.Shahitha**

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B.Sc., -Mathematics Allied Syllabus LOCF - CBCS with effect from 2023-2024 Onwards								
Course Code	**Course Title**	**Course Type**	**Sem.**	**Hours**	**L**	**T**	**P**	**C**
23M4USTA07	**ALLIED: STATISTICAL METHODS -II**	**GEC THOERY - VII**	**IV**	**4**	**2**	**2**	**-**	**3**

Objective	Students equip with theoretical knowledge for estimating unknown parameters.		
Unit	**Course Content**	**Knowledge Levels**	**Sessions**
I	**Point Estimation:** Population and Sample – Parameter and Statistic – Point Estimation – Consistency – Unbiasedness – Efficiency (Cramer – Rao inequality) and Sufficiency (Rao – Blackwell Theorem).	K1	6
II	**Methods of Estimation and Interval Estimation:** Maximum likelihood Estimator (MLE) and Methods of Moments – Properties of these estimators – Interval estimation (concept only).	K2	6
III	**Test of Significance:** 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.	K3	12
IV	**Test of Significance (Large Sample Tests):** Sampling distribution – Standard error – Large sample tests with regard to Mean, Difference of Means, Proportions and Difference of Proportions – Simple Problems.	K4	12
V	**Test of Significance (Small Sample Tests):** Exact sample test based on t and F Distributions with regard to Means Variance and Correlation coefficient – Chi-square test , Goodness of fit and independence of attributes. **Current Trends: *Concept of Statistical Hypothesis***	K5	12
	… Self-Study …		
Course Outcome	**CO1:** List out the importance of good estimators.	K1	
	CO2: Describe the importance of maximum likelihood estimator.	K2	
	CO3: Illustrate the difference types of Statistical hypothesis.	K3	
	CO4: Explain the importance of statistical hypothesis for large samples.	K4	
	CO5: Evaluate the importance of statistical hypothesis for small samples.	K5	
Learning Resources			

Text Books	1.Sharmishtha Kulkarni Ph D, Anjali UpadhyePh D (2020),Statistical Inference -Illustrative Examples on Point Estimation & Properties of Point Estimation,Publisher:Amazon Digital Services LLC - Kdp
Reference Books	1.Marc S. Paolella (2018),Fundamental Statistical Inference : A Computational Approach,John Wiley & Sons, Incorporated 2. Prakash S.Chougule · (2022) Statistical Inference:Testing of Hypothesis,Blue Rose Publishers.
Website Link	1.https://www.google.co.in/books/edition/Likelihood_Methods_in_Biology_and_Ecolog/M3yCDwAAQBAJ?hl=en&gbpv=1&dq=method+of+likelihood&printsec=frontcover 2.https://www.google.co.in/books/edition/Theory_of_Point_Estimation/4f24CgAAQBAJ?hl=en&gbpv=1&dq=point+estimation&printsec=frontcover
Self-Study Material	1.https://ebookcentral.proquest.com/lib/inflibnet-ebooks/detail.action?docID=1602290 2.https://ebookcentral.proquest.com/lib/inflibnetebooks/reader.action?docID=1791152&ppg=1

	L-Lecture	T-Tutorial	P-Practical	C-Credit

B.Sc., -Mathematics Allied Syllabus LOCF - CBCS with effect from 2023-2024 Onwards									
Course Code	**Course Title**	**Course Type**	**Sem.**	**Hours**	**L**	**T**	**P**	**C**	
23M4USTA07	**ALLIED: STATISTICAL METHODS -II**	**GEC THOERY - VII**	**IV**	**4**	**2**	**2**	**-**	**3**	

CO-PO Mapping

CO Number	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S	S	M	S	M	S	M	S	S	S
CO2	S	S	S	S	S	S	S	S	M	S
CO3	S	S	S	S	S	S	M	S	S	M
CO4	S	S	S	M	S	S	S	S	M	S
CO5	S	S	M	S	M	S	S	S	S	S

Level of Correlation between CO and PO	L-LOW	M-MEDIUM	S-STRONG

Tutorial Schedule	Group Discussion, Quiz program, Model preparation
Teaching and Learning Methods	Audio Video lecture, Chalk and Board class, Assignment, PPT Presentation and Video presentation
Assessment Methods	Class Test, Unit Test, Assignment, CIA-I, CIA-II and ESE

Designed By	**Verified By**	**Approved By Member Secretary**
Mrs.S. Manimekalai	**Dr.S.Mohan Prabhu**	**Dr.S.Shahitha**

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B.Sc., -Mathematics Syllabus LOCF - CBCS with effect from 2023-2024 Onwards								
Course Code	**Course Title**	**Course Type**	**Sem.**	**Hours**	**L**	**T**	**P**	**C**
23M4USTAP1	**PRACTICAL: ALLIED STATISTICS**	**DATA ANALYSIS USING MS EXCEL**	**IV**	**2**	**-**	**-**	**2**	**2**
Objective	Students to gain computer practical knowledge about the concepts of statistics.							

Exercises	**Practical Experiments by Using MS Excel**	**Knowledge Levels**	**Sessions**
1 to 22	1. Computation of Measures of Central Tendency for discrete data using MS Excel (Mean, Median, Mode, Geometric Mean, Harmonic Mean) 2. Computation of Measures of Central Tendency for Continuous data using MS Excel (Mean, Median, Mode, Geometric Mean, Harmonic Mean) 3. Computation of Measures of dispersion for discrete data using MS Excel 4. Computation of Measures of dispersion for Continuous data using MS Excel 5. Graphical Presentation of data (Histogram, Frequency Polygon, O gives) Using MS Excel. 6. Computation of Co-efficient of Skewness and Kurtosis – Karl Pearson‘s and Bowley‘s data using MS Excel 7. Fitting of Binomial distribution – Direct Method using MS Excel. 8. Fitting of Poisson distribution – Direct Method using MS Excel. 9. Fitting of Normal distribution – Direct Method using MS Excel. 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 mean. 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. 16. To find the values of student’s t test based on mean. 17. To find the values of student’s tests 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 (Unequal). 22. Goodness of fit for chi-square (Two methods).	K6	24

Course Outcome	**CO1:** Listen the scope and necessity of Statistics, Tabulate and represent the data in diagrams and graphs	K1
	CO2: Classify the formula and calculate descriptive measures of central tendency and dispersion.	K2
	CO3: Choose the formula and calculate descriptive measures of skewness, kurtosis, and moments.	K3
	CO4: Analyze the nature of data and interpret the distributions.	K4
	CO5: Compare the nature of data and interpret the large and small sample.	K5

Learning Resources	
Text Books	1. Advanced Excel with VBA Macros Paperback - 6 October 2020 by Swarup Das (Author).
Reference Books	1. Excel for Beginners (Excel Essentials Book 1) Kindle Editionby M.L. Humphrey (Author) Format: Kindle Edition
Website Link	1. https://ccsuniversity.ac.in/bridge-library/pdf/DHA_Shikha_BHI_204_Unit4.pdf 2. https://www.mcrhrdi.gov.in/4th_mesfc2022/material/Microsoft%20Office(Ms-Excel%202016).pdf

	L-Lecture	T-Tutorial	P-Practical	C-Credit

B.Sc., -Mathematics Syllabus LOCF - CBCS with effect from 2023-2024 Onwards

Course Code	Course Title	Course Type	Sem.	Hours	L	T	P	C
23M4USTAP1	**PRACTICAL: ALLIED STATISTICS**	**DATA ANALYSIS USING MS EXCEL**	**IV**	**2**	**-**	**-**	**2**	**2**

CO-PO Mapping

CO Number	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S	S	S	M	M	S	S	S	S	S
CO2	S	S	S	S	S	M	S	S	S	S
CO3	S	S	S	S	S	S	S	S	S	S
CO4	S	S	M	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	Audio Video Lecture, PPT Presentation and Video Presentation
Assessment Methods	CIA-I, CIA-II and ESE

Designed By	Verified By	Approved By Member Secretary
Dr. S. Mohan Prabhu	**Dr. S. Mohan Prabhu**	**Dr.S.Shahitha**

MUTHAYAMMAL COLLEGE OF ARTS AND SCIENCE
(Autonomous)
Rasipuram - 637408.

Allied B.Sc., CS & BCA & IT & DS Syllabus LOCF-CBCS with Effect From 2023-2024 Onwards								
Course Code	**Course Title**	**Course Type**	**Sem.**	**Hours**	**L**	**T**	**P**	**C**
23M3USTA08	**STATISTICAL METHODS AND ITS APPLICATIONS -I**	**GEC THOERY - VIII**	**III**	**4**	**2**	**2**	**-**	**3**

Objective	Students acquired knowledge about the sample data and its usage in different ways such as locations.

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	10
II	**Measures of Central Tendency:** Mean, Median, Mode, Geometric mean, Harmonic mean – Characteristics of a good average – Merits and demerits – Simple Problems.	K2	10
III	**Measures of Dispersion:** Range – Quartile deviation – Mean deviation and their coefficients – Standard deviation – Coefficient of variation – Merits and demerits – Simple Problems.	K3	10
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.	K4	10
V	**Probability:** Definition of Probability – Addition and Multiplication Theorems – Conditional probability – Simple Problems. **Current Trends-*** Nature and scope of statistics****	K5	8
	…… Self Study.		
Course Outcome	**CO1:** Define the statistical methods measures of location.	K1	
	CO2: Understand the statistical methods measures of dispersion.	K2	
	CO3: Apply the statistical methods of dispersion and location	K3	
	CO4: Compare the relationship between variables and forecasting the future values	K4	
	CO5: Elaborate nonlinear regression models.	K5	

Learning Resources				
Text Books	1. Gupta S. P. (2001), Statistical Methods, Sultan Chand & Sons, New Delhi.			
Reference Books	1. Pillai R. S. N. And Bagavathi. V. (2005), Statistics, S. Chand & Company Ltd., New Delhi			
Self-Study Material	1. https://ebookcentral.proquest.com/lib/inflibnet-ebooks/detail.action?docID=5190782 2. https://ebookcentral.proquest.com/lib/inflibnet-ebooks/reader.action?docID=5190782&ppg=17			
	L-Lecture	T-Tutorial	P-Practical	C-Credit

Allied B.Sc., CS & BCA & IT & DS Syllabus LOCF-CBCS with Effect From 2023-2024 Onwards									
Course Code	**Course Title**	**Course Type**	**Sem**	**Hrs**	**L**	**T**	**P**	**C**	
23M3USTA08	**STATISTICAL METHODS AND ITS APPLICATIONS -I**	**GEC THOERY - VIII**	**III**	**4**	**2**	**2**	**-**	**3**	

CO-PO Mapping

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

Tutorial Schedule	Group Discussion, Quiz program, Model preparation
Teaching and Learning Methods	Audio Video lecture, Chalk and Board class, Assignment, PPT Presentation and Video presentation
Assessment Methods	Class Test, Unit Test, Assignment, CIA-I, CIA-II and ESE

Designed By	Verified By	Approved By Member Secretary
Mrs.P.Keerthana	**Dr.S.Mohan Prabhu**	**Dr.S.Shahitha**

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Allied B.Sc., CS & BCA & IT & DS Syllabus LOCF-CBCS with Effect From 2023-2024 Onwards								
Course Code	**Course Title**	**Course Type**	**Sem.**	**Hours**	**L**	**T**	**P**	**C**
23M3USTA09	**STATISTICAL METHODS AND ITS APPLICATIONS - II**	**GEC THOERY - IX**	**IV**	**4**	**2**	**2**	**-**	**3**
Objective	Students acquired knowledge impart statistical concepts with rigorous mathematical treatment.							

Unit	Course Content	Knowledge Levels	Sessions
I	**Random Variable and Mathematical Expectation :**Definitions – Random variable – Discrete and Continuous Random variable – Distribution functions and Density function- Mathematical Expectation and its Properties - Simple Problems	K1	10
II	**Discrete Probability Distribution :**Binomial and Poisson Distributions – Mean and Variance of Distributions – Recurrence formula – Fitting of Binomial and Poisson Distributions - Simple Problems.	K2	8
III	**Continuous Probability Distribution and Curve Fitting:** Definition of Normal distribution – Characteristics of Normal distribution (Simple Problems) – Curve fitting – Fitting of Straight line and Second degree Parabola - Simple Problems.	K3	10
IV	**Test of Significance (Large Samples Tests):** Concept of Statistical Hypothesis – Simple and Composite Hypothesis – Null and Alternative Hypothesis – Critical region – Type I and Type II Errors – Sampling distribution and Standard Error – Test of Significance: Large Sample Tests for Proportion, Difference of Proportions, Mean and Difference of Means - Simple Problems	K4	10
V	**Test of Significance (Small Samples Tests):** Small sample tests with regard to Mean, Difference between Means and Paired t-test , F-test - Definition of Chi-square test – Assumptions – Characteristics – Chi-square tests for Goodness of fit and Independence of attributes – Simple Problems. **Current Trends-* Basics of probability***	K5	10
	…… Self Study.		
Course Outcome	**CO1:** Relate the concept of random variables and expected average	K1	
	CO2: Compute Bernoulli trials and understand the rare case population.	K2	
	CO3: Interpret the usage of normal curve and curve fitting by using the method of least squares.	K3	
	CO4: Discover Inference about the large samples	K4	
	CO5: Elaborate the basic concepts of theory of attributes	K5	

Learning Resources				
Text Books	1. Gupta S. P. (2001), Statistical Methods, Sultan Chand & Sons, New Delhi.			
Reference Books	1. Sancheti D. C. And Kapoor. V. K (2005), Statistics (7th Edition), Sultan Chand & Sons, New Delhi.			
Website Link	1.https://www.tutorialspoint.com/statistics/data_collection.htm 2.https://seeing-theory.brown.edu/probability-distributions/index.html 3.https://statisticsbyjim.com/regression/curve-fitting-linear-nonlinear- regression/ 4.https://www.investopedia.com/terms/c/chi-square-statistic.asp			
Self-Study Material	1.https://ebookcentral.proquest.com/lib/inflibnet-ebooks/detail.action?docID=1791152 2.https://ebookcentral.proquest.com/lib/inflibnet-ebooks/reader.action?docID=1791152&ppg=12			
	L-Lecture	T-Tutorial	P-Practical	C-Credit

Allied B.Sc., CS & BCA & IT & DS Syllabus LOCF-CBCS with Effect From 2023-2024 Onwards									
Course Code	**Course Title**	**Course Type**	**Sem**	**Hrs**	**L**	**T**	**P**	**C**	
23M3USTA09	**STATISTICAL METHODS AND ITS APPLICATIONS -II**	**GEC THOERY - IX**	**IV**	**4**	**2**	**2**	**-**	**3**	

CO-PO Mapping

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

Tutorial Schedule	Group Discussion, Quiz program, Model preparation
Teaching and Learning Methods	Audio Video lecture, Chalk and Board class, Assignment, PPT Presentation and Video presentation
Assessment Methods	Class Test, Unit Test, Assignment, CIA-I, CIA-II and ESE

Designed By	Verified By	Approved By Member Secretary
Mrs.P.Keerthana	**Dr.S.Mohan Prabhu**	**Dr.S.Shahitha**

Allied B.Sc., CS & BCA & IT & DS Syllabus LOCF-CBCS with Effect From 2023-2024 Onwards								
Course Code	**Course Title**	**Course Type**	**Sem.**	**Hours**	**L**	**T**	**P**	**C**
23M4USTAP2	**PRACTICAL : ALLIED STATISTICS**	**DATA ANALYSIS USING MS EXCEL**	**IV**	**2**	**-**	**-**	**2**	**2**
Objective	Students to gain computer practical knowledge about the concepts of statistics.							

Exercises	**Practical Experiments by Using MS Excel**	**Knowledge Levels**	**Sessions**
1 to 22	1. Computation of Measures of Central Tendency for discrete data using MS Excel (Mean, Median, Mode, Geometric Mean, Harmonic Mean) 2. Computation of Measures of Central Tendency for Continuous data using MS Excel (Mean, Median, Mode, Geometric Mean, Harmonic Mean) 3. Computation of Measures of dispersion for discrete data using MS Excel 4. Computation of Measures of dispersion for Continuous data using MS Excel 5. Graphical Presentation of data (Histogram, Frequency Polygon, Ogives) Using MS Excel. 6. Computation of Co-efficient of Skewness and Kurtosis – Karl Pearson‘s and Bowley‘s data using MS Excel 7. Fitting of Binomial distribution – Direct Method using MS Excel. 8. Fitting of Poisson distribution – Direct Method using MS Excel. 9. Fitting of Normal distribution – Direct Method using MS Excel. 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 mean. 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. 16. To find the values of student’s t test based on mean. 17. To find the values of student’s tests 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 (Unequal).	K6	24

	22. Goodness of fit for chi-square (Two methods).		
Course Outcome	**CO1:** Relate and learn the scope and necessity of Statistics, Tabulate and represent the data in diagrams and graphs	K1	
	CO2: Compute the formula and calculate descriptive measures of central tendency and dispersion.	K2	
	CO3: Interpret the formula and calculate descriptive measures of skewness, kurtosis, and moments.	K3	
	CO4: Correlate the nature of data and interpret the distributions.	K4	
	CO5: Appraise the nature of data and interpret the large and small sample.	K5	

Learning Resources	
Text Books	1. Advanced Excel with VBA Macros Paperback - 6 October 2020by Swarup Das (Author).
Reference Books	1.Excel for Beginners (Excel Essentials Book 1) Kindle Editionby M.L. Humphrey (Author) Format: Kindle Edition
Website Link	1. https://ccsuniversity.ac.in/bridge-library/pdf/DHA_Shikha_BHI_204_Unit4.pdf 2. https://www.mcrhrdi.gov.in/4th_mesfc2022/material/Microsoft%20Office(Ms-Excel%202016).pdf

	L-Lecture	T-Tutorial	P-Practical	C-Credit

Allied B.Sc., CS & BCA & IT & DS Syllabus LOCF-CBCS with Effect From 2023-2024 Onwards

Course Code	Course Title	Course Type	Sem.	Hours	L	T	P	C
23M4USTAP2	**ALLIED: STATISTICS PRACTICAL**	**DATA ANALYSIS USING MS EXCEL**	**IV**	**2**	**-**	**-**	**2**	**2**

CO-PO Mapping

CO Number	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S	S	S	M	M	S	S	S	S	S
CO2	S	S	S	S	S	M	S	S	S	S
CO3	S	S	S	S	S	S	S	S	S	S
CO4	S	S	M	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	Audio Video Lecture, PPT Presentation and Video Presentation
Assessment Methods	CIA-I, CIA-II and ESE

Designed By	Verified By	Approved By Member Secretary
Dr. S. Mohan Prabhu	**Dr. S. Mohan Prabhu**	**Dr.S.Shahitha**

List of Extra Disciplinary Courses (EDC) offered by the B.Sc., Statistics
M.Sc., Chemistry and Organic Chemistry
SYLLABUS - LOCF-CBCS Pattern
EFFECTIVE FROM THE ACADEMIC YEAR 2023-2024 Onwards

S.No.	SEM	COURSE_CODE	TITLE OF THE COURSE
1	III	23M3PSTED1	RESEARCH METHODLOGY AND STATISTICS

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M.Sc., Chemistry and Organic Chemistry Allied Syllabus LOCF-CBCS with effect from 2023-2024 Onwards								
Course Code	**Course Title**	**Course Type**	**Sem.**	**Hours**	**L**	**T**	**P**	**C**
23M3PSTED1	**RESEARCH METHODOLOGY AND STATISTICS**	**EDC THEORY-I**	**III**	**4**	**4**	**-**	**-**	**4**
Objective	Students to learn the methods and techniques of data collection, sampling methods, write research reports and articles, the basic concepts of statistics, the tests of significance and statistical data analysis by MS Excel.							

Unit	Course Content	Knowledge Levels	Sessions
I	**Basic Concept Of Research :** Introduction to Research Methodology - Meaning and importance. Statement, Constraints. Review of literature - Review and synopsis presentation. Types of research, Research tools. Methods and techniques of data collection - types of data, methods of primary data collection (observation/ experimentation/ questionnaire/ interviewing/ case/pilot study, methods), methods of secondary data collection.	K3	10
II	**Sampling and Research Process:** Sampling and sampling distributions. Sampling frame, importance of probability sampling, sampling - simple random, systematic, stratified random and cluster. Variables - nominal, ordinal, discontinuous, continuous, derived. Research process, designs and Report writing - types of research reports, guidelines for writing an article and report, report format, appendices, Ethical issues related to publishing, Plagiarism and Self Plagiarism.	K3	10
III	**Descriptive Statistics:** Introduction to statistics - Basic concepts, Measurement and measurement scales, Sampling and data collection, Data presentation. Measures of central tendency: Mean, Median, Mode. Measures of variability - Standard deviation, standard error, range, mean deviation and coefficient of variation. Frequency table of single discrete variable, computation of mean, variance and standard Deviations, t test, correlation coefficient.	K5	10

IV	**Correlation, Regression and Testing Of Hypothesis:** Correlation and regression - Positive, negative, calculation of Karl-Pearsons co-efficient of correlation. Linear regression and multiple linear regression, ANOVA, one and two way classification. Calculation of an unknown variable using regression equation. Tests of significance - Tests of significance: Small sample test (Chi-square t test, F test), large sample test (Z test) and standard error.	K5	10
V	**Probability and Advanced Excel:** Probability and distributions - Introduction to probability theory and distributions, (concept without deviation) binomial, poison and normal (only definitions and problems) Computer oriented statistical data analysis using MS Excel.	K5	8
	Current Trent : * Measures of Dispersion *		
Course Outcome	**CO1:** Relate the Collection of data and presentation of data for suitable to the research design.	K1	
	CO2: Interpret research manuscripts and articles for journals.	K2	
	CO3: Apply recommend the utilization of statistics tools for analysis of research data.	K3	
	CO4: Analysis and testing of hypothesis for a particular research.	K4	
	CO5: Appraise the data by using statistical software tools.	K5	

Learning Resources	
Text Books	1. Gupta, S.P. (2017): Statistical Methods, Sultan Chand & Sons Pvt Ltd, NewDelhi, 35th Revised Edition. 2. Gupta S. C and Kapoor, V. K. (2002). Fundamentals of Mathematical Statistics, Sultan Chand & Sons Pvt. Ltd.,New Delhi.
Reference Books	1. Warren,J; Gregory,E; Grant,R (2004), ―Statistical Methods in Bioinformatics‖,1st edition,Springer 2. Milton,J.S.(1992),. ―Statistical methods in the Biological and Health Sciences‖, 2nd edition ,Mc Graw Hill, 3. Rosner,B (2005), ―Fundamentals of Biostatistics‖, Duxbury Press 4. Introducing Data Science, Davy Cielen, Anro DB Meysman, Mohamed Ali.

Website Link	https://www.ibm.com/docs/en/SSLVMB_28.0.0/pdf/Accessibility.pdf https://pure.tue.nl/ws/portalfiles/portal/19478370/20160419_CO_Mzolo.pdf https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5453888/ https://home.ubalt.edu/ntsbarsh/excel/excel.htm https://students.shu.ac.uk/lits/it/documents/pdf/analysing_data_using_spss.pdf https://www.ibm.com/support/pages/ibm-spss-statistics-28-documentation\
Self-Study Material	Nature of biological and clinical experiments – Collection of data in experiment Primary and Secondary data. Methods of data collection. Classification and tabulation. Different forms of diagrams and graphs related to biological studies. N-List Link: https://nlist.inflibnet.ac.in/search/Record/EBC4513906 https://ebookcentral.proquest.com/lib/inflibnet-ebooks/reader.action?docID=3386956&ppg=17

	L-Lecture	T-Tutorial	P-Practical	C-Credit

M.Sc., Chemistry and Organic Chemistry Allied Syllabus LOCF-CBCS with effect from 2023-2024 Onwards

Course Code	Course Title	Course Type	Sem.	Hours	L	T	P	C
23M3PSTED1	**RESEARCH METHODOLOGY AND STATISTICS**	**EDC THEORY-I**	**III**	**4**	**4**	**-**	**-**	**4**

CO-PO Mapping

CO Number	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	M	S	S	S	M	S	S	S	S	S
CO2	S	M	S	S	S	S	S	M	S	S
CO3	S	S	S	S	M	S	M	S	S	M
CO4	S	S	M	S	S	S	S	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	Chalk and Board Teaching, Power Point Presentation, Group Discussion and Virtual Learning
Teaching and Learning Methods	Audio Video lecture, Chalk and Board class, Assignment, PPT Presentation and Video presentation
Assessment Methods	Class Test, Unit Test, Assignment, CIA-I, CIA-II and ESE

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B.Sc., -Statistics Syllabus LOCF - CBCS with effect from 2023-2024 Onwards								
Course Code	**Course Title**	**Course Type**	**Sem.**	**Hours**	**L**	**T**	**P**	**C**
23M5USTIS1	**INTERNSHIP**	**INTERNSHIP**	**V**	**-**	**-**	**-**	**-**	**2**
Objective	To give optimum exposure on the practical aspects of statistics industry.							

Unit	Course Content	Knowledge Levels	Sessions
1	The student should undergo 15 Days Internship training in 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.	K4	
2	The training bridges the gap between the theoretical knowledge gained in the 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.	K4	
3	Schedule of visit to be made by the staff is to be prepared by the HOD / Staff-in-charge.	K4	
4	The trainees should strictly adhere to the rules and regulations and office timings of the institutions to which they are attached.	K4	
5	A Staff member of a Department (Guide) will be monitoring the performance of the Candidate.	K4	
6	The students should maintain notes where the student should record his details of the training.	K4	
7	The trainees have to obtain a certificate on successful completion of the internship from the chief executive of an organization.	K4	

8	The student should submit an attendance certificate to the institution for 15 days internship training from an organization.	K4	
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.	K4	
10	Industrial training reports shall be prepared by the students under the supervision of the faculty of the department.	K4	
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.	K4	
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.	K4	
	…… Self Study.		
Course Outcome	CO1: Apply new techniques and ideas in analysis field of Statistics.	K1	
	CO2: Analyze 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 industry.	K5	

Learning Resources	
Text Books	1. Internship Mastery: The Technology Student's Guide to Crushing Your Internship and Launching Your Career by Ryan D Glick (Author).
Reference Books	1. Internships for Today's World: A Practical Guide for High Schools and Community Colleges, by Joan E. McLachlan (Author), Patricia Hess (Author).

Website Link	1. https://www.studocu.com/row/document/university-of-kelaniya/financial-strategizing/internship-guide-2019-lecture-notes-15/5220720 2. https://content5.lecturenotes.in/internship			
Self-Study	-			
	L-Lecture	T-Tutorial	P-Practical	C-Credit

B.Sc., - Statistics Syllabus LOCF - CBCS with effect from 2023-2024 Onwards									
Course Code	**Course Title**	**Course Type**	**Sem.**	**Hours**	**L**	**T**	**P**	**C**	
23M5USTIS1	**INTERNSHIP**	**INTERNSHIP**	**V**	**-**	**-**	**-**	**-**	**2**	

CO-PO Mapping

CO Number	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**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 – 100 Marks 1. Work Log Book – 25 Marks 2. Training Report and Viva-Voce – 75 Marks

Designed By	**Verified By**	**Approved By Member Secretary**
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B.Sc., -Statistics Syllabus LOCF - CBCS with effect from 2023-2024 Onwards								
Course Code	**Course Title**	**Course Type**	**Sem.**	**Hours**	**L**	**T**	**P**	**C**
23M6USTPR1	**PROJECT WORK**	**PROJECT WORK**	**VI**	**5**	**-**	**-**	**5**	**4**
Objective	To inculcate/impart skills on experiment designing, experiment execution and research report to provide skills on writing thesis dissertation.							

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.	K3	12
Inside cover page	Inside cover page Same as cover page.	K3	12
Bonafide Certificate	Bonafide Certificate: The Bonafide Certificate shall be in double line spacing using Font Style Times New Roman and Font Size 14.	K4	12
Acknowledgement	Acknowledgement: This should not exceed one page.	K4	12
Abstract	Abstract: Abstract should be one page synopsis of the project report typed double line spacing, Font Style Times New Roman and Font Size 14.	K5	12
Contents	Table of Contents: The table of contents should list all headings, sub headings 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		
	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 acknowledgements 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 center on the top of the page using 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 first letter in each word should be in capital.		
Regular Text	Regular Text: Times Roman 12 pts and normal print.		
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.		
References	Use only Arabic numerals. Serial numbering should be carried out based on Alphabetical order of surname or last name of first author. The format is written like, author name followed by year followed by title of the work followed by details of the journal. Same font as regular text, serial number and all authors names to be in bold print. Title and Journal names should be in italic. 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. 3+ 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. 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		
	…… Self Study.		
Course Outcome	**CO1:** Identification of research idea.	K4	
	CO2: Analyze of problem solving skills.	K4	
	CO3: Analyze sources for conduct of Research.	K4	
	CO4: Evaluate the research report.	K5	
	CO5: Create the research report.	K6	

Learning Resources	
Text Books	1. Research Methodology: Methods and Techniques, by C.R. Kothari, New Age Publications, 2009.
Reference Books	1. Research Methodology: Methods and Techniques by C.R. Kothari, New Age Publications, 1985. 2. Essentials of Research Design and Methodology by: Geoffrey R. Marczyk, David DeMatteo, David Festinger, 2005.

Website Link	1. http://gen.lib.rus.ec/			
Self-Study Material	-			
	L-Lecture	T-Tutorial	P-Practical	C-Credit

B.Sc., -Statistics Syllabus LOCF - CBCS with effect from 2023-2024 Onwards										
Course Code	**Course Title**	**Course Type**	**Sem.**	**Hours**	**L**	**T**	**P**	**C**		
23M6USTPR1	**PROJECT WORK**	**PROJECT WORK**	**VI**	**5**	**-**	**-**	**5**	**4**		

CO-PO Mapping

CO Number	PO1	PO2	PO3	PO4	PO5	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	EA - 100% 1. Project Report : 50 Marks 2. Viva-Voce : 50 Marks 3. Total : 100 Marks

Designed By	Verified By	Approved By Member Secretary
Dr. S. Mohan Prabhu	**Dr. S. Mohan Prabhu**	**Dr.S.Shahitha**

MUTHAYAMMAL COLLEGE OF ARTS AND SCIENCE
(Autonomous)
Rasipuram - 637408.

B.Sc., -Statistics Syllabus LOCF - CBCS with effect from 2023-2024 Onwards								
Course Code	**Course Title**	**Course Type**	**Sem.**	**Hours**	**L**	**T**	**P**	**C**
23M6USTOE1	**STATISTICS FOR COMPETITIVE EXAMINATIONS**	**SELF STUDY ONLINE - COMPETITIVE EXAMINATION**	**VI**	**2**	**2**	**-**	**-**	**2**
Objective	Creating the awareness on competitive examination among students. Imparting knowledge about the appearing for Competitive Examination and it impacts and developing an attitude of appearing for such exams for students.							

Unit	Course Content	Knowledge Levels	Sessions
	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. 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, multiple choice questions (MCQ), it is extremely suitable for students pursuing their 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. **Rules for creating MCQ pattern.** 1. Objective type online examination will be conducted at the end of 6^{th} semester. 2. Questions must be taken from all previous question papers of TNPSC, IBPS, UPSC, RRB, SSC, GATE, and TRB. 3. **Test critical thinking**. Multiple choice questions to test the superficial knowledge. Learners to interpret facts, evaluate situations, explain cause and effect, make inferences, and predict results. 4. **Emphasize Higher-Level Thinking** Use memory-plus application oriented questions. These questions	K6	24

require students to recall principles, rules or facts in a real life context.

Eg.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

Eg.2

Ability to Interpret Cause-and-Effect Relationships

Primary data and _____data are same

a. Grouped

b. Secondary data

c. Ungrouped

d. None of these

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

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

	Best format. 7. **Keep Option Lengths Similar** Avoid making your correct answer the long or short answer 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 9. HOD's instruct to the faculty to prepare minimum 500 questions booklet (cumulatively for each programme) with solutions and circulate among the students. 10. Each Department to prepare the Questions (MCQ pattern with four answers) and submit to ICT.		
	…… Self Study.		
Course Outcome	**CO1:** Able to attend competitive Examinations.	K1	
	CO2: Able to attend Computer Based Examinations.	K2	
	CO3: Understand the TNPSC, UPSC, RRB statistics related Exams.	K3	
	CO4: Analyze the all concepts in one examination.	K4	
	CO5: Apply the statistics concepts in Real Life.	K5	

Learning Resources				
Text Books	UG Level Textbooks			
Reference Books	-			
Website Link	https://itfeature.com/statistics/mcqs-basic-statistics-1 https://itfeature.com/statistics/mcqs-basic-statistics-with-answers-2 https://www.javatpoint.com/statistics-mcq			
Self-Study Material	-			
	L-Lecture	T-Tutorial	P-Practical	C-Credit

B.Sc., - Statistics Syllabus LOCF - CBCS with effect from 2023-2024 Onwards										
Course Code	**Course Title**		**Course Type**		**Sem.**	**Hours**	**L**	**T**	**P**	**C**
23M6USTOE1	**STATISTICS FOR COMPETITIVE EXAMINATIONS**		**SELF STUDY ONLINE - COMPETITIVE EXAMINATION**		**VI**	**2**	**2**	**-**	**-**	**2**

CO-PO Mapping

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

Tutorial Schedule	TNPSC, IBPS, UPSC, RRB, SSC, GATE, TRB Old question papers – solutions –online mock test.
Teaching and Learning Methods	Self-study.
Assessment Methods	100 multiple choice questions through computer based online examinations passing minimum is 50%.

Designed By	**Verified By**	**Approved By Member Secretary**
Dr. S. Mohan Prabhu	**Dr. S. Mohan Prabhu**	**Dr.S.Shahitha**