FATIMA COLLEGE (AUTONOMOUS)

Re-Accredited with "A" Grade by NAAC (3rd Cycle)
74th Rank in India Ranking 2020 (NIRF) by MHRD
Maryland, Madurai- 625 018, Tamil Nadu, India

NAME OF THE DEPARTMENT : STATISTICS

NAME OF THE PROGRAMME : B.Sc. STATISTICS

PROGRAMME CODE : USST

ACADEMIC YEAR : 2021 - 2022

VISION OF THE DEPARTMENT

To empower women by developing human capabilities through quality education in the field of Statistics

MISSION OF THE DEPARTMENT

To develop statistical and probabilistic theories and techniques and to propagate statistical knowledge through teaching and outreach programmes, in order to serve the needs of the society.

PROGRAMME EDUCATIONAL OBJECTIVES (PEO)

A graduate of B.Sc. STATISTICS programme after five yearswill be

PEO 1	Our graduates will be academic, digital andinformation literates, creative, inquisitive, innovative and desirous for the "more" in all aspects
PEO 2	They will be efficient individual and team performers, exhibiting progress, flexibility, transparency and accountability in their professional work
PEO 3	The graduates will be effective managers of all sorts of real – life and professional circumstances, makingethical decisions, pursuing excellence within the time framework and demonstrating apt leadership skills
PEO 4	They will engage locally and globally evincing socialand environmental stewardship demonstrating civic responsibilities and employing right skills at the right moment.

GRADUATE ATTRIBUTES (GA)

Fatima College empowers her women graduates holistically. A Fatimite achieves all-round empowerment by acquiring Social, Professional and Ethical competencies. A graduate would sustain and nurture the following attributes:

I. SOCIAL COMPETENCE	
GA 1	Deep disciplinary expertise with a wide range of academic and digital literacy
GA 2	Hone creativity, passion for innovation and aspire excellence
GA 3	Enthusiasm towards emancipation and empowerment of humanity
GA 4	Potentials of being independent
GA 5	Intellectual competence and inquisitiveness with problem solving abilities befitting the field of research
GA 6	Effectiveness in different forms of communications to be employed in personal and professional environments through varied platforms
GA 7	Communicative competence with civic, professional and cyber dignity and decorum
GA 8	Integrity respecting the diversity and pluralism in societies, cultures and religions
GA 9	All – inclusive skill sets to interpret, analyse and solve social and environmental issues in diverse environments
GA 10	Self awareness that would enable them to recognise their uniqueness through continuous self-assessment in order to face and make changes building on their strengths and improving their weaknesses
GA 11	Finesse to co-operate exhibiting team-spirit while

	working in groups to achieve goals
GA 12	Dexterity in self-management to control their selves in attaining the kind of life that they dream for
GA 13	Resilience to rise up instantly from their intimidating setbacks
GA 14	Virtuosity to use their personal and intellectual autonomy in being life-long learners
GA 15	Digital learning and research attributes
GA 16	Cyber security competence reflecting compassion, care and concern towards the marginalised
GA 17	Rectitude to use digital technology reflecting civic and social responsibilities in local, national and global scenario
II. PROFESSIONAL COMPETENCE	
GA 18	Optimism, flexibility and diligence that would make them professionally competent
GA 19	Prowess to be successful entrepreuners and become employees of trans-national societies
GA 20	Excellence in Local and Global Job Markets
GA 21	Effectiveness in Time Management
GA 22	Efficiency in taking up Initiatives
GA 23	Eagerness to deliver excellent service
GA 24	Managerial Skills to Identify, Commend and tap Potentials
III. ETHICAL COMPETENCE	
GA 25	Integrity and be disciplined in bringing stability leading a systematic life promoting good human behaviour to build better society

GA 26	Honesty in words and deeds
GA 27	Transparency revealing one‟s own character as well as self-esteem to lead a genuine and authentic life
GA 28	Social and Environmental Stewardship
GA 29	Readiness to make ethical decisions consistently from the galore of conflicting choices paying heed to their conscience
GA 30	Right life skills at the right moment

PROGRAMME OUTCOMES (PO)

On completion (after three years) of B.Sc. Statistics programme, the graduates would be able to

PO 1	Apply acquired scientific knowledge to solve complex issues
PO 2	Attain Analytical skills to solve complex cultural, societal and environmental issues
PO 3	Employ latest and updated tools and technologies to analyse complex issues
PO 4	Demonstrate Professional Ethics that foster Community, Nation and Environment Building Initiatives

PROGRAMME SPECIFIC OUTCOMES (PSO)

On completion (after three years) of B.Sc. Statistics programme, the graduates would be able to

PSO 1	Apply the knowledge of Statistics, Mathematics and Computer science to become competent professionals at global level
PSO 2	Apply statistical knowledge to analyze and solve complex problems using appropriate statistical methodology and interpret results in a variety of settings
PSO 3	Demonstrate the ability of critical observation, logical, analytical and problem-solving skills
PSO 4	Write code to extract and reformat real data and to utilize statistical programming environments
PSO 5	Effectively present statistical findings to an audience lacking statistical expertise and work collaboratively
PSO 6	Excel as socially committed statistics students having mutual respect, effective communication skills, high ethical values and empathy for the needs of society

FATIMA COLLEGE (AUTONOMOUS), MADURAI-18

DEPARTMENT OF STATISTICS

For those who joined in June 2019 onwards

PROGRAMME CODE: USST

PART – I – TAMIL / FRENCH / HINDI– 12 CREDITS

PART – I – TAMIL

Offered by the Research Centre of Tamil

S. NO	SEM.	COURSE CODE	COURSE TITLE	HRS	CRS	CIA Mks	ESE Mks	TOT. Mks
1.	I	19T1LC1	Language-Modern Literature nghJj;jkpo · ,f;fhy ,yf;fpak	5	3	40	60	100
2.	II	19T2LC2	Language - Bakthi Literature nghJj;jkpo · gf;jp ,yf;fpak	5	3	40	60	100
3.	III	19T3LC3	Language- Epic Literature nghJj;jkpo · fhg;gpa ,yf;fpak	5	3	40	60	100
4.	IV	19T4LC4	Language-Sangam Literature nghJj;jkpo · rq;f ,yf;fpak	5	3	40	60	100
			Total	20	12			

PART – I –FRENCH

Offered by The Department of French

S. NO	SEM.	COURSE CODE	COURSE TITLE	HRS	CRE DITS	CIA Mks	ESE Mks	TOT. MKs
1.	I	19R1LC1	PART 1 LANGUAGE FRENCH - LE NIVEAU INTRODUCTIF	5	3	40	60	100

S. NO	SEM.	COURSE CODE	COURSE TITLE	HRS	CREDITS	CIA Mks	ESE Mks	TOT. MKs
2.	II	19R2LC2	PART 1 LANGUAGE FRENCH - LE NIVEAU DÉCOUVERTE	5	3	40	60	100
3.	III	19R3LC3	PART 1 LANGUAGE FRENCH - LE NIVEAU INTERMEDIAIRE – LA CIVILISATION, LA LITTERATURE ET LA GRAMMAIRE	5	3	40	60	100
4.	IV	19R4LC4	PART 1 LANGUAGE FRENCH - LE NIVEAU DE SUIVRE – LA CIVILISATION, LA LITTERATURE ET LA GRAMMAIRE	5	3	40	60	100
			TOTAL	20	12			

PART – I –HINDI

Offered by The Department of Hindi

S. NO	SEM.	COURSECODE	COURSE TITLE	HRS	CREDITS	CIA Mks	ESE Mks	TOT. MKs
1.	I	19D1LC1	PART 1 LANGUAGE HINDI - बोलचाल की हिंदी	5	3	40	60	100
2.	II	19D2LC2	PART 1 LANGUAGE HINDI - कार्यालयीन हिंदी	5	3	40	60	100

S. NO	SEM.	COURSECODE	COURSE TITLE	HRS	CREDITS	CIA Mks	ESE Mks	TOT. MKs
3.	III	19D3LC3	PART 1 LANGUAGE HINDI - हहिंदी साहहत्य का आहदकाल और भक्तिकाल	5	3	40	60	100
4.	IV	19D4LC4	PART 1 LANGUAGE HINDI - हहिंदी साहहत्य का आधुनिक काल	5	3	40	60	100
			TOTAL	20	12			

PART – II -ENGLISH – 12 CREDITS

Offered by The Research Centre of English

S. NO	SEM.	COURSECODE	COURSE TITLE	HRS	CREDITS	CIA Mks	ESE Mks	TOT. MKs
1.	I	19E1LB1	BASIC COMMUNICATIVE ENGLISH	5	3	40	60	100
2.		19E1LI1	INTERMEDIATE COMMUNICATIVE ENGLISH					
3.		19E1LA1	ADVANCED COMMUNICATIVE ENGLISH					
4.	II	19E2LB2	ENGLISH COMMUNICATION SKILLS	5	3	40	60	100
5.		19E2LI2	ENGLISH FOR EMPOWERMENT					
6.		19E2LA2	ENGLISH FOR					

S. NO	SEM.	COURSECODE	COURSE TITLE	HRS	CREDITS	CIA Mks	ESE Mks	TOT. MKs
			CREATIVE WRITING					
7.	III	19E3LC3	ENGLISH FOR DIGITAL ERA	5	3	40	60	100
8.	IV	19E4LC4	ENGLISH FOR INTEGRATED DEVELOPMENT	5	3	40	60	100
			TOTAL	**20**	**12**			

PART – III -MAJOR, ALLIED & ELECTIVES – 95 CREDITS

CORE COURSES : 60 CREDITS

S. NO	SEM.	COURSE CODE	COURSE TITLE	HRS	CRS	CIA Mks	ESE Mks	TOT. Mks
1.	I	19ST1CC1	BASIC STATISTICS	6	4	40	60	100
2.		19ST1CC2	PROBABILITYTHEORY	6	4	40	60	100
3.	II	19ST2CC3	DESCRIPTIVE STATISTICS	6	4	40	60	100
4.		19ST2CC4	DISCRETE PROBABILITY DISTRIBUTIONS	6	4	40	60	100
5.	III	19ST3CC5	CONTINUOUS PROBABILITY DISTRIBUTIONS	6	4	40	60	100
6.		19ST3CC6	SAMPLING THEORY	6	4	40	60	100
7.	IV	19ST4CC7	ESTIMATION THEORY	6	4	40	60	100
8.		19ST4CC8	APPLIED STATISTICS	6	4	40	60	100
9.	V	19ST5CC9	STATISTICAL INFERENCE - II	5	4	40	60	100
10.		19ST5CC10	DESIGN OF	5	4	40	60	100

S. NO	SEM.	COURSE CODE	COURSE TITLE	HRS	CRS	CIA Mks	ESE Mks	TOT. Mks
			EXPERIMENTS					
11.		19ST5CC11	DEMOGRAPHY	5	4	40	60	100
12.		19ST5CC12	REAL ANALYSIS	5	4	40	60	100
13.	VI	19ST6CC13	STATISTICAL QUALITY CONTROL	5	4	40	60	100
14.		19ST6CC14	STOCHASTIC PROCESSES	5	4	40	60	100
15.		19ST6CC15	ACTUARIAL STATISTICS	5	4	40	60	100

ALLIED-20 CREDITS

S.NO	SEM.	COURSE CODE	COURSE TITLE	HRS	CRS	CIA Mks	ESE Mks	TOT. Mks
1.	I	19G1ACST1	CALCULUS	5	5	40	60	100
2.	II	19G2ACST2	ALGEBRA	5	5	40	60	100
3.	III	19ST3AC3	LINEAR PROGRAMMING	5	5	40	60	100
4.	IV	19ST4AC4	LINEAR ALGEBRA	5	5	40	60	100

ELECTIVES-15 CREDITS

S.No	SEM.	COURSE CODE	COURSE TITLE	HRS	CRS	CIA Mks	ESE Mks	TOT. Mks
1	V	19ST5ME1/ 19ST5MEP1 /19ST5ME2	COMPUTER PROGRAMMING IN C/C Practical MULTIVARIATE ANALYSIS	5	5	40	60	100
2	VI	19ST6ME3/ 19ST6ME4	NUMERICAL METHODS/	5	5	40	60	100

S.No	SEM.	COURSE CODE	COURSE TITLE	HRS	CRS	CIA Mks	ESE Mks	TOT. Mks
			REGRESSION ANALYSIS					
3		19ST6ME5/ 19ST6ME6	OPERATIONS RESEARCH/ INDUSTRIAL STATISTICS	5	5	40	60	100
			TOTAL	**15**	**15**			

PART – IV – 20 CREDITS

- **VALUE EDUCATION**
- **ENVIRONMENTAL AWARENESS**
- **NON MAJOR ELECTIVE**
- **SKILL BASED COURSES**

S.No	SEM.	COURSE CODE	COURSE TITLE	HRS	CRS	CIA Mks	ESE Mks	TOT. Mks
1.	I	21G1VE1	PERSONAL VALUES - VALUE EDUCATION (INCLUDING MEDITATION IN ACTION MOVEMENT)	1	1	40	60	100
2.		21ST1NME	FUNDAMENTALS OF STATISTICS	2	2	40	60	100
3.	II	21G2VE2	VALUES FOR LIFE	1	1	40	60	100
4.		21ST2NME	FUNDAMENTALS OF STATISTICS	2	2	40	60	100
5.	III	21G3EE1	ENVIRONMENTAL EDUCATION	1	1	40	60	100
6.		19ST3SB1	PRACTICAL STATISTICS - I	2	2	40	60	100

7.	IV	19G4EE2	GENDER STUDIES	1	1	40	60	100
8.		19ST4SB2	PRACTICAL STATISTICS – II	2	2	40	60	100
9.	V	19ST5SB3	PRACTICAL STATISTICS – III	2	2	40	60	100
10.		19ST5SB4	STATISTICAL SOFTWARE: SPSS	2	2	40	60	100
11.	VI	19ST6SB5 159ST6SB5	PRACTICAL STATISTICS – IV	2	2	40	60	100
12.		19ST6SB6	STATISTICAL SOFTWARE: R	2	2	40	60	100

PART – V – 1 CREDIT

OFF-CLASS PROGRAMMES

SHIFT - II

S. No	SEM	COURSE CODE	COURSE TITLE	HRS	CREDIT	TOT. Mks
1.	I - IV	21S4PED	Physical Education	30/ SEM	1	100
2.		21S4YRC	Youth Red Cross			
3.		21S4NSS	NSS			
4.		21S4RTC	Rotaract			
5.		21S4WEC	Women Empowerment Cell			
6.		21S4ACUF	AICUF			

OFF-CLASS PROGRAMME

ADD-ON COURSES

COURSE CODE	Courses	HRS	CRS	Semester in which the course is offered	CIA Mks	ESE Mks	TOT. Mks
19UAD2CA	**COMPUTER APPLICATIONS**	40	2	I&II	40	60	100
19UADFCA	**ONLINE SELF LEARNING COURSE-** Foundation Course for Arts	40	3	I	50	-	50
19UADFCS	**ONLINE SELF LEARNING COURSE-** Foundation Course for Science	40	3	II	50	-	50
21UADES3	Professional Ethics	15	1	III	40	60	100
21UADES4	Personality Development	15	1	IV	40	60	100
21UADES5	Family Life Education	15	1	V	40	60	100
21UADES6	Life Skills	15	1	VI	40	60	100
19UAD5HR	Human Rights	15	2	V	40	60	100
	OUTREACH PROGRAMME- Reach Out to Society through Action **ROSA**	100	3	V & VI	-	-	100
	PROJECT	30	4	VI	40	60	100
	READING CULTURE	10/Semester	1	II-VI	-	-	-
	MOOC COURSES(Department Specific Courses/any other courses) *	-	Minimum 2 Credit	-	-	-	

COURSE CODE	Courses	HRS	CRS	Semester in which the course is offered	CIA Mks	ESE Mks	TOT. Mks
	Students can opt other than the listed course from UGC-SWAYAM UGC / CEC		s				
	TOTAL		22 +				

EXTRA CREDIT COURSE

Course Code	Courses	Hrs.	Credits	Semester in which the course is offered	CIA Mks	ESE Mks	Total Marks
21ST2SL1	**SELF LEARNING COURSE for ADVANCED LEARNERS (offered for IUG)** Quantitative Aptitude & Data Interpretation			II	40	60	100
19UGSLST1	**(offered for III UG)** **Official Statistics**	-		V & VI	40	60	100
19UGSLST2	**Biostatistics**						

I B.Sc. STATISTICS

SEMESTER I

For those who joined in 2019 onwards

Skill Development-100%

PROGRAMME CODE	COURSE CODE	COURSE TITLE	CATEGORY	HRS/WEEK	CREDITS
USST	19ST1CC1	Basic Statistics	Lecture	6	4

COURSE DESCRIPTION

This course introduces the historical development of statistics, presentation of data, descriptive measures and fitting mathematical curves to the data.

COURSE OBJECTIVES

To enable the students to analyze the given data and make them solve simple real life problems related to descriptive measures in statistics.

UNIT – I COLLECTION OF DATA (18 HRS.)

Introduction – Primary and Secondary data – Methods of Collecting Primary data – Drafting the Questionnaire – Pretesting the Questionnaire – Specimen Questionnaire – Sources of Secondary data – Editing Primary and Secondary data – Precautions in the use of Secondary data.

UNIT –II CLASSIFICATION AND TABULATION OF DATA (18 HRS.)

Introduction – Meaning and Objectives of Classification – Types of Classification – Formation of a Discrete Frequency Distribution - Formationof a Continuous Frequency Distribution – Tabulation of data – Parts of a Table – General rules of Tabulation – Types of Tables.

UNIT –III DIAGRAMATIC AND GRAPHIC PRESENTATION (18 HRS.)

Introduction – Significance of Diagrams and Graphs – General rules for Constructing Diagrams – Types of Diagrams – Graphs – Graphs of Frequency Distributions.

UNIT –IV MEASURES OF CENTRAL TENDENCY (18 HRS.)

Introduction – Objectives of Averaging – Requisites of a Good Average **– Types of Averages – Arithmetic Mean – Median – Mode – Geometric Mean – Harmonic Mean –** Self Study**.**

UNIT –V MEASURES OF DISPERSION (18 HRS.)

Introduction – Significance of Measuring Variation – Properties of a Good Measure of Variation- Methods of Studying Variation – Which Measureof Dispersion to use.

TEXT:

S.P.Gupta, *Statistical Methods*, Sultan Chand & Sons, Revised edition (2014).

Chapters: 3, 5, 6, 7, 8.

REFERENCES:

1. S.C.Gupta and V.K.Kapoor , *Fundamentals of Mathematical statistics*, Sultan Chand & Sons, Revised edition (2014).
2. Arumugam and Thangapandi Isaac, *Statistics*, New Gamma publishing house, (2012).

COURSE CONTENTS & LECTURE SCHEDULE:

Module No.	Topic	No. of Lectures	Teaching Pedagogy	Teaching Aids
UNIT -1 COLLECTION OF DATA				
1.1	Primary and Secondary data	2	Lecture	PPT & White board
1.2	Methods of Collecting Primary data	2	Lecture	PPT & White board
1.3	Drafting the Questionnaire	4	Lecture	PPT & White board
1.4	Pretesting the Questionnaire	2	Lecture	PPT & White board
1.5	Sources of Secondary data	2	Lecture	PPT & White board
1.6	Specimen Questionnaire	2	Chalk & Talk	Black Board
1.7	Editing Primary and Secondary data	2	Chalk & Talk	Black Board
1.8	Precautions in the use of Secondary data.	2	Chalk & Talk	Black Board
UNIT -2 CLASSIFICATION AND TABULATION OF DATA				
2.1	Meaning and Objectives of Classification	3	Lecture	PPT & White board
2.2	Types of Classification	2	Chalk & Talk	Black Board

Module No.	Topic	No. of Lectures	Teaching Pedagogy	Teaching Aids
2.3	Formation of a Discrete Frequency Distribution	4	Chalk & Talk	Black Board
2.4	Formation of a Continuous Frequency Distribution	3	Chalk & Talk	Black Board
2.5	Tabulation of data	3	Chalk & Talk	Black Board
2.6	General rules of Tabulation – Types of Tables	3	Lecture	PPT & White board
UNIT -3 DIAGRAMATIC AND GRAPHIC PRESENTATION				
3.1	Significance of Diagrams and Graphs	4	Lecture	PPT & White board
3.2	General rules for Constructing Diagrams	4	Lecture	PPT & White board
3.3	Types of Diagrams	4	Chalk & Talk	Black Board
3.4	Graphs – Graphs of Frequency Distributions	6	Chalk & Talk	Black Board
UNIT -4 MEASURES OF CENTRAL VALUE				
4.1	Objectives of Averaging	1	Lecture	PPT & White board
4.2	Requisites of a Good Average	1	Lecture	PPT & White board
4.3	Types of Averages	1	Chalk & Talk	Black Board
4.4	Arithmetic Mean	3	Discussion	Black Board

Module No.	Topic	No. of Lectures	Teaching Pedagogy	Teaching Aids
4.5	Median	3	Discussion	Black Board
4.6	Mode	3	Discussion	Black Board
4.7	Geometric Mean	3	Chalk & Talk	Black Board
4.8	Harmonic Mean	3	Chalk & Talk	Black Board
UNIT -5 MEASURES OF DISPERSION				
5.1	Significance of Measuring Variation	3	Lecture	PPT & White board
5.2	Properties of a Good Measure of Variation	2	Lecture	PPT & White board
5.3	Methods of Studying Variation	6	Chalk & Talk	Black Board
5.4	Which Measure of Dispersion to use.	7	Chalk & Talk	Black Board

Levels	C1	C2	C3	C4	C5	Total Scholastic Marks	Non Scholastic Marks C6	CIA Total	% of Assessment
	T1 10 Mks.	T2 10 Mks.	Quiz 5 Mks.	Assignment 5 Mks	OBT/PPT 5 Mks	35 Mks.	5 Mks.	40Mks.	
K1	2	2	-	-	-	4	-	4	10 %
K2	2	2	5	-	-	9	-	9	22.5 %
K3	3	3	-	-	5	11	-	11	27.5 %
K4	3	3	-	5	-	11	-	11	27.5 %
Non Scholastic	-	-	-	-	-		5	5	12.5 %
Total	10	10	5	5	5	35	5	40	100 %

CIA	
Scholastic	35
Non Scholastic	5
	40

- ✓ **The levels of CIA Assessment based on Revised Bloom's Taxonomy are :**

  K1- Remember, **K2-**Understand, **K3-**Apply, **K4-**Analyse

EVALUATION PATTERN

	SCHOLASTIC				NON - SCHOLASTIC	MARKS		
C1	C2	C3	C4	C5	C6	CIA	ESE	Total
10	10	5	5	5	5	40	60	100

COURSE OUTCOMES

On the successful completion of the course, students will be able to:

NO.	COURSE OUTCOMES	KNOWLEDGE LEVEL (ACCORDING TO REVISED BLOOM'S TAXONOMY)	PSOs ADDRESSED
CO 1	Recognizes investigation, investigator, enumerator and enumeration and explain different methods of data collection.	K1	PSO1
CO 2	Identifies the need of Classification and Tabulation	K1 &K2	PSO2
CO 3	Construct and analyze graphical display to summarize data.	K3 & K4	PSO3
CO 4	Explain and evaluates various measure of central tendency	K2 & K3	PSO5 & PSO6
CO 5	Compute and interpret measure of centre and spread of data.	K2 & K4	PSO5

Mapping of C0s with PSOs

CO/ PSO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	2	2	3	1	3	2
CO2	2	2	3	1	3	1
CO3	3	3	3	2	2	2
CO4	3	3	3	1	2	2
CO5	3	3	3	2	2	2

Mapping of C0s with POs

CO/ PSO	PO1	PO2	PO3	PO4
CO1	2	3	1	1
CO2	2	2	1	2
CO3	2	2	3	2
CO4	3	3	2	2
CO5	3	3	3	2

Note: ♦ Strongly Correlated – **3** ♦ Moderately Correlated – **2**

♦ Weakly Correlated -**1**

COURSE DESIGNER:

1. **Mrs. K. Bhuvaneswari**
2. **Ms. K. Saranya**

Forwarded By

Dr. E. Helena

I B.Sc.. STATISTICS

SEMESTER I

For those who joined in 2019 onwards

Skill Development-100%

PROGRAMME CODE	COURSE CODE	COURSE TITLE	CATEGORY	HRS/WEEK	CREDITS
USST	19ST1CC2	Probability Theory	Lecture	6	4

COURSE DESCRIPTION

This course introduces the concepts of functions and its properties, theorems related to random variables.

COURSE OBJECTIVES

To enable the students understand the concepts of random variable and distribution functions, expectation, conditional expectation and variance, generating functions, law of large numbers.

UNIT –I THEORY OF PROBABILITY I (18 HRS.)

Introduction – Basic Terminology – **Mathematical Probability – Statistical Probability – Subjective Probability – (**Self Study) – Mathematical Tools – Axiomatic Approach to Probability.

UNIT –II THEORY OF PROBABILITY II (18 HRS.)

Extended Axiom of Addition– (Self Study) and Axiom of Continuity – Bayes Theorem – Geometric Probability.

UNIT –III RANDOM VARIABLES AND DISTRIBUTION FUNCTIONS (18 HRS.)

Introduction – Distribution Function – Discrete Random Variable – Continuous Random Variable – Two Dimensional Random Variables.

UNIT –IV MATHEMATICAL EXPECTATION (18 HRS.)

Introduction – Mathematical Expectation – Expected Value of Function of a Random Variable – Properties of Expectation – Properties of

Variance – Covariance – Some Inequalities Involving Expectation – Moments of Bivariate Probability Distributions – Conditional Expectation and Conditional Variance.

UNIT –V GENERATING FUNCTIONS AND LAW OF LARGE NUMBERS

(18 HRS.)

Moment Generating Function – Cumulants – Characteristics Function – Inversion Theorem – Uniqueness Theorem of Characteristics Function – Necessary and Sufficient Condition for Independence of Random Variables in Terms of Characteristics Functions – Hally Bray Theorem – Continuity Theorem for Characteristics Functions – Chebychve‟s Inequality – Convergence in Probability.

TEXT:

S.C.Gupta and V.K.Kapoor, *Fundamentals of Mathematical Statistics*, Sultan Chand & Sons, Revised edition (2014).

REFERENCES:

1. Arumugam and Thangapandi Isaac, *Statistics*, New Gamma publishing house (2012).

COURSE CONTENTS & LECTURE SCHEDULE:

Module No.	Topic	No. of Lectures	Teaching Pedagogy	Teaching Aids
UNIT -1 THEORY OF PROBABILITY I				
1.1	Basic Terminology	4	Lecture	PPT & White board
1.2	Mathematical Probability	4	Chalk & Talk	Black Board
1.3	Statistical Probability	4	Discussion	Black Board
1.4	Subjective Probability	3	Discussion	Black Board
1.5	Axiomatic Approach to Probability.	3	Chalk & Talk	Black Board
UNIT -2 THEORY OF PROBABILITY II				
2.1	Extended Axiom of Addition and	6	Discussion	Black Board
2.2	Axiom of Continuity	6	Chalk & Talk	Black Board
2.3	Bayes Theorem	3	Chalk & Talk	Black Board
2.4	Geometric Probability.	3	Chalk & Talk	Black Board
UNIT -3 RANDOM VARIABLES AND DISTRIBUTION FUNCTIONS				
3.1	Distribution Function	4	Chalk & Talk	Black Board
3.2	Discrete Random Variable	5	Chalk & Talk	Black Board
3.3	Continuous Random Variable	5	Chalk &	Black

Module No.	Topic	No. of Lectures	Teaching Pedagogy	Teaching Aids
			Talk	Board
3.4	Two Dimensional Random Variables	4	Chalk & Talk	Black Board
UNIT -4 MATHEMATICAL EXPECTATION				
4.1	Expected Value of Function of a Random Variable	3	Chalk & Talk	Black Board
4.2	Properties of Expectation	3	Chalk & Talk	Black Board
4.3	Properties of Variance	3	Chalk & Talk	Black Board
4.4	Covariance	3	Chalk & Talk	Black Board
4.5	Moments of Bivariate Probability Distributions	2	Chalk & Talk	Black Board
4.6	Conditional Expectation	2	Chalk & Talk	Black Board
4.7	Conditional Variance	2	Chalk & Talk	Black Board
UNIT -5 GENERATING FUNCTIONS AND LAW OF LARGE NUMBERS				
5.1	Moment Generating Function	3	Chalk & Talk	Black Board
5.2	Characteristics Function	3	Chalk & Talk	Black Board
5.3	Inversion Theorem	1	Chalk & Talk	Black Board
5.4	Necessary and Sufficient Condition for Independence of Random Variables in Terms of Characteristics Functions	3	Chalk & Talk	Black Board
5.5	Continuity Theorem for	3	Chalk &	Black

Module No.	Topic	No. of Lectures	Teaching Pedagogy	Teaching Aids
	Characteristics Functions		Talk	Board
5.6	Chebychve‟s Inequality	2	Chalk & Talk	Black Board
5.7	Hally Bray Theorem	1	Chalk & Talk	Black Board
5.8	Convergence in Probability	2	Chalk & Talk	Black Board

Levels	C1	C2	C3	C4	C5	Total Scholastic Marks	Non Scholastic Marks C6	CIA Total	% of Assessment
	T1 10 Mks.	T2 10 Mks.	Quiz 5 Mks.	Assignment 5 Mks	OBT/PPT 5 Mks	35 Mks.	5 Mks.	40Mks.	
K1	2	2	-	-	-	4	-	4	10 %
K2	2	2	5	-	-	9	-	9	22.5 %
K3	3	3	-	-	5	11	-	11	27.5 %
K4	3	3	-	5	-	11	-	11	27.5 %
Non Scholastic	-	-	-	-	-		5	5	12.5 %
Total	10	10	5	5	5	35	5	40	100 %

CIA	
Scholastic	35
Non Scholastic	5
	40

- ✓ **The levels of CIA Assessment based on Revised Bloom's Taxonomy are :**

  K1- Remember, **K2-**Understand, **K3-**Apply, **K4-**Analyse

EVALUATION PATTERN

	SCHOLASTIC				NON - SCHOLASTIC	MARKS		
C1	C2	C3	C4	C5	C6	CIA	ESE	Total
10	10	5	5	5	5	40	60	100

COURSE OUTCOMES

On the successful completion of the course, students will be able to:

NO.	COURSE OUTCOMES	KNOWLEDGE LEVEL (ACCORDING TO REVISED BLOOM'S TAXONOMY)	PSOs ADDRESSED
CO 1	Identify from a probability scenario events that are simple, complementary, mutually exclusive, and independent.	K3	PSO4
CO 2	Recognize multiplication rule for two independent events, the addition rule for union of two events, and the complement rule.	K1 & K2	PSO1
CO 3	Describe the main properties of probability distribution and random variables.	K1 & K3	PSO5
CO 4	Apply general properties of the expectation and variance operators	K3	PSO4
CO 5	Identify and examine generating functions and law of large numbers	K3 & K4	PSO3

Mapping of C0s with PSOs

CO/ PSO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	2	2	2	3	2	1
CO2	3	2	2	2	1	1
CO3	2	2	2	2	3	2
CO4	2	2	2	3	2	2
CO5	2	2	3	2	2	2

Mapping of C0s with POs

CO/ PSO	PO1	PO2	PO3	PO4
CO1				
CO2				
CO3				
CO4				
CO5				

Note: ♦ Strongly Correlated – **3** ♦ Moderately Correlated – **2**

♦ Weakly Correlated -**1**

COURSE DESIGNER:

1. **Mrs. K. Bhuvaneswari**
2. **Ms. K. Saranya**

Forwarded By

Dr. E. Helena

I B.Sc. STATISTICS

SEMESTER I

For those who joined in 2019 onwards

Skill Development-100%

PROGRAMME CODE	COURSE CODE	COURSE TITLE	CATEGORY	HRS/WEEK	CREDITS
USST	19G1ACST1	Calculus	Lecture	5	5

COURSE DESCRIPTION

This course covers differentiation and integration of functions of one variable.

COURSE OBJECTIVES

To enable the students to understand higher derivatives, curvature, singular points, envelopes, asymptotes, reduction formula, multipleintegrals and Fourier series in calculus.

UNIT –I HIGHER DERIVATIVES AND CURVATURE (15 HRS.)

n^{th} Derivative of some standard functions- Leibnitz theorem- p-r equations – Curvature , centre and radius of curvature

UNIT –II EVOLUTE, ENVELOPES AND MULTIPLE POINTS (15 HRS.)

Evolutes - Envelopes - Multiple points – classification of double points – cusps – nodes –conjugate points.

UNIT –III REDUCTION FORMULA (15 HRS.)

Reduction formula for $\sin^n x$, $\cos^n x$,$\tan^n x$, $\cot^n x$, $\operatorname{cosec}^n x$, $\sec^n x$, and $\sin^m x \cos^n x$.

UNIT –IV MULTIPLE INTEGRALS (15 HRS.)

Jacobian - (Self Study) – Double and Triple integrals

UNIT –V FOURIER SERIES (15 HRS.)

Definition – Sine Series & Cosine Series.

TEXT:

S. Arumugam and A. ThangapandiIssac - *Calculus* (Differential and Integral Calculus) **-** New Gamma Publishing House (2012).

UNIT I: (PART I Sections – 2.12, 2.13, 3.3 and 3.4)

UNIT II: (PART I Sections – 3.5, 3.6 and 3.10)

UNIT III: (PART II Section 2.8)

UNIT IV: (PART I Section 3.9, PART II Sections 3.1, 3.2 and 3.3)

UNIT V: (PART II Chapter 5)

REFERENCES:

1. Narayanan and Manickavasagam Pillai, *Calculus*, S.Viswanathan (Printers & Publishers) Pvt Ltd (2008).
2. Anit. M.Agarwal, *Differential Calculus*, MeerutArihantPrakashan (2008).
3. Shanthi Narayanan- *Differential Calculus*, Shyam Lal Chairtable Trust (1994).
4. Shanthi Narayanan, *Integral Calculus*, S.Chand and Company Ltd (1994).

COURSE CONTENTS & LECTURE SCHEDULE:

Module No.	Topic	No. of Lectures	Teaching Pedagogy	Teaching Aids
UNIT -1 HIGHER DERIVATIVES AND CURVATURE				
1.1	n^{th} Derivative of some standard functions	4	Chalk & Talk	Black Board
1.2	Leibnitz theorem	1	Chalk & Talk	Black Board
1.3	p-r equations	1	Chalk & Talk	Black Board
1.4	Curvature	2	Chalk & Talk	Black Board
1.5	Centre of curvature	4	Chalk & Talk	Black Board
1.6	Radius of curvature	3	Chalk & Talk	Black Board
UNIT -2 EVOLUTE, ENVELOPES AND MULTIPLE POINTS				
2.1	Evolutes	2	Chalk & Talk	Black Board
2.2	Envelopes	3	Chalk & Talk	Black Board
2.3	Multiple points	3	Chalk & Talk	Black Board
2.4	Classification of double points	3	Chalk & Talk	Black Board
2.5	Cusps	2	Chalk & Talk	Black Board
2.6	Nodes–conjugate points	2	Chalk & Talk	Black Board
UNIT -3 REDUCTION FORMULA				

Module No.	Topic	No. of Lectures	Teaching Pedagogy	Teaching Aids
3.1	Reduction formula for $\sin^n x$, $\cos^n x$,$\tan^n x$	5	Chalk & Talk	Black Board
3.2	Reduction formula for $\cot^n x$, $\mathrm{cosec}^n x$, $\sec^n x$,	5	Chalk & Talk	Black Board
3.3	Reduction formula for $\sin^m x \cos^n x$.	5	Chalk & Talk	Black Board
UNIT -4 MULTIPLE INTEGRALS				
4.1	Jacobian	5	Discussion	Black Board
4.2	Double integrals	5	Chalk & Talk	Black Board
4.3	Triple integrals	5	Chalk & Talk	Black Board
UNIT -5 FOURIER SERIES				
5.1	Sine Series	8	Chalk & Talk	Black Board
5.2	Cosine Series	7	Chalk & Talk	Black Board

Levels	C1	C2	C3	C4	C5	Total Scholastic Marks	Non Scholastic Marks C6	CIA Total	% of Assessment
	T1 10 Mks.	T2 10 Mks.	Quiz 5 Mks.	Assignment 5 Mks	OBT/PPT 5 Mks	35 Mks.	5 Mks.	40Mks.	
K1	2	2	-	-	-	4	-	4	10 %
K2	2	2	5	-	-	9	-	9	22.5 %
K3	3	3	-	-	5	11	-	11	27.5 %
K4	3	3	-	5	-	11	-	11	27.5 %
Non Scholastic	-	-	-	-	-		5	5	12.5 %
Total	10	10	5	5	5	35	5	40	100 %

CIA	
Scholastic	35
Non Scholastic	5
	40

- ✓ **The levels of CIA Assessment based on Revised Bloom's Taxonomy are :**

  K1- Remember, **K2-**Understand, **K3-**Apply, **K4-**Analyse

EVALUATION PATTERN

	SCHOLASTIC				NON - SCHOLASTIC	MARKS		
C1	C2	C3	C4	C5	C6	CIA	ESE	Total
10	10	5	5	5	5	40	60	100

COURSE OUTCOMES

On the successful completion of the course, students will be able to:

NO.	COURSE OUTCOMES	KNOWLEDGE LEVEL (ACCORDING TO REVISED BLOOM'S TAXONOMY)	PSOs ADDRESSED
CO 1	Explain higher derivatives and apply Leibnitz theorem to find the n^{th} derivative of functions.	K1, K2 & K3	PSO1
CO 2	Explain multiple points, Envelopes, nodes and conjugate points	K2	PSO3
CO 3	Construct reduction formula for trigonometric functions.	K1 & K3	PSO5
CO 4	Define Jacobian, double & triple integrals and apply the knowledge of change of variables to solve the problems in double and triple integrals.	K1, K2 & K3	PSO4
CO 5	Construct Fourier series by recalling integration.	K3 & K4	PSO3

Mapping of C0s with PSOs

CO/ PSO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	3	2	2	2	2	2
CO2	2	2	3	2	2	2
CO3	2	2	2	2	3	2
CO4	2	2	2	3	2	2
CO5	2	2	3	2	2	2

Mapping of C0s with POs

CO/ PSO	PO1	PO2	PO3	PO4
CO1				
CO2				
CO3				
CO4				
CO5				

Note: ♦ Strongly Correlated – **3** ♦ Moderately Correlated – **2**

♦ Weakly Correlated -**1**

COURSE DESIGNER:

1. **Mrs. R. Rajeswari**
2. **Mrs. R. Jenovi Rosary Deepa**

Forwarded By

Dr. E. Helena

I B.Sc. STATISTICS

SEMESTER II

For those who joined in 2019 onwards

Skill Development-100%

PROGRAMME CODE	COURSE CODE	COURSE TITLE	CATEGORY	HRS/WEEK	CREDITS
USST	19ST2CC3	Descriptive Statistics	Lecture	6	4

COURSE DESCRIPTION

This course introduces measurement of relationship in terms of quantitative and qualitative data.

COURSE OBJECTIVES

This course imparts the knowledge of correlation, regression and association of attributes to students.

UNIT –I SKEWNESS, MOMENTS AND KURTOSIS (18 HRS.)

Introduction – Tests of Skewness – Measures of Skewness – Moments – Kurtosis.

UNIT –II CORRELATION ANALYSIS I (18 HRS.)

Introduction – Significance of the Study of Correlation – Correlation and Causation – Types of Correlation – Methods of studying Correlation – Graphic Method – **Karl Pearson's Coefficient of Correlation – Coefficient of Correlation – (**Self Study) and Probable Error**.**

UNIT –III CORRELATION ANALYSIS II (18 HRS.)

Coefficient of Determination – Properties of the Coefficient of Correlation – Rank Correlation Coefficient.

UNIT –IV REGRESSION ANALYSIS (18 HRS.)

Introduction – Uses of Regression Analysis – Correlation and Regression Analysis: A Comparison – Regression Lines – Regression Lines –

Regression Equations – Regression Equations in case of Correlation Table – Standard Error of Estimate.

UNIT –V ASSOCIATION OF ATTRIBUTES (18 HRS.)

Introduction –Difference between Correlation and Association – Notation and Terminology – Consistency of Data – Association and Disassociation – Methods of Studying Association – Association of Three Attributes.

TEXT:

S.P.Gupta, *Statistical Methods*, Sultan Chand & Sons, Revised edition (2014).

Chapters: 9, 10, 11, 12.

REFERENCES:

1. S.C.Gupta and V.K.Kapoor, *Fundamentals of Mathematical statistics,* Sultan Chand & Sons, Revised edition (2014).

2. Arumugam and Thangapandi Isaac, *Statistics*, New Gamma publishing house, (2012).

COURSE CONTENTS & LECTURE SCHEDULE:

Module No.	Topic	No. of Lectures	Teaching Pedagogy	Teaching Aids
UNIT -1 SKEWNESS, MOMENTS AND KURTOSIS				
1.1	Tests of Skewness	3	Chalk & Talk	Black Board
1.2	Measures of Skewness	3	Chalk & Talk	Black Board
1.3	Moments	6	Chalk & Talk	Black Board
1.4	Kurtosis.	6	Chalk & Talk	Black Board
UNIT -2 CORRELATION ANALYSIS I				
2.1	Significance of the Study of Correlation	3	Chalk & Talk	Black Board
2.2	Correlation and Causation, Types of Correlation	4	Chalk & Talk	Black Board
2.3	Methods of studying Correlation	3	Chalk & Talk	Black Board
2.4	Karl Pearson‟s Coefficient of Correlation	4	Discussion	Black Board
2.5	Coefficient of Correlation and Probable Error.	4	Discussion	Black Board
UNIT -3 CORRELATIONANALYSIS II				
3.1	Coefficient of Determination	5	Chalk & Talk	Black Board
3.2	Properties of the Coefficient of Correlation	5	Chalk & Talk	Black Board
3.3	Rank Correlation Coefficient	8	Chalk & Talk	Black Board

Module No.	Topic	No. of Lectures	Teaching Pedagogy	Teaching Aids
UNIT -4 REGRESSION ANALYSIS				
4.1	Uses of Regression Analysis	5	Chalk & Talk	Black Board
4.2	Correlation and Regression Analysis: A Comparison – Regression Lines	5	Chalk & Talk	Black Board
4.3	Equations in case of Correlation Table	4	Chalk & Talk	Black Board
4.4	Standard Error of Estimate	4	Chalk & Talk	Black Board
UNIT -5 ASSOCIATION OF ATTRIBUTES				
5.1	Difference between Correlation and Association	5	Chalk & Talk	Black Board
5.2	Consistency of Data – Association and Disassociation	5	Chalk & Talk	Black Board
5.3	Methods of Studying Association	4	Chalk & Talk	Black Board
5.4	Association of Three Attributes.	4	Chalk & Talk	Black Board

Levels	C1	C2	C3	C4	C5	Total Scholastic Marks	Non Scholastic Marks C6	CIA Total	% of Assessment
	T1 10 Mks.	T2 10 Mks.	Quiz 5 Mks.	Assignment 5 Mks	OBT/PPT 5 Mks	35 Mks.	5 Mks.	40Mks.	
K1	2	2	-	-	-	4	-	4	10 %
K2	2	2	5	-	-	9	-	9	22.5 %
K3	3	3	-	-	5	11	-	11	27.5 %
K4	3	3	-	5	-	11	-	11	27.5 %
Non Scholastic	-	-	-	-	-		5	5	12.5 %
Total	10	10	5	5	5	35	5	40	100 %

CIA	
Scholastic	35
Non Scholastic	5
	40

- ✓ **The levels of CIA Assessment based on Revised Bloom's Taxonomy are :**

  K1- Remember, **K2-**Understand, **K3-**Apply, **K4-**Analyse

EVALUATION PATTERN

	SCHOLASTIC				NON - SCHOLASTIC	MARKS		
C1	C2	C3	C4	C5	C6	CIA	ESE	Total
10	10	5	5	5	5	40	60	100

COURSE OUTCOMES

On the successful completion of the course, students will be able to:

NO.	COURSE OUTCOMES	KNOWLEDGE LEVEL (ACCORDING TO REVISED BLOOM'S TAXONOMY)	PSOs ADDRESSED
CO 1	Evaluates and interprets the nature of skewness and kurtosis	K2 & K4	PSO2
CO 2	Identify the direction and strength of a correlation between two factors.	K3	PSO1
CO 3	Compute and interpret the spearman correlation coefficient.	K2 & K4	PSO3
CO 4	Recognize regression analysis applications for purpose of description and prediction	K1, K2 & K3	PSO4
CO 5	Explain the methods of association of attributes	K2 & K4	PSO6

Mapping of C0s with PSOs

CO/ PSO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	2	3	2	2	2	2
CO2	3	2	2	2	2	2
CO3	2	2	3	2	2	2
CO4	2	2	2	3	2	2
CO5	2	2	2	2	2	3

Mapping of C0s with POs

CO/ PSO	PO1	PO2	PO3	PO4
CO1				
CO2				
CO3				
CO4				
CO5				

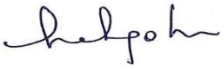
Note: ♦ Strongly Correlated – **3** ♦ Moderately Correlated – **2**

♦ Weakly Correlated -**1**

COURSE DESIGNER:

1. **Dr. P. Vetriselvi**
2. **Mrs. K. Bhuvaneswari**

Forwarded By



Dr. E. Helena

I B.Sc. STATISTICS

SEMESTER II

For those who joined in 2019 onwards

Skill Development-100%

PROGRAMME CODE	COURSE CODE	COURSE TITLE	CATEGORY	HRS/WEEK	CREDITS
USST	19ST2CC4	Discrete Probability Distribution	Lecture	6	4

COURSE DESCRIPTION

This course introduces probability functions for random variables that are defined for different probabilistic situations.

COURSE OBJECTIVES

This course exposes students the various important discrete probability models and real life situations where these distributions provide appropriate models.

UNIT –I BERNOULLI AND BINOMIAL DISTRIBUTIONS (18 HRS.)

Moments of Bernoulli Distribution – Moments of Binomial Distribution –Recurrence Relation for the Moments of Binomial Distribution – Factorial Moments of Binomial Distribution - Mean Deviation about Mean of Binomial Distribution – Mode of Binomial Distribution – Moment Generating Function of Binomial Distribution - Additive Property of Binomial Distribution – Characteristic Function of Binomial Distribution Cumulants of the Binomial Distribution - **Recurrence Relation for Cumulants of Binomial Distribution– (**Self Study) - Probability Generating Function of Binomial Distribution - Recurrence Relation for the Probabilities of Binomial Distribution.

UNIT –II POISSON DISTRIBUTION (18 HRS.)

Moments of Poisson Distribution–Mode of Poisson Distribution - RecurrenceRelation for the Moments of Poisson Distribution – Moment Generating Function of Poisson Distribution - Characteristic Function of

Poisson Distribution - **Cumulants of Poisson Distribution – (**Self Study) - Additive Property of Independent Poisson Variates - Probability Generating Function of Poisson Distribution - Recurrence Relation for the Probabilitiesof Poisson Distribution.

UNIT –III NEGATIVE BINOMIAL DISTRIBUTION (18 HRS.)

Moment Generating Function of Negative Binomial Distribution - Cumulants of Negative Binomial Distribution – Poisson distribution as a Limiting case of Negative Binomial Distribution - Probability Generating Function of Negative Binomial Distribution – Deduction of Moments of Negative Binomial Distribution from those of Binomial Distribution.

UNIT –IV GEOMETRIC AND HYPERGEOMETRIC DISTRIBUTIONS (18 HRS.)

Moments of Geometric Distribution – Moment Generating Function of Geometric Distribution – Mean and Variance of the Hyper geometric Distribution – Factorial Moments of the Hyper geometric Distribution – Approximation to Binomial Distribution – Recurrence Relation for the Hyper geometric Distribution.

UNIT –V MULTINOMIAL AND POWER SERIES DISTRIBUTIONS (18 HRS.)

Moments of Multinomial Distribution – (Self Study) – Moment Generating Function of Power Series Distribution – Recurrence Relation for Cumulants of Power Series Distribution.

TEXT:

S.C.Gupta and V.K.Kapoor, *Fundamentals of Mathematical statistics*, Sultan Chand & Sons, Revised edition (2014).

REFERENCES:

1. Arumugam and Thangapandi Isaac, *Statistics*, New Gamma publishing house, (2012).
2. S.P.Gupta, *Statistical Methods,* Sultan Chand & Sons, Revised edition (2014).

COURSE CONTENTS & LECTURE SCHEDULE:

Module No.	Topic	No. of Lectures	Teaching Pedagogy	Teaching Aids
UNIT -1 BERNOULLI AND BINOMIAL DISTRIBUTIONS				
1.1	Moments of Bernoulli Distribution	2	Chalk & Talk	Black Board
1.2	Moments of Binomial Distribution	2	Chalk & Talk	Black Board
1.3	Relation for the Moments of Binomial Distribution – Factorial Moments of Binomial Distribution	5	Chalk & Talk	Black Board
1.4	Moment Generating Function of Binomial Distribution - Additive Property of Binomial Distribution	5	Chalk & Talk	Black Board
1.5	Recurrence Relation for Cumulants of Binomial Distribution	2	Discussion	Black Board
1.6	Probability Generating Function of Binomial Distribution	2	Chalk & Talk	Black Board
UNIT -2 POISSON DISTRIBUTION				
2.1	Moments of Poisson Distribution	3	Chalk & Talk	Black Board
2.2	Mode of Poisson Distribution	3	Chalk & Talk	Black Board
2.3	Characteristic Function of Poisson Distribution	2	Chalk & Talk	Black Board
2.4	Cumulants of Poisson Distribution	2	Discussion	Black Board
2.5	Additive Property of Independent Poisson Variates	2	Chalk & Talk	Black Board

Module No.	Topic	No. of Lectures	Teaching Pedagogy	Teaching Aids
2.6	Moment Generating Function of Poisson Distribution	2	Chalk & Talk	Black Board
2.7	Probability Generating Function of Poisson Distribution	2	Chalk & Talk	Black Board
2.8	Recurrence Relation for the Probabilities of Poisson Distribution.	2	Chalk & Talk	Black Board
UNIT -3 NEGATIVE BINOMIAL DISTRIBUTION				
3.1	Moment Generating Function of Negative Binomial Distribution	3	Chalk & Talk	Black Board
3.2	Cumulants of Negative Binomial Distribution	3	Chalk & Talk	Black Board
3.3	Poisson distribution as a Limiting case of Negative Binomial Distribution	3	Chalk & Talk	Black Board
3.4	Probability Generating Function of Negative Binomial Distribution	4	Chalk & Talk	Black Board
3.5	Deduction of Moments of Negative Binomial Distribution from those of Binomial Distribution	5	Chalk & Talk	Black Board
UNIT -4 GEOMETRIC AND HYPERGEOMETRIC DISTRIBUTIONS				
4.1	Moments of Geometric Distribution	5	Chalk & Talk	Black Board
4.2	Moment Generating Function of Geometric Distribution	5	Chalk & Talk	Black Board
4.3	Factorial Moments of the Hyper geometric Distribution	4	Chalk & Talk	Black Board
4.4	Recurrence Relation for the Hyper geometric Distribution.	4	Chalk & Talk	Black Board

Module No.	Topic	No. of Lectures	Teaching Pedagogy	Teaching Aids
UNIT -5 MULTINOMIAL AND POWER SERIES DISTRIBUTIONS				
5.1	Moments of Multinomial Distribution	6	Chalk & Talk	Black Board
5.2	Moment Generating Function of Power Series Distribution	6	Chalk & Talk	Black Board
5.3	Recurrence Relation for Cumulants of Power Series Distribution.	6	Chalk & Talk	Black Board

Levels	C1	C2	C3	C4	C5	Total Scholastic Marks	Non Scholastic Marks C6	CIA Total	% of Assessment
	T1 10 Mks.	T2 10 Mks.	Quiz 5 Mks.	Assignment 5 Mks	OBT/PPT 5 Mks	35 Mks.	5 Mks.	40Mks.	
K1	2	2	-	-	-	4	-	4	10 %
K2	2	2	5	-	-	9	-	9	22.5 %
K3	3	3	-	-	5	11	-	11	27.5 %
K4	3	3	-	5	-	11	-	11	27.5 %
Non Scholastic	-	-	-	-	-		5	5	12.5 %
Total	10	10	5	5	5	35	5	40	100 %

CIA	
Scholastic	35
Non Scholastic	5
	40

- ✓ **The levels of CIA Assessment based on Revised Bloom's Taxonomy are :**

  K1- Remember, **K2-**Understand, **K3-**Apply, **K4-**Analyse

EVALUATION PATTERN

	SCHOLASTIC				NON - SCHOLASTIC	MARKS		
C1	C2	C3	C4	C5	C6	CIA	ESE	Total
10	10	5	5	5	5	40	60	100

COURSE OUTCOMES

On the successful completion of the course, students will be able to:

NO.	COURSE OUTCOMES	KNOWLEDGE LEVEL (ACCORDING TO REVISED BLOOM'S TAXONOMY)	PSOs ADDRESSED
CO 1	Recognize cases where the Binomial distribution could be an appropriate model.	K1	PSO2
CO 2	Able to apply the Poisson distribution to a variety of problems.	K3	PSO5
CO 3	Explore the key properties such asthe moment generating function, cumulant of a negative binomial distribution.	K1 & K3	PSO3
CO 4	Understand and derive the formulafor the geometric and hyper geometric probability mass function.	K1, K2 & K3	PSO4
CO5	Explain and evaluate multinomial and power series distribution	K2 & K4	PSO6

Mapping of C0s with PSOs

CO/ PSO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	2	3	2	2	2	2
CO2	2	2	2	2	3	2
CO3	2	2	3	2	2	2
CO4	2	2	2	3	2	2
CO5	2	2	2	2	2	3

Mapping of C0s with POs

CO/ PSO	PO1	PO2	PO3	PO4
CO1				
CO2				
CO3				
CO4				
CO5				

Note: ♦ Strongly Correlated – **3** ♦ Moderately Correlated – **2**

♦ Weakly Correlated -**1**

COURSE DESIGNER:

1. **Mrs. K. Bhuvaneswari**
2. **Ms. K. Mano**

Forwarded By

Dr. E. Helena

I B.Sc. STATISTICS

SEMESTER II

For those who joined in 2019 onwards

Skill Development-100%

PROGRAMME CODE	COURSE CODE	COURSE TITLE	CATEGORY	HRS/WEEK	CREDITS
USST	19G2ACST2	Algebra	Lecture	5	5

COURSE DESCRIPTION

This course introduces the concept of classical algebra to the students of Statistics

COURSE OBJECTIVES

To enable the students to learn the fundamentals of Algebra and this includes topics like binomial, exponential and logarithmic series and theory of equations.

UNIT –I BINOMIAL SERIES (15 HRS.)

Summation and approximation using binomial Series.

UNIT –II EXPONENTIAL AND LOGARITHMIC SERIES (15 HRS.)

Exponential and logarithmic series (Proof not expected). **Summation and approximation using exponential and logarithmic series– (**Self Study**).**

UNIT –III THEORY OF EQUATIONS (15 HRS.)

Introduction – remainder theorem **-** an equation of n^{th} degree has exactly n roots - relation between the roots and coefficients-irrational roots – imaginary roots – Symmetric functions of the roots in terms of the coefficients. Sum of the powers of the roots (Newton‟s theorem)

UNIT –IV TRANSFORMATION OF EQUATIONS (15 HRS.)

Transformation of equations –reciprocal roots - reciprocal equations – properties of equations – removal of terms – transformation in general

UNIT –V THE NATURE OF THE ROOTS OF THE EQUATION (15 HRS.)

Descartes rule of signs – Rolles‟ theorem – multiple roots – solutions of numerical equations - Newtons method and Honers method to solve algebraic equations.

TEXT:

T. K. Manicavachagom Pillay, T Natarajan and K. S. Ganapathy , *Algebra* Volume I, S. Viswanathan (Printers and Publishers), Pvt. Ltd. (2013).

UNIT I- Chapter 3: Sections 10, 12& 14,

UNIT II- Chapter 4: Sections 1-9, 11-12

UNIT III, IV, V - Chapter 6: Sections 1-30

REFERENCES:

1. P.R.Vittal and V.Malini, *Algebra and Trigonometry*, Margham Publications (2008).
2. Sudhir K Pundir Singh, *Algebra and Trigonometry*, Meerat Pragathi rakashan (2003)

COURSE CONTENTS & LECTURE SCHEDULE:

Module No.	Topic	No. of Lectures	Teaching Pedagogy	Teaching Aids
UNIT -1 BINOMIAL SERIES				
1.1	Summation using binomial Series.	8	Chalk & Talk	Black Board
1.2	Approximation using binomial Series.	7	Chalk & Talk	Black Board
UNIT -2 EXPONENTIAL AND LOGARITHMIC SERIES				
2.1	Exponential series	5	Chalk & Talk	Black Board
2.2	Logarithmic series.	6	Chalk & Talk	Black Board
2.3	Summation and Approximationof Exponential and Logarithmic series	4	Discussion	Black Board
UNIT -3 THEORY OF EQUATIONS				
3.1	Remainder theorem	2	Chalk & Talk	Black Board
3.2	an equation of n^{th} degree has exactly n roots	2	Chalk & Talk	Black Board
3.3	relation between the roots and coefficients - irrational roots – imaginary roots	6	Chalk & Talk	Black Board
3.4	Symmetric functions of the roots in terms of the coefficients. Sum of the powers of the roots	5	Chalk & Talk	Black Board
UNIT -4 TRANSFORMATION OF EQUATIONS				
4.1	Transformation of equations	4	Chalk & Talk	Black Board

Module No.	Topic	No. of Lectures	Teaching Pedagogy	Teaching Aids
4.2	Reciprocal roots and reciprocal equations	4	Chalk & Talk	Black Board
4.3	Properties of equations	4	Chalk & Talk	Black Board
4.4	Transformation in general	3	Chalk & Talk	Black Board
UNIT -5 THE NATURE OF THE ROOTS OF THE EQUATION				
5.1	Descartes rule of signs	3	Chalk & Talk	Black Board
5.2	Rolles‟ theorem	3	Chalk & Talk	Black Board
5.3	Multiple roots	3	Chalk & Talk	Black Board
5.4	Solutions of numerical equations	3	Chalk & Talk	Black Board
5.5	Newtons method and Honers method to solve algebraic equations.	3	Chalk & Talk	Black Board

Levels	C1	C2	C3	C4	C5	Total Scholastic Marks	Non Scholastic Marks C6	CIA Total	% of Assessment
	T1 10 Mks.	T2 10 Mks.	Quiz 5 Mks.	Assignment 5 Mks	OBT/PPT 5 Mks	35 Mks.	5 Mks.	40Mks.	
K1	2	2	-	-	-	4	-	4	10 %
K2	2	2	5	-	-	9	-	9	22.5 %
K3	3	3	-	-	5	11	-	11	27.5 %
K4	3	3	-	5	-	11	-	11	27.5 %
Non Scholastic	-	-	-	-	-		5	5	12.5 %
Total	10	10	5	5	5	35	5	40	100 %

CIA	
Scholastic	35
Non Scholastic	5
	40

- ✓ **The levels of CIA Assessment based on Revised Bloom's Taxonomy are :**

  K1- Remember, **K2-**Understand, **K3-**Apply, **K4-**Analyse

EVALUATION PATTERN

	SCHOLASTIC				NON – SCHOLASTIC	MARKS		
C1	C2	C3	C4	C5	C6	CIA	ESE	Total
10	10	5	5	5	5	40	60	100

COURSE OUTCOMES

On the successful completion of the course, students will be able to:

NO.	COURSE OUTCOMES	KNOWLEDGE LEVEL (ACCORDING TO REVISED BLOOM'S TAXONOMY)	PSOs ADDRESSED
CO 1	Identify binomial series and solve problems in binomial expansion	K1	PSO3
CO 2	Identify logarithmic and exponential series and solve problems	K1 & K3	PSO5
CO 3	Relate the roots and co-efficients of the equations and Recognize the important methods in finding roots of the given polynomial	K2 & K3	PSO3
CO 4	Explain the transformations of equations	K1, K2 & K3	PSO5
CO 5	Examine the nature of the roots and solve algebraic equations using Newton's method and Horner's method	K3 & K4	PSO3

Mapping of C0s with PSOs

CO/ PSO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	2	2	3	2	2	2
CO2	2	2	2	2	3	2
CO3	2	2	3	2	2	2
CO4	2	2	2	2	3	2
CO5	2	2	3	2	2	2

Mapping of C0s with POs

CO/ PSO	PO1	PO2	PO3	PO4
CO1				
CO2				
CO3				
CO4				
CO5				

Note: ♦ Strongly Correlated – **3** ♦ Moderately Correlated – **2**

♦ Weakly Correlated -**1**

COURSE DESIGNER:

1. **Mrs. B. Vethamary Jacquline**
2. **Ms. K.Mano**

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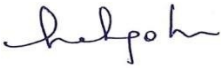


Dr. E. Helena

I B.Sc.. / B.A. / B.Com

SEMESTER – I & II

For those who joined in 2019 onwards

Skill Development-100%

PROGRAMME CODE	COURSE CODE	COURSE TITLE	CATEGORY	HRS/WEEK	CREDITS
USST	19ST1NME / 19ST2NME	Fundamental of Statistics	Lecture	2	2

COURSE DESCRIPTION

This course is designed to make the students learn the basics of statistics

COURSE OBJECTIVES

To enable the students understand the origin and the need of statistics and the statistical data.

UNIT –I INTRODUCTION (6 HRS.)

Origin, meaning and functions of statistics – general uses - relation with other disciplines-limitations and misuses of statistics.

UNIT –II COLLECTION OF DATA (6 HRS.)

Methods of collection: Complete enumeration – sample survey

UNIT –III SCRUTINY OF DATA (6 HRS.)

Primary data - methods of collection - secondary data sources.

UNIT –IV MEASURES OF CENTRAL TENDENCY (6 HRS.)

Arithmetic mean - weighted mean – median - mode

UNIT –V MEASURES OF DISPERSION (6 HRS.)

Range- standard deviation

TEXT:

S.P.Gupta, *Statistical Methods*, Sultan Chand & Sons, Revised edition (2014).

REFERENCES:

1. S.C.Gupta and V.K.Kapoor, *Fundamentals of Mathematical Statistics*- Sultan Chand & Sons, Revised edition (2002).
2. Arumugam and Thangapandi Isaac, *Statistics,* New Gamma publishing house, (2006).

COURSE CONTENTS & LECTURE SCHEDULE:

Module No.	Topic	No. of Lectures	Teaching Pedagogy	Teaching Aids
UNIT -1 INTRODUCTION				
1.1	Origin, meaning and functions of statistics, relation with other disciplines	3	Lecture	PPT & White board
1.2	Limitations and misuses of statistics	3	Lecture	PPT & White board
UNIT -2 COLLECTION OF DATA				
2.1	Methods of collection: Complete enumeration	3	Chalk & Talk	Black Board
2.2	Sample survey	3	Chalk & Talk	Black Board
UNIT -3 SCRUTINY OF DATA				
3.1	Primary data	2	Lecture	PPT & White board
3.2	Methods of collection	2	Lecture	PPT & White board
3.3	Secondary data sources	2	Lecture	PPT & White board
UNIT -4 MEASURES OF CENTRAL TENDENCY				
4.1	Arithmetic mean	1	Chalk & Talk	Black Board
4.2	Weighted mean	1	Chalk & Talk	Black Board
4.3	Median	2	Chalk & Talk	Black Board

Module No.	Topic	No. of Lectures	Teaching Pedagogy	Teaching Aids
4..4	Mode	2	Chalk & Talk	Black Board
UNIT -5 MEASURES OF DISPERSION				
5.1	Range	2	Chalk & Talk	Black Board
5.2	Standard deviation	4	Chalk & Talk	Black Board

Levels	C1 T1 10 Mks.	C2 T2 10 Mks.	C3 Quiz 5 Mks.	C4 Assignment 5 Mks	C5 OBT/PPT 5 Mks	Total Scholastic Marks 35 Mks.	Non Scholastic Marks C6 5 Mks.	CIA Total 40Mks.	% of Assessment
K1	2	2	-	-	-	4	-	4	10 %
K2	2	2	5	-	-	9	-	9	22.5 %
K3	3	3	-	-	5	11	-	11	27.5 %
K4	3	3	-	5	-	11	-	11	27.5 %
Non Scholastic	-	-	-	-	-		5	5	12.5 %
Total	10	10	5	5	5	35	5	40	100 %

CIA	
Scholastic	35
Non Scholastic	5
	40

- ✓ **The levels of CIA Assessment based on Revised Bloom's Taxonomy are :**

  K1- Remember, **K2-**Understand, **K3-**Apply, **K4-**Analyse

EVALUATION PATTERN

	SCHOLASTIC				NON – SCHOLASTIC	MARKS		
C1	C2	C3	C4	C5	C6	CIA	ESE	Total
10	10	5	5	5	5	40	60	100

COURSE OUTCOMES

On the successful completion of the course, students will be able to:

NO.	COURSE OUTCOMES	KNOWLEDGE LEVEL (ACCORDING TO REVISED BLOOM'S TAXONOMY)	PSOs ADDRESSED
CO 1	Summarize the origin of statistics and its relation with other disciplines.	K2	PSO3
CO 2	Explain and evaluate various measure of central tendency	K3	PSO3
CO 3	Examine the various measures of dispersion	K4	PSO3
CO 4	Identify the direction and strength of a correlation between two factors	K1 & K4	PSO3
CO 5	Form regression equation of lines and solve	K2 & K4	PSO3

Mapping of C0s with PSOs

CO/ PSO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	2	2	3	2	2	2
CO2	2	2	3	2	2	2
CO3	2	2	3	2	2	2
CO4	2	2	3	2	2	2
CO5	2	2	3	2	2	2

Mapping of C0s with POs

CO/ PSO	PO1	PO2	PO3	PO4
CO1				
CO2				
CO3				
CO4				
CO5				

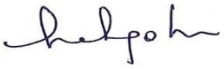
Note: ♦ Strongly Correlated – **3** ♦ Moderately Correlated – **2**

♦ Weakly Correlated -**1**

COURSE DESIGNER:

1. **Mrs. K. Bhuvaneswari**
2. **Ms. K. Saranya**

Forwarded By



Dr. E. Helena

II B.Sc. STATISTICS

SEMESTER III

For those who joined in 2019 onwards

Skill Development-100%

PROGRAMME CODE	COURSE CODE	COURSE TITLE	CATEGORY	HRS/WEEK	CREDITS
USST	19ST3CC5	Continuous Probability Distribution	Lecture	6	4

COURSE DESCRIPTION

This course is designed to expose the students various important continuous probability models

COURSE OBJECTIVES

To enable the students understand the continuous probability distribution and real life situations where these distributions provide appropriate models.

UNIT –I NORMAL DISTRIBUTION (18 HRS.)

Normal distribution as a limiting form of binomial distribution-chief characteristics of the normal distribution – mode, median, moment generating function of normal distribution - cumulant generating function of normal distribution – moments of normal distribution – a linear combination of independent normal variates - points of inflexion of normal curves – mean deviation about mean for normal distribution - area property – error function - importance of normal distributions - fitting of normal distribution

UNIT –II RECTANGULAR, BETA AND GAMMA DISTRIBUTIONS (18 HRS.)

Moments of rectangular distribution -m.g.f of rectangular distribution – characteristics function of rectangular distribution - mean deviation about mean of rectangular distribution – m.g.f of gamma distribution – cumulant generating function of gamma distribution – additive function of gamma distribution - beta distribution of first kind – beta distribution of secondkind.

UNIT –III EXPONENTIAL AND CAUCHY DISTRIBUTIONS (18 HRS.)

Moment generating function of exponential distribution - **characteristic function of Cauchy distribution – moments of Cauchy distribution – (**Self Study).

UNIT –IV SAMPLING DISTRIBUTION (CHI-SQUARE) (18 HRS.)

Introduction – derivation of the χ^2 distribution – moment generating function of the χ^2 distribution – some theorems on χ^2 distribution – linear transformation – applications of χ^2 distribution.

UNIT –V SAMPLING DISTRIBUTION (t, F) (18 HRS.)

Introduction – student‟s „t‟ distribution – applications of „t‟ distribution – distribution of sample correlation coefficient when population correlation coefficient $\rho = 0$ - f distribution – applications of f distribution – relation between t and f distributions – relation between f and χ^2 distribution.

TEXT:

S.C.Gupta and V.K.Kapoor, *Fundamentals of Mathematical Statistics,* Sultan Chand & Sons, Revised edition (2014).

Chapters: 9, 15, 16

REFERENCES:

1. Arumugam and Thangapandi Isaac, *Statistics*, New Gamma publishing house, (2012).
2. S.P.Gupta, *Statistical Methods*, Sultan Chand & Sons, Revised edition (2014).

COURSE CONTENTS & LECTURE SCHEDULE:

Module No.	Topic	No. of Lectures	Teaching Pedagogy	Teaching Aids
UNIT -1 NORMAL DISTRIBUTION				
1.1	Normal distribution as a limiting form of binomial distribution- chief characteristics of the normal distribution	4	Chalk & Talk	Black Board
1.2	Mode, median, moment generating function of normal distribution - cumulant generating function of normal distribution	5	Chalk & Talk	Black Board
1.3	Linear combination of independent normal variates	1	Chalk & Talk	Black Board
1.4	Mean deviation about mean for normal distribution - area property	3	Chalk & Talk	Black Board
1.5	Importance of normal distributions	2	Chalk & Talk	Black Board
1.6	Fitting of normal distribution	3	Chalk & Talk	Black Board
UNIT 2 RECTANGULAR, BETA AND GAMMA DISTRIBUTIONS				
2.1	Moments of rectangular distribution	4	Chalk & Talk	Black Board
2.2	m.g.f of rectangular distribution – characteristics function of rectangular distribution	4	Chalk & Talk	Black Board
2.3	m.g.f of gamma distribution – cumulant generating function of gamma distribution	4	Chalk & Talk	Black Board
2.4	beta distribution of first kind	3	Chalk & Talk	Black Board

Module No.	Topic	No. of Lectures	Teaching Pedagogy	Teaching Aids
2.5	Beta distribution of second kind.	3	Chalk & Talk	Black Board
UNIT -3 EXPONENTIAL AND CAUCHY DISTRIBUTIONS				
3.1	Moment generating function of exponential distribution	6	Chalk & Talk	Black Board
3.2	characteristic function of Cauchy distribution	6	Discussion	Black Board
3.3	Moments of Cauchy distribution.	6	Discussion	Black Board
UNIT -4 SAMPLING DISTRIBUTION (CHI-SQUARE)				
4.1	Derivation of the χ^2 distribution	4	Chalk & Talk	Black Board
4.2	Moment generating function of the χ^2 distribution	4	Chalk & Talk	Black Board
4.3	Linear transformation	4	Chalk & Talk	Black Board
4.4	Applications of χ^2 distribution.	6	Chalk & Talk	Black Board
UNIT -5 SAMPLING DISTRIBUTION (t, F)				
5.1	student‟s „t‟ distribution	3	Chalk & Talk	Black Board
5.2	applications of „t‟ distribution	4	Chalk & Talk	Black Board
5.3	applications of f distribution	4	Chalk & Talk	Black Board
5.4	relation between t and f distributions	3	Chalk & Talk	Black Board
5.5	Relation between f and χ^2 distribution.	4	Chalk & Talk	Black Board

Levels	C1	C2	C3	C4	C5	Total Scholastic Marks	Non Scholastic Marks C6	CIA Total	% of Assessment
	T1 10 Mks.	T2 10 Mks.	Quiz 5 Mks.	Assignment 5 Mks	OBT/PPT 5 Mks	35 Mks.	5 Mks.	40Mks.	
K1	2	2	-	-	-	4	-	4	10 %
K2	2	2	5	-	-	9	-	9	22.5 %
K3	3	3	-	-	5	11	-	11	27.5 %
K4	3	3	-	5	-	11	-	11	27.5 %
Non Scholastic	-	-	-	-	-		5	5	12.5 %
Total	10	10	5	5	5	35	5	40	100 %

CIA	
Scholastic	35
Non Scholastic	5
	40

- ✓ **The levels of CIA Assessment based on Revised Bloom's Taxonomy are :**

  K1- Remember, **K2-**Understand, **K3-**Apply, **K4-**Analyse

EVALUATION PATTERN

	SCHOLASTIC				NON - SCHOLASTIC	MARKS		
C1	C2	C3	C4	C5	C6	CIA	ESE	Total
10	10	5	5	5	5	40	60	100

COURSE OUTCOMES

On the successful completion of the course, students will be able to:

NO.	COURSE OUTCOMES	KNOWLEDGE LEVEL (ACCORDING TO REVISED BLOOM'S TAXONOMY)	PSOs ADDRESSED
CO 1	Recognize cases where the normal distribution could be an appropriate.	K1	PSO1& PSO2
CO 2	Understand and derive the moments, moment generating functions, characteristic functions of rectangular, beta and gamma distribution.	K1 & K2	PSO3
CO 3	Explore the key properties such as the moment generating function and cumulants of exponential and Cauchy distribution	K3 & K4	PSO3
CO 4	Derive chi square distribution and apply in real life problem	K1, K2 & K3	PSO5
CO 5	State and apply the definitions of the t and F distributions	K2 & K3	PSO6

Mapping of C0s with PSOs

CO/ PSO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	3	3	2	2	2	2
CO2	2	2	3	2	2	2
CO3	2	2	3	2	2	2
CO4	2	2	2	2	3	2
CO5	2	2	2	2	2	3

Mapping of C0s with POs

CO/ PSO	PO1	PO2	PO3	PO4
CO1				
CO2				
CO3				
CO4				
CO5				

Note: ♦ Strongly Correlated – **3** ♦ Moderately Correlated – **2**

♦ Weakly Correlated -**1**

COURSE DESIGNER:

1. **Dr. P. Vetriselvi**
2. **Ms. D. K. Pon Ovya**

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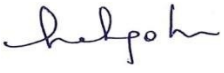

Dr. E. Helena

II B.Sc. STATISTICS

SEMESTER III

For those who joined in 2019 onwards

PROGRAMME CODE	COURSE CODE	COURSE TITLE	CATEGORY	HRS/WEEK	CREDITS
USST	19ST3CC6	Sampling Theory	Lecture	6	4

COURSE DESCRIPTION

This course is introduced to the students to impart the basic knowledge of statistical sampling concepts.

COURSE OBJECTIVES

To enable the students understand the concept of statistical sampling and to make them conduct sample survey independently by selecting the suitable sampling techniques.

UNIT –I SAMPLE SURVEY (18 HRS.)

Census and Sample surveys - principle steps in sample survey - principles of sample survey - sampling and non-sampling errors - **advantages of sampling over complete census – (**Self Study) - limitations of sampling.

UNIT –II SIMPLE RANDOM SAMPLING (18 HRS.)

Sampling from finite population - **simple random sampling with and without replacement– (**Self Study) – procedure of selecting a randomsample - unbiased estimate, variance of the estimates –finite population correction - estimation of standard error from a sample.

UNIT –III STRATIFIED RANDOM SAMPLING (18 HRS.)

Stratified random sampling - properties of the estimates - unbiased estimates of the mean and variance of the estimates of the mean-optimum and proportional allocations – relative precision of a stratified sampling and

simple random sampling - estimation of gain in precision in stratified sampling.

UNIT –IV SYSTEMATIC SAMPLING (18 HRS.)

Systematic sampling - estimate of mean and variance of the estimated mean – comparison of simple and stratified with systematic random sampling, systematic sampling with cluster sampling, methods for populations with linear trend.

UNIT –V RATIO ESTIMATOR (18 HRS.)

Ratio estimators: Ratio estimates, variance of the ratio estimates - Bias of the ratio estimates. Regression estimators: Linear regression estimate regression estimates with pre assigned b-regression estimates when b is computed from the sample.

TEXT:

1. S.C.Gupta, and V.K. Kapoor, *Fundamentals of Applied Statistics*, Sultan Chand & Co., 11th edition (2014).
2. William G. Cochran, *Sampling Techniques*, John Wiley Sons (1999).

REFERENCES:

1. Daroga Singh and F.S.Choudary, *Theory and Analysis of Sample Survey Designs*, New age international publishers (1986).
2. P.V. Sukhatame and B.V.Sukhatame, *Sampling Theory of Surveys with Applications*, ISAS publishers, 3rd Edition (1957).
3. S.Sampath, *Sampling Theory and Methods*, Narosa Publishing House (2001).

COURSE CONTENTS & LECTURE SCHEDULE:

Module No.	Topic	No. of Lectures	Teaching Pedagogy	Teaching Aids
UNIT- 1 SAMPLE SURVEY				
1.1	Census and Sample surveys	3	Lecture	PPT & White board
1.2	Principle steps in sample survey	4	Lecture	PPT & White board
1.3	Sampling and non-sampling errors	4	Lecture	PPT & White board
1.4	Advantages of sampling over complete census	4	Lecture	PPT & White board
1.5	Limitations of sampling.	3	Lecture	Smart Board
UNIT -2 SIMPLE RANDOM SAMPLING				
2.1	Sampling from finite population	3	Chalk & Talk	Black Board
2.2	Simple random sampling with and without replacement	4	Discussion	Black Board
2.3	Procedure of selecting a random sample	4	Chalk & Talk	Black Board
2.4	Unbiased estimate, variance of the estimates	4	Chalk & Talk	Black Board
2.5	Estimation of standard error from a sample	3	Chalk & Talk	Black Board
UNIT -3 STRATIFIED RANDOM SAMPLING				
3.1	Stratified random sampling	2	Chalk & Talk	Black Board
3.2	Properties of the estimates	3	Chalk &	Black

Module No.	Topic	No. of Lectures	Teaching Pedagogy	Teaching Aids
			Talk	Board
3.3	Unbiased estimates of the mean and variance of the estimates of the mean	3	Chalk & Talk	Black Board
3.4	Optimum and proportional allocations	2	Chalk & Talk	Black Board
3.5	Relative precision of a stratified sampling and simple random sampling	5	Chalk & Talk	Black Board
3.6	Estimation of gain in precision in stratified sampling	3	Chalk & Talk	Black Board
UNIT -4 SYSTEMATIC SAMPLING				
4.1	Estimate of mean and variance of the estimated mean	6	Chalk & Talk	Black Board
4.2	Comparison of simple and stratified with systematic random sampling, systematic sampling with cluster sampling,	7	Chalk & Talk	Black Board
4.3	Methods for populations with linear trend	5	Chalk & Talk	Black Board
UNIT -5 RATIO ESTIMATOR				
5.1	Ratio estimates	5	Chalk & Talk	Black Board
5.2	variance of the ratio estimates	4	Chalk & Talk	Black Board
5.3	Bias of the ratio estimates	4	Chalk & Talk	Black Board
5.4	Estimate regression estimates with pre assigned b-regression estimates when b is computed from the sample	5	Chalk & Talk	Black Board

Levels	C1	C2	C3	C4	C5	Total Scholastic Marks	Non Scholastic Marks C6	CIA Total	% of Assessment
	T1 10 Mks.	T2 10 Mks.	Quiz 5 Mks.	Assignment 5 Mks	OBT/PPT 5 Mks	35 Mks.	5 Mks.	40Mks.	
K1	2	2	-	-	-	4	-	4	10 %
K2	2	2	5	-	-	9	-	9	22.5 %
K3	3	3	-	-	5	11	-	11	27.5 %
K4	3	3	-	5	-	11	-	11	27.5 %
Non Scholastic	-	-	-	-	-		5	5	12.5 %
Total	10	10	5	5	5	35	5	40	100 %

CIA	
Scholastic	35
Non Scholastic	5
	40

- ✓ **The levels of CIA Assessment based on Revised Bloom's Taxonomy are :**

  K1- Remember, **K2-**Understand, **K3-**Apply, **K4-**Analyse

EVALUATION PATTERN

	SCHOLASTIC				NON - SCHOLASTIC	MARKS		
C1	C2	C3	C4	C5	C6	CIA	ESE	Total
10	10	5	5	5	5	40	60	100

COURSE OUTCOMES

On the successful completion of the course, students will be able to:

NO.	COURSE OUTCOMES	KNOWLEDGE LEVEL (ACCORDING TO REVISED BLOOM'S TAXONOMY)	PSOs ADDRESSED
CO 1	Illustrate census and sampling and their advantages and disadvantages	K2	PSO1& PSO2
CO 2	Differentiates the SRSWOR, SRSWR, methods of SRS – lottery method and random number table method	K1 & K2	PSO2
CO 3	Understand and identify stratified random sampling	K1 & K3	PSO5
CO 4	Understand and identify systematic sampling.	K4	PSO6
CO 5	Analyse ratio estimator	K2 & K4	PSO2

Mapping of C0s with PSOs

CO/ PSO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	3	3	2	2	2	2
CO2	2	3	2	2	2	2
CO3	2	2	2	2	3	2
CO4	2	2	2	2	2	3
CO5	2	3	2	2	2	2

Mapping of C0s with POs

CO/ PSO	PO1	PO2	PO3	PO4
CO1				
CO2				
CO3				
CO4				
CO5				

Note: ♦ Strongly Correlated – **3** ♦ Moderately Correlated – **2**

♦ Weakly Correlated -**1**

COURSE DESIGNER:

1. **Dr. P. Vetriselvi**
2. **Ms. D.K. Pon Ovya**

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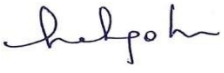

Dr. E. Helena

II B.Sc. STATISTICS

SEMESTER III

For those who joined in 2019 onwards

Skill Development-100%

PROGRAMME CODE	COURSE CODE	COURSE TITLE	CATEGORY	HRS/WEEK	CREDITS
USST	19ST3AC3	Linear Programming	Lecture	5	5

COURSE DESCRIPTION

The course provides appropriate methods for the efficient computation of optimal solutions to problems which are modelled by objective function and linear constraints.

COURSE OBJECTIVES

This course enable the students convert real life problems into a Mathematical problem and to solve them using different techniques like graphical method, simplex method, Big – M method, Two - phase method and dual simplex method.

UNIT –I MATHEMATICAL FORMULATION OF LPP (15 HRS.)

Mathematical formulation – classification - graphical solutions of lpp- **simple examples of lpp - slack and surplus variables - standard form of lpp– (**Self Study**).**

UNIT–II SIMPLEX METHOD (15 HRS.)

Definition of objective function - linear and non-negative constraints - feasible solution - basic feasible solution - optimum basic feasible solution - degenerate solution - evaluation and net evaluation - unbounded solutions and conditions for optimality of a feasible solution in terms of net evaluations (no proof) - pivotal element - computational procedure of the simplex method - tie for entering basis vector and leaving basis vector- solution using artificial variables.

UNIT –III METHOD AND TWO PHASE METHOD (15 HRS.)

Charne‟s method of penalities and two phase simplex method - restricted and unrestricted variables - inverse of a matrix using simplex method

UNIT –IV TRANSPORTATION PROBLEM (15 HRS.)

Mathematical formulation - existence of feasible solution - feasible solution by north west corner rule - matrix minima method - Vogel‟s approximation method -optimal solution to a TP by modified distribution method - degeneracy in TP - unbalanced TP.

UNIT –V ASSIGNMENT PROBLEM (15 HRS.)

Mathematical formulation - assignment algorithm rule for finding optimal assignment - unbalanced AP - travelling salesman problem as an AP.

TEXT:

Kanti Swarup, P.K.Gupta and Man Mohan, *Operation Research*, Sultan Chand and sons, New Delhi - 11th Edition (2003).

REFERENCES:

1. P.K.Gupta and Man Mohan, *Problems in Operation Research*, Sultan Chand and sons, New Delhi, 11th Edition (2007).
2. Prem Kumar Gupta and D.S.Hira, *Operations Research*, S.Chand and Company, Ram Nagar, New Delhi, Edition (2007).

COURSE CONTENTS & LECTURE SCHEDULE:

Module No.	Topic	No. of Lectures	Teaching Pedagogy	Teaching Aids
UNIT -1 MATHEMATICAL FORMULATION OF LPP				
1.1	Mathematical formulation	3	Chalk & Talk	Black Board
1.2	Classification	3	Chalk & Talk	Black Board
1.3	Graphical solutions of lpp	3	Chalk & Talk	Black Board
1.4	Simple examples of lpp	2	Discussion	Black Board
1.5	Slack and surplus variables	2	Discussion	Black Board
1.6	Standard form of lpp	2	Chalk & Talk	Black Board
UNIT -2 SIMPLEX METHOD				
2.1	Linear and non-negative constraints	1	Chalk & Talk	Black Board
2.2	Feasible solution	1	Chalk & Talk	Black Board
2.3	Basic feasible solution, optimum basic feasible solution	3	Chalk & Talk	Black Board
2.4	Unbounded solutions and conditions for optimality of a feasible solution in terms of net evaluations	3	Chalk & Talk	Black Board
2.5	Computational procedure of the simple method	4	Chalk & Talk	Black Board
2.6	Solution using artificial variables	3	Chalk & Talk	Black Board

Module No.	Topic	No. of Lectures	Teaching Pedagogy	Teaching Aids
UNIT -3 BIG – M METHOD AND TWO PHASE METHOD				
3.1	Charne‟s method of penalities and two phase simplex method	6	Chalk & Talk	Black Board
3.2	restricted and unrestricted variables	4	Chalk & Talk	Black Board
3.3	inverse of a matrix using simplex method.	5	Chalk & Talk	Black Board
UNIT -4 TRANSPORTATION PROBLEM				
4.1	Mathematical formulation	2	Chalk & Talk	Black Board
4.2	Existence of feasible solution	2	Chalk & Talk	Black Board
4.3	Feasible solution by north west corner rule	2	Chalk & Talk	Black Board
4.4	Vogel‟s approximation method	4	Chalk & Talk	Black Board
4.5	Optimal solution to a TP by modified distribution method	2	Chalk & Talk	Black Board
4.6	Unbalanced TP	3	Chalk & Talk	Black Board
UNIT-5 ASSIGNMENT PROBLEM				
5.1	Mathematical formulation	2	Chalk & Talk	Black Board
5.2	Assignment algorithm rule for finding optimal assignment	5	Chalk & Talk	Black Board
5.3	Unbalanced AP	4	Chalk & Talk	Black Board
5.4	Travelling salesman problem as an AP.	4	Chalk & Talk	Black Board

Levels	C1 T1 10 Mks.	C2 T2 10 Mks.	C3 Quiz 5 Mks.	C4 Assignment 5 Mks	C5 OBT/PPT 5 Mks	Total Scholastic Marks 35 Mks.	Non Scholastic Marks C6 5 Mks.	CIA Total 40Mks.	% of Assessment
K1	2	2	-	-	-	4	-	4	10 %
K2	2	2	5	-	-	9	-	9	22.5 %
K3	3	3	-	-	5	11	-	11	27.5 %
K4	3	3	-	5	-	11	-	11	27.5 %
Non Scholastic	-	-	-	-	-		5	5	12.5 %
Total	10	10	5	5	5	35	5	40	100 %

CIA	
Scholastic	35
Non Scholastic	5
	40

- ✓ **The levels of CIA Assessment based on Revised Bloom's Taxonomy are :**

  K1- Remember, **K2-**Understand, **K3-**Apply, **K4-**Analyse

EVALUATION PATTERN

	SCHOLASTIC				NON - SCHOLASTIC	MARKS		
C1	C2	C3	C4	C5	C6	CIA	ESE	Total
10	10	5	5	5	5	40	60	100

COURSE OUTCOMES

On the successful completion of the course, students will be able to:

NO.	COURSE OUTCOMES	KNOWLEDGE LEVEL (ACCORDING TO REVISED BLOOM'S TAXONOMY)	PSOs ADDRESSED
CO 1	Formulate linear programming problems and solve by graphical method	K2	PSO1& PSO2
CO 2	Classify simplex method to solve linear programming problems	K1, K2 & K3	PSO3
CO 3	Identify and solve two phase and Big – M method	K2 & K3	PSO3
CO 4	Recognize and formulate transportation and find the optimal solution	K1, K2 & K3	PSO2 & PSO3
CO5	Recognize and formulate assignment problems and find the optimal solution.	K2 & K3	PSO3

Mapping of C0s with PSOs

CO/ PSO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	3	3	2	2	2	2
CO2	2	2	3	2	2	2
CO3	2	2	3	2	2	2
CO4	2	3	3	2	2	2
CO5	2	2	3	2	2	2

Mapping of C0s with POs

CO/ PSO	PO1	PO2	PO3	PO4
CO1				
CO2				
CO3				
CO4				
CO5				

Note: ♦ Strongly Correlated – **3** ♦ Moderately Correlated – **2**

♦ Weakly Correlated -**1**

COURSE DESIGNER:

1. **Dr. R. Srija**
2. **Ms. K. Mano**

Forwarded By

Dr. E. Helena

II B.Sc. STATISTICS

SEMESTER III

For those who joined in 2019 onwards

Employability-100%

PROGRAMME CODE	COURSE CODE	COURSE TITLE	CATEGORY	HRS/WEEK	CREDITS
USST	19ST3SB1	Practical Statistics I	Lecture & Practical	2	2

COURSE DESCRIPTION

The course provides problems related to measure of central tendency, measure of dispersion, and measures of association of attributes.

COURSE OBJECTIVES

To expose the students the analysis of statistical techniques in real life situations.

1. Problems based on measure of central tendency
2. Problems based on measure of dispersion..
3. Problems based on moments, skewness and kurtosis
4. Computation of Karl Pearson correlation co-efficient.
5. Correlation coefficient for a bivariate frequency distribution.
6. Concurrent deviation
7. Rank correlation.
8. Regression Equations..
9. Computation of various measures of associations of attributes.

TEXT:

1. S.C.Gupta and V.K.Kapoor, *Fundamentals of Mathematical statistics*, Sultan Chand & Sons, Revised edition (2002).

Levels	C1 T1 10 Mks.	C2 T2 10 Mks.	C3 Quiz 5 Mks.	C4 Assignment 5 Mks	C5 OBT/PPT 5 Mks	Total Scholastic Marks 35 Mks.	Non Scholastic Marks C6 5 Mks.	CIA Total 40Mks.	% of Assessment
K1	2	2	-	-	-	4	-	4	10 %
K2	2	2	5	-	-	9	-	9	22.5 %
K3	3	3	-	-	5	11	-	11	27.5 %
K4	3	3	-	5	-	11	-	11	27.5 %
Non Scholastic	-	-	-	-	-		5	5	12.5 %
Total	10	10	5	5	5	35	5	40	100 %

CIA	
Scholastic	35
Non Scholastic	5
	40

- ✓ **The levels of CIA Assessment based on Revised Bloom's Taxonomy are :**

  K1- Remember, **K2-**Understand, **K3-**Apply, **K4-**Analyse

EVALUATION PATTERN

	SCHOLASTIC				NON - SCHOLASTIC	MARKS		
C1	C2	C3	C4	C5	C6	CIA	ESE	Total
10	10	5	5	5	5	40	60	100

COURSE OUTCOMES

On the successful completion of the course, students will be able to:

NO.	COURSE OUTCOMES	KNOWLEDGE LEVEL (ACCORDING TO REVISED BLOOM'S TAXONOMY)	PSOs ADDRESSED
CO 1	Calculate measure of central tendency.	K1	PSO1& PSO2
CO 2	Classify measures of dispersion, skewness and kurtosis.	K1, K2	PSO5 & PSO6
CO3	Compute correlation, regression and measures of association of attributes.	K3, K4	PSO5 & PSO6

Mapping of C0s with PSOs

CO/ PSO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	3	3				
CO2					3	3
CO3					3	3

Mapping of C0s with POs

CO/ PSO	PO1	PO2	PO3	PO4
CO1				
CO2				
CO3				

Note: ♦ Strongly Correlated – **3** ♦ Moderately Correlated – **2**

♦ Weakly Correlated -**1**

COURSE DESIGNER:

1. **Dr. P. Vetriselvi**
2. **D.K.Pon Ovya**

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Dr. E. Helena

II B.Sc. STATISTICS

SEMESTER IV

For those who joined in 2019 onwards

Skill Development-100%

PROGRAMME CODE	COURSE CODE	COURSE TITLE	CATEGORY	HRS/WEEK	CREDITS
USST	19ST4CC7	Estimation Theory	Lecture	6	4

COURSE DESCRIPTION

This course introduces the concepts of statistical estimation theory.

COURSE OBJECTIVES

To enable the students understand the various statistical estimation methods of parameters and its applications in solving real life problems

UNIT –I POINT ESTIMATION THEORY (18 HRS.)

Parametric estimation: estimator - characteristics of an estimator - consistency and unbiasedness of an estimator - Cramer-Rao inequality. Efficiency-asymptotic efficiency of an estimator- estimators based on sufficient statistics- Neyman‟s factorization theorem (without proof) - Rao-Blackwell theorem

UNIT –II METHODS OF POINT ESTIMATION-I (18 HRS.)

Methods of point estimation - **method of Maximum Likelihood Estimator (MLE) – (**Self Study) - Properties of MLEs (without proof) – Problems based on MLEs.

UNIT–III METHODS OF POINT ESTIMATION-II (18 HRS.)

Method of moments – problems-method of least squares - method of minimum Chi-square-method of minimum variance-Minimum Variance Unbiased Estimation (MVUE)-Problems based on MVUE.

UNIT –IV INTERVAL ESTIMATION-I (18 HRS.)

Concept of interval estimation - interval estimation in case of large samples- confidence interval for proportions, means and variances based on normal distribution.

UNIT –V INTERVAL ESTIMATION-II (18 HRS.)

Interval estimation for small samples – confidence intervals for means, variances, correlation coefficient and regression coefficient based on Chi square,Student‟st,andfdistributions.

TEXT:

S.C. Gupta and V.K.Kapoor, *Fundamentals of Mathematical Statistics*, Sultan Chand & Sons, New Delhi, 11th Edition (2002).

REFERENCES:

1. M.Kendall and A.Stuart, *The advanced theory of Statistics*, Vol. II, Charles Griffin, (1961).
2. V.K.Rohatgi, *Statistical Inference*, John Wiley and sons (1984).
3. R.V Hogg, A.T.Craig. and Tannis, *Introduction to Mathematical Statistics*, Prentice Hall, England (1995).

COURSE CONTENTS & LECTURE SCHEDULE:

Module No.	Topic	No. of Lectures	Teaching Pedagogy	Teaching Aids
UNIT -1 POINT ESTIMATION THEORY				
1.1	Parametric estimation: estimator	3	Chalk & Talk	Black Board
1.2	characteristics of an estimator	3	Chalk & Talk	Black Board
1.3	consistency and unbiasedness of an estimator	4	Chalk & Talk	Black Board
1.4	Cramer-Rao inequality	2	Chalk & Talk	Black Board
1.5	asymptotic efficiency of an estimator	2	Chalk & Talk	Black Board
1.6	Neyman‟s factorization theorem	2	Chalk & Talk	Black Board
1.7	Rao-Blackwell theorem.	2	Chalk & Talk	Black Board
UNIT -2 METHODS OF POINT ESTIMATION-I				
2.1	Methods of point estimation-method of Maximum Likelihood Estimator (MLE)	6	Discussion	Black Board
2.2	Properties of MLEs	4	Chalk & Talk	Black Board
2.3	Problems based on MLEs.	8	Chalk & Talk	Black Board
UNIT -3 METHODS OF POINT ESTIMATION				
3.1	Method of moments	3	Chalk & Talk	Black Board
3.2	Method of least squares	3	Chalk & Talk	Black Board

Module No.	Topic	No. of Lectures	Teaching Pedagogy	Teaching Aids
3.3	Method of minimum Chi-square	3	Chalk & Talk	Black Board
3.4	Method of minimum variance	3	Chalk & Talk	Black Board
3.5	Minimum Variance Unbiased Estimation (MVUE)	2	Chalk & Talk	Black Board
3.6	Problems based on MVUE.	4	Chalk & Talk	Black Board
UNIT -4 INTERVAL ESTIMATION –I				
4.1	Concept of interval estimation	5	Chalk & Talk	Black Board
4.2	interval estimation in case of large samples	13	Chalk & Talk	Black Board
UNIT -5 INTERVAL ESTIMATION-II				
5.1	Interval estimation for small samples	4	Chalk & Talk	Black Board
5.2	Confidence intervals for means	4	Chalk & Talk	Black Board
5.3	Confidence intervals for variances	4	Chalk & Talk	Black Board
5.4	Confidence intervals for correlation coefficient	4	Chalk & Talk	Black Board
5.5	Regression coefficient based on Chi square, Student‟s t, and F distributions.	6	Chalk & Talk	Black Board

Levels	C1	C2	C3	C4	C5	Total Scholastic Marks	Non Scholastic Marks C6	CIA Total	% of Assessment
	T1 10 Mks.	T2 10 Mks.	Quiz 5 Mks.	Assignment 5 Mks	OBT/PPT 5 Mks	35 Mks.	5 Mks.	40Mks.	
K1	2	2	-	-	-	4	-	4	10 %
K2	2	2	5	-	-	9	-	9	22.5 %
K3	3	3	-	-	5	11	-	11	27.5 %
K4	3	3	-	5	-	11	-	11	27.5 %
Non Scholastic	-	-	-	-	-		5	5	12.5 %
Total	10	10	5	5	5	35	5	40	100 %

CIA	
Scholastic	35
Non Scholastic	5
	40

- ✓ **The levels of CIA Assessment based on Revised Bloom's Taxonomy are :**

  K1- Remember, **K2-**Understand, **K3-**Apply, **K4-**Analyse

EVALUATION PATTERN

	SCHOLASTIC				NON - SCHOLASTIC	MARKS		
C1	C2	C3	C4	C5	C6	CIA	ESE	Total
10	10	5	5	5	5	40	60	100

COURSE OUTCOMES

On the successful completion of the course, students will be able to:

NO.	COURSE OUTCOMES	KNOWLEDGE LEVEL (ACCORDING TO REVISED BLOOM'S TAXONOMY)	PSOs ADDRESSED
CO 1	Explain and compute point estimation	K1	PSO1& PSO2
CO 2	Estimate maximum likelihood estimator	K1, K2,	PSO3
CO 3	Analyse minimum variance unbiased estimator	K1 & K3	PSO5
CO 4	Compute interval estimation in large samples using normal distribution	K3 & K4	PSO5 & PSO6
CO 5	Distinguish Interval estimation in small samples based on F, chi square and t distribution	K3 & K4	PSO5 & PSO6

Mapping of C0s with PSOs

CO/ PSO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	3	3	2	2	2	2
CO2	2	2	3	2	2	2
CO3	2	2	2	2	3	2
CO4	2	2	2	2	3	3
CO5	2	2	2	2	3	3

Mapping of C0s with POs

CO/ PSO	PO1	PO2	PO3	PO4
CO1				
CO2				
CO3				
CO4				
CO5				

Note: ♦ Strongly Correlated – **3** ♦ Moderately Correlated – **2**

♦ Weakly Correlated -**1**

COURSE DESIGNER:

1. **Dr. P. Vetriselvi**
2. **Ms. D.K. Pon Ovya**

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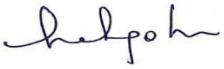

Dr. E. Helena

II B.Sc. STATISTICS

SEMESTER IV

For those who joined in 2019 onwards

Skill Development-40% &
Employability-60%

PROGRAMME CODE	COURSE CODE	COURSE TITLE	CATEGORY	HRS/WEEK	CREDITS
USST	19ST4CC8	Applied statistics	Lecture	6	4

COURSE DESCRIPTION

This course provides some of the applications of statistics which includes topics such as curve fitting, time series, index numbers, interpolation and extrapolation, birth and death rates.

COURSE OBJECTIVES

To enable the students understand and appreciate the applications of Statistics

UNIT –I CURVE FITTING (18 HRS.)

Fitting of a straight line, **second degree parabola– (**Self Study), exponential and power curves.

UNIT –II ANALYSIS OF TIME SERIES (18 HRS.)

Components of a time series- measurements of trends.

UNIT –III INDEX NUMBERS (18 HRS.)

Classification and methods-Tests of adequacy- Chain index numbers - **consumer price index numbers– (**Self Study).

UNIT –IV INTERPOLATION AND EXTRAPOLATION (18 HRS.)

Interpolation – Methods - Extrapolation

UNIT –V VITAL STATISTICS (18 HRS.)

Introduction – Vital Statistics Defined – Uses of Vital Statistics –Methods of Obtaining Vital Statistics – Measurement of Fertility – Reproduction Rates. Crude Death Rate – Specific Death Rates –

Standardized Death Rates – Infant Mortality Rate – Neo-Natal Mortality Rate – Maternal Mortality Rate – Natural Increase Rate – Net Migration Rate – Vital Index – Life Tables.

TEXT:

1. S. Arumugam and Thangapandi Isaac, *Statistics*, New Gamma publishing house (2006).
2. S.P.Gupta, *Statistical Methods*- Sultan Chand & Sons, Revised edition (2014).

REFERENCES:

S.C.Gupta and V.K.Kapoor, *Fundamentals of Mathematical Statistics*, Sultan Chand & Sons, Revised edition (2002).

COURSE CONTENTS & LECTURE SCHEDULE:

Module No.	Topic	No. of Lectures	Teaching Pedagogy	Teaching Aids
UNIT -1 CURVE FITTING				
1.1	Fitting of a straight line	5	Chalk & Talk	Black Board
1.2	Fitting of a second degree parabola	4	Discussion	Black Board
1,3	Fitting of a exponential curve	5	Chalk & Talk	Black Board
1.4	Fitting of a power curve	4	Chalk & Talk	Black Board
UNIT -2 ANALYSIS OF TIME SERIES				
2.1	Components of a time series	9	Chalk & Talk	Black Board
2.2	Measurements of trends.	9	Chalk & Talk	Black Board
UNIT 3 INDEX NUMBERS				
3.1	Classification and methods	5	Chalk & Talk	Black Board
3.2	Tests of adequacy	3	Chalk & Talk	Black Board
3.3	Chain index numbers	5	Chalk & Talk	Black Board
3.4	Consumer price index numbers	5	Discussion	Black Board
UNIT 4 INTERPOLATION AND EXTRAPOLATION				
4.1	Interpolation	9	Chalk & Talk	Black Board
4.2	Extrapolation	9	Chalk &	Black

Module No.	Topic	No. of Lectures	Teaching Pedagogy	Teaching Aids
			Talk	Board
UNIT 5 VITAL STATISTICS				
5.1	Vital Statistics	2	Lecture	PPT & White board
5.2	Uses of Vital Statistics	2	Lecture	PPT & White board
5.3	Methods of Obtaining Vital Statistics	2	Lecture	PPT & White board
5.4	Crude Death Rate, Specific Death Rates, Standardized Death Rates	4	Chalk & Talk	Black Board
5.5	Mortality Rate, Neo-Natal Mortality Rate, Maternal Mortality Rate	4	Chalk & Talk	Black Board
5.6	Infant – Natural Increase Rate	4	Chalk & Talk	Black Board
5.7	Vital Index – Life Tables.	4	Chalk & Talk	Black Board

Levels	C1	C2	C3	C4	C5	Total Scholastic Marks	Non Scholastic Marks C6	CIA Total	% of Assessment
	T1 10 Mks.	T2 10 Mks.	Quiz 5 Mks.	Assignment 5 Mks	OBT/PPT 5 Mks	35 Mks.	5 Mks.	40Mks.	
K1	2	2	-	-	-	4	-	4	10 %
K2	2	2	5	-	-	9	-	9	22.5 %
K3	3	3	-	-	5	11	-	11	27.5 %
K4	3	3	-	5	-	11	-	11	27.5 %
Non Scholastic	-	-	-	-	-		5	5	12.5 %
Total	10	10	5	5	5	35	5	40	100 %

CIA	
Scholastic	35
Non Scholastic	5
	40

- ✓ **The levels of CIA Assessment based on Revised Bloom's Taxonomy are :**

  K1- Remember, **K2-**Understand, **K3-**Apply, **K4-**Analyse

EVALUATION PATTERN

	SCHOLASTIC				NON - SCHOLASTIC	MARKS		
C1	C2	C3	C4	C5	C6	CIA	ESE	Total
10	10	5	5	5	5	40	60	100

COURSE OUTCOMES

On the successful completion of the course, students will be able to:

NO.	COURSE OUTCOMES	KNOWLEDGE LEVEL (ACCORDING TO REVISED BLOOM'S TAXONOMY)	PSOs ADDRESSED
CO 1	Construct curve fitting.	K3	PSO1& PSO2
CO 2	Define and explain analysis of time series.	K1 & K2	PSO5
CO 3	Explain index numbers	K3 & K4	PSO3
CO 4	Classify interpolation and extrapolation	K3 & K4	PSO3
CO 5	Evaluate birth, death rate, infant mortality and neo natal mortality rate.	K1, K3 & K4	PSO5 & PSO6

Mapping of C0s with PSOs

CO/ PSO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	3	3	2	2	2	2
CO2	2	2	2	2	3	2
CO3	2	2	3	2	2	2
CO4	2	2	3	2	2	2
CO5	2	2	2	2	3	3

Mapping of C0s with POs

CO/ PSO	PO1	PO2	PO3	PO4
CO1				
CO2				
CO3				
CO4				
CO5				

Note: ♦ Strongly Correlated – **3** ♦ Moderately Correlated – **2**

♦ Weakly Correlated -**1**

COURSE DESIGNER:

1. **Mrs. K. Bhuvaneswari**
2. **Ms. K. Mano**

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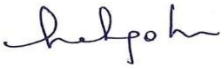

Dr. E. Helena

II B.Sc. STATISTICS

SEMESTER IV

For those who joined in 2019 onwards

Skill Development-100%

PROGRAMME CODE	COURSE CODE	COURSE TITLE	CATEGORY	HRS/WEEK	CREDITS
USST	19ST4AC4	Linear Algebra	Lecture	5	5

COURSE DESCRIPTION

This course will focus on matrix as linear transformations relative to a basis of a vector space.

COURSE OBJECTIVES

To enable the students to understand matrix and vector space concepts which can be applied in Graph Theory, Linear Programming, Physics and Chemistry etc.,

UNIT –I VECTOR SPACES (15 HRS.)

Definition and Examples – Subspaces – Linear Transformation – Span of a set

UNIT –II BASIS AND DIMENSION (15 HRS.)

Linear Independence – Basis and Dimension – Rank and Nullity - Matrix of a Linear Transformation

UNIT –III INNER PRODUCT SPACES (15 HRS.)

Definition and Examples – Orthogonality – Orthogonal Complement

UNIT –IV THEORY OF MATRICES (20 HRS.)

Algebra of Matrices – Types of Matrices – The Inverse of a Matrix – Elementary Transformations. Rank of a Matrix **– Simultaneous Linear Equations – Characteristic Equation and Cayley Hamilton Theorem – Eigen Values and Eigen Vectors (Self Study).**

UNIT –V BILINEAR FORMS (10 HRS.)

Bilinear forms – Quadratic forms

TEXT:

S. Arumugam and A.Thanga Pandi Isaac *Modern Algebra*, Scitech Publications (India) Private Limited (2003). Chapters 5,6,7,8.

REFERENCES:

1. A.R.Vasishtha, *Modern Algebra,* Krishna Prakashan Media (P) Ltd.,Delhi (2006).
2. N.S.Gopalakrishnan, *University Algebra*, New Age International Limited- II Edition (2005).

COURSE CONTENTS & LECTURE SCHEDULE:

Module No.	Topic	No. of Lectures	Teaching Pedagogy	Teaching Aids
UNIT -1 VECTOR SPACES				
1.1	Definition and Examples of Vector Spaces	6	Chalk & Talk	Black Board
1.2	Subspaces	4	Chalk & Talk	Black Board
1.3	Linear Transformation	3	Lecture	PPT & White board
1.4	Span of a set	2	Chalk & Talk	Black Board
UNIT -2 BASIS AND DIMENSION				
2.1	Linear Independence	3	Chalk & Talk	Black Board
2.2	Basis and Dimension	5	Chalk & Talk	Black Board
2.3	Rank and Nullity	3	Chalk & Talk	Black Board
2.4	Matrix of a Linear Transformation	4	Chalk & Talk	Black Board
UNIT- 3 INNER PRODUCT SPACES				
3.1	Definition and Examples of Inner Product Space	5	Chalk & Talk	Black Board
3.2	Orthogonality	5	Chalk & Talk	Black Board
3.3	Orthogonal Complement	5	Chalk & Talk	Black Board
UNIT- 4 THEORY OF MATRICES				

Module No.	Topic	No. of Lectures	Teaching Pedagogy	Teaching Aids
4.1	Algebra of Matrices	3	Lecture	PPT & White board
4.2	Types of Matrices	3	Lecture	PPT & White board
4.3	The Inverse of a Matrix	3	Chalk & Talk	Black Board
4.4	Elementary Transformations. Rank of a Matrix	3	Chalk & Talk	Black Board
4.5	Characteristic Equation and Cayley Hamilton Theorem	3	Discussion	PPT & White board
4.6	Eigen Values and Eigen Vectors.	5	Discussion	Black Board
UNIT- 5 BILINEAR FORMS				
5.1	Bilinear forms	4	Chalk & Talk	Black Board
5.2	Quadratic forms	6	Chalk & Talk	Black Board

Levels	C1	C2	C3	C4	C5	Total Scholastic Marks	Non Scholastic Marks C6	CIA Total	% of Assessment
	T1 10 Mks.	T2 10 Mks.	Quiz 5 Mks.	Assignment 5 Mks	OBT/PPT 5 Mks	35 Mks.	5 Mks.	40Mks.	
K1	2	2	-	-	-	4	-	4	10 %
K2	2	2	5	-	-	9	-	9	22.5 %
K3	3	3	-	-	5	11	-	11	27.5 %
K4	3	3	-	5	-	11	-	11	27.5 %
Non Scholastic	-	-	-	-	-		5	5	12.5 %
Total	10	10	5	5	5	35	5	40	100 %

CIA	
Scholastic	35
Non Scholastic	5
	40

- ✓ **The levels of CIA Assessment based on Revised Bloom's Taxonomy are :**

  K1- Remember, **K2-**Understand, **K3-**Apply, **K4-**Analyse

EVALUATION PATTERN

	SCHOLASTIC				NON - SCHOLASTIC	MARKS		
C1	C2	C3	C4	C5	C6	CIA	ESE	Total
10	10	5	5	5	5	40	60	100

COURSE OUTCOMES

On the successful completion of the course, students will be able to:

NO.	COURSE OUTCOMES	KNOWLEDGE LEVEL (ACCORDING TO REVISED BLOOM'S TAXONOMY)	PSOs ADDRESSED
CO 1	Define Vector Space and explain its various concepts	K1	PSO1
CO 2	Explain basis and dimension	K1, K2,	PSO3
CO 3	Illustrate Inner Product Spaces	K1 & K3	PSO3
CO 4	Define basic concepts of matrices and solve linear equations, Appraise Eigen Value and Eigen Vectors of matrices	K1, K2 & K4	PSO4
CO 5	Describe bilinear forms and quadratic forms	K2 & K4	PSO4

Mapping of C0s with PSOs

CO/ PSO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	3	2	2	2	2	2
CO2	2	2	3	2	2	2
CO3	2	2	3	2	2	2
CO4	2	2	2	3	2	2
CO5	2	2	2	3	2	2

Mapping of C0s with POs

CO/ PSO	PO1	PO2	PO3	PO4
CO1				
CO2				
CO3				
CO4				
CO5				

Note: ♦ Strongly Correlated – **3** ♦ Moderately Correlated – **2**

♦ Weakly Correlated -**1**

COURSE DESIGNER:

1. **Mrs. R. Rajeswari**
2. **Dr. M. Rajeswari**

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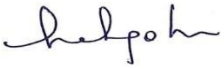

Dr. E. Helena

II B.Sc. STATISTICS

SEMESTER IV

For those who joined in 2019 onwards

Employability-100%

PROGRAMME CODE	COURSE CODE	COURSE TITLE	CATEGORY	HRS/WEEK	CREDITS
USST	19ST4SB2	Practical Statistics II	Lecture & Practical	2	2

COURSE DESCRIPTION

The course provides an application related to the concepts of sampling theory, & sampling distribution for large & small samples.

COURSE OBJECTIVES

To expose the students analyze the statistical techniques in real life situations

1. Fitting of Binomial Distribution
2. Fitting of Poisson Distribution
3. Fitting of Normal Distribution
4. Fitting of Exponential Distribution
5. Fitting of Cauchy Distribution
6. Sampling Theory - Simple Random Sampling, Stratified Random Sampling, Systematic Random Sampling
7. Sampling Distribution for Large Sample
8. Sampling Distribution for Small sampling

Levels	C1	C2	C3	C4	C5	Total Scholastic Marks	Non Scholastic Marks C6	CIA Total	% of Assessment
	T1 10 Mks.	T2 10 Mks.	Quiz 5 Mks.	Assignment 5 Mks	OBT/PPT 5 Mks	35 Mks.	5 Mks.	40Mks.	
K1	2	2	-	-	-	4	-	4	10 %
K2	2	2	5	-	-	9	-	9	22.5 %
K3	3	3	-	-	5	11	-	11	27.5 %
K4	3	3	-	5	-	11	-	11	27.5 %
Non Scholastic	-	-	-	-	-		5	5	12.5 %
Total	10	10	5	5	5	35	5	40	100 %

CIA	
Scholastic	35
Non Scholastic	5
	40

- ✓ **The levels of CIA Assessment based on Revised Bloom's Taxonomy are :**

  K1- Remember, **K2-**Understand, **K3-**Apply, **K4-**Analyse

EVALUATION PATTERN

	SCHOLASTIC				NON - SCHOLASTIC	MARKS		
C1	C2	C3	C4	C5	C6	CIA	ESE	Total
10	10	5	5	5	5	40	60	100

COURSE OUTCOMES

On the successful completion of the course, students will be able to:

NO.	COURSE OUTCOMES	KNOWLEDGE LEVEL (ACCORDING TO REVISED BLOOM'S TAXONOMY)	PSOs ADDRESSED
CO 1	Interpret discrete and continuous distributions.	K2 & K4	PSO1 & PSO2
CO 2	Calculate the sampling distributions for large samples.	K1, K2 & K3	PSO5 & PSO6
CO 3	Calculate the sampling distributions for small samples.	K1, K2 & K3	PSO5 & PSO6

Mapping of C0s with PSOs

CO/ PSO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	3	3	2	2	2	2
CO2	2	2	2	2	3	3
CO3	2	2	2	2	3	3

Mapping of C0s with POs

CO/ PSO	PO1	PO2	PO3	PO4
CO1				
CO2				
CO3				

Note: ♦ Strongly Correlated – **3** ♦ Moderately Correlated – **2**

♦ Weakly Correlated -**1**

COURSE DESIGNER:

1. **Dr. P. Vetriselvi**
2. **Mrs. K. Bhuvaneswari**

Forwarded By

Dr. E. Helena

III B.Sc. STATISTICS

SEMESTER V

For those who joined in 2019 onwards

Skill Development-100%

PROGRAMME CODE	COURSE CODE	COURSE TITLE	CATEGORY	HRS/WEEK	CREDITS
USST	19ST5CC9	Statistical Inference _ II	Lecture	5	4

COURSE DESCRIPTION

The course provides the basics of hypothesis testing with emphasis on some commonly encountered hypothesis tests in statistical data analysis.

COURSE OBJECTIVES

To enable the students have a better understanding on testing of hypothesis in statistical data analysis.

UNIT –I TESTING OF HYPOTHESIS (15 HRS.)

Statistical Hypothesis – Simple and composite hypothesis, Null and alternative Hypothesis, Two types of errors, statistical test, size of a test, level of significance, critical region, power of the test- Steps in solving testingof hypothesis problem - Most powerful test (definition) – Neymann-Pearson lemma – Simple problems based on Binomial, Poisson, Uniform, Normal & exponential distributions.

UNIT –II UNIFORMLY MOST POWERFUL TESTS (15 HRS.)

Power function and power curve(definition) – one parameter exponential family, Monotone likelihood Ratio property- Best critical region - Simple problems based on BCR - UMP tests for the parameters of univariate Normal and Exponential distributions.

UNIT –III LIKELIHOOD RATIO TEST (LRT) (15 HRS.)

Definition of LRT –Parameter space - Properties of LRT tests (Statements only) – Theorem based on LRT - Test for the mean of normal

population - Test for the variance of normal population - **Test for equality of means of 2 independent normal populations – Test for equality of variances of 2 independent normal populations – (**Self Study).

UNIT –IV NON-PARAMETRIC TESTS (15 HRS.)

Sign test, Wilcoxon signed rank test, Median test, Mann-Whitney U test, Runs test- test for randomness.

UNIT –V SEQUENTIAL PROBABILITY RATIO TEST (15 HRS.)

Sequential Probability Ratio Test – Definition and properties of SPRT (without proof), simple problem based on OC and ASN for Binomial, Bernoulli, Poisson & Normal distributions.

TEXT:

1. S.C Gupta and V.K.Kapoor, *Fundamentals of Mathematical Statistics*, Sultan Chand & Sons Pvt. Ltd. New Delhi (2002).
2. S.P. Gupta, *Fundamentals of Statistics*, Sultan Chand & Sons Pvt. Ltd. New Delhi.

REFERENCES:

1. A.M.Mood, F.A.Graybill and D.C.Boes, *Introduction to the theory of Statistics*, McGraw Hill (1974).
2. R.V.Hogg and A.T.Craig, *Introduction to mathematical statistics*, 3rd edition (1972).
3. A.M.Goon, M.K.Gupta and B.Das Gupta, *An outline of statistical theory*, Volume I, 6th revised edition World Press ltd, Calcutta (1980)
4. P.G.Hod, *Introduction to mathematical statistics*, Asia publishing house (1971).
5. V.K.Rohatgi, *An introduction to probability theory and Mathematical Statistics*, Wiley Eastern (1984).
6. Marek Fisz, *Probability theory and Mathematical Statistics*, John Wiley (1961).
7. M.R.Spiegal, *Theory and problems of probability and statistics*, Schaum's outline series, McGraw Hill (1982).

8. G.W.Snedecor and W.G.Cochran, *Statistical methods*,6th edition (1967):

COURSE CONTENTS & LECTURE SCHEDULE:

Module No.	Topic	No. of Lectures	Teaching Pedagogy	Teaching Aids
UNIT -1 TESTING OF HYPOTHESIS				
1.1	Statistical Hypothesis	2	Lecture	PPT & White board
1.2	Simple and composite hypothesis, Null and alternative Hypothesis	2	Chalk & Talk	Black Board
1.3	Two types of errors	2	Lecture	PPT & White board
1.4	statistical test, size of a test, level of significance, critical region	3	Lecture	PPT & White board
1.5	Most powerful test	1	Chalk & Talk	Black Board
1.6	Neymann-Pearson lemma	1	Chalk & Talk	Black Board
1.7	Simple problems based on Binomial, Poisson, Uniform, Normal & exponential distributions.	4	Chalk & Talk	Black Board
UNIT -2 UNIFORMLY MOST POWERFUL TESTS				
2.1	Power function and power curve	2	Lecture	Green Board Charts
2.2	one parameter exponential family, Monotone likelihood ratio property	4	Chalk & Talk	Black Board

Module No.	Topic	No. of Lectures	Teaching Pedagogy	Teaching Aids
2.3	Best critical region	2	Chalk & Talk	Black Board
2.4	Simple problems based on BCR	3	Chalk & Talk	Black Board
2.5	UMP tests for the parameters of univariate Normal and Exponential distributions.	4	Chalk & Talk	Black Board
UNIT 3 LIKELIHOOD RATIO TEST (LRT)				
3.1	Definition of LRT	1	Chalk & Talk	Black Board
3.2	Parameter space - Properties of LRT tests	2	Chalk & Talk	Black Board
3.3	Theorem based on LRT	1	Chalk & Talk	Black Board
3.4	Test for the mean of normal population - Test for the varianceof normal population	4	Chalk & Talk	Black Board
3.5	Test for equality of means of 2 independent normal populations	4	Discussion	Black Board
3.6	Test for equality of variances of 2 independent normal populations	3	Discussion	Black Board
UNIT 4 NON-PARAMETRIC TESTS				
4.1	Sign test, Wilcoxon signed rank test	5	Chalk & Talk	Black Board
4.2	Median test, Mann-Whitney U test	5	Chalk & Talk	Black Board
4.3	Runs test- test for randomness	5	Chalk & Talk	Black Board
UNIT 5 SEQUENTIAL PROBABILITY RATIO TEST				

Module No.	Topic	No. of Lectures	Teaching Pedagogy	Teaching Aids
5.1	Sequential Probability Ratio Test	5	Chalk & Talk	Black Board
5.2	Definition and properties of SPRT	5	Chalk & Talk	Black Board
5.3	Simple problem based on OC and ASN for Binomial, Bernoulli, Poisson & Normal distributions.	5	Chalk & Talk	Black Board

Levels	C1	C2	C3	C4	C5	Total Scholastic Marks	Non Scholastic Marks C6	CIA Total	% of Assessment
	T1 10 Mks.	T2 10 Mks.	Quiz 5 Mks.	Assignment 5 Mks	OBT/PPT 5 Mks	35 Mks.	5 Mks.	40Mks.	
K1	2	2	-	-	-	4	-	4	10 %
K2	2	2	5	-	-	9	-	9	22.5 %
K3	3	3	-	-	5	11	-	11	27.5 %
K4	3	3	-	5	-	11	-	11	27.5 %
Non Scholastic	-	-	-	-	-		5	5	12.5 %
Total	10	10	5	5	5	35	5	40	100 %

CIA	
Scholastic	35
Non Scholastic	5
	40

- ✓ **The levels of CIA Assessment based on Revised Bloom's Taxonomy are :**

  K1- Remember, **K2-**Understand, **K3-**Apply, **K4-**Analyse

EVALUATION PATTERN

	SCHOLASTIC				NON - SCHOLASTIC	MARKS		
C1	C2	C3	C4	C5	C6	CIA	ESE	Total
10	10	5	5	5	5	40	60	100

COURSE OUTCOMES

On the successful completion of the course, students will be able to:

NO.	COURSE OUTCOMES	KNOWLEDGE LEVEL (ACCORDING TO REVISED BLOOM'S TAXONOMY)	PSOs ADDRESSED
CO 1	Describe the process of hypothesis testing and given a statement of a research question, construct an appropriate null and alternative hypothesis to use for hypothesis testing.	K1 & K3	PSO1& PSO2
CO 2	Explain best critical region and carry out UMP test for the parameters of univariate normal and exponential distribution.	K2	PSO5
CO 3	Explain LRT and its properties and test mean and variance of normal population	K3 & K4	PSO5 & PSO6
CO 4	Analyse the basic properties of non parametric statistical techniques Illustrate the significance level as the probability of rejecting a true null hypothesis	K1, K2 & K3	PSO5 & PSO6
CO 5	Illustrate Sequential probability ratio test	K2 & K4	PSO5 & PSO6

Mapping of C0s with PSOs

CO/ PSO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	3	3	2	2	2	2
CO2	2	2	2	2	3	2
CO3	2	2	2	2	3	3
CO4	2	2	2	2	3	3
CO5	2	2	2	2	3	3

Mapping of C0s with POs

CO/ PSO	PO1	PO2	PO3	PO4
CO1				
CO2				
CO3				
CO4				
CO5				

Note: ♦ Strongly Correlated – **3** ♦ Moderately Correlated – **2**

♦ Weakly Correlated -**1**

COURSE DESIGNER:

1. **Dr. P. Vetriselvi**
2. **Ms. D.K. Pon Ovya**

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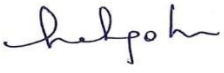

Dr. E. Helena

III B.Sc. STATISTICS

SEMESTER V

For those who joined in 2019 onwards

Skill Development-100%

PROGRAMME CODE	COURSE CODE	COURSE TITLE	CATEGORY	HRS/WEEK	CREDITS
USST	19ST5CC10	Design of Experiment	Lecture	5	4

COURSE DESCRIPTION

This course is introduced to the students to understand the fundamental principles of experimental designs.

COURSE OBJECTIVES

To enable the students understand the fundamentals of experimental designs, analysis tools and techniques, interpretation and applications.

UNIT –I FUNDAMENTAL PRINCIPLES OF EXPERIMENTS (15 HRS.)

Terminology in Experimental statistics – Principles of experimental design - Replication, Randomization and Local Control Techniques

UNIT –II LINEAR MODEL AND ITS CLASSIFICATIONS I (15 HRS.)

Completely Randomized Design (CRD) and its analysis-**Randomized Block Design (RBD) – (**Self Study) and its analysis - **Latin Square Design (LSD) – (**Self Study) and its analysis.

UNIT –III ANALYSIS OF VARIANCE (15 HRS.)

Definition – Assumption – One way classification – Two wayclassification (one observation per cell) - Two way classification with m observation per cell

UNIT –IV LINEAR MODEL AND ITS CLASSIFICATIONS II (15HRS.)

Missing plot technique – Meaning – Analysis of missing plot design (Fisher‟s Rule) –Analysis of RBD with one missing observation - Analysis of

RBD with two missing observation - Analysis of LSD with one missing observation

UNIT –V FACTORIAL EXPERIMENTS (15 HRS.)

Advantages of factorial experiment – Definition 2^2 , 2^3 and 2^n factorial experiments and their analysis – Confounding - Partial and Complete confounding in 2^3 - Split plot design and its analysis, BlBD- definition and parameters .

TEXT:

1. S.C. Gupta and V.K. Kapoor, *Fundamentals of Applied Statistics*, Sultan Chand & Sons (2007).

REFERENCES:

1. D.Montgomery, *Design of Experiments*, John Wiley and Son (2009).
2. M.N.Dass and N.C.Gin, *Design and Analysis of Experiments*, Wiley Eastern, New Delhi (1986)
3. Kempthorne, *Design and Analysis of Experiments*, John Wiley. New York (1956).

COURSE CONTENTS & LECTURE SCHEDULE:

Module No.	Topic	No. of Lectures	Teaching Pedagogy	Teaching Aids
UNIT -1 FUNDAMENTAL PRINCIPLES OF EXPERIMENTS				
1.1	Terminology in experimental statistics	3	Lecture	PPT & White board
1.2	Principles of experimental design	6	Chalk & Talk	Black Board
1.3	Replication, Randomization and Local Control Techniques	6	Chalk & Talk	Black Board
UNIT -2 ANALYSIS OF VARIANCE				
2.1	Definition – Assumption – One way classification	3	Chalk & Talk	Black Board
2.2	Two way classification (one observation per cell)	6	Chalk & Talk	Black Board
2.3	Two way classification with m observation per cell	6	Chalk & Talk	Black Board
UNIT- 3 LINEAR MODEL AND ITS CLASSIFICATIONS I				
3.1	Completely Randomized Design (CRD) and its analysis	5	Chalk & Talk	Black Board
3.2	Randomized Block Design (RBD) and its analysis	5	Discussion	PPT & White board
3.3	Latin Square Design (LSD) and its analysis.	5	Discussion	PPT & White board
UNIT - 4 LINEAR MODEL AND ITS CLASSIFICATIONS II				
4.1	Missing plot technique	2	Chalk & Talk	Black Board
4.2	Analysis of missing plot design	3	Chalk &	Black

Module No.	Topic	No. of Lectures	Teaching Pedagogy	Teaching Aids
	(Fisher‟s Rule)		Talk	Board
4.3	Analysis of RBD with one missing observation	4	Chalk & Talk	Black Board
4.4	Analysis of RBD with two missing observation	3	Chalk & Talk	Black Board
4.5	Analysis of LSD with one missing observation	3	Chalk & Talk	Black Board
UNIT - 5 FACTORIAL EXPERIMENTS				
5.1	Advantages of factorial experiment	2	Chalk & Talk	Black Board
5.2	Definition 2^2 , 2^3 and 2^n factorial experiments and their analysis – Confounding	5	Chalk & Talk	Black Board
5.3	Partial and Complete confounding in 2^3	4	Chalk & Talk	Black Board
5.4	Split plot design and its analysis, BlBD	4	Chalk & Talk	Black Board

Levels	C1 T1 10 Mks.	C2 T2 10 Mks.	C3 Quiz 5 Mks.	C4 Assign ment 5 Mks	C5 OBT/PPT 5 Mks	Total Scholastic Marks 35 Mks.	Non Scholastic Marks C6 5 Mks.	CIA Total 40Mks.	% of Assess ment
K1	2	2	-	-	-	4	-	4	10 %
K2	2	2	5	-	-	9	-	9	22.5 %
K3	3	3	-	-	5	11	-	11	27.5 %
K4	3	3	-	5	-	11	-	11	27.5 %
Non Scholastic	-	-	-	-	-		5	5	12.5 %
Total	10	10	5	5	5	35	5	40	100 %

CIA	
Scholastic	35
Non Scholastic	5
	40

- ✓ **The levels of CIA Assessment based on Revised Bloom's Taxonomy are :**

  K1- Remember, **K2-**Understand, **K3-**Apply, **K4-**Analyse

EVALUATION PATTERN

	SCHOLASTIC				NON - SCHOLASTIC	MARKS		
C1	C2	C3	C4	C5	C6	CIA	ESE	Total
10	10	5	5	5	5	40	60	100

COURSE OUTCOMES

On the successful completion of the course, students will be able to:

NO.	COURSE OUTCOMES	KNOWLEDGE LEVEL (ACCORDING TO REVISED BLOOM'S TAXONOMY)	PSOs ADDRESSED
CO 1	Define and recognize the terminology of experimental design.	K1	PSO1& PSO2
CO 2	Apply and interpret the methods of analysis of variance	K2 & K3	PSO4
CO 3	Analyse CRD, RBD AND LSD	K4	PSO3
CO 4	Analyse missing plot technique I RBD and LSD	K1, K2 & K3	PSO5 & PSO6
CO 5	Design and conduct two level functional factorial designs, split plot design	K1, K2 & K3	PSO5 & PSO6

Mapping of C0s with PSOs

CO/ PSO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	3	3				
CO2				3		
CO3			3			
CO4					3	3
CO5					3	3

Mapping of C0s with POs

CO/ PSO	PO1	PO2	PO3	PO4
CO1				
CO2				
CO3				
CO4				
CO5				

Note: ♦ Strongly Correlated – **3** ♦ Moderately Correlated – **2**

♦ Weakly Correlated -**1**

COURSE DESIGNER:

1. **Dr. P. Vetriselvi**
2. **Ms. D.K. Pon Ovya**

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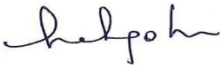

Dr. E. Helena

III B.Sc. STATISTICS

SEMESTER V

For those who joined in 2019 onwards

Skill Development-100%

PROGRAMME CODE	COURSE CODE	COURSE TITLE	CATEGORY	HRS/WEEK	CREDITS
USST	19ST5CC11	Demography	Lecture	5	4

COURSE DESCRIPTION

This course begins by focusing on understanding the core social demographic variables such as fertility, mortality and migration and how these variables influence population growth, composition and structure.

COURSE OBJECTIVES

To enable the students understand how population is examined in relation to its sociological determinants and consequence

UNIT –I DEMOGRAPHY (15 HRS.)

Demography: Definition – Sources of Demographic data - Vital Registration – Population Census -Population Register - Demographic Surveys - Population data as an aid to Social, Economic and Health Planning - Simple Problems

UNIT –II FERTILITY MEASUREMENTS (15 HRS.)

Fertility measurements: Rates and Ratios –Fertility – Factors affecting fertility – Fertility Measures - **Crude Birth Rate (CBR), General, Specific and Total Fertility Rates – (**Self Study) – Growth Rates- Gross and Net Reproduction Rates (GRR, NRR) - Simple Problems.

UNIT –III MORTALITY MEARSUREMENTS (15 HRS.)

Mortality Measurements: Mortality – Mortality Measures - Crude Death Rate (CDR), Age, Sex and Cause Specific Death Rates - Standardized Death Rate - Infant Mortality Rate - - Simple Problems

UNIT –IV LIFE TABLE (15 HRS.)

Life Table: Assumptions, Description of various columns of a Life table and their relationships - Construction of a Life table - Uses of a Life table - Simple Problems

UNIT –V MIGRATION (15 HRS.)

Migration: Definition - Factors affecting Migration - Gross and Net Migration Rates - Projection: Population estimates and Projection – Arithmetic, Geometric and Exponential Growth Rates - Basic ideas of Stationary and Stable population - Simple Problems.

TEXT:

1. A.M.Goon, M.K. Gupta. and Das Gupta, *Fundamentals of Statistics* Vol.II, world press.

2. S.C.Gupta and V.K. Kapoor, *Fundamentals of Applied Statistics*, S.Chand & Co, 4th thoroughly revised edition, New Delhi, Reprint 2009

REFERENCES:

1. D.E. Mishra, *An introduction to the study of population*, South India publishers, Madras.
2. M.L Jhingan, B.K. Bhatt and J.N. Desai, *Demography*, Vrinda Publications Pvt. Ltd, Delhi, 2nd Revised Edition (2003).

COURSE CONTENTS & LECTURE SCHEDULE:

Module No.	Topic	No. of Lectures	Teaching Pedagogy	Teaching Aids
UNIT -1 DEMOGRAPHY				
1.1	Sources of Demographic data	3	Lecture	PPT & White board
1.2	Vital Registration	2	Lecture	PPT & White board
1.3	Population Census and Population Register	3	Lecture	PPT & White board
1.4	Demographic Surveys	2	Lecture	PPT & White board
1.5	Population data as an aid to Social, Economic and Health Planning	2	Lecture	PPT & White board
1.6	Simple Problems	3	Chalk & Talk	Black Board
UNIT -2 FERTILITY MEASUREMENTS				
2.1	Rates and Ratios –Fertility – Factors affecting fertility	4	Chalk & Talk	Black Board
2.2	Fertility Measures - Crude Birth Rate (CBR), General, Specific and Total Fertility Rates	4	Discussion	PPT & White board
2.3	Growth Rates	3	Chalk & Talk	Black Board
2.4	Gross and Net Reproduction Rates (GRR, NRR) - Simple Problems.	4	Chalk & Talk	Black Board
UNIT -3 MORTALITY MEARSUREMENTS				

Module No.	Topic	No. of Lectures	Teaching Pedagogy	Teaching Aids
3.1	Mortality Measures	5	Chalk & Talk	Black Board
3.2	Crude Death Rate (CDR), Age, Sex and Cause Specific Death Rates	5	Chalk & Talk	Black Board
3.3	Standardized Death Rate, Infant Mortality Rate, Simple Problems	5	Chalk & Talk	Black Board
UNIT -4 LIFE TABLE				
4.1	Life Table: Assumptions, Description of various columns of a Life table and their relationships	4	Chalk & Talk	Black Board
4.2	Construction of a Life table	4	Chalk & Talk	Black Board
4.3	Uses of a Life table	2	Chalk & Talk	Black Board
4.4	Simple Problems	5	Chalk & Talk	Black Board
UNIT -5 MIGRATION				
5.1	Factors affecting Migration	3	Chalk & Talk	Black Board
5.2	Gross and Net Migration Rates	3	Chalk & Talk	Black Board
5.3	Population estimates and Projection	2	Chalk & Talk	Black Board
5.4	Arithmetic, Geometric and Exponential Growth Rates	2	Chalk & Talk	Black Board
5.5	Basic ideas of Stationary and Stable population	2	Chalk & Talk	Black Board
5.6	Simple Problems	3	Chalk & Talk	Black Board

Levels	C1 T1 10 Mks.	C2 T2 10 Mks.	C3 Quiz 5 Mks.	C4 Assignment 5 Mks	C5 OBT/PPT 5 Mks	Total Scholastic Marks 35 Mks.	Non Scholastic Marks C6 5 Mks.	CIA Total 40Mks.	% of Assessment
K1	2	2	-	-	-	4	-	4	10 %
K2	2	2	5	-	-	9	-	9	22.5 %
K3	3	3	-	-	5	11	-	11	27.5 %
K4	3	3	-	5	-	11	-	11	27.5 %
Non Scholastic	-	-	-	-	-		5	5	12.5 %
Total	10	10	5	5	5	35	5	40	100 %

CIA	
Scholastic	35
Non Scholastic	5
	40

- ✓ **The levels of CIA Assessment based on Revised Bloom's Taxonomy are :**

  K1- Remember, **K2-**Understand, **K3-**Apply, **K4-**Analyse

EVALUATION PATTERN

	SCHOLASTIC				NON - SCHOLASTIC	MARKS		
C1	C2	C3	C4	C5	C6	CIA	ESE	Total
10	10	5	5	5	5	40	60	100

COURSE OUTCOMES

On the successful completion of the course, students will be able to:

NO.	COURSE OUTCOMES	KNOWLEDGE LEVEL (ACCORDING TO REVISED BLOOM'S TAXONOMY)	PSOs ADDRESSED
CO 1	Explain sources of demographic data.	K1 & K2	PSO1& PSO2
CO 2	Apply fertility measurements such as CBR, TFR, GRR and NRR	K1, K2 & K3	PSO5
CO 3	Compute mortality measures CDR, SDR and infant mortality rate	K2 & K4	PSO5
CO 4	Construct the demographic table	K1, K2 & K3	PSO6
CO 5	Explain the factors affecting migration and the basic ideas of Stationary and Stable population	K1, K2 & K3	PSO6

Mapping of C0s with PSOs

CO/ PSO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	3	3	2	2	2	2
CO2	2	2	2	2	3	2
CO3	2	2	2	2	3	2
CO4	2	2	2	2	3	2
CO5	2	2	2	2	3	2

Mapping of C0s with POs

CO/ PSO	PO1	PO2	PO3	PO4
CO1				
CO2				
CO3				
CO4				
CO5				

Note: ♦ Strongly Correlated – **3** ♦ Moderately Correlated – **2**

♦ Weakly Correlated -**1**

COURSE DESIGNER:

1. **Dr. P. Vetriselvi**
2. **Mrs. K. Bhuvaneswari**

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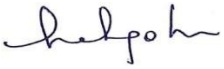

Dr. E. Helena

III B.Sc. STATISTICS

SEMESTER V

For those who joined in 2019 onwards

Skill Development-100%

PROGRAMME CODE	COURSE CODE	COURSE TITLE	CATEGORY	HRS/WEEK	CREDITS
USST	19ST5CC12	Real Analysis	Lecture	5	4

COURSE DESCRIPTION

This course introduces the basic concepts in analysis and to enable the students understand fundamental ideas and theorems in analysis.

COURSE OBJECTIVES

To enable the students understand the basic concepts of sequences and series, connectedness and compactness and proof techniques.

UNIT –I REAL VALUED FUNCTIONS AND REAL SEQUENCE (15 HRS.)

Real valued functions **- equivalence - countability- real numbers –** (Self Study) – least upper bound- definition of sequence and subsequence – limit of a sequence.

UNIT –II CONVERGENT AND DIVERGENT SEQUENCES (15 HRS.)

Convergent sequences –divergent sequences-bounded sequences- monotone sequences- operations on convergent sequences- operations on divergent sequences- Cauchy sequences

UNIT –III SERIES OF REAL NUMBERS (15 HRS.)

Series- convergence and divergence of series – series with non-negative terms – alternating series- conditional convergence and absolute convergence- test for absolute convergence

UNIT –IV LIMITS AND METRIC SPACES (15 HRS.)

Limit if a function on the real line- metric spaces- limit in metric spaces- functions continuous on a metric space- functions continuous on the real line

UNIT –V CONNECTEDNESS, COMPLETENESS AND COMPACTNESS (15 HRS.)

Open sets- closed sets- more about open sets- connected sets- bounded sets- complete metric spaces- compact metric spaces

TEXT:

Richard R. Goldberg, *Methods of Real Analysis*, Oxford & IBH Publishing co. Pvt. Ltd.

REFERENCES:

1. S. Arumugam and A. Thangapandi Issac, *Modern Analysis*
2. Copson, *Metric spaces*, Universal book stall, New Delhi (1989).
3. Walter Rudin, *Mathematical Analysis*, MC-craw hill international, Third edition.

COURSE CONTENTS & LECTURE SCHEDULE:

Module No.	Topic	No. of Lectures	Teaching Pedagogy	Teaching Aids
UNIT -1 REAL VALUED FUNCTIONS AND REAL SEQUENCES				
1.1	Real valued functions	1	Chalk & Talk	Black Board
1.2	Equivalence	1	Discussion	PPT & White board
1.3	Countability, real numbers	2	Discussion	PPT & White board
1.4	Least upper bound	2	Chalk & Talk	Black Board
1.5	Definition of sequence and subsequence	4	Chalk & Talk	Black Board
1.6	Limit of a sequence.	5	Chalk & Talk	Black Board
UNIT -2 CONVERGENT AND DIVERGENT SEQUENCES				
2.1	Convergent sequences	3	Chalk & Talk	Black Board
2.2	Divergent sequences	3	Chalk & Talk	Black Board
2.3	Bounded sequences-monotone sequences	3	Chalk & Talk	Black Board
2.4	Operations on convergent sequences	2	Chalk & Talk	Black Board
2.5	Operations on divergent sequences	2	Chalk & Talk	Black Board
2.6	Cauchy sequences.	2	Chalk & Talk	Black Board

Module No.	Topic	No. of Lectures	Teaching Pedagogy	Teaching Aids
UNIT -3 SERIES OF REAL NUMBERS				
3.1	Convergence and divergence of series	3	Chalk & Talk	Black Board
3.2	Series with non-negative terms	3	Chalk & Talk	Black Board
3.3	Alternating series	3	Chalk & Talk	Black Board
3.4	Conditional convergence and absolute convergence	3	Chalk & Talk	Black Board
3.5	Test for absolute convergence	3	Chalk & Talk	Black Board
UNIT -4 LIMITS AND METRIC SPACES				
4.1	Limit if a function on the real line- metric spaces	4	Chalk & Talk	Black Board
4.2	Limit in metric spaces	3	Chalk & Talk	Black Board
4.3	Functions continuous on a metric space	4	Chalk & Talk	Black Board
4.4	Functions continuous on the real line.	4	Chalk & Talk	Black Board
UNIT -5 CONNECTEDNESS, COMPLETENESS AND COMPACTNESS				
5.1	Open sets	2	Chalk & Talk	Black Board
5.2	Closed sets	2	Chalk & Talk	Black Board
5.3	More about open sets	2	Chalk & Talk	Black Board
5.4	Connected sets	3	Chalk & Talk	Black Board

Module No.	Topic	No. of Lectures	Teaching Pedagogy	Teaching Aids
5.5	Bounded sets	1	Chalk & Talk	Black Board
5.6	Complete metric spaces	3	Chalk & Talk	Black Board
5.7	Compact metric spaces	2	Chalk & Talk	Black Board

Levels	C1	C2	C3	C4	C5	Total Scholastic Marks	Non Scholastic Marks C6	CIA Total	% of Assessment
	T1 10 Mks.	T2 10 Mks.	Quiz 5 Mks.	Assignment 5 Mks	OBT/PPT 5 Mks	35 Mks.	5 Mks.	40Mks.	
K1	2	2	-	-	-	4	-	4	10 %
K2	2	2	5	-	-	9	-	9	22.5 %
K3	3	3	-	-	5	11	-	11	27.5 %
K4	3	3	-	5	-	11	-	11	27.5 %
Non Scholastic	-	-	-	-	-		5	5	12.5 %
Total	10	10	5	5	5	35	5	40	100 %

CIA	
Scholastic	35
Non Scholastic	5
	40

- ✓ **The levels of CIA Assessment based on Revised Bloom's Taxonomy are :**

  K1- Remember, **K2-**Understand, **K3-**Apply, **K4-**Analyse

EVALUATION PATTERN

	SCHOLASTIC				NON - SCHOLASTIC	MARKS		
C1	C2	C3	C4	C5	C6	CIA	ESE	Total
10	10	5	5	5	5	40	60	100

COURSE OUTCOMES

On the successful completion of the course, students will be able to:

NO.	COURSE OUTCOMES	KNOWLEDGE LEVEL (ACCORDING TO REVISED BLOOM'S TAXONOMY)	PSOs ADDRESSED
CO 1	Describe fundamental ideas and theorems on sequences.	K1	PSO1& PSO2
CO 2	Distinguish convergent and divergent sequences	K2 & K4	PSO2
CO 3	Elucidate types and operations on series. Also, analyze the convergent and divergent series using comparison, root, and ratio test.	K3 & K4	PSO3
CO 4	Expound the concepts on limits, metric space and its related properties	K1, K2 & K3	PSO3
CO 5	Explain the concept of connectedness, completeness, compactness and their roles in the real line. Also, organize theorems in a correct mathematical way	K2 & K4	PSO3

Mapping of C0s with PSOs

CO/ PSO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	3	3	2	2	2	2
CO2	2	3	2	2	2	2
CO3	2	2	3	2	2	2
CO4	2	2	3	2	2	2
CO5	2	2	3	2	2	2

Mapping of C0s with POs

CO/ PSO	PO1	PO2	PO3	PO4
CO1				
CO2				
CO3				
CO4				
CO5				

Note: ♦ Strongly Correlated – **3** ♦ Moderately Correlated – **2**

♦ Weakly Correlated -**1**

COURSE DESIGNER:

1. **Mrs. J. Annaal Mercy**
2. **Dr. A. Yuvarani**

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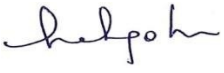

Dr. E. Helena

III B.Sc. STATISTICS

SEMESTER V

For those who joined in 2019 onwards

Employability-60%

PROGRAMME CODE	COURSE CODE	COURSE TITLE	CATEGORY	HRS/WEEK	CREDITS
USST	19ST5ME1	Computer Programming in C	Lecture	3	3

COURSE DESCRIPTION

This course provides skills in designing and writing simple programs in C.

COURSE OBJECTIVES

To enable the students to learn the basic concepts of data input, output, operators, expressions, control statements, arrays, handling of strings and user – defined functions. to write C programs,

UNIT –I C FUNDAMENTALS, OPERATORS AND EXPRESSION (9 HRS.)

Character Set – C Tokens – Keywords and Identifiers – Constants – Variables – Data types – Declaration of Variables – Assigning Values to Variables – Defining Symbolic Constants – Operators & Expressions : Introduction – **Arithmetic of operators – Relational operators – Logical operators – Assignment operators – Increment and decrement operators – Conditional operator – Bitwise operators – Special operators – (**Self Study) – Arithmetic expressions – Evaluation of expressions – Precedence of arithmetic operators – Some computational problems – Type conversions in expressions – Operator precedence and associativity – Mathematical functions.

UNIT –II DATA INPUT, OUTPUT & CONTROL STATEMENTS (9 HRS.)

Reading a character – Writing a character – Formatted input – Formatted output - Decision Making and Branching: IF Statement – the IF ELSE statement – Nesting of IF..ELSE statements – The ELSE IF ladder – The

switch statement - The ?: Operator – the GOTO statement – Decision Making and Looping : The WHILE statement – the DO statement – the FOR statement – Jumps in loops

UNIT –III ARRAYS (9 HRS.)

One Dimensional Array – Two Dimensional Arrays – Initializing Two Dimensional Arrays

UNIT –IV HANDLING OF STRINGS (9 HRS.)

Handling of Character Strings : Declaring and Initializing String Variables – Reading String from Terminal – Writing Strings to Screen – Arithmetic Operations on Characters – Putting Strings together – Comparison of two Strings – String Handling Functions – Table of Strings

UNIT –V USER – DEFINED FUNCTIONS (9 HRS.)

Need for User-Defined Functions – A Multi-function Program – Form of C Functions – Return Values and their Types – Calling a Function – Category of Functions – No Arguments and No Return Values – Arguments but No Return Values – Arguments with Return Values – Handling of Non- Integer Functions – Nesting of Functions – Recursion – Functions with Arrays - the scope and lifetime of variables in functions.

TEXT:

E. Balagurusamy - Programming in ANSI C - Tata McGraw-Hill Publishing Company Ltd. – Sixth Edition - 2014

UNIT I & II : Chapters: 2, 3,4,5,6 **UNIT III** : Chapter: 7: Section 7.1 – 7.6 **UNIT IV** : Chapter 8 **UNIT V** : Chapter: 9

REFERENCES:

1. Byron S. Gotfried - Theory and problems of programming with C (Schaums Series) Tata – McGraw Hills Edition - 1991.

2. Kernighan & Brian. W - The C programming language, Prentice – Hall of India, Private Limited, New Delhi - 1999.

COURSE CONTENTS & LECTURE SCHEDULE:

Module No.	Topic	No. of Lectures	Teaching Pedagogy	Teaching Aids
UNIT -1 C FUNDAMENTALS, OPERATORS AND EXPRESSION				
1.1	Character Set – C Tokens – Keywords and Identifiers	1	Lecture	PPT & White board
1.2	Constants – Variables – Data types – Declaration of Variables – Assigning Values to Variables	1	Chalk & Talk	Black Board
1.3	Defining Symbolic Constants – Operators & Expressions	1	Lecture	PPT & White board
1.4	Arithmetic of operators – Relational operators – Logical operators – Assignment operators	2	Discussion	PPT & White board
1.5	Increment and decrement operators – Conditional operator – Bitwise operators – Special operators	1	Discussion	PPT & White board
1.6	Type conversions in expressions	1	Chalk & Talk	Black Board
1.7	Operator precedence and associativity – Mathematical functions.	2	Lecture	PPT & White board
UNIT -2 DATA INPUT, OUTPUT & CONTROL STATEMENTS				
2.1	Reading a character – Writing a character – Formatted input – Formatted output - Decision Making and Branching	2	Chalk & Talk	Black Board
2.2	IF Statement – the IF ELSE statement – Nesting of IF..ELSE statements – The ELSE IF ladder	2	Chalk & Talk	Black Board

Module No.	Topic	No. of Lectures	Teaching Pedagogy	Teaching Aids
2.3	Decision Making and Looping : The WHILE statement	3	Chalk & Talk	Black Board
2.4	the DO statement – the FOR statement – Jumps in loops	2	Chalk & Talk	Black Board
UNIT -3 ARRAYS				
3.1	One Dimensional Array	3	Chalk & Talk	Black Board
3.2	Two Dimensional Arrays	3	Chalk & Talk	Black Board
3.3	Initializing Two Dimensional Arrays	3	Chalk & Talk	Black Board
UNIT – 4 HANDLING OF STRINGS				
4.1	Declaring and Initializing String Variables – Reading String from Terminal	3	Chalk & Talk	Black Board
4.2	Writing Strings to Screen – Arithmetic Operations on Characters	2	Chalk & Talk	Black Board
4.3	Putting Strings together	1	Chalk & Talk	Black Board
4.4	Comparison of two Strings – String Handling Functions	2	Chalk & Talk	Black Board
4.5	Table of Strings	1	Chalk & Talk	Black Board
UNIT -5 USER – DEFINED FUNCTIONS				
5.1	A Multi-function Program	1	Lecture	PPT & White board
5.2	Form of C Functions	1	Lecture	PPT & White

Module No.	Topic	No. of Lectures	Teaching Pedagogy	Teaching Aids
				board
5.3	Return Values and their Types	2	Chalk & Talk	Black Board
5.4	Category of Functions	2	Lecture	PPT & White board
5.5	Handling of Non-Integer Functions – Nesting of Functions –	2	Chalk & Talk	Black Board
5.6	Functions with Arrays - the scope and lifetime of variables in functions.	1	Lecture	PPT & White board

Levels	C1 T1 10 Mks.	C2 T2 10 Mks.	C3 Quiz 5 Mks.	C4 Assignment 5 Mks	C5 OBT/PPT 5 Mks	Total Scholastic Marks 35 Mks.	Non Scholastic Marks C6 5 Mks.	CIA Total 40Mks.	% of Assessment
K1	2	2	-	-	-	4	-	4	10 %
K2	2	2	5	-	-	9	-	9	22.5 %
K3	3	3	-	-	5	11	-	11	27.5 %
K4	3	3	-	5	-	11	-	11	27.5 %
Non Scholastic	-	-	-	-	-		5	5	12.5 %
Total	10	10	5	5	5	35	5	40	100 %

CIA	
Scholastic	35
Non Scholastic	5
	40

- ✓ **The levels of CIA Assessment based on Revised Bloom's Taxonomy are :**

  K1- Remember, **K2-**Understand, **K3-**Apply, **K4-**Analyse

EVALUATION PATTERN

	SCHOLASTIC				NON - SCHOLASTIC	MARKS		
C1	C2	C3	C4	C5	C6	CIA	ESE	Total
10	10	5	5	5	5	40	60	100

COURSE OUTCOMES

On the successful completion of the course, students will be able to:

NO.	COURSE OUTCOMES	KNOWLEDGE LEVEL (ACCORDING TO REVISED BLOOM'S TAXONOMY)	PSOs ADDRESSED
CO 1	Explain various data types and operators in C	K1 & K2	PSO1
CO 2	Summarize Decision Making Branching, looping statements and arrays	K1, K2 & K4	PSO3 & PSO4
CO 3	Categorize function, pointers and structures	K2, K3 & K4	PSO4 & PSO5
CO 4	Describe Strings and String Handling Functions	K1, K2 & K3	PSO4
CO 5	Create C program for real life problems	K2 & K4	PSO4 & PSO6

Mapping of C0s with PSOs

CO/ PSO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	3	2	2	2	2	2
CO2	2	2	3	3	2	2
CO3	2	2	2	3	3	2
CO4	2	2	2	3	2	2
CO5	2	2	2	3	2	3

Mapping of C0s with POs

CO/ PSO	PO1	PO2	PO3	PO4
CO1				
CO2				
CO3				
CO4				
CO5				

Note: ♦ Strongly Correlated – **3** ♦ Moderately Correlated – **2**

♦ Weakly Correlated -**1**

COURSE DESIGNER:

1. **Dr. E. Helena**
2. **Mrs. B. Vethamary Jacquline**

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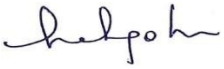


Dr. E. Helena

III B.Sc. STATISTICS

SEMESTER V

For those who joined in 2019 onwards

PROGRAMME CODE	COURSE CODE	COURSE TITLE	CATEGORY	HRS/WEEK	CREDITS
USST	19ST5MEP1	C Practical	Practical	2	2

1. To find the area of a square
2. To find the area of a circle
3. To find the area of a triangle
4. To find Simple interest
5. Solving Quadratic equations
6. Checking primes
7. Arranging numbers in ascending order
8. Reversing digits of a number
9. Finding the values of ncr, npr.
10. Palindrome
11. Matrix addition
12. Matrix multiplication
13. Transpose of a matrix
14. Trace of a matrix
15. Alphabetizing names
16. Mean and Standard deviation
17. To find Correlation Coefficient
18. Straight line fitting by the method of least squares
19. To print n th Fibonacci number
20. To read a series of words form a terminal

III B.Sc. STATISTICS

SEMESTER V

For those who joined in 2019 onwards

Skill Development-100%

PROGRAMME CODE	COURSE CODE	COURSE TITLE	CATEGORY	HRS/WEEK	CREDITS
USST	19ST5ME2	Multivariate Analysis	Lecture	5	5

COURSE DESCRIPTION

The course covers multivariate normal distribution, hotelling T^2 statistics, multivariate classification and discrimination analysis, principal components and cluster analysis.

COURSE OBJECTIVES

To derive statistical inference based on multivariate statistical analysis.

UNIT –I MULTIVARIATE NORMAL DISTRIBUTION (15 HRS.)

Multivariate normal distribution and its properties - **Maximum Likelihood Estimators of parameters, distribution of sample mean vector – (**Self Study), sample dispersion matrix.

UNIT –II PARTIAL AND MULTIPLE CORRELATION COEFFICIENTS (15 HRS.)

Partial and multiple correlation coefficients - Null distribution - Application in testing. Null distribution of Hotelling‟s T2 statistics. Application in tests on mean vector for one and more multivariate normal populations and also on equality of the components of a mean vector in a multivariate normal population

UNIT –III CLASSIFICATION AND DISCRIMINATION (15 HRS.)

Classification and discrimination procedures for discrimination between two multivariate normal populations – Linear Discriminant function, Mahalanobis Distance, tests associated with Discriminant

functions, probabilities of misclassification and their estimation, classification into more than two multivariate normal populations.

UNIT –IV PRINCIPAL COMPONENT ANALYSIS (15 HRS.)

Principal component Analysis, Canonical variables and canonical correlation, clustering-similarity measures- hierarchical algorithms- Single Linkage, Non-hierarchical Clustering

UNIT –V CONTINGENCY TABLES (15 HRS.)

Contingency Tables, Correspondence Analysis for Two Dimension Contingency Table.

TEXT:

1. T.W. Anderson, *An Introduction To Multivariate Statistical Analysis*, 2nd Edition Wiley (1983).
2. R.Johnson and Wichern *Applied Multivariate Statistical Analysis*, Pearson, 6th edition (2008).

REFERENCES:

1. Brain S. Everitt and Graham Dunn, *Applied Multivariate Data Analysis*, 2nd Edition (2001)
2. Neil H.Timm, *Applied Multivariate Analysis*, Springer (2002).
3. Verlag Dallas E. Johnson, *Applied Multivariate Methods For Data Analysts*, Duxbury Press (1998).
4. William.R.Dillon and Mathew Goldstein *Multivariate Analysis Methods and Applications*, John Weily (1984).

COURSE CONTENTS & LECTURE SCHEDULE:

Module No.	Topic	No. of Lectures	Teaching Pedagogy	Teaching Aids
UNIT -1 MULTIVARIATE NORMAL DISTRIBUTION				
1.1	Multivariate normal distribution and its properties	4	Lecture	PPT & White board
1.2	Maximum Likelihood Estimators of parameters	6	Discussion	PPT & White board
1.3	Distribution of sample mean vector, sample dispersion matrix	5	Chalk & Talk	Black Board
UNIT -2 PARTIAL AND MULTIPLE CORRELATION COEFFICIENTS				
2.1	Partial and multiple correlation coefficients- Null distribution	4	Chalk & Talk	Black Board
2.2	Application in testing of Hotelling‟s T2 statistics	4	Chalk & Talk	Black Board
2.3	Application in tests on mean vector for one and more multivariate normal populations	4	Chalk & Talk	Black Board
2.4	equality of the components of a mean vector in a multivariate normal population	3	Chalk & Talk	Black Board
UNIT -3 CLASSIFICATION AND DISCRIMINATION				
3.1	Classification and discrimination procedures for discrimination between two multivariate normal populations	5	Chalk & Talk	Black Board
3.2	Linear discriminant function, Mahalanobis distance, tests associated with discriminant functions	5	Chalk & Talk	Black Board
3.3	Probabilities of misclassification and their estimation, classification into more than two	5	Chalk & Talk	Black Board

Module No.	Topic	No. of Lectures	Teaching Pedagogy	Teaching Aids
	multivariate normal populations			
UNIT- 4 PRINCIPAL COMPONENT ANALYSIS				
4.1	Principal component Analysis	3	Lecture	PPT & White board
4.2	Canonical variables and canonical correlation	3	Chalk & Talk	Black Board
4.3	Clustering-similarity measures	3	Chalk & Talk	Black Board
4.4	Hierarchical algorithms	3	Lecture	PPT & White board
4.5	Single Linkage, Non-hierarchical Cluster	3	Chalk & Talk	Black Board
UNIT -5 CONTINGENCY TABLES				
5.1	Contingency Tables	7	Chalk & Talk	Black Board
5.2	Correspondence Analysis for Two Dimension Contingency Table	8	Chalk & Talk	Black Board

Levels	C1 T1 10 Mks.	C2 T2 10 Mks.	C3 Quiz 5 Mks.	C4 Assignment 5 Mks	C5 OBT/PPT 5 Mks	Total Scholastic Marks 35 Mks.	Non Scholastic Marks C6 5 Mks.	CIA Total 40Mks.	% of Assessment
K1	2	2	-	-	-	4	-	4	10 %
K2	2	2	5	-	-	9	-	9	22.5 %
K3	3	3	-	-	5	11	-	11	27.5 %
K4	3	3	-	5	-	11	-	11	27.5 %
Non Scholastic	-	-	-	-	-		5	5	12.5 %
Total	10	10	5	5	5	35	5	40	100 %

CIA	
Scholastic	35
Non Scholastic	5
	40

- ✓ **The levels of CIA Assessment based on Revised Bloom's Taxonomy are :**

  K1- Remember, **K2-**Understand, **K3-**Apply, **K4-**Analyse

EVALUATION PATTERN

	SCHOLASTIC				NON – SCHOLASTIC	MARKS		
C1	C2	C3	C4	C5	C6	CIA	ESE	Total
10	10	5	5	5	5	40	60	100

COURSE OUTCOMES

On the successful completion of the course, students will be able to:

NO.	COURSE OUTCOMES	KNOWLEDGE LEVEL (ACCORDING TO REVISED BLOOM'S TAXONOMY)	PSOs ADDRESSED
CO 1	Derive the important properties of multivariate normal distribution.	K1	PSO1& PSO2
CO 2	Compute hotelling T^2 statistics test on mean vector and multivariate normal population.	K2 & K4	PSO5
CO 3	Understand how to assess the efficacy of a classification and discrimination analysis.	K2 & K3	PSO5
CO 4	Introduce principal components analysis and clustering methods.	K1, K3 & K4	PSO6
CO 5	Explain and Analyse contingency tables.	K1, K3 & K4	PSO6

Mapping of C0s with PSOs

CO/ PSO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	3	3	2	2	2	2
CO2	2	2	2	2	3	2
CO3	2	2	2	2	3	2
CO4	2	2	2	2	2	3
CO5	2	2	2	2	2	3

Mapping of C0s with POs

CO/ PSO	PO1	PO2	PO3	PO4
CO1				
CO2				
CO3				
CO4				
CO5				

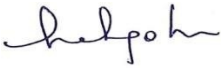
Note: ♦ Strongly Correlated – **3** ♦ Moderately Correlated – **2**

♦ Weakly Correlated -**1**

COURSE DESIGNER:

1. **Dr. P. Vetriselvi**
2. **Mrs. K. Bhuvaneswari**

Forwarded By



Dr. E. Helena

III B.Sc. STATISTICS

SEMESTER V

For those who joined in 2019 onwards

Employability-100%

PROGRAMME CODE	COURSE CODE	COURSE TITLE	CATEGORY	HRS/WEEK	CREDITS
USST	19ST5SB3	Practical Statistics III	Practical	2	2

COURSE DESCRIPTION

The course provides an application based on MLEs, analysis of time series, index numbers and vital statistics & cure fitting.

COURSE OBJECTIVES

To expose the students to the analysis of statistical techniques in real life situations.

1. Confidence interval for proportions means and variances based on Normal distribution.

2. Confidence intervals for means, variances, correlation coefficient

3. Problems based on MLEs.

4. Fitting of a straight line, second degree and Parabola, exponential

5. Analysis of Time Series

6. Index Numbers - Chain index numbers-consumer price index numbers

7. Interpolation and Extrapolation

8. Vital Statistics

Levels	C1	C2	C3	C4	C5	Total Scholastic Marks	Non Scholastic Marks C6	CIA Total	% of Assessment
	T1 10 Mks.	T2 10 Mks.	Quiz 5 Mks.	Assignment 5 Mks	OBT/PPT 5 Mks	35 Mks.	5 Mks.	40Mks.	
K1	2	2	-	-	-	4	-	4	10 %
K2	2	2	5	-	-	9	-	9	22.5 %
K3	3	3	-	-	5	11	-	11	27.5 %
K4	3	3	-	5	-	11	-	11	27.5 %
Non Scholastic	-	-	-	-	-		5	5	12.5 %
Total	10	10	5	5	5	35	5	40	100 %

CIA	
Scholastic	35
Non Scholastic	5
	40

- ✓ **The levels of CIA Assessment based on Revised Bloom's Taxonomy are :**

  K1- Remember, **K2-**Understand, **K3-**Apply, **K4-**Analyse

EVALUATION PATTERN

	SCHOLASTIC				NON – SCHOLASTIC	MARKS		
C1	C2	C3	C4	C5	C6	CIA	ESE	Total
10	10	5	5	5	5	40	60	100

COURSE OUTCOMES

On the successful completion of the course, students will be able to:

NO.	COURSE OUTCOMES	KNOWLEDGE LEVEL (ACCORDING TO REVISED BLOOM'S TAXONOMY)	PSOs ADDRESSED
CO 1	Analyze the problems based on confidence interval for proportions, mean, variances and correlation coefficient.	K1 & K4	PSO1 & PSO2
CO 2	Apply and interpret the methods of curve fitting, time series	K2 & K3	PSO5 & PSO6
CO 3	Analyze the problem based on vital statistics	K2 & K3	PSO5 & PSO6

Mapping of C0s with PSOs

CO/ PSO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	3	3	2	2	2	2
CO2	2	2	2	2	3	3
CO3	2	2	2	2	3	3

Mapping of C0s with POs

CO/ PSO	PO1	PO2	PO3	PO4
CO1				
CO2				
CO3				

Note: ♦ Strongly Correlated – **3** ♦ Moderately Correlated – **2**

♦ Weakly Correlated -**1**

COURSE DESIGNER:

1. **Dr. P. Vetriselvi**
2. **Mrs. K. Bhuvaneswari**

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Dr. E. Helena

III B.Sc. STATISTICS

SEMESTER V

For those who joined in 2019 onwards

Employability-100%

PROGRAMME CODE	COURSE CODE	COURSE TITLE	CATEGORY	HRS/WEEK	CREDITS
USST	19ST5SB4	Statistical software – SPSS	Practical	2	2

COURSE DESCRIPTION

The course is introduced to learn a programming language which helps to handle all aspects of data analysis using statistical software SPSS.

COURSE OBJECTIVES

To expose the students on the applications of statistical analysis using SPSS

1. Diagrammatic Representation Bar Chart, Pie Diagram
2. Construction of Discrete and Continuous Frequency Tables from raw data
3. Graphical Representation - Histogram , Box- Whiskers plot
4. Descriptive Statistics
5. Simple correlation, Rank correlation,
6. Regression Fitting of Poisson distribution
7. Fitting of Normal distribution
8. Parametric tests – Means, Variances and Proportions
9. Chi – square test for goodness of fit
10. Chi – square test for independence samples
11. Non- Parametric tests Sign test, Wilcoxon test, Mann-Whitney U test, Median test, Run test, Kolmogorov Smirnov one sample test, Kruskal Wallis
12. ANOVA – one way and two way
13. Design of Experiment – CRD, RBD, LSD
14. Factorial Experiment - $2^2 2^3$ experiments with total and partial confounding.

Levels	C1 T1 10 Mks.	C2 T2 10 Mks.	C3 Quiz 5 Mks.	C4 Assignment 5 Mks	C5 OBT/PPT 5 Mks	Total Scholastic Marks 35 Mks.	Non Scholastic Marks C6 5 Mks.	CIA Total 40Mks.	% of Assessment
K1	2	2	-	-	-	4	-	4	10 %
K2	2	2	5	-	-	9	-	9	22.5 %
K3	3	3	-	-	5	11	-	11	27.5 %
K4	3	3	-	5	-	11	-	11	27.5 %
Non Scholastic	-	-	-	-	-		5	5	12.5 %
Total	10	10	5	5	5	35	5	40	100 %

CIA	
Scholastic	35
Non Scholastic	5
	40

- ✓ **The levels of CIA Assessment based on Revised Bloom's Taxonomy are :**

  K1- Remember, **K2-**Understand, **K3-**Apply, **K4-**Analyse

EVALUATION PATTERN

	SCHOLASTIC				NON - SCHOLASTIC	MARKS		
C1	C2	C3	C4	C5	C6	CIA	ESE	Total
10	10	5	5	5	5	40	60	100

COURSE OUTCOMES

On the successful completion of the course, students will be able to:

NO.	COURSE OUTCOMES	KNOWLEDGE LEVEL (ACCORDING TO REVISED BLOOM'S TAXONOMY)	PSOs ADDRESSED
CO 1	Understand how to start SPSS and recode variables and prepare data for analysis	K1 & K4	PSO1 & PSO2
CO 2	Conduct descriptive and basic inferential statistics	K2 & K3	PSO3 & PSO4
CO 3	Carry out statistical analysis that can test hypothesis and analyze factorial experiments.	K2 & K3	PSO5 & PSO6

Mapping of C0s with PSOs

CO/ PSO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	3	3				
CO2			3	3		
CO3					3	3

Mapping of C0s with POs

CO/ PSO	PO1	PO2	PO3	PO4
CO1				
CO2				
CO3				

Note: ♦ Strongly Correlated – **3** ♦ Moderately Correlated – **2**

♦ Weakly Correlated -**1**

COURSE DESIGNER:

1. **Mrs. K. Bhuvaneswari**
2. **Ms. K. Saranya**

Forwarded By

Dr. E. Helena

III B.Sc. STATISTICS

SEMESTER VI

For those who joined in 2019 onwards

Skill Development-100%

PROGRAMME CODE	COURSE CODE	COURSE TITLE	CATEGORY	HRS/WEEK	CREDITS
USST	19ST6CC13	Statistical Quality Control	Lecture	5	4

COURSE DESCRIPTION

This course is designed to introduce students to statistical qualitycontrol emphasizing those aspects which are relevant for SQC‟s practical implementation

COURSE OBJECTIVES

. To introduce the students the basics of Statistical Quality Control and to enable them describe quality characteristics and relationships

UNIT–1 STATISTICAL QUALITY CONTROL (15 HRS.)

Basis of Statistical Quality Control - Definition – Benefits – Process control and Product control - Control Limits , Specification Limits and tolerance Limits – Control Charts – Control Limits – **Tools for Statistical Quality Control– (**Self Study) - application of theory of runs in quality control.

UNIT – II CONTROL CHART FOR VARIABLES (15 HRS.)

Control chart for variables – The General theory of Control Chart – **Definition of Control Chart – Learning Outcomes of the Control Charts – (**Self Study) - $\bar{X}$ and R Charts – Control limits for $\bar{X}$ Chart – Control limits for R Chart - Interpretation of control charts X and R. - chart – Basis ofsub grouping - plotting X and R results - determining the trial control limits

UNIT – III CONTROL CHART FOR ATTRIBUTES (15 HRS.)

Control chart for attributes –Control chart for fraction defective (p- chart) – Control chart for number of defectives (d-chart) – Interpretation of p chart – Control chart for number of defects per unit (c-chart) – c- charts for variable sample size – Applications of c-chart

UNIT –IV SAMPLING PLANS (15 HRS.)

Acceptance of sampling plans for attributes - Producer's risk and consumer's risk - concepts of AQL, LTPD, AOQ, AOQL, ATI and ASN – single and double sampling plans - OC, AOQ, ATI curves for single - OC, ASN, ATI curves for Double sampling plans. – Single sampling vs Double sampling plans – Sequential sampling plan.

UNIT –V RELIABILITY (15 HRS.)

Reliability: Definition of reliability – Basic elements of reliability –Bath tub curve - Achievement of reliability – Designing for reliability – measurement an of reliability – cost of reliability - maintenance and reliability – MTBF –– MTTR – Hazard analysis –MTTF –quality and reliability
– Reliability of series , parallel and mixed systems.

TEXT BOOKS:

1. V.K.Kapoor, and S.P.Gupta, *Fundamentals of applied statistics*, Sultan Chand and sons (1978).
2. M. Mahajan, Statistical Quality Control (2005).

REFERENCE BOOKS:

1. E.L. Grant, and R.S. Laven Worth, *Statistical Quality Control*, McGraw Hill.
2. R.C.Gupta, *Statistical Quality Control* (1974).
3. D.C.Montgomery, *Introduction to Statistical Quality Control*, John Waley & Sons (1983).
4. S.K.Ekambaram, *Statistical basis of Acceptance sampling*, Asia Publishing House(1963).

COURSE CONTENTS & LECTURE SCHEDULE:

Module No.	Topic	No. of Lectures	Teaching Pedagogy	Teaching Aids
UNIT -1 STATISTICAL QUALITY CONTROL				
1.1	Basis of Statistical Quality Control	2	Lecture	PPT & White board
1.2	Process control and Product control	3	Lecture	PPT & White board
1.3	Control Limits , Specification Limits and tolerance Limits	3	Lecture	PPT & White board
1.4	Control Charts – Control Limits	3	Chalk & Talk	Black Board
1.5	Tools for Statistical Quality Control	2	Discussion	PPT & White board
1.6	Application of theory of runs in quality	2	Chalk & Talk	Black Board
UNIT -2 CONTROL CHART FOR VARIABLES				
2.1	Control chart for variables	2	Chalk & Talk	Black Board
2.2	The General theory of Control Chart – Definition of Control Chart – Learning Outcome‟s of the Control Charts	4	Discussion	PPT & White board
2.3	$\bar{X}$ and R Charts, Control limits for $\bar{X}$ Chart	3	Chalk & Talk	Black Board
2.4	Control limits for R Chart	3	Chalk & Talk	Black Board
2.5	Interpretation of control charts X and R. - chart – Basis of sub grouping - plotting X and R	3	Chalk & Talk	Black Board

Module No.	Topic	No. of Lectures	Teaching Pedagogy	Teaching Aids
	results			
UNIT -3 CONTROL CHART FOR ATTRIBUTES				
3.1	Control chart for attributes – Control chart for fraction defective (p-chart)	3	Chalk & Talk	Black Board
3.2	Control chart for number of defectives (d-chart)	3	Chalk & Talk	Black Board
3.3	Interpretation of p chart	3	Chalk & Talk	Black Board
3.4	Control chart for number of defects per unit (c-chart)	3	Chalk & Talk	Black Board
3.5	charts for variable sample size	3	Chalk & Talk	Black Board
UNIT -4 SAMPLING PLANS				
4.1	Acceptance of sampling plans for attributes	4	Chalk & Talk	Black Board
4.2	Producer's risk and consumer's risk	3	Chalk & Talk	Black Board
4.3	Concepts of AQL, LTPD, AOQ, AOQL, ATI and ASN	4	Chalk & Talk	Black Board
4.4	Single and double sampling plans , Double sampling plans	4	Chalk & Talk	Black Board
UNIT -5 RELIABILITY				
5.1	Definition–Bath tub curve - Achievement of reliability	3	Chalk & Talk	Black Board
5.2	Designing for reliability – measurement an of reliability – cost of reliability	4	Chalk & Talk	Black Board
5.3	Maintenance and reliability – MTBF –– MTTR – Hazard	4	Chalk & Talk	Black Board

Module No.	Topic	No. of Lectures	Teaching Pedagogy	Teaching Aids
	analysis –MTTF			
5.4	Quality and reliability – Reliability of series, parallel and mixed systems.	4	Chalk & Talk	Black Board

Levels	C1 T1 10 Mks.	C2 T2 10 Mks.	C3 Quiz 5 Mks.	C4 Assignment 5 Mks	C5 OBT/PPT 5 Mks	Total Scholastic Marks 35 Mks.	Non Scholastic Marks C6 5 Mks.	CIA Total 40Mks.	% of Assessment
K1	2	2	-	-	-	4	-	4	10 %
K2	2	2	5	-	-	9	-	9	22.5 %
K3	3	3	-	-	5	11	-	11	27.5 %
K4	3	3	-	5	-	11	-	11	27.5 %
Non Scholastic	-	-	-	-	-		5	5	12.5 %
Total	10	10	5	5	5	35	5	40	100 %

CIA	
Scholastic	35
Non Scholastic	5
	40

- ✓ **The levels of CIA Assessment based on Revised Bloom's Taxonomy are :**

  K1- Remember, **K2-**Understand, **K3-**Apply, **K4-**Analyse

EVALUATION PATTERN

	SCHOLASTIC				NON - SCHOLASTIC	MARKS		
C1	C2	C3	C4	C5	C6	CIA	ESE	Total
10	10	5	5	5	5	40	60	100

COURSE OUTCOMES

On the successful completion of the course, students will be able to:

NO.	COURSE OUTCOMES	KNOWLEDGE LEVEL (ACCORDING TO REVISED BLOOM'S TAXONOMY)	PSOs ADDRESSED
CO 1	Describe the use of control charts	K1	PSO1& PSO2
CO 2	Demonstrate the ability to design, use and interpret control charts for variables.	K2	PSO4
CO 3	Identify the difference between $\bar{X}$, R, p, np and C charts.	K1 & K3	PSO2 & PSO5
CO 4	Explain the process of acceptance sampling and describe the use of OC curve.	K1, K2 & K3	PSO5
CO 5	Make use of the concept of Reliability and examine its uses in problems of quality and cost.	K3 & K4	PSO5 & PSO6

Mapping of C0s with PSOs

CO/ PSO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	3	3	2	2	2	2
CO2	2	2	2	3	2	2
CO3	2	3	2	2	3	2
CO4	2	2	2	2	3	2
CO5	2	2	2	2	3	3

Mapping of C0s with POs

CO/ PSO	PO1	PO2	PO3	PO4
CO1				
CO2				
CO3				
CO4				
CO5				

Note: ♦ Strongly Correlated – **3** ♦ Moderately Correlated – **2**

♦ Weakly Correlated -**1**

COURSE DESIGNER:

1. **Dr. P. Vetriselvi**
2. **Mrs. K. Bhuvaneswari**

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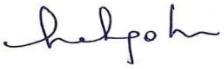

Dr. E. Helena

III B.Sc. STATISTICS

SEMESTER VI

For those who joined in 2019 onwards

Skill Development-100%

PROGRAMME CODE	COURSE CODE	COURSE TITLE	CATEGORY	HRS/WEEK	CREDITS
USST	19ST6CC14	Stochastic Processes	Lecture	5	4

COURSE DESCRIPTION

This course covers Markov chains in discrete time, the Poisson process and the Markov processes in continuous time

COURSE OBJECTIVES

To expose the students to the basics of stochastic process and to clarify Markov chain, Poisson process and pure birth

UNIT –I STOCHASTIC PROCESSES (15 HRS.)

Definition of stochastic process, classification of stochastic process according to time parameter space and state space - examples of stochastic process. Concept of Stationary and independent increment process

UNIT –II MARKOV CHAIN (15 HRS.)

Markov chain – definitions and examples – higher transition probabilities – Chapman – Kolmogorov equations (discrete) - simple problems only.

UNIT –III POISSON PROCESS (15 HRS.)

. **Poisson Process – (**Self Study) – Postulates – Properties – Related distributions – exponential, uniform, geometric and **negative binomial distributions – (**Self Study).

UNIT –IV BIRTH AND DEATH PROCESS (15 HRS.)

Pure Birth Process – Yule-Fury process – Birth and Death Process – Immigration - Emigration processes

UNIT –V TIME SERIES (15 HRS.)

Time Series - **Introduction Moving Average Process – (**Self Study) – Autoregressive Process - Autoregressive Process of Order Two – Autoregressive Moving Average process (ARMA Process

TEXT BOOKS:

1. **J.** Medhi, *Stochastic Process*, New age International, $4^{t}{}_{h}$ edition (2009).

   Chapter 1(1.5,) Chapter 2(2.1, 2.2), chapter 3(3.1, 3.2, 3.3.3, 3.4), Chapter10(10.1, 10.2).
2. T. Veerarajan, *Probability, Statistics and Random Processes*, Second edition, Tata McGraw-Hill Publishing Company Ltd., New Delhi (2003).

REFERENCE BOOKS:

1. W. Feller, *Introduction to Probability Theory and its Applications*, Volume I, Wiley Eastern Ltd, New York (1972).
2. S. Karlin and H.M.Taylor, *A Fist course in Stochastic Processes*, Academic Press, New York (1975).
3. S.M. Ross, *Stochastic Processes*, John Wiley and Sons, New York (1983).

COURSE CONTENTS & LECTURE SCHEDULE:

Module No.	Topic	No. of Lectures	Teaching Pedagogy	Teaching Aids
UNIT -1 STOCHASTIC PROCESS				
1.1	Definition of stochastic process	3	Lecture	PPT & White board
1.2	Classification of stochastic process according to time parameter space and state space-	4	Chalk & Talk	Black Board
1.3	Examples of stochastic process	4	Chalk & Talk	Black Board
1.4	Concept of Stationary and independent increment process.	4	Chalk & Talk	Black Board
UNIT -2 MARKOV CHAIN				
2.1	Markov chain	3	Chalk & Talk	Black Board
2.2	Higher transition probabilities	4	Chalk & Talk	Black Board
2.3	Chapman – Kolmogorov equations	4	Chalk & Talk	Black Board
2.4	Simple problems	4	Chalk & Talk	Black Board
UNIT -3 POISSON PROCESS				
3.1	Poisson Process– Postulates	3	Chalk & Talk	Black Board
3.2	Properties – Related distributions	5	Chalk & Talk	Black Board
3.3	Exponential, uniform, geometric and negative binomial distribution	7	Discussion	PPT & White Board

Module No.	Topic	No. of Lectures	Teaching Pedagogy	Teaching Aids
UNIT -4 BIRTH AND DEATH PROCESS				
4.1	Pure Birth Process	4	Chalk & Talk	Black Board
4.2	Yule-Fury process	4	Chalk & Talk	Black Board
4.3	Birth and Death Process	4	Chalk & Talk	Black Board
4.4	Immigration - Emigration processes	3	Chalk & Talk	Black Board
UNIT -5 TIME SERIES				
5.1	Introduction Moving Average Process	3	Discussion	PPT & White Board
5.2	Autoregressive Process	4	Chalk & Talk	Black Board
5.3	Autoregressive Process of Order Two	4	Chalk & Talk	Black Board
5.4	Autoregressive Moving Average process (ARMA Process) -	4	Chalk & Talk	Black Board

Levels	C1	C2	C3	C4	C5	Total Scholastic Marks	Non Scholastic Marks C6	CIA Total	% of Assessment
	T1 10 Mks.	T2 10 Mks.	Quiz 5 Mks.	Assignment 5 Mks	OBT/PPT 5 Mks	35 Mks.	5 Mks.	40Mks.	
K1	2	2	-	-	-	4	-	4	10 %
K2	2	2	5	-	-	9	-	9	22.5 %
K3	3	3	-	-	5	11	-	11	27.5 %
K4	3	3	-	5	-	11	-	11	27.5 %
Non Scholastic	-	-	-	-	-		5	5	12.5 %
Total	10	10	5	5	5	35	5	40	100 %

CIA	
Scholastic	35
Non Scholastic	5
	40

- ✓ **The levels of CIA Assessment based on Revised Bloom's Taxonomy are :**

  K1- Remember, **K2-**Understand, **K3-**Apply, **K4-**Analyse

EVALUATION PATTERN

	SCHOLASTIC				NON - SCHOLASTIC	MARKS		
C1	C2	C3	C4	C5	C6	CIA	ESE	Total
10	10	5	5	5	5	40	60	100

COURSE OUTCOMES

On the successful completion of the course, students will be able to:

NO.	COURSE OUTCOMES	KNOWLEDGE LEVEL (ACCORDING TO REVISED BLOOM'S TAXONOMY)	PSOs ADDRESSED
CO 1	Explain the concept of stochastic proc and stationary and appreciate significance	K1 & K2	PSO1& PSO2
CO 2	Compute probabilities of transition between states and identify classes of states in Markov chains and characterize the classes	K1, K2 & K3	PSO3
CO 3	Explain Poisson process and its related distributions	K1, K2 & K3	PSO3
CO 4	Demonstrate the knowledge in Pure and Death process	K1 & K2	PSO5
CO 5	Compute moving averages using various methods	K2 & K4	PSO5 & PSO6

Mapping of C0s with PSOs

CO/ PSO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	3	3	2	2	2	2
CO2	2	2	3	2	2	2
CO3	2	2	3	2	2	2
CO4	2	2	2	2	3	2
CO5	2	2	2	2	3	3

Mapping of C0s with POs

CO/ PSO	PO1	PO2	PO3	PO4
CO1				
CO2				
CO3				
CO4				
CO5				

Note: ♦ Strongly Correlated – **3** ♦ Moderately Correlated – **2**

♦ Weakly Correlated -**1**

COURSE DESIGNER:

1. **Dr. P. Vetriselvi**
2. **Mrs. K. Bhuvaneswari**

Forwarded By

Dr. E. Helena

III B.Sc. STATISTICS

SEMESTER VI

For those who joined in 2019 onwards

Entrepreneurship-60% &
Employability-40%

PROGRAMME CODE	COURSE CODE	COURSE TITLE	CATEGORY	HRS/WEEK	CREDITS
USST	19ST6CC15	Actuarial statistics	Lecture	5	5

COURSE DESCRIPTION

The course covers the applications of insurance and finance.

COURSE OBJECTIVES

The Actuarial statistics curriculum aims at providing the academicsand professional training to students who wish to join the actuarial profession

UNIT –I SIMPLE & COMPOUND INTEREST (15 HRS.)

Elements of simple & compound interest - nominal rate of interest i(m) and effective rate of interest i – Force of interest δ - relationship between different rates of interest- expression for δ by use of calculus - relationship between nominal and effective rates of interest - present value – varying rates of interest – equation of value – equated time – **simple discount – discount & discounted value – (**Self Study**).**

UNIT –II ANNUITIES (15 HRS.)

Annuities – immediate annuity – annuity due – perpetuity - deferred annuities - present values, accumulated amounts of annuities. Increasingand decreasing annuities.

UNIT –III REDEMPTION OF LOANS (15 HRS.)

Redemption of Loans – Amortization and Sinking Funds - Average Yield of interest on the Life Fund of an insurance office. Simple Problems

UNIT –IV PREMIUM (15 HRS.)

Premiums; general principles, natural premiums, office & net premiums, loading for expenses with and without profit premiums, adequacy of premiums, relative consistency. Simple Problems.

UNIT –V POLICY VALUES (15 HRS.)

Policy values - retrospective and prospective policies; Surplus – sources of surplus, distribution of surplus.

TEXT BOOKS:

1. Dixit, S.P., Modi, C.S., Joshi, R.V.(2000): Mathematical Basis of life Assurance, IC-81 (Published by Insurance Institute of India, Bombay - 400001).
2. Frank Ayers, J.R. (1983): Theory and problems of mathematics of finance, Schaum‟s outline series, McGraw-Hill book company, Singapore.

REFERENCE BOOKS:

1. Donald, D.W.A. (1975): Compound Interest and Annuities certain, Heinemann, London
2. Zima, P. and Brown, R.L. (2005): Theory and problems of mathematics of finance, 2nd edition, Tata McGraw - Hill.

COURSE CONTENTS & LECTURE SCHEDULE:

Module No.	Topic	No. of Lectures	Teaching Pedagogy	Teaching Aids
UNIT -1 SIMPLE & COMPOUND INTEREST				
1.1	Elements of simple & compound interest	1	Chalk & Talk	Black Board
1.2	nominal rate of interest i(m) and effective rate of interest i	2	Chalk & Talk	Black Board
1.3	Force of interest δ	1	Lecture	PPT & White board
1.4	relationship between different rates of interest	2	Chalk & Talk	Black Board
1.5	expression for δ by use of calculus	2	Chalk & Talk	Black Board
1.6	relationship between nominal and effective rates of interest	2	Lecture	PPT & White board
1.7	present value, varying rates of interest	2	Chalk & Talk	Black Board
1.8	equation of value, equated time	2	Chalk & Talk	Black Board
1.9	simple discount, discount & discounted value	1	Discussion	PPT & White board
UNIT -2 ANNUITIES				
2.1	Annuities, immediate annuity, annuity due	4	Lecture	PPT & White board
2.2	Perpetuity, deferred annuities	3	Lecture	PPT & White board
2.3	Present values, accumulated	4	Lecture	PPT & White

Module No.	Topic	No. of Lectures	Teaching Pedagogy	Teaching Aids
	amounts of annuities			board
2.4	Increasing and decreasing annuities	4	Lecture	PPT & White board
UNIT -3 REDEMPTION OF LOANS				
3.1	Redemption of Loans	3	Chalk & Talk	Black Board
3.2	Amortization and Sinking Funds	3	Chalk & Talk	Black Board
3.3	Average yield of interest on the Life Fund of an insurance office	4	Chalk & Talk	Black Board
3.4	Simple Problems	5	Chalk & Talk	Black Board
UNIT -4 PREMIUM				
4.1	Premiums; general principles, natural premiums	3	Lecture	PPT & White board
4.2	Office and net premiums	2	Lecture	PPT & White board
4.3	Loading for expenses with and without profit premiums	3	Lecture	PPT & White board
4.4	Adequacy of premiums, relative consistency	2	Chalk & Talk	Black Board
4.5	Simple Problems.	5	Chalk & Talk	Black Board
UNIT -5 POLICY VALUES				
5.1	Retrospective and prospective policies	4	Lecture	PPT & White board

Module No.	Topic	No. of Lectures	Teaching Pedagogy	Teaching Aids
5.2	Surplus	3	Lecture	PPT & White board
5.3	Sources of surplus	4	Lecture	PPT & White board
5.4	Distribution of surplus.	4	Lecture	PPT & White board

Levels	C1	C2	C3	C4	C5	Total Scholastic Marks	Non Scholastic Marks C6	CIA Total	% of Assessment
	T1 10 Mks.	T2 10 Mks.	Quiz 5 Mks.	Assignment 5 Mks	OBT/PPT 5 Mks	35 Mks.	5 Mks.	40Mks.	
K1	2	2	-	-	-	4	-	4	10 %
K2	2	2	5	-	-	9	-	9	22.5 %
K3	3	3	-	-	5	11	-	11	27.5 %
K4	3	3	-	5	-	11	-	11	27.5 %
Non Scholastic	-	-	-	-	-		5	5	12.5 %
Total	10	10	5	5	5	35	5	40	100 %

CIA	
Scholastic	35
Non Scholastic	5
	40

- ✓ **The levels of CIA Assessment based on Revised Bloom's Taxonomy are :**

  K1- Remember, **K2-**Understand, **K3-**Apply, **K4-**Analyse

EVALUATION PATTERN

	SCHOLASTIC				NON - SCHOLASTIC	MARKS		
C1	C2	C3	C4	C5	C6	CIA	ESE	Total
10	10	5	5	5	5	40	60	100

COURSE OUTCOMES

On the successful completion of the course, students will be able to:

NO.	COURSE OUTCOMES	KNOWLEDGE LEVEL (ACCORDING TO REVISED BLOOM'S TAXONOMY)	PSOs ADDRESSED
CO 1	Calculate quantities such as SI & CI, nominal and effective rates of interest and simple discount	K1 & K2	PSO1& PSO2
CO 2	Recognize simple assurance and annuities contracts and develop formulae for the present value of payments	K1, K2 & K3	PSO3
CO 3	Explain the concepts of redemption of loans	K1 & K3	PSO5
CO 4	Construct the demographic statistics and premiums	K3 & K4	PSO5
CO 5	Describe the policy values and its types	K2 & K4	PSO6

Mapping of C0s with PSOs

CO/ PSO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	3	3	2	2	2	2
CO2	2	2	3	2	2	2
CO3	2	2	2	2	3	2
CO4	2	2	2	2	3	2
CO5	2	2	2	2	2	3

Mapping of C0s with POs

CO/ PSO	PO1	PO2	PO3	PO4
CO1				
CO2				
CO3				
CO4				
CO5				

Note: ♦ Strongly Correlated – **3** ♦ Moderately Correlated – **2**

♦ Weakly Correlated -**1**

COURSE DESIGNER:

1. **Dr. P. Vetriselvi**
2. **Ms. D. K. Pon Ovya**

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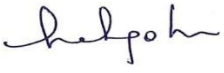


Dr. E. Helena

III B.Sc. STATISTICS

SEMESTER VI

For those who joined in 2019 onwards

Skill Development-100%

PROGRAMME CODE	COURSE CODE	COURSE TITLE	CATEGORY	HRS/WEEK	CREDITS
USST	19ST6ME3	Numerical Methods	Lecture	5	5

COURSE DESCRIPTION

This course enables the students to solve equations using various Numerical Methods

COURSE OBJECTIVES

To enable the students to solve Algebraic, Transcendental, Differential Equations using various Numerical methods like Bisection, Runge-Kutta, Euler and Taylor

UNIT –I ALGEBRAIC AND TRANSCENDENTAL EQUATIONS (15 HRS.)

Introduction - Bisection method - Iteration method – Regula-falsi method – Newton-Raphson method. (No derivations).

UNIT –II SIMULTANEOUS LINEAR ALGEBRAIC EQUATIONS (15 HRS.)

Introduction- – Gauss Elimination method – Gauss Jordan method – Calculation of inverse of a matrix – Gauss Jacobi Iteration method – Gauss-Seidel iteration method.(No derivations).

UNIT –III FINITE DIFFERENCES & INTERPOLATION (15 HRS.)

. **Difference operators – Other difference operators-Relation between the operators – (**Self Study) - Newton‟s forward Interpolation formula- **Newton's backward Interpolation formula – (**Self Study) – Gauss forward Interpolation formula - **Gauss backward Interpolation formula –(**Self Study) – Stirling‟s formula - Lagrange‟s interpolation formula – Divided difference – Newton‟s Divided difference formula – Inverse interpolation.(No derivations

UNIT –IV NUMERICAL DIFFERENTIATION AND INTEGRATION (15 HRS.)

Derivatives using Newton‟s forward difference formula-Derivatives using Newton‟s backward difference formula- Derivatives using Central difference formula-Maxima and minima of the interpolating polynomial- Numerical Integration – Trapezoidal Rule – Simpson‟s one third rule.(No derivations

UNIT –V NUMERICAL SOLUTION OF DIFFERENTIAL EQUATION (15 HRS.)

Taylor series method – Picard‟s method – Euler‟s method – Modified Euler‟s method- Runge -Kutta methods –Second order Runge-Kutta method-Higher order Runge-Kutta method Predictor-Corrector formulae-Milne‟s Predictor-Corrector formulae-Adam‟s Predictor- Corrector equations.(No derivations

TEXT BOOK:

M.K.Venkataraman, *Numerical Methods in Science and Engineering*, The National publishing company, fifth edition.

REFERENCES:

1. S.Arumugam, Thangapandi Isaac and A. Soma Sundaram, *Numerical Analysis*, New Gamma Publishing House (2007).
2. S.S.Sastry**,** *Introductory Methods of Numerical analysis*, Prentice Hall of India Private Limited (1991)

COURSE CONTENTS & LECTURE SCHEDULE:

Module No.	Topic	No. of Lectures	Teaching Pedagogy	Teaching Aids
UNIT -1 ALGEBRAIC AND TRANSCENDENTAL EQUATIONS				
1.1	Bisection method	3	Chalk & Talk	Black Board
1.2	Iteration method	4	Chalk & Talk	Black Board
1.3	Regula-falsi method	4	Chalk & Talk	Black Board
1.4	Newton-Raphson method	4	Chalk & Talk	Black Board
UNIT -2 SIMULTANEOUS LINEAR ALGEBRAIC EQUATIONS				
2.1	Gauss Elimination method	3	Chalk & Talk	Black Board
2.2	Gauss Jordan method	3	Chalk & Talk	Black Board
2.3	Calculation of inverse of a matrix	3	Chalk & Talk	Black Board
2.4	Gauss Jacobi Iteration method	3	Chalk & Talk	Black Board
2.5	Gauss-Seidel iteration method	3	Chalk & Talk	Black Board
UNIT -3 FINITE DIFFERENCES & INTERPOLATION				
3.1	Difference operators	1	Chalk & Talk	Black Board
3.2	Newton‟s forward Interpolation formula and Newton‟s backward Interpolation formula	3	Chalk & Talk	Black Board
3.3	Gauss forward Interpolation formula and Gauss backward	3	Chalk & Talk	Black Board

Module No.	Topic	No. of Lectures	Teaching Pedagogy	Teaching Aids
	Interpolation formula			
3.4	Stirling‟s formula	3	Chalk & Talk	Black Board
3.5	Lagrange‟s interpolation formula Divided difference	2	Chalk & Talk	Black Board
3.6	Newton‟s Divided difference formula – Inverse interpolation	3	Chalk & Talk	Black Board
UNIT -4 NUMERICAL DIFFERENTIATION AND INTEGRATION				
4.1	Derivatives using Newton‟s forward difference formula- Derivatives using Newton‟s backward difference formula	4	Chalk & Talk	Black Board
4.2	Derivatives using Central difference formula	3	Chalk & Talk	Black Board
4.3	Maxima and minima of the interpolating polynomial	3	Chalk & Talk	Black Board
4.4	Numerical Integration: Trapezoidal Rule	2	Chalk & Talk	Black Board
4.5	Simpson‟s one third rule	3	Chalk & Talk	Black Board
UNIT -5 NUMERICAL SOLUTION OF DIFFERENTIAL EQUATION				
5.1	Taylor series method	2	Chalk & Talk	Black Board
5.2	Picard‟s method – Euler‟s method	2	Chalk & Talk	Black Board
5.3	Modified Euler‟s method- Runge -Kutta methods	2	Chalk & Talk	Black Board
5.4	Second order Runge-Kutta method-Higher order Runge-Kutta method Predictor-	3	Chalk & Talk	Black Board

Module No.	Topic	No. of Lectures	Teaching Pedagogy	Teaching Aids
5.5	Corrector formulae-Milne‟s Predictor	3	Chalk & Talk	Black Board
5.6	Corrector formulae-Adam‟s Predictor	3	Chalk & Talk	Black Board

Levels	C1	C2	C3	C4	C5	Total Scholastic Marks	Non Scholastic Marks C6	CIA Total	% of Assessment
	T1 10 Mks.	T2 10 Mks.	Quiz 5 Mks.	Assignment 5 Mks	OBT/PPT 5 Mks	35 Mks.	5 Mks.	40Mks.	
K1	2	2	-	-	-	4	-	4	10 %
K2	2	2	5	-	-	9	-	9	22.5 %
K3	3	3	-	-	5	11	-	11	27.5 %
K4	3	3	-	5	-	11	-	11	27.5 %
Non Scholastic	-	-	-	-	-		5	5	12.5 %
Total	10	10	5	5	5	35	5	40	100 %

CIA	
Scholastic	35
Non Scholastic	5
	40

- ✓ **The levels of CIA Assessment based on Revised Bloom's Taxonomy are :**

  K1- Remember, **K2-**Understand, **K3-**Apply, **K4-**Analyse

EVALUATION PATTERN

	SCHOLASTIC				NON - SCHOLASTIC	MARKS		
C1	C2	C3	C4	C5	C6	CIA	ESE	Total
10	10	5	5	5	5	40	60	100

COURSE OUTCOMES

On the successful completion of the course, students will be able to:

NO.	COURSE OUTCOMES	KNOWLEDGE LEVEL (ACCORDING TO REVISED BLOOM'S TAXONOMY)	PSOs ADDRESSED
CO 1	Solve algebraic and transcendental equations using various methods	K1 & K2	PSO1& PSO2
CO 2	Identify the various methods of solving simultaneous linear algebraic equations	K1, K2 & K3	PSO3
CO 3	Recognize difference operators and apply the concept of interpolation.	K1 & K3	PSO4
CO 4	Compute the values of the derivatives at some point using numerical differentiation and integration.	K3 & K4	PSO3
CO 5	Compute numerical solution of differential equation	K3 & K4	PSO3

Mapping of C0s with PSOs

CO/ PSO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	3	3	2	2	2	2
CO2	2	2	3	2	2	2
CO3	2	2	2	3	2	2
CO4	2	2	3	2	2	2
CO5	2	2	3	2	2	2

Mapping of C0s with POs

CO/ PSO	PO1	PO2	PO3	PO4
CO1				
CO2				
CO3				
CO4				
CO5				

Note: ♦ Strongly Correlated – **3** ♦ Moderately Correlated – **2**

♦ Weakly Correlated -**1**

COURSE DESIGNER:

1. **Mrs. R. Rajeswari**
2. **Mrs. R. Jenovi Rosary Deepa**

Forwarded By

Dr. E. Helena

III B.Sc. STATISTICS

SEMESTER VI

For those who joined in 2019 onwards

Skill Development-100%

PROGRAMME CODE	COURSE CODE	COURSE TITLE	CATEGORY	HRS/WEEK	CREDITS
USST	19ST6ME4	Regression Analysis	Lecture	5	5

COURSE DESCRIPTION

This course focuses on building a greater understanding on statistical tools for applying the linear regression model and its generations.

COURSE OBJECTIVES

To expose the students to regression models applicable to real life situation.

UNIT –I CORRELATION (15 HRS.)

Partial and multiple correlation coefficients, relationships among simple, multiple and partial correlation coefficients – biserial correlation coefficients.

UNIT –II SIMPLE LINEAR REGRESSION MODEL - I (15 HRS.)

Simple linear regression model: Description of the data model – estimation of parameters by least square method and test of hypothesis – index of fit – predicted values and standard errors – evaluation of fit – analysis of residuals.

UNIT –III SIMPLE LINEAR REGRESSION MODEL - II (15 HRS.)

Effect of outliers in simple regression – model, adequacy and residual plots – deletion of data points – **transformation of variables – transformation to achieve linearity** (Self Study) – transformation to stabilize variance – removal of heterogeneity – principles of weighted least squares.

UNIT –IV MULTIPLE LINEAR REGRESSION (15 HRS.)

Multiple linear regressions: Description of the Data model – properties of least squares estimators – predicted values and standard errors in multiple regression – generalized least squares.

UNIT –V INFERENCE ON GLM (15 HRS.)

Inference on GLM: Test of hypothesis on the linear model – Assumption about the explanatory variable – testing a subset of regressioncoefficient equals to zero – testing of equality of regression coefficients.

TEXT BOOK:

D.C.Montgomery, E.A Peck,. and G.G.Vining, *Introduction to linear regression analysis*, third edition, John Wiley and Sons, Inc. (2003).

REFERENCES:

1. N.R.Draper,. and H.Smith, *Applied Regression Analysis*, third edition, John Wiley and Sons, Inc. (2003).
2. J.Johnson, *Econometric methods*, third edition, McGraw-Hill International (1984).
3. V.K.Kapoor, and S.C.Gupta, *Fundamentals of Mathematical Statistics*, Sultan Chand and Sons (2007).

COURSE CONTENTS & LECTURE SCHEDULE:

Module No.	Topic	No. of Lectures	Teaching Pedagogy	Teaching Aids
UNIT -1 CORRELATION				
1.1	Partial and multiple correlation coefficients	5	Chalk & Talk	Black Board
1.2	Relationships among simple, multiple and partial correlation coefficients	5	Lecture	PPT & White board
1.3	Biserial correlation coefficients	5	Chalk & Talk	Black Board
UNIT -2 SIMPLE LINEAR REGRESSION MODEL – I				
2.1	Description of the data model	1	Chalk & Talk	Black Board
2.2	Estimation of parameters by least square method	3	Chalk & Talk	Black Board
2.3	Test of hypothesis	3	Chalk & Talk	Black Board
2.4	Index of fit	2	Chalk & Talk	Black Board
2.5	Predicted values and standard errors – evaluation of fit	3	Chalk & Talk	Black Board
2.6	Analysis of residuals.	3	Chalk & Talk	Black Board
UNIT -3 SIMPLE LINEAR REGRESSION MODEL – II				
3.1	Effect of outliers in simple regression	3	Chalk & Talk	Black Board
3.2	Model, adequacy and residual plots	3	Chalk & Talk	Black Board
3.3	Deletion of data points	3	Chalk & Talk	Black Board

Module No.	Topic	No. of Lectures	Teaching Pedagogy	Teaching Aids
3.4	Transformation of variables – transformation to achieve linearity	3	Discussion	PPT
3.5	Transformation to stabilize variance	2	Discussion	PPT
3.6	Removal of heterogeneity	2	Chalk & Talk	Black Board
3.7	Principles of weighted least squares.	2	Chalk & Talk	Black Board
UNIT -4 MULTIPLE LINEAR REGRESSION				
4.1	Description of the Data model	3	Chalk & Talk	Black Board
4.2	Properties of least squares estimators	4	Chalk & Talk	Black Board
4.3	Predicted values and standard errors in multiple regression	5	Chalk & Talk	Black Board
4.4	Generalized least squares.	3	Chalk & Talk	Black Board
UNIT -5 INFERENCE ON GLM				
5.1	Test of hypothesis on the linear model	4	Chalk & Talk	Black Board
5.2	Assumption about the explanatory variable	3	Chalk & Talk	Black Board
5.3	testing a subset of regression coefficient equals to zero	4	Chalk & Talk	Black Board
5.4	Testing of equality of regression coefficients	4	Chalk & Talk	Black Board

Levels	C1 T1 10 Mks.	C2 T2 10 Mks.	C3 Quiz 5 Mks.	C4 Assignment 5 Mks	C5 OBT/PPT 5 Mks	Total Scholastic Marks 35 Mks.	Non Scholastic Marks C6 5 Mks.	CIA Total 40Mks.	% of Assessment
K1	2	2	-	-	-	4	-	4	10 %
K2	2	2	5	-	-	9	-	9	22.5 %
K3	3	3	-	-	5	11	-	11	27.5 %
K4	3	3	-	5	-	11	-	11	27.5 %
Non Scholastic	-	-	-	-	-		5	5	12.5 %
Total	10	10	5	5	5	35	5	40	100 %

CIA	
Scholastic	35
Non Scholastic	5
	40

- ✓ **The levels of CIA Assessment based on Revised Bloom's Taxonomy are :**

  K1- Remember, **K2-**Understand, **K3-**Apply, **K4-**Analyse

EVALUATION PATTERN

	SCHOLASTIC				NON - SCHOLASTIC	MARKS		
C1	C2	C3	C4	C5	C6	CIA	ESE	Total
10	10	5	5	5	5	40	60	100

COURSE OUTCOMES

On the successful completion of the course, students will be able to:

NO.	COURSE OUTCOMES	KNOWLEDGE LEVEL (ACCORDING TO REVISED BLOOM'S TAXONOMY)	PSOs ADDRESSED
CO 1	Classify and compute simple, multiple and partial correlation.	K1 & K3	PSO1& PSO2
CO 2	Evaluate the regression model and estimate the standard error	K2 & K4	PSO3
CO 3	Apply multiple linear regression analysis and classify simple linear regression analysis and multiple linear regression analysis	K2 & K4	PSO5
CO 4	Test equality of regression coefficients	K2, K3 & K4	PSO3 & PSO5

Mapping of C0s with PSOs

CO/ PSO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	3	3				
CO2			3			
CO3					3	
CO4			3		3	

Mapping of C0s with POs

CO/ PSO	PO1	PO2	PO3	PO4
CO1				
CO2				
CO3				
CO4				

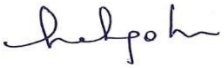
Note: ♦ Strongly Correlated – **3** ♦ Moderately Correlated – **2**

♦ Weakly Correlated -**1**

COURSE DESIGNER:

1. **Dr. P. Vetriselvi**
2. **Ms. D.K. Pon Ovya**

Forwarded By



Dr. E. Helena

III B.Sc. STATISTICS

SEMESTER VI

For those who joined in 2019 onwards

Skill Development-100%

PROGRAMME CODE	COURSE CODE	COURSE TITLE	CATEGORY	HRS/WEEK	CREDITS
USST	19ST6ME5	Operations Research	Lecture	5	5

COURSE DESCRIPTION

This helps in solving in different environments that needs decisions.

COURSE OBJECTIVES

To aim at familiarizing the students with quantitative tools and techniques, which are frequently applied to business decision making and to provide a formal quantitative approach to problem solving.

UNIT – I SEQUENCING PROBLEM (15 HRS.)

Introduction – problem of sequencing – Basic terms used insequencing - Processing n jobs through two machines – **Processing n jobs through k machines - Processing 2 jobs through k machines** (Self Study).

UNIT – II GAMES AND STRATEGIES (15 HRS.)

Introduction – Two person zero sum games – Some basic terms - The maximin-minimax principle – Games without saddle points – mixed strategies – Graphical solution of 2 x n and m x 2 games – Dominance property – Arithmetic method for n x n game – General solution of m x n rectangular games.

UNIT –III INVENTORY CONTROL (15 HRS.)

Introduction – The Inventory decisions – Cost associated withinventories – Factors affecting inventory control - Economic Order Quantity (EOQ) – Deterministic inventory problems with no shortages - Deterministic inventory problems with shortages – Probabilistic inventory problems.

UNIT – IV QUEUING THEORY (15 HRS.)

Introduction- Queuing system – Elements of Queuing system – Operating characteristics of queuing system – Probability distributions in queuing systems – Classification of queuing models – Definition of transient and steady states – Poisson queuing systems –Model I (M/M/1):(∞ / FIFO) – Model II (M/M/I): (∞/SIRO) - Model III (M/M/1): (N/FIFO).

UNIT –V NETWORK SCHEDULING BY PERT/CPM (15 HRS.)

Introduction – Network and basic components – Logical sequencing – Rules of network construction – Critical path analysis – probability considerations in PERT

TEXT BOOK:

UNIT I - Chapter 12: Sections 12.1 to 12.6

UNIT II - Chapter 17: Sections 17.1 to 17.9

UNIT III - Chapter 19: Sections 19.1 to 19.7, 19:12.1, 19:12.2

UNIT IV - Chapter 20: Sections 20.1 to 20.8 (Up to model III)

UNIT V - Chapter 21: Sections 21.1 to 21.6

REFERENCES:

1. Prem Kumar Gupta and D.S Hira, *Problems in Operations Research*, Sultan Chand & Co. Ltd., Revised edition (2009).

2. P.K Gupta and Man Mohan, *Problems in Operations Research*, Sultan Chand & Sons (2007).

COURSE CONTENTS & LECTURE SCHEDULE:

Module No.	Topic	No. of Lectures	Teaching Pedagogy	Teaching Aids
UNIT -1 SEQUENCING PROBLEM				
1.1	Problem of sequencing	2	Chalk & Talk	Black Board
1.2	Basic terms used in sequencing	2	Chalk & Talk	LCD
1.3	Processing n jobs through two machines	4	Lecture	PPT & White board
1.4	Processing n jobs through k machines	4	Discussion	Black Board
1.5	Processing 2 jobs through k machines.	3	Discussion	Black Board
UNIT -2 GAMES AND STRATEGIES				
2.1	Two person zero sum games	1	Chalk & Talk	Black Board
2.2	The maximin-minimax principle	1	Chalk & Talk	Black Board
2.3	Games without saddle points	3	Chalk & Talk	Black Board
2.4	mixed strategies	2	Chalk & Talk	Black Board
2.5	Graphical solution of 2 x n and m x 2 games	2	Chalk & Talk	Black Board
2.6	Dominance property – Arithmetic method for n x n game –	3	Chalk & Talk	Black Board
2.7	General solution of m x n rectangular games	3	Chalk & Talk	Black Board
UNIT -3 INVENTORY CONTROL				

Module No.	Topic	No. of Lectures	Teaching Pedagogy	Teaching Aids
3.1	The Inventory decisions	1	Chalk & Talk	Black Board
3.2	Cost associated with inventories	1	Chalk & Talk	Black Board
3.3	Factors affecting inventory control	1	Chalk & Talk	Black Board
3.4	Economic Order Quantity(EOQ)	3	Chalk & Talk	Black Board
3.5	Deterministic inventory problems with no shortages	3	Chalk & Talk	Black Board
3.6	Deterministic inventory problems with shortages	3	Chalk & Talk	Black Board
3.7	Probabilistic inventory problems	3	Chalk & Talk	Black Board
UNIT -4 QUEUING THEORY				
4.1	Queuing system	3	Chalk & Talk	Black Board
4.2	Elements of Queuing system	3	Chalk & Talk	Black Board
4.3	Operating characteristics of queuing system	3	Chalk & Talk	Black Board
4.4	Probability distributions in queuing systems	3	Chalk & Talk	Black Board
4.5	Classification of queuing	3	Chalk & Talk	Black Board
UNIT -5 NETWORK SCHEDULING BY PERT/CPM				
5.1	Network and basic components	2	Lecture	PPT & White Board
5.2	Logical sequencing	4	Chalk &	Black

Module No.	Topic	No. of Lectures	Teaching Pedagogy	Teaching Aids
			Talk	Board
5.3	Rules of network construction	4	Chalk & Talk	Black Board
5.4	Critical path analysis – probability considerations	5	Chalk & Talk	Black Board

Levels	C1 T1 10 Mks.	C2 T2 10 Mks.	C3 Quiz 5 Mks.	C4 Assignment 5 Mks	C5 OBT/PPT 5 Mks	Total Scholastic Marks 35 Mks.	Non Scholastic Marks C6 5 Mks.	CIA Total 40Mks.	% of Assessment
K1	2	2	-	-	-	4	-	4	10 %
K2	2	2	5	-	-	9	-	9	22.5 %
K3	3	3	-	-	5	11	-	11	27.5 %
K4	3	3	-	5	-	11	-	11	27.5 %
Non Scholastic	-	-	-	-	-		5	5	12.5 %
Total	10	10	5	5	5	35	5	40	100 %

CIA	
Scholastic	35
Non Scholastic	5
	40

- ✓ **The levels of CIA Assessment based on Revised Bloom's Taxonomy are :**

  K1- Remember, **K2-**Understand, **K3-**Apply, **K4-**Analyse

EVALUATION PATTERN

	SCHOLASTIC				NON - SCHOLASTIC	MARKS		
C1	C2	C3	C4	C5	C6	CIA	ESE	Total
10	10	5	5	5	5	40	60	100

COURSE OUTCOMES

On the successful completion of the course, students will be able to:

NO.	COURSE OUTCOMES	KNOWLEDGE LEVEL (ACCORDING TO REVISED BLOOM'S TAXONOMY)	PSOs ADDRESSED
CO 1	Define sequencing problem and apply it to solve real life problems.	K1	PSO1& PSO2
CO 2	Solve problems in decision making.	K1 & K2	PSO3
CO 3	Apply inventory control to solve practical problems.	K1 & K3	PSO5
CO 4	Classify queuing models.	K2 & K4	PSO5
CO 5	Explain CPM and PERT to plan schedule and control project activities.	K2 & K4	PSO5 & PSO6

Mapping of C0s with PSOs

CO/ PSO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	3	3				
CO2			3			
CO3					3	
CO4					3	
CO5					3	3

Mapping of C0s with POs

CO/ PSO	PO1	PO2	PO3	PO4
CO1				
CO2				
CO3				
CO4				
CO5				

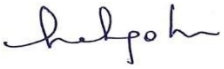
Note: ♦ Strongly Correlated – **3** ♦ Moderately Correlated – **2**

♦ Weakly Correlated -**1**

COURSE DESIGNER:

1. **Mrs. R. Jenovi Rosary Deepa**
2. **Mrs. B. Vethamary Jacquline**

Forwarded By



Dr. E. Helena

III B.Sc. STATISTICS

SEMESTER VI

For those who joined in 2019 onwards

Skill Development-50% &
Employability-50%

PROGRAMME CODE	COURSE CODE	COURSE TITLE	CATEGORY	HRS/WEEK	CREDITS
USST	19ST6ME6	Industrial Statistics	Lecture	5	5

COURSE DESCRIPTION

This course is concerned with maintaining and improving the quality of goods and services

COURSE OBJECTIVES

This course enables the students competent to undertake industrial researches

UNIT –I INVENTORY PLANNING (15 HRS.)

. Inventory planning: Concept of planned inventory policies: Deterministic models - Policy when inventory levels are reviewed continuously and demands occur uniformly with and without shortage costs Economic order quantity.

UNIT – II PRODUCTION PLANNING (15 HRS.)

. Policy for production planning when inventory levels are reviewed periodically Stochastic models Single period model with no set up cost having zero or non-zero initial stock {(s,S) policy} Solving special cases using computer packages.

UNIT – III FORECASTING (15 HRS.)

Forecasting: Concept of forecasting and its applications in manufacturing and non manufacturing industrial situations Different methods of forecasting including average, last value, weighted average(exponential smoothing) **Forecasting in presence of linear trends**

using least square methods (Self Study) - Forecasting in presence of seasonal effects Solving special cases using computer package.

UNIT – IV RELIABILITY (15 HRS.)

. Reliability: Definitions and relationships between survival function, hazard function, hazard rate of a non-negative random variable - Parametric distributions: Weibull, amma, Lognormal and Exponential as life time distributions - Concept of aging, IFR, IFRA classes of distributions and their dual.

UNIT – V STRUCTURE FUNCTIONS (15 HRS.)

Coherent system as binary function: Minimal cut and path sets (vectors) -Representation of structure function of series, parallel and k out of n: G systems of independent components - Minimal cut and path structure functions - Dual of a coherent structure Derivation of reliabilitiesof above structures.

TEXT BOOK:

1. H.A. Taha, *Operations Research*, Macmillan Publishing Co. (1999).
2. F.S.Hiller and G.J.Libermann, *Introduction to Operations Research*, 6th Edition, McGraw Hill (1995).
3. L.J.Bain and Enghardt, *Statistical Analysis of Reliability and Life Testing Models*, Marckel Dekker (1991).

REFERENCES:

1. S.Zacks, *Introduction to Reliability Analysis, Probability models and Statistical methods*, Springer Verlag (1992).
2. R.E.Barlow and F.Proschan, *Statistical theory of Reliability and Life testing:Probability models*, Holt, Rinehart and Winston (1975)

COURSE CONTENTS & LECTURE SCHEDULE:

Module No.	Topic	No. of Lectures	Teaching Pedagogy	Teaching Aids
UNIT -1 INVENTORY PLANNING				
1.1	Concept of planned inventory policies	2	Chalk & Talk	Black Board
1.2	Deterministic models	2	Chalk & Talk	LCD
1.3	Policy when inventory levels are reviewed continuously and demands occur uniformly with shortage costs	4	Chalk & Talk	Black Board
1.4	Policy when inventory levels are reviewed continuously and demands occur uniformly without shortage costs	4	Chalk & Talk	Black Board
1.5	Economic order quantity	3	Chalk & Talk	Black Board
UNIT -2 PRODUCTION PLANNING				
2.1	Policy for production planning when inventory levels are reviewed periodically	5	Chalk & Talk	Black Board
2.2	Stochastic models Single period model with no set up cost having zero	5	Chalk & Talk	Black Board
2.3	Non-zero initial stock {(s,S) policy} Solving special cases using computer packages.	5	Chalk & Talk	Black Board
UNIT -3 FORECASTING				
3.1	Concept of forecasting and its applications in manufacturing	3	Chalk & Talk	Black Board

Module No.	Topic	No. of Lectures	Teaching Pedagogy	Teaching Aids
	and non manufacturing industrial situations			
3.2	Different methods of forecasting including average, last value, weighted average(exponential smoothing)	3	Chalk & Talk	Black Board
3.3	Forecasting in presence of linear trends using least square methods	3	Discussion	Black Board
3.4	Forecasting in presence of seasonal effects	3	Discussion	Black Board
3.5	Solving special cases using computer package	3	Chalk & Talk	Black Board
UNIT -4 RELIABILITY				
4.1	Definitions and relationships between survival function, hazard function,	3	Chalk & Talk	Black Board
4.2	Hazard rate of a non-negative random variable	2	Chalk & Talk	Black Board
4.3	Weibull, amma, Lognormal and Exponential as life time distributions	5	Chalk & Talk	Black Board
4.4	Concept of aging, IFR, IFRA classes of distributions and their dual	5	Chalk & Talk	Black Board
UNIT -5 STRUCTURE FUNCTIONS				
5.1	Coherent system as binary function: Minimal cut and path sets (vectors)	3	Chalk & Talk	Black Board

Module No.	Topic	No. of Lectures	Teaching Pedagogy	Teaching Aids
5.2	Representation of structure function of series, parallel and k out of n: G systems of independent components	3	Chalk & Talk	Black Board
5.3	Minimal cut and path structure functions	3	Chalk & Talk	Black Board
5.4	Dual of a coherent structure	3	Chalk & Talk	Black Board
5.5	Derivation of reliabilities of above structures.	3	Chalk & Talk	Black Board

Levels	C1	C2	C3	C4	C5	Total Scholastic Marks	Non Scholastic Marks C6	CIA Total	% of Assessment
	T1 10 Mks.	T2 10 Mks.	Quiz 5 Mks.	Assignment 5 Mks	OBT/PPT 5 Mks	35 Mks.	5 Mks.	40Mks.	
K1	2	2	-	-	-	4	-	4	10 %
K2	2	2	5	-	-	9	-	9	22.5 %
K3	3	3	-	-	5	11	-	11	27.5 %
K4	3	3	-	5	-	11	-	11	27.5 %
Non Scholastic	-	-	-	-	-		5	5	12.5 %
Total	10	10	5	5	5	35	5	40	100 %

CIA	
Scholastic	35
Non Scholastic	5
	40

- ✓ **The levels of CIA Assessment based on Revised Bloom's Taxonomy are :**

  K1- Remember, **K2-**Understand, **K3-**Apply, **K4-**Analyse

EVALUATION PATTERN

	SCHOLASTIC				NON - SCHOLASTIC	MARKS		
C1	C2	C3	C4	C5	C6	CIA	ESE	Total
10	10	5	5	5	5	40	60	100

COURSE OUTCOMES

On the successful completion of the course, students will be able to:

NO.	COURSE OUTCOMES	KNOWLEDGE LEVEL (ACCORDING TO REVISED BLOOM'S TAXONOMY)	PSOs ADDRESSED
CO 1	Summarize the concept of deterministic models when the demands occur uniformly with and without shortage costs.	K1	PSO1& PSO2
CO 2	Explain the policy for production planning when inventory levels are reviewed periodically	K1 & K2	PSO3 & PSO4
CO 3	Demonstrate the concept of forecasting and its applications in manufacturing and non manufacturing industrial situations.	K1 , K2 & K3	PSO5 & PSO6
CO 4	Classify survival functions and hazard functions	K2 & K4	PSO5

Mapping of C0s with PSOs

CO/ PSO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	3	3	2	2	2	2
CO2	2	2	3	3	2	2
CO3	2	2	2	2	3	3
CO4	2	2	2	2	3	2

Mapping of C0s with POs

CO/ PSO	PO1	PO2	PO3	PO4
CO1				
CO2				
CO3				
CO4				

Note: ♦ Strongly Correlated – **3** ♦ Moderately Correlated – **2**

♦ Weakly Correlated -**1**

COURSE DESIGNER:

1. **Dr. P. Vetriselvi**
2. **Ms. D. K. Pon Ovya**

Forwarded By

Dr. E. Helena

III B.Sc. STATISTICS

SEMESTER VI

For those who joined in 2019 onwards

Employability-100%

PROGRAMME CODE	COURSE CODE	COURSE TITLE	CATEGORY	HRS/WEEK	CREDITS
USST	19ST6SB5	Practical Statistics IV	Lecture & Practical	2	2

COURSE DESCRIPTION

The course provides an application related to statistical quality control, non parametric tests & design of experiments

COURSE OBJECTIVES

To expose the students to the analysis of statistical techniques in real life situations.

1. Control Charts for Variables - $\bar{X}$, R chart
2. Control Charts for Attributes - p, np, c-chart
3. Acceptance sampling for attributes – single sapling plan – OC, AOQ, ASN and ATI
4. Acceptance sampling for attributes – Double sampling plan – OC, AOQ, ASN and ATI curves
5. Non- Parametric tests - Sign test, Wilcoxon test, Mann-Whitney U test, Median test, Run test, Kolmogorov Smirnov one sample test, Kruskal Wallis
6. Anova – One way and Two way
7. Design of Experiment – CRD, RBD, LSD
8. Missing Plot
9. Factorial Experiment - $2^2 2^3$ experiments with completely confounding
10. Factorial Experiment - $2^2 2^3$ experiments with partially confounding.

Levels	C1	C2	C3	C4	C5	Total Scholastic Marks	Non Scholastic Marks C6	CIA Total	% of Assessment
	T1 10 Mks.	T2 10 Mks.	Quiz 5 Mks.	Assignment 5 Mks	OBT/PPT 5 Mks	35 Mks.	5 Mks.	40Mks.	
K1	2	2	-	-	-	4	-	4	10 %
K2	2	2	5	-	-	9	-	9	22.5 %
K3	3	3	-	-	5	11	-	11	27.5 %
K4	3	3	-	5	-	11	-	11	27.5 %
Non Scholastic	-	-	-	-	-		5	5	12.5 %
Total	10	10	5	5	5	35	5	40	100 %

CIA	
Scholastic	35
Non Scholastic	5
	40

- ✓ **The levels of CIA Assessment based on Revised Bloom's Taxonomy are :**

  K1- Remember, **K2-**Understand, **K3-**Apply, **K4-**Analyse

EVALUATION PATTERN

	SCHOLASTIC				NON - SCHOLASTIC	MARKS		
C1	C2	C3	C4	C5	C6	CIA	ESE	Total
10	10	5	5	5	5	40	60	100

COURSE OUTCOMES

On the successful completion of the course, students will be able to:

NO.	COURSE OUTCOMES	KNOWLEDGE LEVEL (ACCORDING TO REVISED BLOOM'S TAXONOMY)	PSOs ADDRESSED
CO 1	Analyze the problems based on statistical quality control	K1 & K3	PSO1& PSO2
CO 2	Examine various non parametric tests	K1 & K3	PSO1& PSO2
CO 3	Apply and interpret the methods of ANOVA, factorial experiments, CRD, RBD and LSD.	K2 & K4	PSO5 & PSO6

Mapping of C0s with PSOs

CO/ PSO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	3	3	2	2	2	2
CO2	3	3	2	2	2	2
CO3	2	2	2	2	3	3

Mapping of C0s with POs

CO/ PSO	PO1	PO2	PO3	PO4
CO1				
CO2				
CO3				

Note: ♦ Strongly Correlated – **3** ♦ Moderately Correlated – **2**

♦ Weakly Correlated -**1**

COURSE DESIGNER:

1. **Dr. P. Vetriselvi**
2. **Ms. D.K. Pon Ovya**

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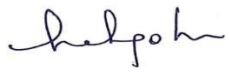

Dr. E. Helena

III B.Sc. STATISTICS

SEMESTER VI

For those who joined in 2019 onwards

Entreprenuership-50% &
Employability-50%

PROGRAMME CODE	COURSE CODE	COURSE TITLE	CATEGORY	HRS/WEEK	CREDITS
USST	19ST6SB6	Statistical Software – R	Lecture and Practical	2	2

COURSE DESCRIPTION

The course is introduced to learn a programming language which helps to handle all aspects of statistical software.

COURSE OBJECTIVES

To expose the students on the applications of statistical analysis using statistical package.

1. Diagrammatic Representation Bar Chart, Pie Diagram
2. Construction of Discrete and Continuous Frequency Tables from raw data
3. Graphical Representation - Histogram , Box- Whiskers plot
4. Descriptive Statistics
5. Simple correlation, Rank correlation,
6. Regression Fitting of Poisson distribution
7. Fitting of Normal distribution
8. Parametric tests – Means, Variances and Proportions
9. Chi – square test for goodness of fit
10. Chi – square test for independence samples
11. Non- Parametric tests Sign test, Wilcoxon test, Mann-Whitney U test, Median test, Run test, Kolmogorov Smirnov one sample test, Kruskal Wallis

12. ANOVA – one way and two way

13. Design of Experiment – CRD, RBD, LSD

14. Factorial Experiment - $2^2 2^3$ experiments with total and partial confounding.

REFERENCE BOOKS:

1. Sudha Purohit, Sharad D Gore and Shailaja R. Deshmukh, Narosa Publishing House, New Delhi (2015).

2. Jured. P. Lander, *R for everyone, advance Analytics and Graphics*, Addison-Wesley, USA (2014).

3. Online help manuals and other materials available in R project site will form basis for the course

Levels	C1	C2	C3	C4	C5	Total Scholastic Marks	Non Scholastic Marks C6	CIA Total	% of Assessment
	T1 10 Mks.	T2 10 Mks.	Quiz 5 Mks.	Assignment 5 Mks	OBT/PPT 5 Mks	35 Mks.	5 Mks.	40Mks.	
K1	2	2	-	-	-	4	-	4	10 %
K2	2	2	5	-	-	9	-	9	22.5 %
K3	3	3	-	-	5	11	-	11	27.5 %
K4	3	3	-	5	-	11	-	11	27.5 %
Non Scholastic	-	-	-	-	-		5	5	12.5 %
Total	10	10	5	5	5	35	5	40	100 %

CIA	
Scholastic	35
Non Scholastic	5
	40

- ✓ **The levels of CIA Assessment based on Revised Bloom's Taxonomy are :**

  K1- Remember, **K2-**Understand, **K3-**Apply, **K4-**Analyse

EVALUATION PATTERN

	SCHOLASTIC				NON - SCHOLASTIC	MARKS		
C1	C2	C3	C4	C5	C6	CIA	ESE	Total
10	10	5	5	5	5	40	60	100

COURSE OUTCOMES

On the successful completion of the course, students will be able to:

NO.	COURSE OUTCOMES	KNOWLEDGE LEVEL (ACCORDING TO REVISED BLOOM'S TAXONOMY)	PSOs ADDRESSED
CO 1	To impart efficient Data Handling Techniques	K1 & K3	PSO1& PSO2
CO 2	To equip students to Statistical Programming Skills based on examples and datasets	K2 & K4	PSO4 & PSO5
CO 3	Able to explore results using ANOVA and ANOCOVA	K2 & K4	PSO4 & PSO5

Mapping of C0s with PSOs

CO/ PSO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	3	3	2	2	2	2
CO2	2	2	2	3	3	2
CO3	2	2	2	3	3	2

Mapping of C0s with POs

CO/ PSO	PO1	PO2	PO3	PO4
CO1				
CO2				
CO3				

Note: ♦ Strongly Correlated – **3** ♦ Moderately Correlated – **2**

♦ Weakly Correlated -**1**

COURSE DESIGNER:

1. **Dr. P. Vetriselvi**
2. **Ms. D.K. Pon Ovya**

Forwarded By

Dr. E. Helena

I B.Sc. STATISTICS

For those who joined in 2021 onwards

Skill Development-40% & Entreprenuership-60%

PROGRAMME CODE	COURSE CODE	COURSE TITLE	CATEGORY	HRS/WEEK	CREDITS
USST	21ST2SL1	Quantitative Aptitude & Data Interpretation	Self Study		2

COURSE DESCRIPTION

This course is designed to make the students learn the basics of statistics

COURSE OBJECTIVES

To enable the students understand the origin and the need of statistics and the statistical data.

UNIT –I TABLES AND GRAPHS (6 HRS.)

Data Tables, Bar graphs, Line graphs, pie graphs

UNIT –II INTERPRETATION AND ANALYSIS OF DATA BASED ON TEXT (6 HRS.)

Venn diagram, caselets data interpretations, histogram

UNIT –III PERMUTATION AND COMBINATION (6 HRS.)

Permutation - Combination

UNIT –IV STOCKS AND SHARES (6 HRS.)

Stock- capital, share andshareholders, dividend, face value and market value, brokerage

UNIT –V TRUE DISCOUNT, BANKER'S DISCOUNT (6 HRS.)

Present worth, true discount, banker‟s discount and banker‟s gain

TEXT:

R.S Aggarwal, Quantitative Aptitude, New Delhi, S.Chand and company Ltd, 2006, Chapters:
(Sections 21,22,29,32,33,36-39).

REFERENCES:

1. Eugene D.Jafle, GMAT (Graduates Management Admission Test), New Delhi-2, GalgotiaPublication Pvt.Ltd, 1996.
2. Samuel C.Brownstein, SAT (Scholastic Aptitude Test), New Delhi - 2, Galgotia Publications (P) Ltd, 1997.
3. Thomas H.Martinson, Super Course for the GMAT, New Delhi -2, Goyl Saab Publishers, 1998.

DIGITAL EDUCATIONAL OPEN RESOURCES:

https://pdf.exampundit.in/quantitative-aptitude

https://www.ibpsguide.com/banking-insurance/quantitative-aptitude/

III B.Sc. STATISTICS

For those who joined in 2019 onwards

Entreprenuership-100%

PROGRAMME CODE	COURSE CODE	COURSE TITLE	CATEGORY	HRS/WEEK	CREDITS
USST	19UGSLST1	Official Statistics	Self Study	-	

COURSE DESCRIPTION

This paper gives an idea about various methods in which Statistics are being collected in different sectors Goal :

COURSE OBJECTIVES

To enable the students to understand how the statistics are collected, recorded and published

UNIT –I OFFICIAL STATISTICS

Official Statistics: Definition – Growth of Indian Statistics – Statistical organizations of India: Central Statistical Organisation (CSO) – Divisions of Central Statistical Organisation – Functions – Publications.

UNIT – II SURVEY ORGANISATION

National Sample Survey Organisation (NSSO) – Divisions of NSSO – Functions of NSSO – Procedure for collection of information – Agriculture Statistics, Yield Statistics – Official series: Traditional method, Random Sampling Method – NSS Series – Forest Statistics, Fisheries Statistics – Defects in agricultural Statistics.

UNIT – III NATIONAL INCOME

National income: Definition – Methods of estimating national income: The Income method, the Output method and the Expenditure method – Uses of National income estimates – Difficulties of estimation.

UNIT – IV SOCIAL ACCOUNTING

Social accounting – Population statistics – Sources – Different methods of collecting population census – Methods of enumeration – Merits and demerits of De Facto method, Merits and demerits of the De Jure system.

UNIT – V PRICE STATISTICS

Price Statistics: Wholesale prices, Retail prices, Uses and limitations of price statistics. Industrial Statistics: Main Sources of industrial Statistics – Limitations.

TEXT BOOK:

R.S.N. Pillai and V. Bagavathi (1995), Statistics, Third Edition, S. Chand & Company, New Delhi – 110 055.

REFERENCES:

1. Central Statistical Organization (2011), Statistical Systems in India, Department of Statistics, Ministry of Planning, New Delhi.
2. Goon, A.M. Gupta, M.K and Das Gupta, B.(1986), Fundamentals of Statistics, Volume II, The World Press Private Limited, Calcutta.

On successful completion of this course a student will have a knowledge about the statistical organizations, NSSO etcand the methods of collecting and recording statistic

III B.Sc. STATISTICS

For those who joined in 2019 onwards

Entreprenuership-100%

PROGRAMME CODE	COURSE CODE	COURSE TITLE	CATEGORY	HRS/WEEK	CREDITS
USST	19UGSLST2	Bio Statistics	Self Study	-	

COURSE DESCRIPTION

This course covers the basic tools for the collection, analysis and presentation of data in all areas of public health.

COURSE OBJECTIVES

To enable the students describe the roles of biostatistics serves inpublic health and biomedical research

UNIT –I STUDY DESIGN

Introduction to study designs – Different types of observational studies – Experimental studies, Epidemiology – Odds – Odds ratio – Confidence interval for odds ratio – Relative risk

UNIT – II CHI-SQUARE TEST

Chi-Square test: Diagnostic Procedures with Threshold model. Measuring the accuracy of diagnosis – Sensitivity, Specificity, ROC curve.

UNIT – III CLINICAL TRAILS

Clinical Trials: Introduction – Different Phases of Clinical Trials - Purpose – Duration Cost - Drug Regulatory Bodies

UNIT – IV SURVIVAL DISTRIBUTIONS

Survival Time, Survival Distributions- Hazard Function- Exponential – Gamma – Type I and Type II Censoring, Progressive Censoring – Estimation of Parameters with Numerical Examples.

UNIT – V

Estimating Survival Function and Variance using Kaplan Meier Method – Comparison of Survival Distribution – Log Rank Test for Comparing Two Groups

TEXT BOOK:

1. Dawson, Beth & Robert, G (2001) ; Basic & Clinical Biostatistics,

Mcgraw-Hill

2. Ellisa T.Lee (1992): Statistical Methods For Survival Data Analysis
3. Friedman, L.M, Forbes, C.D, And Demats, D.L(TT): Fundamental of Clinical Trials, Springer.

REFERENCES:

1. David G. Kleinbawn (1996): Survival Analysis, Springer.
2. Mathews, J.N.S. (2006): Introducing To Randomized Controlled Clinical Trials, Chapman and Hall.
3. Steven Diantadosi (2000): Clinical Trials – A Methodological Perspective, John Willey.
4. Stephan Sann (2000) : Statistical Issues In Drug Development, John Wiley