KUNTHAVAI NAACCHIYAAR GOVERNMENT ARTS COLLEGE FOR WOMEN
An Autonomous College Affiliated to Bharathidasan
UniversityRe-Accredited by NAAC with 'B' Grade
Thanjavur -613 007, Tamil Nadu, India.



CBCS & OBE
Scheme of Instruction and Syllabus for
B.Sc., Statistics
(I to VI Semester)



Effective from 2023 - 2024 and onwards PG DEPARTMENT OF STATISTICS

## B.SC., STATISTICS

## **SYLLABUS**

## FROM THE ACADEMIC YEAR 2023-2024



TAMILNADU STATE COUNCIL FOR HIGHER EDUCATION, CHENNAI – 600 005

## STATISTICS BOARD OF STUDIES MEMBERS

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## KUNTHAVAI NAACCHIYAAR GOVT. ARTS COLLEGE FOR WOMEN

#### (AUTONOMOUS) THANJAVUR - 7

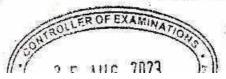


#### POST GRADUATE DEPARTMENT OF STATISTICS

#### I - B.Sc., Statistics., Course Structure under CBCS

(For the candidates admitted from the academic year 2023-2024 onwards)

ester Part					Title of the Paper Hrs C	Irs Credit	Exam	Ma	rks	Tol		
nester	Pa	art 🍴	Code	Subject Code	Title of the Paper	Hrs	Credit	Hrs	IA	EA	1134344	
	4	1	LC I	23К1Т1	1.1 Tamil	6	3	3	25	75	10	
		ī	ELC I	23K1E1	1.2 English	6	3	3	25	75	10	
	-		C 1	23K1S0I	1.3 Probability Theory	5	5	3	25	75	10	
	( m		C II		1.4 Descriptive Statistics	3	3	3	25	75	10	
	l II	1	900 III	23K1SECSI:1	1.5 Mathematics for Statistics	4			26	75	10	
		E	C1 -	23K1SECS1:2	1.5 Statistics and Mathematics -I		4	3	25	75	10	
3			CII		1.6 Practical – I (Calculator Based– Descriptive Statistics and Distribution Theory)	2	-	-	-			
		S	EC I	23K1SSEC1	1.7 Basic of Statistics – 1	2	2	3	25	75	10	
	IV	F	<u> </u>	23K1SFC	1.8 Bridge - Elementary Statistics	2	2	3	25	75	10	
			3 74		TOTAL	30	22				70	
-	Ī	LC	2 11	23K2T2	2.1 Tamil	6	3	3	25	j 7:	5 10	
	П	EL	C II	23K2E2	2.2 English	6	3	3	2:	5 7	5 1	
-		cc	[[]	23K2S03	2.3 Matrix and Linear Algebra	5	5	3	2	5 7	75 1	
		cc	IV	23K2S04	2.4 Distribution Theory	3	3	3	2	5 7	75 1	
	Ш	Ш	EČI	r	23K2SECS2P	2.5. Practical –I (Calculator Based– Descriptive Statistics and Distribution Theory)	2	2	3	2	5	75
		EC I	II	23K2SECS3:1	2.6 Real Analysis	-	-	THIS I	-			
			10/01	23K2SECS3;2	2.6 Fuzzy Set theory	4	3,	3	3   1	25	75	

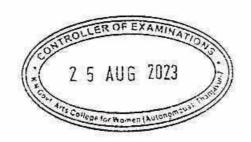


	SEC II		2.7 Practical - II (Data Analysis Using MS - Excel)	2	2		3	25	75		100	
		23K2SSEC3	2.8 Basic of Statistics -II	2	2	+	3	25	75	+	100	
	SEC III	23K288EC3	TOTAL	30	23	-				1	800	
v		ar -ne-cum	TOTAL	30		-	3	25	75	+	100	Ť
 1	LC III	23K3T3	3.1Tamil	6	3		э 	23				3
	ELC	23K3E3	3.2 English	6	3		3	25	7	5	100	
11	III		3.3 Estimation Theory	3	3		3	25	+ 7	15	100	
-	CC V	23K3S05		5	5		3	25	+	75	100	
	CC VI	23K3S06	3.4 Sampling Techniques	3	1	_	,S		+			-
		23K3SECS4:1	3.5 Numerical Methods	4	2		3	25	5	75	100	
	EC IV	23K3SECS4:2	3.5 Financial Statistics	li li				_	//w 		-	
III	EC V		3.6 Practical – III (Calculator Based – Statistical Inference)	2		•	=		-	말		
	SEC IV	23K3SSEC4P	3.8 Practical – IV (Calculator Based - Sampling Techniques	) 2		2	3		25	75	-	00 
	SEC V	23K3SSEC5	3.7 Database Management System		i.	1		3	25	75		100
ĮV	EVS		3.9 Environmental Studies		1	-		<b>5</b> 1:		<u> </u>		
		23K3SECC1:	Competitive Exam Skill (Contents In Tamil)		- 10 - 10 - 10	3*		-	=	1	00	100
	ECCI	23K3SECC1: 2	<b>*</b>	e)						1		
	ECC2	23K3SECC2	COMPUTATIONAL STATISTICS( Add on Cours	se)	8	4*		•			-	700
		_	ТОТ	AL	30	21						700
I	LC IV	23K4T4	4:1 Tamil		6	3		_3	1	25	75	100
II	ELC IV	23K4E4	4.2 English		6	3	H-4	3	100	25	75	100
	CC VII	23K4S07	4.3 Testing of Statistical Hypothesis		3	04 93	3	3		25	75	10
III	CC	23K4S08	4.4 Actuarial Statistics		4		4	3	ľ	25	75	10

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			The state of the Colorest	•	1				
	EC V	23K4SECS5P	4.5 Practical – III (Calculator Based – Statistical Inference)	2	2	3	25	75	100
	EC VI		Statistics	4	3	3	25	75	100
		23K4SECS6:2	4.6 Econometrics / Population Studies	*	3	3	25	/3	100
7	SEC VI	23K4SSEC6P	4.7 Practical – V (Statistical Software Using R)	2	2	3	25	75	100
	SEC VII	23K4SSEC7	4.8 Survey Sampling and Indian official Statistics	2	2	3	25	75	100
	EVS	23K4SEVS	4.9 Environmental Studies	1	2	3	25	75	100
IV	ECC3	23K4SECC3:	Quantitative Aptitude		3*	3			100
		23K4SECC3: 2	MOOC ( Value Added Course)			Parks			or
			TOTAL	30	24				900
	CC IX	23K5S09	5.1 Stochastic Process	6	5	3	25	75	100
	CC X	23K5S10	5.2 Regression Analysis	6	5	3	25	75	100
	CC XI (P)	23K5S11P	5.3 Practical-VI (Core IX & X)	6	5	3	25	75	100
m	CC XII	23K5S12PW	5.4 Project	6	4	: <del>-</del>	70 <del>-</del> 2	100	100
	Вали	· 23K5SECS7;1	5.5 Statistical Quality Control		No.				
	EC VII	23K5SECS7:2	5.5 Simulation and Inventory Control	4	3	3	25	75	10
2 1 1	VE	23K5VE	5.6 Value Education	2	2	3	25	75	10
IV		1 / 3 / 3 / 3	5.7 Summer Internship – Industrial Visit/ Field Visit	•	2		*		95
			TOTAL	30	26	(			60
	CC :	23K6S13	6.1 Design of Experiment	7	.6	3	25	75	1
	- uk		OLLER OF EXAMINA						1

<i>Y</i>		23K6S14	6.2 Demography	7					
	CC.		M ST	•	6	3	25	75	100
	CC NV(P)	23K6S15P	6.3 Practical – VII (SPSS Core XIII & XIV )	7	6	3	25	75	100
	EC	23K6SECS8:1	6.4 Operations Research		rem.		-		
	AIII	23K6SECS8:2	6.4 Bayesian Inference	7	3	3	25	75	100
	SEC VIII	23K6SSEC8	6.5 Introduction to R Language/Python	2	2	3	25	75	100
		23k6EA	6.6 Extension Activity	-	1	<del>7</del>			
IV			TOTAL	30	24	E-1			500
	65		GRAND TOTAL	180	140				420



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A.N.G.A.C. (W) (AUTO)
THANJAVUR

#### Contents .

- i Introduction
- ii. PO and PSO Description
- iii. UG Template
- iv. Methods of Evaluation & Methods of Assessment
- v. Semester Index.
- vi. Subjects Core, Elective, Non major, Skill Enhanced, Ability Enhanced, Extension Activity, Environment, Professional Competency
  - 1) Course Lesson Box
  - 2) Course Objectives
  - 3) Units
  - 4) Learning Outcome
  - 5) Reference and Text Books
  - 6) Web Sources
  - 7) . PO & PSO Mapping Table



#### 1. Introduction

## B.Sc. Statistics: Programme Outcome, Programme Specific Outcome and Course Outcome

Statistics is the study of Data and extracting knowledge in the data using various methods and techniques, analyze and interpret data, taking data driven predictions and decisions. It also helps data collection through sampling techniques, that is to collect data focusing on problem solving, and presenting it with wider scope of application in science, social sciences, medical science, life sciences, country's official statistics etc. Statistical methods are used as research methodology in all most all domains. The key core areas of study in Statistics include Descriptive Statistics, Probability Theory, Sampling techniques, Matrix and Linear Algebra, Distribution Theory, Estimation Theory, Testing of Statistical hypotheses, Stochastic process, Regression analysis, Design of Experiments, Demography and Official Statistics. The Bachelor's Degree B.Sc. Statistics is awarded to the students on the basis of knowledge, understanding, skills, attitudes, values and academic achievements expected to be acquired by learners at the end of the Programme. Learning outcomes of Statistics are aimed at facilitating the learners to acquire these attributes, keeping in view of their preferences and aspirations for gaining knowledge of Statistics.

Bachelor's degree in Statistics is the culmination of in-depth knowledge in both theoretical and practical methods and techniques of Statistics. This also leads to study of related areas like Computer science, Industrial Statistics, Mathematical Statistics, Business Statistics and many more. Thus, this programme helps learners in building a solid foundation for higher studies in Statistics. The skills and knowledge gained have intrinsic aesthetics leading to proficiency in analytical reasoning. This can be utilized in Statistical modeling and solving real life problems.

Students completing this programme will be able to present Statistics clearly and precisely, make abstract ideas precise by formulating them in the language of Statistics, describe Statistical ideas from multiple perspectives and explain fundamental concepts of Statistics to those non-Statistics users.

Completion of this programme will also enable the learners to join teaching profession, enhance their employability for government jobs, jobs in banking, insurance and investment sectors, data analyst jobs, entrepreneurship, business and research areas and jobs in various other public and private enterprises.



LEARNING O	UTCOMES-BASED CURRICULUM FRAMEWORK GUIDELINES BASED REGULATIONS FOR UNDER GRADUATE PROGRAMME
Programme:	U.G.
Programme Code:	
Duration:	3 years [UG]
Programme Outcomes:	PO1: Disciplinary knowledge: Capable of demonstrating comprehensive knowledge and understanding of one or more disciplines that form a part of an undergraduate Programme of study  PO2: Communication Skills: Ability to express thoughts and ideas effectively in writing and orally; Communicate with others using appropriate media; confidently share one's views and express herself/himself; demonstrate the ability to listen carefully, read and write analytically, and present complex information in a clear and concise manner to different groups.  PO3: Critical thinking: Capability to apply analytic thought to a body of knowledge; analyze and evaluate evidence, arguments, claims, beliefs on the basis of empirical evidence; identify relevant assumptions or implications; formulate coherent arguments; critically evaluate practices, policies and theories by following scientific approach to knowledge development.  PO4: Problem solving: Capacity to extrapolate from what one has learned and apply their competencies to solve different kinds of non-familiar problems, rather than replicate curriculum content knowledge; and apply one's learning to real life situations.  PO5: Analytical reasoning: Ability to evaluate the reliability and relevance of evidence; identify logical flaws and holes in the arguments of others; analyze and synthesize data from a variety of sources; draw valid conclusions and support them with evidence and examples, and addressing opposing viewpoints.  PO6: Research-related skills: A sense of inquiry and capability for asking relevant/appropriate questions, problem arising, synthesizing and articulating; Ability to recognize cause-and-effect relationships, define problems, formulate hypotheses, test hypotheses, analyze, interpret and draw conclusions from data, establish hypotheses, predict cause-and-effect relationships; ability to plan, execute and report the results of an experiment or investigation  PO7: Cooperation/Team work: Ability to work effectively and respectfully with diverse teams; facilitate c

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from quantitative/qualitative data; and critically evaluate ideas, evidence and experiences from an open-minded and reasoned perspective.

PO9: Reflective thinking: Critical sensibility to lived experiences, with self-awareness and reflexivity of both self and society.

PO10 Information/digital literacy: Capability to use ICT in a variety of learning situations, demonstrate ability to access, evaluate, and use a variety of relevant information sources; and use appropriate software for analysis of data.

- PO 11 Self-directed learning: Ability to work independently, identify appropriate resources required for a project, and manage a project through to completion.
- PO 12 Multicultural competence: Possess knowledge of the values and beliefs of multiple cultures and a global perspective; and capability to effectively engage in a multicultural society and interact respectfully with diverse groups.
- PO 13: Moral and ethical awareness/reasoning: Ability to embrace moral/ethical values in conducting one's life, formulate a position/argument about an ethical issue from multiple perspectives, and use ethical practices in all work. Capable of demonstrating the ability to identify ethical issues related to one's work, avoid unethical behavior such as fabrication, falsification or misrepresentation of data or committing plagiarism, not adhering to intellectual property rights; appreciating environmental and sustainability issues; and adopting objective, unbiased and truthful actions in all aspects of work.
- PO 14: Leadership readiness/qualities: Capability for mapping out the tasks of a team or an organization, and setting direction, formulating an inspiring vision, building a team who can help achieve the vision, motivating and inspiring team members to engage with that vision, and using management skills to guide people to the right destination, in a smooth and efficient way.
- PO 15: Lifelong learning: Ability to acquire knowledge and skills, including "learning how to learn", that are necessary for participating in learning activities throughout life, through self-paced and self-directed learning aimed at personal development, meeting economic, social and cultural objectives, and adapting to changing trades and demands of work place through knowledge/skill development/reskilling.

Programme Specific Outcomes: PSO1: To enable students to apply basic microeconomic, macroeconomic and monetary concepts and theories in real life and decision making.

PSO 2: To sensitize students to various economic issues related to Development, Growth, International Economics, Sustainable Development and Environment.

PSO 3: To familiarize students to the concepts and theories related to Finance, Investments and Modern Marketing.

PSO 4: Evaluate various social and economic problems in the society and develop answer to the problems as global citizens.

PSO 5: Enhance skills of analytical and critical thinking to analyze effectiveness of economic policies.

	PO 1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
PSO 1	Y	Y	Y	Y	Y	Y	Y	Y
PSO 2	Y	Y	Y	Ÿ	Y	Y	Y	Y
PSO3	Y	Ý	Y	Y	Y	Y	Y	Y
PSO 4	Y	Y	Y	Y	Y	Y	Y	Y
PSO 5	Y	Y	Y	Y	Y	Y	Y	Y

3 - Strong, 2- Medium, 1- Low



## Highlights of the Revamped Curriculum:

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- Student-centric, meeting the demands of industry & society, incorporating industrial components, hands-on training, skill enhancement modules, industrial project, project with vivavoce, exposure to entrepreneurial skills, training for competitive examinations, sustaining the quality of the core components and incorporating application oriented content wherever required.
- ➤ The Core subjects include latest developments in the education and scientific front, advanced programming packages allied with the discipline topics, practical training, devising mathematical models and algorithms for providing solutions to industry / real life situations. The curriculum also facilitates peer learning with advanced mathematical topics in the final semester, catering to the needs of stakeholders with research aptitude.
- ➤ The General Studies and Mathematics based problem solving skills are included as mandatory components in the 'Training for Competitive Examinations' course at the final semester, a first of its kind.
- The curriculum is designed so as to strengthen the Industry-Academia interface and provide more job opportunities for the students.
- > The Industrial Statistics course is newly introduced in the fourth semester, to expose the students to real life problems and train the students on designing a mathematical model to provide solutions to the industrial problems.
- > The Internship during the second year vacation will help the students gain valuable work experience, that connects classroom knowledge to real world experience and to narrow down and focus on the career path.
- Project with viva-voce component in the fifth semester enables the student, application of conceptual knowledge to practical situations. The state of art technologies in conducting a Explain in a scientific and systematic way and arriving at a precise solution is ensured. Such innovative provisions of the industrial training, project and internships will give students an edge over the counterparts in the job market.
- > State-of Art techniques from the streams of multi-disciplinary, cross disciplinary and inter disciplinary nature are incorporated as Elective courses, covering conventional topics to the latest Artificial Intelligence.



## Value additions in the Revamped Curriculum:

	Newly introduced Components	Outcome/ Benefits  > Instill confidence
Semester I	Foundation Course To ease the transition of learning from higher secondary to highereducation, providing an over view of the pedagogy of learning Literature and analysing the world through the literary lens	<ul> <li>Instill confidence among students</li> <li>Create interest for the subject</li> </ul>
I,II,IIV	Give sire to anew perspective.  Skill Enhancement papers(Discipline centric /Generic/Entrepreneurial)	<ul> <li>Industry ready graduates</li> <li>Skilled human resource</li> <li>Students are equipped with essential skills to Make them employable</li> </ul>
		<ul> <li>Training on language and communication skills enable the students gain Knowledge and Exposure in the competitive world.</li> <li>Discipline centric skill will improve the Technical knowhow of solving real life problems.</li> </ul>
III,IV,V& VI	Elective papers	➤ Strengthening the domain knowledge  ➤ Introducing the stakeholders to the State-of Art technique from the streamsofmulti-disciplinary, crossdisciplinary and interdisciplinary and interdisciplinary ature  ➤ Emerging topics in higher education/industry/communication network/he lthsectoretc.are introduction.



		hands-on-training.
IV.	Elective Papers	<ul> <li>Exposure to industry molds students into solution providers</li> <li>Generates Industry ready graduates</li> <li>Employment opportunities enhanced</li> </ul>
V Semester	Elective papers	> Self-learning is enhanced > Application of the concept to real situation is conceived resulting Intangible outcome
VI Semester	Elective papers	➤ Enriches the study beyond the course. ➤ Developing are search framework and presenting their independent and Intellectual ideas effectively.
Extra Credits: For Advanced Lear	rners/Honors degree	> To cater to the need softer learners/research Aspirants
Skills acquired from	n the Courses	Knowledge, Problem Solving, Analytica ability, Professional Competency, Professional Communication and Transferrable Skill





		Cc. Cc.	1.3 Co Course CCI	- Tamil  1.2 Part  English	Sem I 1.1 Part 1.	Credi
1.6 Elective II Generic/ Discipline	1.5 Elective 1 Generic/ Discipline Specific	1.4 Core Course – CCII	Core 5	Part.2 3	Int 1. 3	t Distrib
ē <u> </u>	4	ω	5		Credit 3	utior
			US	6	9 H	for
2	4	CC CC	223	2.2 En	Sem II 2.1Par Langu	1 Su
2.6 Elective III Generic/	2.5 Elective II Generic/ Discipline Specific	2.4 Core Course – CC IV	2.3 Core Course – CC III	- Tamil 2.2Part2 English	Sem II  2.1Part1.  Language	Credit Distribution for UG Programmes
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4 3.6 V Dis		3.4 Course VI	3.3 Course V	Tamil 3.2Part2 English	3.1Part.1. Language	III mes
scip	3.5 Elective IV Generic/ Discipline Specific	1 0	Core % - CC	t.2	ge .1.	7
Elective - Generic/ line	tive 4	CC 3	0.9	Lis	l w	Credit
	415 F25 - 52		5	6		H H
2	4	ω				
4.6 Elective VI Generic/	4.5 Elective V Generic/ Discipline Specific	4.4 Core Course— CC VIII	4.3 Core Course – CC VII Core Industry Module	4.2Part2 English	4.1Part1. Language	Sem IV
w	2	ين	4	w	u	Credit
2	ca C	· ·	4.	6	6	H
5.6 Value Educati on	5.5 Elective VII Generic/ Discipli ne Specific	4.Core 4.Core Course  / Project with viva- voce CC -XII	5. 3.Core Course CC-XI	5.2 Core Course – CC X	5.1 Core Course _\CC IX	Sem V
22	w	S-1	s vi	\$	Ü	
ю	4		0	6	0	-
6.6 Extension Activity	6.5 Skill Enhancem ent Course SEC-8/ Profession al Competen cy Skill	Elective - VIII Generic/ Discipline Specific	6.3 Core Course – CC XV	6.2 Core Course – CC XIV	$\times$ 5	61 Core
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Choice Based Credit System (CBCS), Learning Outcomes Based Curriculum Framework (LOCF)
Guideline Based Credit and Hours Distribution System for all UG courses including Lab Hours

#### First Year - Semester-I

Part	List of Courses	Credit	No. of Hours
lait	Elst of Coales	3	6
Part-1	Language - Tamil	3	6
Part-2	English	12	14
Part-3	Core Courses& Elective Courses [in Total]	2	2
	Skill Enhancement Course SEC-1	2	2
Part-4	Foundation Course	22	30

#### Semester-II

Part	List of Courses	Credit	No. of Hours
- 1000 V	Ly woodware Tame!	3	6
Part-1	Language - Tamil	3	6
Part-2	English Control of the Total of	13	14
Part-3	Core Courses& Elective Courses including laboratory [in Total]	13	2
Part-4	Skill Enhancement Course -SEC-2	12	12
1 art 1	Skill Enhancement Course -SEC-3 (Discipline / Subject Specific)	2	2
100 100	SKIII Elimancoment Course 222 ( )	23	30

#### Second Year - Semester-III

Part	List of Courses	Credit	No. of Hours
Part-1	Language — Tamil	3	6
Part-2	English	3	6
Part-3	Core Courses& Elective Courses including laboratory [in Total]	12	14
Part-4	Skill Enhancement Course -SEC-4 (Entrepreneurial Based)	1	1
	Skill Enhancement Course -SEC-5 (Discipline / Subject Specific)	2	2
	E.V.S		i i
		21	30



#### Semester-IV

Part	List of Courses	Credit	No. of Hours
lait		3	6
Part-1	Language - Tamil	3	6
Part-2		12	13
Part-3	English  Core Courses& Elective Courses including laboratory [in Total]	2	2
Part-4	Core Courses& Elective Courses including insortant Subject Specific)  Skill Enhancement Course -SEC-6 (Discipline / Subject Specific)	2	2
\$165300E/ Tr	Skill Enhancement Course -SEC-6 (Discipline / Subject Specific)  Skill Enhancement Course -SEC-7 (Discipline / Subject Specific)	2	1
	E.V.S	24	30

## Third Year - Semester-V

Part	List of Courses	Credit	No. of Hours
	The stive Dened	22	26
Part-3	Core Courses including Project / Elective Based	2	2
Part-4	Value Education	2	2
	Internship / Industrial Visit / Field Visit	26	30

#### Semester-VI

Part	List of Courses	Credit	No. of Hours
Part-3	Core Courses including Project / Elective Based & LAB	21	28
Part-4	Professional Competency Skill	2	
	Extension Activity	1	2
1672-24		24	30



## Consolidated Semester wise and Component wise Credit distribution

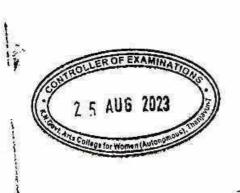
Parts	Sem I	Sem II	Sem III	Sem IV	Sem V	Sem VI	Total Credits
Part I	3	3	3	3		1-	12
Part II	3	3	3	3			12
Part III	12	13	12	12	22	21	92
Part IV	4	4	3	6	4	1	22
Part V	) (870)	(9)		N <sub>E</sub> X	9 <del>1</del>	2	2
Total	22	23	21	24	26	24	140

\*Part I. II, and Part III components will be separately taken into account for CGPA calculation and classification for the under graduate programme and the other components. IV, V have to be completed during the duration of the programme as per the norms, to be eligible for obtaining the UG degree.

	Methods of Evaluation	
	Continuous Internal Assessment Test	de die e
Internal	Assignments	25 Marks
Evaluation	Seminars	
	Attendance and Class Participation	
External Evaluation	End Semester Examination	75 Marks
	Total	100 Marks
	Methods of Assessment	
Recall(K1)	Simple definitions, MCQ, Recall steps, Con	cent definitions
Understand/C omprehend(K2)	MCQ, True/False, Short essays, Concept ex Overview	planations, Short summary or
Application (K3)	Suggest idea/concept with examples, Sugge Observe, Explain	
Analyze(K4)	Problem-solvingquestions, Finishaprocedure	inmonylete - D:00
1007 1007 200	Between various ideas, Map knowledge	minarysteps, Differentiate
Evaluate(K5)	Longer essay/Evaluation essay, Critique or	
Create(K6)	Checkknowledgeinspecificoroffbeatsituatio Presentations	ns,Discussion,Debatingor



р <sub>енти</sub> Турга	Credit	Nos	Total
Paper Type	3	8	24
Language Core- Papers	4	15	60
Allied / Elective	3	8	24
Ability Enhancement Compulsory Course (AECC) Soft Skill-	2	15	30
Extension Activity	1	2	2
Total			140



HOD OF STAPISHER K.N.G.A.C. (W) (AUTO) THANJAVUR

Title of the Course	Probability	THEOL	J				
Paper Number	CORE I Year I		Credits	5	Course		23K1S01
Category Core	Semester	Ī			Code	3	
		/Pari	torial	Lab Pra	ctice	Tot	าสไ
Instructional Hours	Lecture	1 1	OTIAL			5	
Per week	Basic Know	ladon (	an events an	A STATE OF THE PARTY OF THE PAR	У		
Pre-requisite							738
Objectives of the Course	The main objectives of this course are:  1. To describe the importance and scope of probability the and to predict the chance of an experimental outcomes.  2. It provides the study of random variable, distribution functionathematical expectation,  3. Generating function and law of large numbers.  4. Two-dimentional variables and its distributions						ribution functions.
Course Outline	Definition - Probability	Axion Addi 'n' even and Pro	matic appro tion and Mu ents (Stater oof)- Baves'	ach — Typultiplication nent and theorem	n theor Proof) of Prob	ems - B abili	ic terminology ts - Conditional of Probability for coole's inequality ty (Statement and
	Unit-II Introduction Discrete di variable: P central ten	Ran - Dis stribut robabil dency,	dom varionete randonion function lity density dispersion	ables an wariable an, Proper function n, Skew	d Die: Prob	strib abili Cor	ution functions ty mass function ntinuous randor ies, measures o
	Unit-II Introduction Discrete di variable: P central ten continuous I  Unit-III mass functio function. distribution	Ran - Dis stribut robabil dency, Probab  Two on- Ma functi condition.	dom varionerete random ion function iity density dispersion ility distribution dimension reginal probations - Join onal distributions formations	ables an wariable on, Proper function on, Skew ation.  The proper function on the density function of the contraction of the co	d Die: Probeties. and propess varial ction, ( cribution function - ( )	striberability Corporate and colors of fition-Cond	ution functions ty mass function ntinuous randor ies, measures o



	Unit-V Generating functions: M.G.F-Properties-Uniqueness theorem - C.G.F-Properties P.G.F-Properties Characteristic Function: Properties-Inversion theorems (Statement only)- Uniqueness theorem (Statement only). Chebychev's Inequality (Statement and Proof). Law of Large Numbers (L.L.N): Convergence in probability - Properties: Weak L.L.N - properties-Bernoulli's L.L.N (Statement and Proof) - Khinchin's theorems (Statement only).
Component (is a part of internal component only.	(To be discussed during the Tutorial hour)
Skills acquired from this Course	Knowledge, Problem Solving, Analytical ability, Professional Competency, Professional Communication and Transferrable Skill
Recommended Text	Gupta S.C. and Kapoor V.K (2015): Fundamentals of Mathematical Statistics, Sultan Chand & Sons.
Reference Books	<ol> <li>Rohatgi, V.K. (1984): An introduction to probability theory and mathematical statistics.</li> <li>Hogg. R.V. and Craig. A.T. (1978): Introduction to Mathematical Statistics, McGraw Hill Publishing Co. Inc. New York.</li> <li>Mood A.M. Graybill, F.A. and Bose. D.C. (1974): Introduction to the theory of Statistics, McGraw Hill Publishing Co. Inc. New York.</li> <li>Sanjay Arora and Bansilal (1989): New Mathematical Statistics, Satyaprakashan, New Delhi</li> </ol>
Website and e-Learning Source	e-books, tutorials on MOOC/SWAYAM courses on the subject  www.khanacademy.org/math/statistics-probability/random- variables-stats-library  https://ocw.mit.edu/courses/mathematics/18-440-probability- and-random-variables-spring-2014/



## Course Learning Outcome(for Mapping with POs and PSOs)

CLO-1: Understand concepts of probability and identify the different approaches of probability theory

CLO-2: Define the random variable and its respective probability values and to compare a discrete and

CLO-3: Calculate the expected value of a random variable variance, covariance, moments and find the

conditional expectation and variance of bi-vitiate random variable. CLO-4: Estimate the measures of central values, Dispersions, Skewness and Kurtosis through the generating function

CLO-4: Calculate the mean and variance through some law of large numbers.

CLO-5: Understand bivariate random variables and its distributions

CLO-6: Application of probability theory in real life

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	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7	PSO8	PSO9
	en-	0	M	M	м	S	M	S	М
CL01		8	C C	C	M	S	м	S	М
CLO2	As	8	<u> </u>	-	C	c	M	S	S
CLO3	7	S	S	M	2	5	G	c	M
CLO4	S	S	S	M	S	S	8	3	101
CLO5	s	S	S	S	M	S	S	8	M
CLO6		S .	S	S	M	S	S	s	M

## CLO-PSO Mapping (Course Articulation Matrix) S-Strong, M-Medium, W-Weak

CO/PO	PSO1	PSO2	PSO3	PSO4	PSO5
C01	3	3	3	3	3
CO2	3	3	3	3	3
CO3	3	3	3	3	3
CO4	3	3	3 .	3	3
C05	3	3	3	3	3
Weightage	15	15	15	15	15
Weighted percentage of Course Contribution to Pos	3.0	3.0	3.0	3.0	3.0

Level of Correlation between PSO's and CO's



Title of the Course	Descriptive	Statis			- Id	de	23K1S02
aper Number	CORE II	Ī	Credits	3	Cour		(A.2882.11)
Category Core	Year	<u> </u>		6	Code	Ø.	
Jacobary	Semester	<b>(*)</b>				T 60 4	
7		Ton	torial	Lab Pra	ctice	Tot	a)
nstructional Hours	Lecture	_	(0) (a)	30.01		3	
	2	1					
Per week	Basic arithn	netic		urce are:		tresse	1 -totictical
Pre-requisite Objectives of the	Basic arithn The main ol	ojectivo	es of this co	ant concer	ots of s	tatist	ics and statistical
Course	2. It p distr 3. Also sym 4. Esti	orovide ibution they metry, mate and they of no	s to form measure moments, ind predict the	the aver relationship the unknown d consister	rages, p amon n and fi	dispe g var uture he da	ersions, lack of lables. values.
Course Outline	Executing to Methods Sampling: Formation Types. I representat Limitations	of col Censu of free Diagran ion -	lecting pring some series and San quency distribution regarded for a graphs of grams and g	mary data mple metheribution-Ta epresentation frequency graphs.	- Source hods. houlation on - y distri	ces o Class on - F Ty ibutio	ection-Definitions
	Types - Weighted Introduction	Mean- mean n – De Stand	Median-Mo - Merits a finition – T lard deviation I Demerits.	and Deme ypes – Ran on - Co-e	erits-Me nge - Qu fficient	easure uartile of v	Harmonic Mean es of Dispersion e deviation - Mean eriation - Loren
	Unit-III	- Bow	. YE 11	J- mathar	6 - 1 h	eır m meri	inition-Types-Kar erits and demerits and demerits
		Introd Introd lations	uction-Delli uction - De s.	finition-T	ypes -	1,	ts and demerite Central momen

(4	Exponential and Power curves.
89	Unit-VTheory of Attributes: Introduction — Definition-Classes and Class frequencies-Consistency of data-Independence of attributes-Association of attributes-Yule's coefficient and -Coefficient of Colligation.
Extended Professional	Questions related to the above topics, from various competitive
Component (is a part of	examinations UPSC/TRB/NET/UGC-CSIR/GATE/TNPSC / others
nternal component only,	to be solved
Not to be included in the	(To be discussed during the Tutorial hour)
External Examination	類
Question paper)	
Skills acquired from this	Knowledge, Problem Solving, Analytical ability, Professional
Course	Competency Professional Communication and Transferrable Skill
Recommended Text	<ol> <li>Gupta, S.P. (2017): Statistical Methods, Sultan Chand &amp; Sons Pvt Ltd, New Delhi, 35<sup>th</sup> Revised Edition.</li> <li>Gupta S.C and Kapoor, V.K. (2002). Fundamentals o Mathematical Statistics, Sultan Chand &amp; Sons Pvt. Ltd., New Delhi</li> </ol>
Reference Books	<ol> <li>Goon A.M. Gupta. A.K. and Das Gupta, B (1987) Fundamental of Statistics, vol.2 World Press Pvt. Ltd. Kolkatta</li> <li>G.U.Yule and M.G. Kendall (1956). An introduction to the theory of Statistics, Charles Griffin.</li> <li>M.R. Spiegel (1961). Theory and problems of Statistics Schaum's outline series.</li> <li>Anderson, T.W. and Sclove SL. (1978). An introduction to statistical analysis of data, Houghton Miffin &amp; co.</li> <li>Pillai, R.S., and Bagavathi (2003): Statistics, S. Chand and Company Ltd., New Delhi.</li> </ol>
Website and e-Learning Source	e-books, tutorials on MOOC/SWAYAM courses on the subject <a href="https://en.wikipedia.org/wiki/Statistics">https://en.wikipedia.org/wiki/Statistics</a>



## Course Learning Outcome (for Mapping with POs and PSOs)

Students will be able to

CLO-1: Describe the scope, functions, applications and limitations of Statistics.

CLO-2: Also to explain the statistical survey, collection of data, sampling and presentation of data.

CLO-3: Discuss the importance and uses of central values and dispersions for the various types of data.

CLO-4: Also to measure the various measures of averages and scatteredness of the mass of data in a

CLO-5: Explain about the lack of symmetry, rth moments and peakedness of the frequency distributions.

CLO-6: Ability to apply in data

	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7	PSO8	PSO9
CLO1		8	М	М	М	s	M	s	М
CLO2	A	S	s	s	М	s	M	S	M
CLO3		S	s	М	s	s	М	s	S
CLO4		s	s	s	s	s	S	S	M
CLO5	200	S	s	s	М	s	s	s	М
CLO6	20-03-E-1	s	s	s	М	s	s	S	M

## CLO-PSO Mapping (Course Articulation Matrix) S-Strong, M-Medium, W-Weak

CO/PO	PSO1	PSO2	PSO3	PSO4	PSO5
C01	3	3	3	3	3
CO2	3	3	3	3	3
C03	3	3	3	3	3
C04	3	3	3	3	3
CO5	3	3	3	3	3
Weightage	15	15	15	15	15
Weighted percentage of Course Contribution to Pos	.3.0	3.0	3.0	3.0	3.0

Level of Correlation between PSO's and CO's

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Title of the Course	Mathema	tics for	Statistics	<u> </u>	ASS THE		ese Pelos	
Paper Number	Elective I	(Discipl	4	Course		23K1SECS1:1		
Category Core	Year	I	Credits	1 17	Code			
	Semester	I			872, 340,040	R		
Instructional Hours	Lecture	Tut	torial	Lab Pra	ctice	Tot	al	
Per week	3	ī				4		
Des roquisits	Calculus -	- Basic at	rithmetic es of this cou					
Course	lea kn and 2. It l the	owledge of theorem the control of th	and underst and underst ans. students to adge and sk and applied	enhance the problems is	finition ne abil d by to n math	ity of them nemat	e deep interest in ad and balance ncepts, principles to apply to solve specific ics. range of generic ial activities.	
Course Outline	Unit-II Binomial,	Seri Expone	es: Summa ential and even and odd	ation and Logarithm	appro	oxima ries	tions related to -Taylor's series	
**	Unit-III Theory of equations: Polynomial equations with real coefficients- imaginary and irrational roots-solving equations with related roots-equation with given numbers as roots-equation whose roots are symmetric functions of roots.							
	Unit-IV Differential calculus: Functions — Different types simple valued and many valued — Implicit and Explicit functions, Ode and even functions, periodic functions, algebraic and transcendenta functions. Inverse functions, Limit of a function — Some standard limit (without proof) Differentiation of standard functions- standard rules of differentiation-Addition, subtraction, multiplication and quotient rule — function of function rule.							
	of standar Successive	rd funct e partial functions	ions – sim differentia . Homogen	iple probletion. Max	ems.	Partia	n, nth derivative I differentiation Minima for two er's theorem or	



Component (is a part of internal component only, Not to be included in the External Examination Question paper)	(To be discussed during the Tutorial hour)
Skills acquired from this Course	Knowledge, Problem Solving, Analytical ability, Professional Competency, Professional Communication and Transferrable Skill
Recommended Text	<ol> <li>Duraipandian, P. and Udaya Baskaran, S. (2014): Allied Mathematics, Vol. – I&amp;II,S. Chand&amp; Company Pvt. Ltd.</li> <li>Vittal, P.R( 2012). Allied Mathematics, Margham Publications.</li> <li>Narayanan,S ManickavachagamPillai(1993): Ancillary Mathematics, Book II: (Containing Differential Calculus) S. Viswanathan Pvt, Ltd.</li> </ol>
Reference Books	<ol> <li>Narayanan, S and ManickavachagamPillai (1993): Ancillary Mathematics (Vol. II,Part I): (Containing Trignometry) S. ViswanathanPvt. Ltd.</li> <li>Narayanan, S and ManickavachagamPillai (1993): Ancillary Mathematics, Book I: (Containing Algebra). S. Viswanathan Pvt.Ltd.</li> <li>S.J.Venkatesan (2019), Algebra,Sri Krishna Publications ,Chennai-77, skhengg1999@gmail.com</li> </ol>
Website and e-Learning Source	e-books, tutorials on MOOC/SWAYAM courses on the subject

Course Learning Outcome(for Mapping with POs and PSOs)

Students will be able to

CLO-1 Distinguish between proper and improper fractions. Express an algebraic fraction as the sum of its partial fractions.

CLO-2 Demonstrate the knowledge to determine the sums, expansion and approximation of series including binomial, exponential, logarithmic and fourier.

CLO-3 Solve problems about polynomials with real coefficients, imaginary and irrational roots. Explain the relationship between the derivative of a function as a function and the notion of the derivative.



CLO-5 Obtain the nth derivative in successive differentiation. Apply Euler's theorem on homogenous CLO-6Obtain the mathematical knowledge and skills for the better understanding of statistics as a

mathematical science

6Obtain the matter	PSO6 PSO7 PSO8 PSO5
ation science	205 130
PSO2 PSO3 TS	M S M S M
1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	M S M S S
CLOIS S S	S S M
CLO2S S S M	S S S M
CLO3S S S M	M S S M M
CLO4S S M M	M S B
CL05S S S	- mak
Chook	Tadium, W-Weak

# CLO-PSO Mapping (Course Articulation Matrix) S-Strong, M-Medium, W-Weak

CLO-PSO Mapping (Course A	arm 		PSO3	PSO4	PSO5
V	PSO1	PSO2	- 2	3	3
CO/PO	3	3	<del></del>	3	3
CO1	3	3	3	3	3
CO2	3	3	3	$\frac{1}{3}$	3
CO3	3	3	3		3
CO4	2	3	3	3	15
CO5	15	15	15	15	13
Weightage		_	2.0	3.0	3.0
Weighted percentage of Course Contribution to Pos	3.0	3.0	3.0		

Level of Correlation between PSO's and CO's

THAMJAVIR

Title of the Course	Statistics a	nd Ma	athematics	-I	-	- 119		
Paper Number	Elective I (I		Credits	2)	Com	*60	23K1SECS1:2	
Category Core	I Car			4	Course Code		251ki0Deb2i-	
	Semester I				Code	8		
Instructional Hours	Lecture	Tut	orial ·	Lab Prac	ctice	Tota	aI	
Per week	3	1		-		4		
Pre-requisite	Calculus - B	asic ar	ithmetic					
Objectives of the Course	learni know and th  2. It hely the k theore 3. It also	overall ing maledge in the orem in the interest in the interes	objective of athematics and understants. students to die and skilling applied purages the	of the study which do anding def enhance th ill acquired problems in students to	evelop inition e abili l by the mather devel	broas, con ty of linem tem emation	e deep interest in ad and balance acepts, principles learners to apply to solve specific cs. range of generic ial activities.	
Course Outline	sampling — J disadvantage: stratified rand Unit-II Vita rate, specific reproduction	udgem s, pro dom sa l statis birth rate ar	ent sampling bability sampling, systics – Definerate, generated Net reproduced the sampling sample.	ng, Quota mpling – tematic san  ition – Me al birth rat	sampl Simpl npling thods te, tota	ing – e ran – sam Fertili il fert	advantages and adom sampling, apling errors.  ity – crude birth ility rate, gross as. Mortality –	
	crude death rate, SDR life table – uses – problems.  Unit-III Eigen values and Eigen vectors – power of matrix,  Inverse of matrix – Cayley Hamilton – theorem (without proof) – simple problems.							
	expansion	Unit-IV Algebra – Binomial theorem – Expansion of rational fractions, summation of the series, approximation. Exponential series – expansion – summation of the series, logarithmic series – summation of the series – simple problems.						
	Tarana Lange	THURST	IIIIIIIIX I	Thogona	The second second	**	Operations on ank of matrix. Ogeneous linear	



	equations, homogeneous linear equations, simple problems.
Component (is a part of internal component only,	Questions related to the above topics, from various competitive examinations UPSC/TRB/NET/UGC-CSIR/GATE/TNPSC/ others to be solved (To be discussed during the Tutorial hour)
Skills acquired from this	Knowledge, Problem Solving, Analytical ability, Professional
Course	Competency, Professional Communication and Transferrable Skill
Recommended Text	<ol> <li>Duraipandian, P. and Udaya Baskaran, S. (2014): Allied Mathematics, Vol. – I&amp;II,S. Chand&amp; Company Pvt. Ltd.</li> <li>Vittal, P.R( 2012). Allied Mathematics, Margham Publications.</li> <li>Narayanan,S ManickavachagamPillai(1993): Ancillary Mathematics, Book II: (Containing Differential Calculus) S. Viswanathan Pvt, Ltd.</li> </ol>
Reference Books	<ol> <li>Narayanan, S and ManickavachagamPillai (1993): Ancillary Mathematics (Vol. II,Part I): (Containing Trignometry) S. ViswanathanPvt. Ltd.</li> <li>Narayanan, S and ManickavachagamPillai (1993): Ancillary Mathematics, Book I: (Containing Algebra). S. Viswanathan Pvt.Ltd.</li> <li>S.J.Venkatesan (2019), Algebra,Sri Krishna Publications ,Chennai-77, skhengg1999@gmail.com</li> </ol>
Website and e-Learning Source	e-books, tutorials on MOOC/SWAYAM courses on the subject

Course Learning Outcome(for Mapping with POs and PSOs)

Students will be able to

CLO-1 Distinguish between proper and improper fractions. Express an algebraic fraction as the sum of its partial fractions.

CLO-2 Demonstrate the knowledge to determine the sums, expansion and approximation of series including binomial, exponential, logarithmic and fourier.



CLO-3 Solve problems about polynomials with real coefficients, imaginary and irrational roots. Explain the relationship between the derivative of a function as a function and the notion of the derivative.

CLO-4 Calculate limits of a function.

CLO-5 Obtain the nth derivative in successive differentiation. Apply Euler's theorem on homogenous function

CLO-6Obtain the mathematical knowledge and skills for the better understanding of statistics as a mathematical science

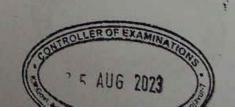
	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7	PSO8	PSO9
CLOI		S	м	М	M	s	М	S	M
CLO2	4	S	s	s	М	S	М	s	М
CLO3	200.00	S	S	М	S	s	М	S	S
CLO4		s	s	м	S	S	S	S	M
CL05	-	S	М	М	М	S	S	s	М
CL06		s	S	s	М	s	S	М	М

## CLO-PSO Mapping (Course Articulation Matrix) S-Strong, M-Medium, W-Weak

CO/PO	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	3	3	3	3	3
CO2	3	3	3	3	3
CO3	3	3	3	3	3
CO4	3	3	3	3	3
CO5	3	3	3	3	3
Weightage	15	15	15	15	15
Weighted percentage of Course Contribution to Pos	3.0	3.0	3.0	3.0	3.0

Level of Correlation between PSO's and CO's

Paper Number			100	-	Course		
Category Core	Year Semester	I I	Credits	2	Code	23K1SSEC1	
Instructional	Lecture	Tu	torial	Lab	Practice	Total	
Hours per week	Decture	-				2	
	Uses and its ba	isics				r entireine	
Objectives of the Course	21	lata, p statist	resentation ics and its s	of data a	ind analysis	c concepts of statistics s of data. 2. To acquir ce in various areas suc iences etc.,	
	Concepts of Ra only. Unit II Collect	efinition of	on – Scope n sampling a	– Limita nd Non-	random sar	pulation and Sample npling – Basic concept	
Course Outline	secondary data Schedule. Unit III Preser Classification	ntatio	ources of on of Data a - Types -	lata – F	reparation ency distrib	of Questionnaire and outions for discrete are one, two factors	
Classification.  Unit IV Diagrammatic Representation of Data  Bar Diagrams: Types of one dimensional and two dim diagrams - Pie-diagrams - Uses.  Unit -V Graphical Representation of Statistical Data  Histogram - Frequency Polygon - Frequency curve and							
ctended ofessional omponent (is a rt of internal	frequency curve Questions rela examinations U others to be solv (To be discussed	ted t	to the abo	ove top ET / U(	ics, from GC – CSII	various competitiv R / GATE / TNPSC	
t to be included the External amination estion paper)							



	Company Ltd.					
Reference Books	<ol> <li>Gupta. S. P. (2001), Statistical methods, Sultan Chand &amp; Company Ltd.</li> <li>New Delhi.</li> <li>Pillai. R. S. N. And Bagavathi. V. (2005), Statistics, S. Chand &amp; Company Ltd., New Delhi.</li> <li>Sancheti. D. C. and Kapoor. V. K, Statistics (7th Edition), Sultan Chand &amp; Sons, New Delhi.</li> <li>Arora P. N, Comprehensive Statistical Methods, Sultan Chand &amp; Sons, New Delhi.</li> <li>Agarwal B. L, Basic Statistics, Wiley Eastern Ltd., Publishers, New Delhi.</li> <li>Shukla M. C and Gulshan S. S, Statistics, Sultan Chand &amp; Sons New Delhi.</li> <li>Simpson G and Kafka F, Basic Statistics, Oxford and IBH, Calcutta.</li> <li>Freud J. E, Modern Elementary Statistics, Prentice Hall of India.</li> <li>Saxena H. C (1983), Elementary Statistics, Sultan Chand &amp; Sons, New Delhi.</li> </ol>					
Website and e- Learning Source	<ul> <li>https://www.tutorialspoint.com/statistics/</li> <li>https://www.emathzone.com/tutorials/basicstatistics/collection-of-statistical-data.html</li> <li>https://byjus.com/commerce/meaning-and-objectives-ofclassification-of-data/</li> <li>https://byjus.com/commerce/diagrammatic-presentation-ofdata/</li> <li>https://byjus.com/maths/graphical-representation/</li> </ul>					

## Course Learning Outcome (for Mapping with POs and PSOs)

Students will be able to

- CLO -1 Distinguish between population and sample.
- CLO-2 Know the concepts of random sampling and non sampling
- CLO-3 Frame a questionnaire and collect primary and secondary data.
- CLO-4 Easy to understand the basic concepts.
- CLO-5 Analyze statistical data and draw graphs, histograms, frequency polygons and Ogives.
- CLO-6 Obtain the mathematical knowledge and skills for the better understanding of statistics.



	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7	PSO8	PSO9
CL01	S	S	М	м	М	S	М	S	М
CLO2	S	S	S	S	М	s	М	S	М
CLO3	S	S	S	М	S	S	М	S	S
CLO4	S	S	s	М	S	s	s	S	М
CLO5	S	S	М	М	М	S	S	S	M
CLO6	S	S	S	S	М	S	S	М	М

CLO-PSO Mapping (Course Articulation Matrix) S-Strong, M-Medium, W-Weak

CO/PO	PSO1	PSO2	PSO3	PSO4	PSO5
C01	3	3	3	3	3
CO2	3	3	3	3	3
CO3	3	3	3	3	3
CO4	3	3	3	3	3
C05	3	3	3	3	3
Weightage	15	15	15	15	15
Weighted percentage of Course Contribution to Pos	3.0	3.0	3.0	3.0	3.0

Level of Correlation between PSO's and CO's

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110.50 \(\frac{1}{2}\) (40.70 \(\frac{1}2\) (40.70 \(\frac{1}2\) (40.70 \(\frac{1}2\) (40.70 \(\frac{1}2\) (40.70

maria Est	Course	Foundatio	n Co	urse – Eleme	ntary St	atistico (-				
Title of the				- 51 HE CANADA		Course				
Paper Nun	nber	Year	I	Credits	2	Code	23K1SFC			
Category	Core	Semester	I		拼	Practice	Total			
Instruction	and Hours	Lecture	T	utorial		Tactice	2			
per week		2 -								
per week		Uses and i	ts bas	ics	- 14 - 15 - 15 - 15 - 15 - 15 - 15 - 15	1 d - h	asic concepts of set			
Objectives	s of the Course	2.Appreci 3.Underst 4.To acqu Geometric others.	ate the and the ire kind ire kind	e basics of fur e types of fur nowledge the d useful appl	nctions and the sections and sections s	nd relation nd relation ce and ser in comme ermutatio	15.			
		problems Unit – II Sequence Introduct	and	a	rithmetic eries, Ar	and Geo	ometric Progressions – Progression, Geometric			
Course O	utline	Unit – II Basic Co Principle Permutat Problems Unit – IV	I ncepts s of C ions,	s of Permutat ounting, Fact Permutation	ions & C orial, Pe with Res	rmutation trictions,	on – Fundamental s, Circular Combinations – Simple			
		and a s	– Im ample and s	e – quantita econdary dat	tive and	l qualitat	of statistical population ive data. Collection cales – nominal, ordin			
	Professiona	3	s rel	ated to the	above to	opics, fro	om various competitiv			



Skills acquired from thi Course	Knowledge, Problem Solving, Analytical ability, Professional Competency, Professional Communication and Transferrable Skill V.K. Kapoor and S.C. Gupta: Fundamentals of Mathematical
	Statistics, Sultan Chand & Sons, New Delin.  2. Charles C.Pinter: A Book of Set Theory –Dover Publications, Inc, Mineola, New York.  3. Dr. R.S. Aggarwal: A Modern Approach to Logical Reasoning, Sultan & Chand – 2018.
Website and e Learning Source	https://www.icai.org/post.html?post_id=17790

# Course Learning Outcome (for Mapping with POs and PSOs)

Students will be able to

CLO-1: Describe the rule that definition, relations and functions of set theory.

CLO-2: To develop the skill of computation with real sequences and series.

CLO-3: Students should be able to determine the number of outcomes in a problem.

CLO-4: Students should be able to apply the fundamental principle of counting to find out the total number of outcomes in problem.

CLO-5: Understand of data and its relevance in business and develop an understanding of quantitative techniques. CLO-6: Ability to apply in data.

	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7	PSO8	PSO9
CL01	S	s	М	М	М	s	М	s	М
CLO2	S	S	s	S	М	s	М	s	м
CLO3	S	S	s	М	S	s	M	s	s
CLO4	s	S	s	М	s	S	s	s	М
CLO5	S	S	М	М	М	S	s	s	м
CLO6	S	S	S	S	М	s	s	М	М

CLO-PSO Mapping (Course Articulation Matrix) S-Strong, M-Medium, W-Weak



HOD OF STATISTICS K.N.G.A.C. (W) (AUTO) THANJAVUR

Title of th	e Course	Matrix and	Linea	r Algebra			N. C.		
Paper Nui		Core III		[a] 114a	5	Course	Code	23K2S03	
Category	Core	Year	I	Credits	3	Cour			
38 35		Semester	II				1		
	111	Lecture	Tut	orial	Lab P	ractice	Tota		
Instruction	ial Hours	4 1			100		5		
Per week Pre-requis		Basic vector and matrix theory							
Objectives	of the Course	2. To ki 3. To le 4. To k polyn	udy the now the arn the now as omials	e basic opera e structure of invariance p nd to apply	orthogor foroperties the cond	of ranks cepts of v	ector s	pace and matr	
Course Ou		transpose and Singular and Unit II Commutative inverse and Matrices, Pro Unit III Ra transformatio elementary to matrices. Unit-IV —Sub-space - Row and Col Sum and Proc Sum and Proc Unit-VMatrix between char Geometric me matrices, Car	l conjunt Non - Severs Proper lumn seluct of a polymatterisaltiplic yley- F	gate transpo Singular matical law for inverse and gate transport funitary mate matrix, Ech lementary rmations, Roor space – Linguis or space – Linguis paces, Equal matrices nomials, Chatic roots are ity, Nature	se. Adjointees, the investment of characteria.	rse of prese of manatrix, Octitioning n, Rank of Invarianto Norwendence own and other to the control of the con	oduct of trix, Corthogon of matriof transpance of mal formal formal formal and vectors, roots in	rank through rank Equivale of a vector spanendent system ranks, Rank ectors, Relation Algebraic are case of speci	
			lated	to the stee	we toni	ce from	vario		
tended	Professional	A STATE OF THE PARTY OF THE PAR						and the second s	
mponent (	is a part of	examinations						and the second s	
emponent (	is a part of e	examinations solved	UPSC	TRB/NET/U	JGC-CS	IR/GATE		and the second s	
emponent (	is a part of	examinations solved	UPSC	TRB/NET/U	JGC-CS	IR/GATE		and the second s	
emponent (	is a part of e conent only, s luded in the (	examinations solved	UPSC	TRB/NET/U	JGC-CS	IR/GATE		and the second s	
omponent ( ernal comp of to be inc	is a part of e conent only, s luded in the ( nination	examinations solved	UPSC	TRB/NET/U	JGC-CS	IR/GATE		and the second s	
omponent ( ernal comp of to be inc ternal Exan	is a part of e conent only, s luded in the ( nination r)	examinations solved	UPSC	TRB/NET/U	JGC-CS	IR/GATE	E/TNPS	C/ others to be	



Recommended Text	Vasishtha.A.R (1972) : Matrices, Krishnaprakashan Mandir,  Meerut.
Reference Books	Shanthinarayan, (2012): A Text Book of Matrices, S.Chand & Co, New Delhi     M.L.Khanna (2009), Matrices, Jai PrakashNath & Co
Website and -Learning Source	e-books, tutorials on MOOC/SWAYAM courses on the subject <a href="https://samples.jbpub.com/9781556229114/chapter7.pdf">https://samples.jbpub.com/9781556229114/chapter7.pdf</a> <a href="https://www.vedantu.com/maths/matrix-rank">https://www.vedantu.com/maths/matrix-rank</a> <a href="https://textbooks.math.gatech.edu/ila/characteristic-polynomial.html">https://textbooks.math.gatech.edu/ila/characteristic-polynomial.html</a> <a href="https://www.aitude.com/explain-echelon-form-of-a-matrix/">https://www.aitude.com/explain-echelon-form-of-a-matrix/</a>

Course Learning Outcome (for Mapping with POs and PSOs)

Students will be able to

CLO-1 Do basic operations of matrices

CLO-2 Understand various transactions of matrices and its applications

CLO-3 Understand various properties of matrices

CLO-4 Able to understand vector space and its applications

CLO-5 Able understand Eigen vector and its applications

CLO-6Able understand vector and matrix applications



	nero.	PSO2	PS03	PSO4	PSO5	PSO6	PSO7	PSO8	PSO9
200	PSO1	1.807	1.500			2	N	8	M
CLO <sub>1</sub>		S	M				N.	8	M
CLO <sub>2</sub>	<u>s</u>	8	8	P	<u> </u>	P		2	8
CLO <sub>3</sub>	S	8	8	M		M	-	-	
CLO4	S	S	8	M	<b>S</b>	5	<u> </u>	P	-
CLO5	-	S	M	M	M	S	8	5	M
CLO6		S	M	S	M	s	8	M	M

# CLO-PSO Mapping (Course Articulation Matrix) S-Strong, M-Medium, W-Weak

	PSO1	PSO2	PSO3	PSO4	PSO5
СО ТО	rsor	1302	- 1	13	3
COI	3	3			3
CO2	3	3	3	3	
CO3	3	3	3	3	3
	3	3	3	3	3
C04	3	7		3	3
CO5		13	15	15	15
Weightage	15	15	13		- 1.5
Weighted percentage of Course Contribution to Pos	3.0	3.0	3.0	3.0	3.0

Level of Correlation between PSO's and CO's

ONTROLLER OF EXAMINATIONS

- AUG 2023

- Aug 2023

- Aug 2023

HOD OF STATISTICS K.N.G.A.C. (W) (AUTO) THANJAVUR

Title of the Course	Distributi Core IV	OH LINE	-			21 BROOM
Paper Number	Year	I	Credits	3 (	Course	23K2S04
Category Core	Semester	П		C	Code	
Instructional Hours	Lecture	Tu	torial	Lab Practi		I
Per week	4	1		-	3	
Pre-requisite	Calculus	- 4/.	3 -09			
Objectives of th Course	2. To learn	liscrete continu tand Di mal dist	distribution: ous distribut stributions g ribution and	s ions enerated fron its properties	n marhema s	atical functions
	mode, mom Fitting of Bi recurrence re cumulants. F - m.g.f., cum Unit II C Hypergeomet	ent ger inomial elation, litting of nulants. Geometric di currence	nerating fun Distribution moment ge of Poisson di Fitting of N ic distributi stribution	ction, character. Poisson distribution. Notes that the stribution of the stribution	eteristic fur stribution ction, char egative bit nial distrib memory, ariance,	n, mean deviation metion, cumulant metion, cumulant metion, moderate moments, moderate function oution.  moments, m.g.f. approximation to on — m.g.f., mean
	distribution a	nd non function Recta	nal probabi on, moment angular dist	lity curve, n s, points of ribution – mo	nean, med inflexion	es of the norma lian, mode, m.g.f , mean deviation g.f., characteristic
n	nemory less	propert	y - Gamm roductive p	a distributio	n – m.g.1	cteristic function f., cumulants and ution — First kind
	Init-VFunctiond F-distributi					to t, Chi-square

Confirment (is a part of internal confirmation).	Questions related to the above topics, from various competitive examinations UPSC/TRIVNET/UGC-CSIR/GATE/TNPSC/ others to be solved.  (To be discussed during the Putorial hour)
Extensel Examination Question paper)	
Skills acquired from this course	Knowledge, Problem Solving, Analytical ability, Professional Competency, Professional Communication and Transferrable Skill
Recommended Fest	<ol> <li>Gupta, S.C. Kapoor, V.K. (2007) Fundamentals of Mathematical Statistics, Sultan Chand and Sons, New Delhi</li> <li>Goon, A.M. Gupta M.K. and Das Gupta B (1977) An Outline of Statistical Theory, Vol I, 6/e, World Press, Calcutta.</li> <li>Hogg, R.V. and Graig, A.T. (1978): Introduction to Mathematical Statistics, A/e, Mc.Graw Hill Publishing Co.Inc., New York.</li> </ol>
Reference Books	<ol> <li>Mood, A.D. Graybill, F.A. and Boes, D.C (1974): Introduction to the Theory of Statistics, 3/e, Mc.Graw Hill, New York.</li> </ol>
Website and e-Learning Source	e-looks, tutorials on MOOC/SWAYAM courses on the subject

Course Learning Outcome(for Mapping with POs and PSOs) Students will be able to

CLO-lidentify discrete distributions appeared in real life situations

CLO-2understand some continuous distributions and its applications

CLO-3connection between some of the real values mathematical functions and its application in distribution theory

CLO-4 understand normal distribution and its properties

CLO-5 understand sampling distributions and its applications in real life

CLO-6identify probability models in real data and estimate population parameters



***************************************						Distribution				
t'aper	Number	Elective - II				100				
Category	Core	Year	1	Credits	2	Course	23K28SEC2			
584 M		Semester	1			Code				
Instructi	ional Hours	Lecture	William William Control of the Contr							
per	week	2 2 4								
Pre-requisite Objectives of the Course				Bas	ic arithme	tiz	-III a paleithia			
		It providistrib     Also timomes     Estima	rides to ution. hey m nts, re nte and	o formulate t easure the av lationship an I predict the t	he visualii erages, dis iong varia inknown s	peri io noite: cel snoistep	k of symmetry.			
		mean-Harmon Mean devisiio	ic Me	an. Measures	of Disper	sion: Quartile				
		mean-Harmon Mean devisito Unit-II Skewn Kurtosis: Mon Unit-III Corre correlations - Fregression. Ass	n Star ness: Hents: lation Regres	an. Measures odard deviatio Carl Pearson` Raw, Centra analysis: Ra ssion analysis	of Disper on - Co-eff s - Bowle, I moments nk correla Regressi	sion: Quartile ficient of vari y's - Kelly's and their rel tion - Partial	e deviation - ation. methods ations. and Multiple :-Multiple			



Extended Professional Component (is a part of internal component only, Not to be included in the External Examination question paper)	Questions related to the above topics, from various conspective examinations UPSC/TRB/INET/UGC - CSIR/GATE/TSIPSC/others to be solved (To be discussed during the Tutorial hour)
Skills acquired from this Course	Knowledge, Problem Solving, Analytical ability, Professional Competency, Professional Communication and Transferrable Skill
Recommended Text	<ol> <li>Gupta, S.P. (2017): Statistical Metivols, Sultan Chand &amp; Sons Pot Ltd, New Delhi, 35th Revised Polition.</li> <li>Gupta S.C. and Kapoor, V.K. (2012). Fundamentals of Mathematical Statistics, Sultan Chand &amp; Sons Pot. Ltd., New Delhi</li> <li>Gupta, S.C. Kapoor, V.K. (2007) Fundamentals of Mathematical Statistics, Sultan Chand and Sons, New Delhi</li> <li>Goon, A.M. Gupta M.K. and Das Gupta B (1977) An Outline of Statistical Theory, Vol I, 6/e, World Press, Calcutta.</li> <li>Hogg, R.V. and Graig, A.T. (1978): Introduction to Mathematical Statistics, A/e, Mc.Graw Hill Publishing Co.Inc., New York.</li> </ol>
Reference Books	<ol> <li>Goon A.M. Gupta. A.K. and Das Gupta, B (1987). Fundamental of Statistics, vol.2 World Press Pvt. Ltd., Kolkatta</li> <li>G.U.Yule and M.G. Kendall (1956). An introduction to the theory of Statistics, Charles Griffin.</li> <li>Mood, A.D. Graybill, F.A. and Boes, D.C (1974): Introduction to the Theory of Statistics, 3/e, Mc.Graw Hill, New York.</li> </ol>
Website and e- Learning Source	e-books, tutorials on MOOC/SWAYAM courses on the subject <a href="https://en.wikipedia.org/wiki/Statistics">https://en.wikipedia.org/wiki/Statistics</a> <a href="https://en.wikipedia.org/wiki/Descriptive_statistics">https://en.wikipedia.org/wiki/Descriptive_statistics</a> e-books, tutorials on MOOC/SWAYAM courses on the subject



Course Learning Outcome(for Mapping with POs and PSOs) Students will be able to

- CLO-lidentify discrete distributions appeared in real life situations
- CLO-2understand some continuous distributions and its applications
- CLO-3connection between some of the real values mathematical functions and its application in distribution theory
- CLO-4 understand normal distribution and its properties
- CLO-5 understand sampling distributions and its applications in real life
- CLO-6identify probability models in real data and estimate population parameters

	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7	PSO8	PSO9
CT 01	- W	5	M	М	м	S	М	S	M
CLO1 CLO2	000	c c	S	S	м	S	м	s	M
	200	8	8	М	s	М	М	S	M
CLO3		c	8	М	S	s	S	M	M
CLO4		S	M	M	м	s	s	s	M
CLO5		IVI	14	C	М	s	s	S	M
CLO6	S	М	M	5	£41	Ρ	P		

# CLO-PSO Mapping (Course Articulation Matrix) S-Strong, M-Medium, W-Weak

	PSO1	PSO2	PSO3	PSO4	PSO5
CO/PO	1301	2	3	13	13
CO1	3	3	12		13
CO1 CO2	3	3	3		12
C03	3	3	3	3	
COS	3	3	13	3	3
CO4	2	12	3	3	13
C05	3	3	1,5	15	15
Weightage	15	15	15	15	12
Weighted percentage of Course Contribution to Pos	3.0	3.0	3.0	3.0	3.0

Level of Correlation between PSO's and CO's

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Title of the	Course	Real Analysis Elective – III (Discipline specific)							
Paper Num	ber	Elective -	- Ш	(Disc	ipline spec	ilic)	Cour	-60	23K2SECS3:1
Category	Core	Year	1		Credits	3	Code		
		Semester II		Į.			30		
	1700	Lecture Tuto		rial	Lab Pra	ctice	To	tal	
Instruction: Per week	al Hours	Lecture Tuto		11 141		110 7-017	4		
Pre-requisit		Number theory and Arithmetic							
Objectives Course	The attrictive the basic operations of soils and temperature							derivative of real	
	Equivalen Bounds, C Unit II Converge	Def nt a oton	Countest Landinition	t ability, Fower Boun of Seque vergent se	Real Num id. ince, Sub quences, Gerations o	sequent Oscillation conv	ce, L	valued functions, r set, Least Upper imit of a sequence, sequence, Bounded at sequences, Limits, Sum ability of	
		Unit III Definition of Series, Convergent and Divergent series, series with nonnegative terms, alternating series, conditional convergence, absolute convergences and test for absolute convergence.  Unit-IV Limit of a function on the real line, Increasing and Decreasing functions, Continuous function, Operations on continuous functions, Composition of continuous functions, Derivatives Derivative and continuity, Rolle's Theorem, Mean value theorem Taylor's theorem							
		Unit-V Concept of Riemann Integral, Refinement of partition Upper and Lower sums, Upper integral and Lower Integral Rieman integrability, Necessary and Sufficient condition for Rieman integrable, Properties of Riemann integrals, Fundamental theorem							



Component (is a part of internal component only, Not to be included in the External Examination Question paper)	Questions related to the above topics, from various competitive examinations UPSC/TRB/NET/UGC-CSIR/GATE/TNPSC/ others to be solved (To be discussed during the Tutorial hour)  Knowledge, Problem Solving, Analytical ability, Professional
Skills acquired from this Course	Competency Professional Communication and Transferrable Skill
Recommended Text	1. Goldberg .R R(1976): Methods of Real Analysis, Oxford &IBH.
Reference Books	<ol> <li>Shanthinarayan, (2012): Real Analysis, S.Chand&amp; Co, New Delhi</li> <li>Walter Rudin (2017), Principles of Mathematical Analysis, 3rd Edition, McGraw-Hill</li> </ol>
Website and e-Learning Source	e-books, tutorials on MOOC/SWAYAM courses on the subject https://tutorial.math.lamar.edu/classes/calci/thelimit.aspx https://www.mathsisfun.com/calculus/derivatives- introduction.html https://www.math.ucdavis.edu/~hunter/m125b/ch1.pdf https://math.hmc.edu/calculus/hmc-mathematics-calculus- online-tutorials/single-variable-calculus/taylors-theorem/ http://www.ms.uky.edu/~droyster/courses/fal106/PDFs/Chapte r06.pdf

Course Learning Outcome (for Mapping with POs and PSOs)

Students will be able to

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CLO-1do basic operations of sets and understand set functions

CLO-2understand sequence and its convergence

CLO-3understand series and its convergence

CLO-4 identify real valued functions and its discontinuity

CLO-5 understand integration concepts

CLO-6understand probability functions as set functions and get knowledge on discrete and continuous nature of it



	======	DEC:2	PS03	PSO4	PSO5	PSO6	PSO7	PSO8	PSO9
	PSO1	1302	6	84	M	S	S	S	M
CLOIS		5	PM -	F.	IN E	S	s	s	M
CL02S		5	<b>b</b>	<u> </u>	E .	M	5	s	M
CLOSS		5	S	M	<u> </u>	F .	s	s	М
CLO45	,	5	S	M	5	D _	5	6	М
CLOSS		5	M	M	M	8	<u> </u>	5	N/
CLOSS	;	B.C	P.A	5	M	\$	S	P	μVI

# CLO-PSO Mapping (Course Articulation Matrix) S-Strong, M-Medium, W-Weak

	77.01	PS02	PS03	PSO4	PSO5
CO/PO	PS01	FSU2	1202	3	3
CO1	3	3	3		
C02	3	3	3	3	2
C03	3	3	3	3	3
NOT HENCE:		15	3	13	3
CO4	3	13		2	3
C05	3	3	1.5		15
Weightige	15	15	15	15	15
Weighted percentage of Course Contribution to Pos	3,0	3.0	3.0	3.0	3.0

Level of Correlation between PSO's and CO's

2 5 AUG 2023

HOD OF STATISTICS HOD OF STATISTICS

Title of the	Course	Fuzzy Se	t Th	eory						
Paper Nun	The second secon	Elective .	[1]			7 4 17 17 17 18 18 18 18 18 18 18 18 18 18 18 18 18		michae.	23K2SECS3:2	
Category	Core	Year	Year I		Credits	3	Cou		Z3KZ3EC33.2	
- Direct	(MS-25-2-070)	Semest	П				Code	2		
		er			16 St. 16 St			Total		
Instruction	al Hours	Lecture		Tuto	orial	Lab Pr	actice			
Per week		3 1 4								
Objectives Course		Fu sy re	uzzy ztem	set th	s course at cory can be or decision optimization	e used in on mak	ang, i	elopn denti	nent of intelligent fication, pattern	
Course Out line		Unit – II  Basic conshift – Add  Unit – III  Represent	once dition I tation s — T	pts-C nal pre		cs and sα-cuts.  -Extensi	significa	nce	asic Types.  of the paradigm	
		Fuzzy complements-Fuzzy Intersections :t- norms- Fuzzy unions; t-conforms.								
Д		Unit – $V$ Combinations of operations–Aggregation operations.								



Component (is a part of	Questionsrelatedtotheabovetopics, from various competitive examinations UPSC/TRB/NET/UGC-CSIR/GATE/TNPSC/others to be solved (To be discussed during the Tutorial hour)
Skills acquired from this course	Knowledge, Problem Solving, Analytical ability Professional Competency , Professional Communication and Transferrable Skill
Recommended Text	<ol> <li>Georgej.Klir/boyuan, "fuzzysetsandfuzzylo gietheoryandapplication", prenticehallof indiaprivateltd., newdelhi, 2008.</li> </ol>
Reference Books	S.Nanda,&N.R.Das,"FuzzyMathematicalConcepts",Naro saPublishingHouse,NewDelhi.
Website and e-Learning Source	e-books, tutorials on MOOC/SWAYAM courses on the subject

## Course Learning Out come (for Mapping with POs and PSOs)

Students will be able to

- CLO-1understand optimization techniques and solving set of equations with constraints
- CLO-2solve problems of linear programming
- CLO-3understand transportation problems and its applications
- CLO-4 solve problems using games theory
- CLO-5 do replacement problems and solve it
- CLO-6do network analysis and get problem solving skills



Title of the Course		Practical- II (Data Analysis Using MS - Excel)								
Paper Num	iber	SEC-II								
		Year I		0.34	1	Course	23K2SSEC2P			
Category	Core	Semester	II	Credits	12	Code				
Instructional Hours per week		Lecture		Tutorial	Lab Practice		Total			
			-		2		2			

#### Objectives:

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- 1. To enable the students to gain computer practical knowledge about the concepts of statistics.
- To apply the measures of descriptive statistics and probability in real life situations using MS excel
- To provide practical knowledge in random variables, probability distributions, expectation, moment generating function, matrices, Rank of matrices.

#### Practical Exercises:

- Computation of Measures of Central Tendency for discrete data using MS Excel (Mean, Median, Mode, Geometric Mean, Harmonic Mean)
- Computation of Measures of Central Tendency for Continuous data using MS Excel (Mean, Median, Mode, Geometric Mean, Harmonic Mean)
- 3. Computation of Measures of dispersion for discrete data using MS Excel ()
- 4. Computation of Measures of dispersion for Continuous data using MS Excel ()
- 5. Graphical Presentation of data (Histogram, Frequency Polygon, Ogives) Using MS Excel.
- Computation of Co-efficient of Skewness and Kurtosis Karl Pearson's and Bowley's data using MS Excel
- 7. Fitting of Binomial distribution Direct Method using MS Excel.
- 8. Fitting of Poisson distribution Direct Method using MS Excel.
- 9. Fitting of Exponential distribution Direct Method using MS Excel.
- Problems based on univariate probability distributions.
- 11. Problems based on probability.
- 12. Calculating Inverse matrix in Excel.
- 13. Calculating Transpose matrix in Excel.
- 14. Calculating Rank matrix in Excel.



#### Notes

## Question Paper Serting:

5 questions are to be set without omitting any unit. All questions carry equal marks.

Any 3 questions are to be answered in 3 hours duration out of 5.

# Examinations Distribution of Marks

75 Marks University Examinations (Computer Practical)

25 Marks ClA (Including Practical Record)

> 100 Marks Total

K.N.G.A.C. (W) (AUTO) THANJAVUR

Paper Number	SEC-III Ba		OF HIGH SPECKERS		Cam	rse Code	23K2SSEC3		
	e Year	ī	Credits	2	Cour	ise cour			
	Semester	II		Lab Pra		Total			
Instructional	Lecture	Market N	Tutorial		ettee	2			
Hours per week	2		State of the state	1-					
Pre-requisite	Statistics and	its bas	ics		nuta tha t	neasures 0	f central tendency		
	seasonal variates. Acquired alculate an in Unit I Measure Definitions an UNIT II Measure Coefficient of Unit III Corresponds Simple Problem Unit IV Time Measures of the Coefficient of the Coefficient of Unit IV Time Measures of the Coefficient of the Coefficien	tions be known dices res of dices res of dices sures tile de variation elation si coeff ms. series rend -	y using various in whedge about income real life profession and their control of Central Tendence appears of Arithmetical Science and their control of Central Tendence and their control of Central and their control of C	lex numbers blems.  Y c mean Med ir relative to blems.	lian and limeasures	Mode - M - Standa	dex numbers and erits and Demerits and Demerits and Moving average		
	method - Simple Problems.  Unit V Index Numbers  Un weighted and Weighted Index Numbers: Laspeyre's, Paasche's and Fisher's metho-  Cost of living index numbers - Simple Problems.								
tills acquired from is Course	Knowledge, Problem Solving, Analytical ability, Professional Competency Professional Communication and Transferrable Skill								
7	<ul> <li>https://byjus.com/maths/central-tendency/</li> <li>https://byjus.com/maths/dispersion/</li> <li>https://www.bmj.com/about-bmj/resourcesreaders/publications/statistics-square-one/11-correlation-andregression</li> <li>http://www.stat.columbia.edu/~rdavis/lectures/Session6.pdf</li> <li>https://www.civilserviceindia.com/subject/Management/notes/indexnumbers.html</li> </ul>								
	http://w	ww.st	at.columbia.edu/-	rdavis/lect	ires/Sess Managei	ion6.pdf ment/notes			



Title of the	on District Burgor (growth you		Estimation Theory							
Paper Nur	nber	Core - V		100	- 2	- 12	90,662	23K3S05		
Category	Core	Year	II	Credits	3	Cou		23K3505		
	1	Semester	Ш	Thos		Cod	е			
Instruction	nal Hours	Lecture	Lecture Tuto		Lab P	ractice	To	tal		
Per week		2	1		w <del>-</del>	500 T 15	3			
re-requis	ite ,	Number th	neory and	Arithmetic	<b>.</b>		165			
Objectives Course	of th	Est 2 To	Emphas timation.	ize on the C	oncept good e	stimator		nation and Interval		
		Point estimation – Estimator – Consistency and Unbiasedness  – Efficiency and asymptotic efficiency – Estimators based on sufficient statistics – Neyman Factorization theorem (statement only)  – Simple illustrations								
		Unit II								
		Unit III Methods of Estimation – Methods of Maximum likelihood and moments – Properties of estimators obtained by these methods Simple illustrations								
		Unit-IVMethod of Minimum Chi-Square-Method of Minimum Variance-Methods of moments -Methods of Least squares- Intervalentian.								
		Unit-V Notion of Bayes estimation — concept of prior posterior and conjugate priors. Simple problems involving quadrat error loss function — Notion of Minimax estimation — Simpillustrations.								



Component (is a part of	Knowledge, Problem Solving ,Analytical ability, Professional
Recommended Text	<ol> <li>Gupta S.C. and Kapoor V.K. (2007): Fundamentals of Mathematical Statistics, Sultan Chand Sons, New Delhi.</li> <li>P.R. Vittal(2002): Mathematical Statistics, Margham Publications, Chennai.</li> <li>Ashok K. Bansal(2007): Bayesian Parametric Inference, Narosa Publishing House.</li> <li>Mood, A.M. Graybill, F.A. and Boes D.C. (1974): Introduction to Theory of Statistics, McGraw – Hill.</li> </ol>
Reference Books	<ol> <li>Rohatgi, V. (1976): An Introduction to Probability Theory and Mathematical Statistics, Wiley Eastern.</li> <li>Goon A.M. Gupta M.K. and Das B. (1980): An Outline of Statistical Theory, Vol II, World Press, Calcutta</li> <li>Sanjay Arora and Bansi Lal (1989): New Mathematical Statistics, Satya Prakasam, New Delhi.</li> <li>Hodges, J.L. and Lehman, E.L (1964): Basic Concepts of Probability and Statistics, Holden Day.</li> <li>Dr. A. Santhakumaran(2004): Probability Models and their Parametric Estimation</li> </ol>
Website and e-Learning Source	e-books, tutorials on MOOC/SWAYAM courses on the subject

# CourseLearningOutcome(forMappingwithPOsandPSOs)

### Studentswill beableto

- CLO-1estimate population parameters
- CLO-2identify good estimators and its properties
- CLO-3derive interval estimators of a parameter
- CLO-4 estimate parameters using various estimation methods and identify the best among the estimators
- CLO-5 handle data and can estimate population parameters
- CLO-6 realize the application of different types of estimators.



W	peor	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7	PSO8	PSO9
	PSO1	FSU2	1000	* 4	NA	S	S	S	M
CLO <sub>1</sub>		S	M	)VI	1 (	41	C.	S	M
CLO <sub>2</sub>	S	S	S	S	M	3	,	k!	M
CLO3	S	S	S	M	S	M	2	P	
CLO4		Q	g	M	S	S	S	ß	IN
		5		24	M	S	S	S	M
CLO <sub>5</sub>	S	S	IVI	IVI	141	C	C	S	M
CLO6	S	M	M	S	M	P	P	1/	

# CO-PO Mapping (Course Articulation Matrix) S-Strong, M-Medium, W-Weak

7006 50 50	ngot	PSO2	PSO3	PSO4	PSO5
CO/PO	PSO1	F502	2	3	3
CO1	3	3	3		3
CO2	3	3	3	3	
C03	3	3	3	3	3
	2	3	3	3	3
CO4	э 		3	3	3
CO5	3	3		15	15
Weightage	15	15	15	13	1.0
Weighted percentage of Course Contribution to Pos	3.0	3.0	3.0	3.0	3.0

Level of Correlation between PSO's and CO's

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2 5 AUG 2023

HOD OF STATISTIES
K.M.G.A.C. (W) (AUTO)
THANJAVUR

TitleoftheCourse	Sampling		chniques			1177	
PaperNumber	Core - V						harrage
Category Core	Year	II	Credits	5	Cou		23K3S06
	Semest	Ш			Cod	e	
	er						
InstructionalHours	Lecture		Tutorial	LabPra	ctice	То	tal
perweek	4		1	i <del>nc</del> s:		5	
Pre-requisite	Descriptiv	ve st	atistics and Proba	ability the	ory		
Objectives of theCours	Themain	obje	1. To know the 2. To study the 3. To learn pra 4. To apply Sy problems.	basic op theory a ctical use	nd appl s of Sti	icatio atific	ons of SRS
	-Principa Census - Mean Squ Unit II Sin and witho	I step Prob pare I mple out re	os in Sample sur pability Samplin Error. random samplin eplacement – Pr	vey, Sam g, Alterna ng, Metho operties o dard erro	ds of sof esting	nit — o pro electi nates,	tages of Sampling Sampling frame - bability sampling on, Sampling wit Finite population ce limits - Simplics, Sample siz
	Unit III Str Notations Estimated equal allo	ratification variocation	for proportions a ed random sa Estimation of ance and confi on, proportiona	ampling, populatio dence lin l allocat	princi n mea nits, A	ata. I ples n ar Alloc	
	Unit-IV Systematic	sai	npling –Relatio	on to clu	variar	ice .	ing, Estimation  – Comparison samples.Systema

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F.	Ling in two dimensions
	sampling in two dimensions.
	Unit-V Varying Probability sampling, Selection of one unit with PPS, PPS Sampling with replacement, Estimator for population total and its variance, Selection procedures, Cumulative total method, Lahiri's method, Split method.
ExtendedProfessionalCo mponent (is a part ofinternal component only,Not to be included in theExternalExamination questionpaper)	Questionsrelatedtotheabovetopics,fromvariouscompetitiveexaminationsuPSC/TRB/NET/UGC-CSIR/GATE/TNPSC/otherstobesolved (TobediscussedduringtheTutorialhour)
Skillsacquiredfromthis	Knowledge, Problem Solving, Analytical ability, Professional Competency, Professional Communication and Transferrable Skill
Course Recommended Text	<ol> <li>Cochran, W.G. (1978): Sampling Techniques, John Wiley Eastern</li> <li>Murthy M.N. (1967):Sampling Theory and Methods Statistical Publishing Society, Calcutta</li> </ol>
Reference Books	<ol> <li>Singh. D. and ChaudryF.S. (1986): Theory and Analysis of Sample Surveys Design Wiley Eastern Ltd.</li> <li>Sampath.S, (2001), Sampling Theory and Methods, CROPPress.</li> </ol>
Website and e-Learning Source	e-books, tutorials on MOOC/SWAYAM courses on the subject  http://ocw.jhsph.edu/courses/statmethodsforsamplesur  eys/pdfs/lecture2.pdf  https://www.questionpro.com/blog/stratified-random- sampling/ https://www.scribbr.com/methodology/systematic- sampling/ http://home.iitk.ac.in/~shalab/sampling/chapter7- sampling-varying-probability-sampling.pdf



# Course Learning Outcome (for Mapping with POs and PSOs)

#### Studentswill beableto

- CLO-1 Know the difference between census and sampling.
- CLO-2 Understand basic operations and advantages of sampling
- CLO-3 Understand widely used sampling techniques
- CLO-4 Know to estimate population information using sampling
- CLO-5 Apply sampling techniques in real time problems
- CLO-6 identify suitable sampling technique for a real life survey

To the	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7	PSO8	PSO9
CLO1		5	M	м	м	s	S	S	M
CLO2		8	S	S	М	s	s	S	M
CLO3		c c	g	M	S	М	s	s	M
		6	<u> </u>	M	8	S	S	S	М
CLO4		8	S	N/	M	g	s	s	М
CLO5		8	M	IVI .	IVI N. f	0	ę –	S	м
CLO6	S	M	M	S	IVI	ρ	ρ	Ρ	***

# CO-PO Mapping (Course Articulation Matrix) S-Strong, M-Medium, W-Weak

СО ТО	PSO1	PSO2	PSO3	PSO4	PSO5
CO/PO	2001	2	3	3	3
CO1	3		- 2	3	, 3
CO2	3	3	3	- 3	
CO3	3	3	3	3	3
C04	3	3	3	3	3
	3	3	3	3	3
CO5	15	15	15	15	15
Weightage Weighted percentage of Course Contribution to Pos	3.0	3.0	3.0	3.0	3.0

Level of Correlation between PSO's and CO's

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HOD OF STATISTICS K.N.G.A.C. (W) (AUTO) THANJAVUR

Numerical Methods TitleoftheCourse Elective - IV (Discipline Specific) PaperNumber 23K3SECS4:1 Course Credits Year Category Core Code III Semest er Total LabPractice Tutorial Lecture InstructionalHours 4 perweek Basic Arithmetic and calculus Pre-requisite Themain objectives offhis courseare: 1. To introduce the study of algorithms that used numerical Objectives of theCours approximation for the problems of Mathematical analysis. 2. To solve mathematical problems numerically The Solution of Numerical Algebraic and Transcedental Unit l CourseOutline Equations: Bisection Method, Iteration Method, Regula Falsi Method, Newton - Raphson Method, Hornor's Method Unit HSolution of Simultaneous Linear Algebraic Equations: Guass -Elimination Method, Guass-Jordan Method, Guass - Jacobi Method, Guass -Seidel Method. Finite Differences: Operators.Interpolation for Equal intervals: Newton's Forward Interpolation Formula and Newton's Backward Interpolation Formula, Evaluation of missing terms. Central Difference Interpolation Formula For Equal Unit III Intervals: Guass Forward Interpolation Formula, Gauss Backward Interpolation Formula, Sterlings Formula, Bessel's Formula, Laplace- Everett's Formula. Unit-IVInterpolation with Unequal Intervals: Divided Differences, Newton's Divided Differences Interpolation Formula, Lagrange's InterpolationFormula and Inverse Lagrange's Interpolation, Method of reversal of series. Numerical Differentiation: Numerical Differentiation based on Newton's Forward and Backward Interpolation Formula Computation of Second order derivatives. Numerical Integration:General Quadrature formula for equidistant ordinates, Trapezoidal Rule, Simpson's 1/3rd Rule, Simpson's 3/8th

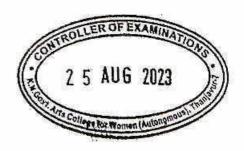


	Rule and Weddle's Rule,  Numerical Solution of Ordinary Differential Equations: Taylor Series  Method, Picard's Method and Runge — Kutta Method. (Simple  Problems Only Without Derivation)
ExtendedProfessionalCo mponent (is a part ofinternal component only,Not to be included in theExternalExamination questionpaper)	Questionsrelatedtotheabovetopics, from various competitive examinations UPSC/TRB/NET/UGC-CSIR/GATE/TNPSC/otherstobesolved (Tobediscussed during the Tutorial hour)
Skillsacquiredfromthis	Knowledge, Problem Solving, Analytical ability, Professional Competency, Professional Communication and Transferrable Skill
Course Recommended Text	<ol> <li>Kandasamy, P., Thilagavathy, K. (2003): Calculus of Finite Differences and Numerical Analysis, S.Chand Publications.</li> <li>Balasubramaniam and Venkatraman(1972): Numerical mathematics part I and II by Rochouse and Sons</li> </ol>
Reference Books	<ol> <li>Kalavathy, S., and Thomson. (2004): Numerical Methods, Vijay Nico::le Publications.</li> <li>Gupta, B.D. (2004): Numerical Analysis, Konark Publications.</li> <li>Venkatachalapathy, S.G. (2004): Calculus of Finite Differences and Numerical Analysis, Margam Publications.</li> <li>Gerald Wheatley, (1970): Applied Numerical Analysis Pearson Education Publications.</li> <li>Jain, M.K., Iyengar, S.R., Jain, R.K., (1994): Numerical Methods Problems and Solutions, New Age International Publishers.</li> </ol>
ebsite and Learning Source	e-books, tutorials on MOOC/SWAYAM courses on the subject
9	www.nptel.com

# CourseLearningOutcome(forMappingwithPOsandPSOs)

## Studentswill beableto

- CLO-1Solve numerically equations that cannot have direct solution
- CLO-2solve system of linear equations
- CLO-3understand the need of interpolation
- CLO-4 handle numerical differentiation
- CLO-5 do integration numerically
- CLO-6 get a foundation on algorithms to solve a mathematical problem



	8		T was a	2001	PSO5	PSO6	PSO7	PSO8	PSO9
	PSO1	PSO2	PSO3	PSO4	P803	7505	e ·		M
CL01	S	s	М	M	M	8	9	9	N.d
CLO2		9	S	s	M	S	S	<u> </u>	IVI
		9	c	м	s	M	S	S	M
CLO3		8			e	S	S	s	M
CLO <sub>4</sub>	S	S	8	M	<u> </u>	6	0	S	M
CLO5	S	S	M	M	M	<u> </u>	9	<u></u>	NA
CLO6		М	M	s	M	<u>s</u>	<u>s</u>	<u>p</u>	ĮVI

# CO-PO Mapping (Course Articulation Matrix) S-Strong, M-Medium, W-Weak

	Two a	PSO2	PSO3	PSO4	PSO5
CO/PO	PSO1	PS02	1500	3	3
CO1	3	3	3		3
CO2	3	3	3	3	
C03	3	3	3	3	3
	2	3	3	3	3
CO4	3	3	3	3	3
CO5	3	3		15	15
Weightage	15	15	13	13	
Weighted percentage of Course Contribution to Pos	3.0	3.0	3.0	3.0	3.0

Level of Correlation between PSO's and CO's

2 5 AUG 2023

HOD OF STATISTICS

Title of the Course	Financi	al S	tatistics		The same of the sa		Ballet Standard
Paper Number	SEC IV				-	-	harrage CO 4 2
Category Core	Year II		Credits	4	Con		23K3SECS4:2
	Semest er	III			Code		
Instructional Hours	Lecture	1	Tutorial	Lab P	ractice	Tot	tal
Per week	4		2			4	
Pre-requisite	Probabilit	v the	eory	1			
Objectives of the Course	1. To the pro 2. To	studente operi o le	ost important t	cepts of ypes of cristics (	Stochas Poisson,	stic I Mor	chastic Processes Processes, various kov and others). stationarity and
₩	expectat probabil Binomia	ion ities il pi wa	review: Re and variance, s and expectation occesses, Gen lks, Binomial	kewnes ons. Disc eral ra	s and ku crete Sto ndom	irtosi ochas walks	s, conditional
S 8	stochasti Introduc forward	ic in tion pric	tegration, and to derivative	stocha s: Forw	stic diff ard con	eren ntrac	ener process, tial equations. ts, spot price, s, zero-coupon
	UNIT III						
	markets, relations	pric hip l in F	ing futures, pu between strike inance: Disci	t-call pa price a	arity for and opti	Eur on p	erfect financial ropean options, rice. Stochastic binomial model
y -	UNIT IV		november of the	95			
							time process- Black-Scholes



	differential equation, Black-Scholes formula for European options, Hedging portfolios: Delta, Gamma and Theta hedging. Binomial Model for European options: Cox-Ross-Rubinstein approach to option pricing. Discrete dividends.
	UNIT V Solution of Simultaneous Linear Algebraic Equations: Guass – Elimination Method, Guass–Jordan Method, Guass – Jacobi Method, Guass – Seidel Method. Finite Differences: Operators. Interpolation for Equal intervals: Newton's Forward Interpolation Formula and Newton's Backward Interpolation Formula, Evaluation of missing terms.
Component (is a part of	Questionsrelatedtotheabovetopics, from various competitive examinations UPSC/TRB/NET/UGC-CSIR/GATE/TNPSC/otherstobesolved (Tobediscussed during the Tutorial hour)
Skills acquired from this course	Knowledge, Problem Solving, Analytical ability, Professional Competency, Professional Communication and Transferrable Skill
Recommended Text	<ol> <li>Medhi, J. (2019): Stochastic Processes, New Age International Publishers.</li> <li>KantiSwarup, Gupra.P.K. Man Mohan., (2010): Operation Research, Sultan Chand &amp; Sons</li> </ol>
Reference Books	<ol> <li>Franke, J., Hardle, W.K. And Hafner, C.M. (2011):         Statistics of Financial Markets: AnIntroduction, 3<sup>rd</sup>Edition Springer Publications.     </li> <li>Stanley L. S. (2012): A Course on Statistics for Finance, Chapman and Hall/CRC.</li> </ol>
Vebsite and Learning Source	

Course Learning Outcome (for Mapping with POs and PSOs) Students will be able to

CLO-1Understand stochastic nature of random variable and different stochastic process

CLO-2know about transition matrix and its calculations

CLO-3understand Markov chain and its applications

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CLO-4 understand Markov process and its applications

CLO-5 unserstandrenewel process and its applications

CLO-6know about various stochastic modeling and its applications



		,		0004	PSO5	PSO6	PSO7	PSO8	PSO9
	PSO1	PSO2	PSO3	PSO4	1303	c	S	S	S
CLOI	S	S	M	S	M	G	g g	S	S
CLO <sub>2</sub>		S	s	<u>S</u>	M	<u> </u>	c	М	S
CLO3	Went de la Station de la contraction de la contr	S	S	8	S	M	5	e e	М
		9	S	M	<u>s</u>	S	8	6	М
CLO4		e	9	М	M	S	M	<u> </u>	141
CLO5		0	N4	S	M	S	s	M	IVI
CLO6		S	М	S	M	<u>s</u>	<b>P</b>	hAi	

# CO-PO Mapping (Course Articulation Matrix) S-Strong, M-Medium, W-Weak

CO-PO Wapping (Com-			PSO3	PSO4	PSO5
CO/PO	PSO1	PSO2	1303	3	3
CO1	3	3	3	- 2	3
	3	3	3	3	
CO2	3	3	3	3	
CO3	2	3	3	3	3
CO4	3	- 2	3	3	3
CO5	3	3	15	15	15
Weightage	15	15	- 13	J. C.	
Weighted percentage of Course Contribution to Pos	3.0	3.0	3.0	3.0	3.0

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Level of Correlation between PSO's and CO's

2 5 AUG 2023

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HOD OF STATUSTICS LOS W ENG.A.C. (W) (AUTO) THANJAVUR

Title of the Course	Practical -	Practical - IV (Calculator Based Sampling Techniques)								
Paper Number	SEC-IV	SEC – IV (Discipline specific)								
	Year	II	Credits	2	Con	rse Code	23K3SSEC4P			
Category Core	Semester	III	Credits	-		Anover fireserver				
Instructional Hou	rs Lecture	111	Tutorial	Lab Pr	Lab Practice		Total 2			
per week	2		-							
Course Course Outline	parameters 2. To 3. To 4. To 5. To Unit I distribution	and know study learn apply Estin, exp	its interval,  of the basic oper  of the theory and  practical uses  y Systematic ar  mation of par	rations of s I applicati of Stratifi ad PPS Sa ameters of mial and F	sampling ons of Sl cation mpling in of statist Poisson d	RS n real time ical mode	of estimation of problems.  I — Multinomia —Construction o			
10 24	Unit III Si Drawing S Estimation Unit IVSto Estimation estimator of Unit V Estimation	Unit II Method of maximum likelihood and method of moments.  Unit III Simple random Sampling  Drawing Sample from the Population with and without Replacement Estimation of Population Mean, Total Variance and its Standard Error.  Unit IVStratified random Sampling  Estimation of Mean, Variance of the Population Means — Variance of the estimator of Mean under Proportional and Optimal allocations.  Unit V Systematic random sampling  Estimation of Mean and Variance — Comparison of Simple Rando Sampling, Stratified Random Sampling and Systematic Random Sampling.								

#### Note:

## Question Paper Setting:

5 questions are to be set without omitting any unit. All questions carry equal marks. Any 3 questions are to be answered in 3 hours duration.

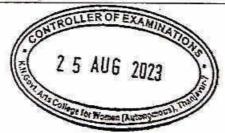
# **Examinations Distribution of Marks**

University Examinations (Written Practical) 75 Marks
CIA (Including Practical Record) 25 Marks
Total 100 Marks



Title of the Course	Database Management System									
Paper Number	-	SEC - V								
Category Core	Year Semester	Ш	Credits	1	G (2)	ode	23K3SSE	C5		
Instructional Hour	s Lecture	1	Tutorial	Lab	ractic	Tota	al			
per week	1	- 1	-	1-	-	11				
Pre-requisite	-					***				
Objectives of the Cours	systems. 2. Ma 3. Uni	ister ders	the basics of SC stand the relation	QL and c nal datab	onstruc ase des	a queri ign pri	es using SQI nciple.			
	Introduction – Database System Application – Purpose of Database Systems – View of Data – Database Languages – Transaction Management – Database Architecture – Database users and Administrators.  UNIT II Relational Model: Structure of Relational Database – Database Design – ER Model – SQL: Background – Data definition – Basic Structure of SQL – Queries – Set Operations – Aggregate Functions – Null Values – Nested Sub Queries.  Unit III Intermediate SQL: Join Expressions – View – Transactions – Authorization – Advance SQL: Functions and Procedures – Triggers Unit IV PL/SQL: Programming Language: Fundamentals – Block Structure									
ourse Outline	Structure o  Null Valu Unit III Intermediat Authorizati Unit IV PL/SQL: 1	f SC ues- te S ion-	QL - Queries Nested Sub Q  SQL : Join E - Advance SQI  gramming Lang	Set Oper meries. xpressio : Funct mage: F	ns – ions ar	View Id Proc	- Transacti edures - Tr	ons -		
	Structure of Null Value Unit III Intermediate Authorizati Unit IV PL/SQL: I Commen Bind Varial Unit V PL/SQL Commed Blow Data Dictio	f S(  ues-  ues-  te s  from  Program  complete  complet	QL - Queries - Nested Sub Q  SQL: Join E Advance SQI  gramming Lang Data Types - Substitution  posite Data ty s: Procedures y Views.	xpression: Function Variable  — Function Press: Reference - Function Press: Reference	ns — ions ar ions ar ation — es — Pr ecords	View ad Proc entals Assig inting  — Ta — Pack	- Transacti cedures - Tr - Block St nment oper Operators. bles - V tages - Tri	ions - iggers ructur ation Array		
rence Books	Structure o Null Valu Unit III Intermediat Authorizati Unit IV PL/SQL: I Commen Bind Varial Unit V PL/SQL C Named Blo Data Dictio I. "Data F. Korth, S. Leon, Math	f SC ues- te Scion- Progets – bles compocks mar taba Sucund ews	QL - Queries Nested Sub Q  SQL: Join E - Advance SQI  gramming Lang - Data Types Substitution  posite Data ty s: Procedures	Set Oper nueries.  xpressio  : Funct  quage: F  Declara  Variabl  pes: R  - Func  oncepts  I - 5 <sup>th</sup> E  Database  licole In	ns — ions ar i	View ad Proc entals Assig inting — Ta — Pack tham S ageme	- Transactivedures - Transactive	ions - iggers ructur ation Array ggers Hen		
erence Books	Structure o Null Valu Unit III Intermediat Authorizati Unit IV PL/SQL: I Commen Bind Varial Unit V PL/SQL C Named Blo Data Dictio I. "Data F. Korth, S. Leon, Math	f SC ues- te Scion- Progets – bles compocks mar taba Sucund ews	QL - Queries - Nested Sub Q  SQL : Join E Advance SQI  gramming Lang Data Types - Substitution  posite Data ty s: Procedures y Views.  ase System Co alharshan, TMH amentals of I S Leon, Vijay N	Set Oper nueries.  xpressio  : Funct  quage: F  Declara  Variabl  pes: R  - Func  oncepts  I - 5 <sup>th</sup> E  Database  licole In	ns — ions ar i	View ad Proc entals Assig inting — Ta — Pack tham S ageme	- Transactivedures - Transactive	ions - iggers ructur ation Array ggers Hen		
rence Books	Structure of Null Value Unit III Intermediate Authorizati Unit IV PL/SQL: If Commen Bind Varial Unit V PL/SQL Commen Bind Varial PL/	f S( ues - te s ion - Pros ts - bles onar taba Suc und ews	QL - Queries - Nested Sub Q  SQL: Join E Advance SQI  gramming Lang Data Types - Substitution  posite Data ty s: Procedures y Views.  ase System Co alharshan, TMH amentals of I S Leon, Vijay N	Set Operated Set O	ns — ions ar i	View ad Proc entals Assig inting — Ta — Pack tham S ageme	- Transactivedures - Transactive	ions - iggers ructur ation Array ggers Hen		
rence Books	Structure of Null Value Unit III Intermediate Authorizati Unit IV PL/SQL: I Commen Bind Varial Unit V PL/SQL Commed Block Data Diction I. "Data Diction II.	f SC ues- te Scion- Prog ts- bles compocks nar taba Suc und ews	QL - Queries - Nested Sub Q  SQL: Join E Advance SQI  gramming Lang Data Types - Substitution  posite Data ty S: Procedures y Views.  ase System Co Iharshan, TMH amentals of I S Leon, Vijay N ase Systems U	Set Open nueries.  xpressio .: Funct quage: F Declara Variabl  pes: R - Func oncepts  I - 5 <sup>th</sup> E Database icole In sing Or	rations  ns — ions ar fundamention — es — Pr ecords tions — dition e Man aprints racle",	View ad Proc entals Assig inting — Ta — Pack tham S ageme	- Transactivedures - Transactive	ions - iggers ructur ation Array ggers Hen		

TI-V



# Course Learning Outcome (for Mapping with POs and PSOs)

CLO-1 Demonstrate the basic elements of a relational database management system

CLO-2 Identify the data models for relevant problems.

CLO-3 Design entity relationship and convert entity relationship diagrams into RDBMS and formulate SQL queries on the respect data into RDBMS and formulate SQL queries on the data..CLO-4 Demonstrate their understanding of key notions of query evaluation and optimization techniques.

CLO-5 Extend normalization for the development of application software's

	rsot	rso2	rso3	PSO4	PS05	PSO6	PSO7	PSO8	PSO9
CLOI	8	8	M	M	NI	S	М	s	М
CLO2	<u> </u>	8	S	S	M	s	М	S	М
CL03	<u> </u>	8	s	M	S	s	M	S	S
CLO4	S	S	s	M	S	s	s	S	М
CL05	S	s	М	M	M	S	S	S	M

CLO-PSO Mapping (Course Articulation Matrix) S-Strong, M-Medium, W-Weak

CLO-PSO Mapping (Course CO /PO	PSO1	PSO2	PSO3	PSO4	PSO5
	3	3	3	3	3
C01	2	3	3	3	3
CO2	3	3	- 3	3	3
CO3	3	3	3	- 3	2
CO4	3	3	3	3	
CO5	3	3	3	3	3
Weightage	15	15	15	15	15
Weighted percentage of Course Contribution to Pos	3.0	3.0	3.0	3,0	3.0

Level of Correlation between PSO's and CO's



YOU OF STATISTICS ".N.G.A.C. (W) (AUTO) **PUVALNAH** 

## Kunthayai Naachiyaar Govt, Arts College (W) Autonomous, Thanjavur

23K3SECCE1 Credit -3

B.Sc., Statistics

Self Study Course - 1 Competitive Exam Skills (Contents in Tamil)

#### UNIT-I

(i). இலக்கணம்

இலக்கணம் - பொருத்துதல் - பிரித்து எழுதுதல் - எதிர்சொல் - பிழைதிருத்தும் -ஆங்கில சொல்லுக்கு நேரான தமிழ் சொல் அறிதல் - அசுரவரிசைப்படி எழுதுதன் - இலக்கணக் குறிப்பு அறிதல் - விணையின் வகைகள் - உவமையால் பொருத்தமான பொருளைத் தேர்ந்தெழுதுதல் - எதுகை, மோனை, இபையு.

(ii). இலக்கியம்

திருக்குறள் (பத்தொன்பது அதிகாரங்கள் மட்டும்) – அறநுடல்கள் தொடர்பான செய்திகள் - கம்புராமாயணம், புறநானூறு, அகநானூறு — தொடர்பான செய்திகள் - சிலப்பதிகாரம், ஐஞ்சிறு காப்பியம் - பெரியபுராணம், சிற்றிலக்கியம், மனோன்மணியம், நாட்டுபுறபாட்டு மற்றும் சமய முன்னோடிகள் பற்றிய செய்திகள்.

தமிழ் அறிஞர்கள் ஆற்றிய தொண்டு, இயல், இசை, நாடகம் மற்றும் உரைநடை பற்றிய UNIT-II செய்திகள்.

## UNIT - III

பொது அறிவியல

(i) , இயற்பியல்

பொது அறிவியல் விதிகள் - தேசிய அறிவியல் ஆராய்ச்சிக் கூடங்கள் -பருப்பொருளின் பண்புகளும், இயக்கங்களும் - இயற்பியல் அளவுகள், அளவீடுகள் இயக்கம் மற்றும் ஆற்றல் - காந்தவியல், மின்சாரவியல் மற்றும் மின்னனுவியல் -வெப்பம், ஒளி மற்றும் ஒலி.

(ii) வேதியியல்

தனிமங்கள் மற்றும் சேர்மங்கள் - அமிலங்கள், காரங்கள் மற்றும் உப்புகள் -செயற்கை உரங்கள், உயிர் கொல்லிகள் - நுண்ணுயிர் கொல்லிகள்.

(iii) தாவரவியல்

உயிரினங்களின் பல்வேறு வகைகள் - உணவூட்டம் மற்றும் திட்ட உணவு — சுவாசம்.

இரத்தம் மற்றும் இரத்த சுழற்சி - இனப்பெருக்க மண்டலம் - மனிதனின் நோய்கள் (iv) ഖിலங்கியல் - பரவும் மற்றும் பரவா நோய்கள் உட்பட- தற்காத்தல் மற்றும் தீர்வுகள் - விலங்குகள், தாவரங்கள் மற்றும் மனித வாழ்வு!



#### UNIT - IV

- (1) புளியியரை பூறியும் போளி மும் அரிய குடும்பம் பருவக்காற்று, களைத்தைகள் புற்றும் தட்புக்கொட்டிக்கை – டூர்வன ஆதாரங்கள் – இத்தியாளித்துள்ள ஆறுகள் -புற்றும் தட்புக்கள் மூறியங்கள் பறிறும் இயற்கை வளங்கள் - காடுகள் மற்றும் வன உயிருகள் – விளையா முறையகள்
- (日), அதிபட அரசியல் : அந்திய அரசியல் அமைப்பு — மத்திய மாநில மத்திய அற்மை காசனம் - இத்திய குடியுறியை — உரிமைகளும், கடமைகளும் - மனித உரிமை காசனம் - இத்திய நாடாளமைன்றும் - பாராளமண்றும் - மாநில நிர்வாகம் - மாநில கட்டமன்றும் -நாடாளமைன்றும் - பாராளமன்றும் - மாநிகாயத்து ராஜ் - இந்திய தணிக்கை மத்தும் சட்ட சபை — உள்ளாட்சி அரசு — பஞிசாயத்து ராஜ் - இந்திய தணிக்கை மத்தும் சுணிகாணிப்பு தலைவர் - தகவல் அநியும் உரிமை — பெண்கள் முன்னேற்றம் -முகரினேறி பாதுகாப்பு அமைப்புகள்.
- (iii), இந்திய பொருளாதாரம் மற்றும் தேசிய இயக்கம் : இந்திய பொருள்பதாரத்தின் இயக்புகள் - ஐந்தாண்டு திட்டங்கள் -இந்திய பொருள்பதாரத்தின் இயக்புகள் - ஐந்தாண்டு தளந்தி — கிராம நலம் கோருள்கு திட்டங்கள் - சமூகம் சார்ந்த பிரச்சனைகள் - மக்கட்தொகை, கல்வி, சமாதாரம், கோலைவாய்ப்பு, வழுமை — தேசிய மறுமலர்ச்சி — சகாதாரம், கோலைவரப்பு, வழுமை — தேசிய மறுமலர்ச்சி — தேசுத்தலைவர்களின் எழுச்சி (காந்தி, நேரு, தாகர்) — பல்வேறு போராட்ட முரைகள் - சுதந்திர் போராட்டத்தில் தமிழ் நாட்டின் பங்கு (இராஜாஜி, வ.உ.சி, ரெறியார், பாரதியார் மற்றும் பலர்)
- (iv), இந்தியா மற்றும் தமிழ்நாடு வரலாறு மற்றும் பண்பாடு: சிந்து சமவெளி நாகரிகம் - குப்தர்கள், டெல்லி சுல்தான்கள், மொகலாயர்கள் மற்றும் மராட்டியர்கள் - விஜய நகரத்தின் காலம் மற்றும் பாமினிகள் - தென் இந்திய வரலாறு, பண்பாடு மற்றும் தமிழ் மக்களின் புராதாணம் - இந்திய சுதந்திரம்.

#### UNIT-V

- (i) திறுளறிவு மற்றும் புத்திக் கூர்மை தேர்வுகள் : தகவல்களை விவரங்களாக மாற்றுதல் - விவரம் சேகரித்தல், தொகுத்தல் மற்றும் பார்வைக்கு உட்படுத்துதல் - அட்டவணைகள், புள்ளி விவர வரைபடங்கள் -விவர பகுப்பாய்வு விளக்கம் - சுருக்குதல் - சதவிகிதம் - மீப்பெரு பொது வகுத்தி (ர்ஊகு) — மீச்சிறு பொது மடங்கு (டூஊஆு) — விகிதம் மாற்று சரிவிகிதம் - தனிவட்டி - கூட்டுவட்டி — பரப்பளவு — கனஅளவு — நேரம் மற்றும் வேலை — தர்க்க அறிவு — புதிர்கள் - பகடை — கானொளிதர்க்க அறிவு — எண் கணிததர்க்க அறிவு — எண் தொடர்கள்.
- (ii) நடப்பு நிகழ்வுகள் : செய்திகளில் இடம் பெறும் புகழ்பெற்ற நபர்கள் மற்றும் இடங்கள் - விளையாட்டு மற்றும் போட்டிகள் - நூல்களும் நூலாசிரியர்களும் - விருதுகளும் மற்றும் பட்டங்களும் - இந்தியாவும் அதன் அண்டை நாடுகளும்.



### Books for Study:

Unit - 1 & Unit - II

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6-ஆம் வகுப்பு முதல; 10-Mk; வகுப்பு வரை உள்ள தமிழ் பாடபுத்தகங்கள்.

6-ஆம் வகுப்பு முதல் 10-ஆம் வகுப்பு வரை உள்ள அறிவியல் பாடபுத்தகங்கள்.

Unit - IV

6-ஆம் வகுப்பு முதல் 10-ஆம் வகுப்பு வரை உள்ள சமூக அறிவியல் பாடபுத்தகங்கள்.

Unit - V

6-ஆம் வகுப்பு முதல் 10-ஆம் வகுப்பு வரை உள்ள கணிதப் பாடபுத்தகங்கள் மற்றும் அன்றாட செய்திதாள்கள்.

> AUG 2023 College for Women ()

HOD WE STATISTICS k.N.G.A.C. (W) (AUTO) THANJAVUR

Title of the	Course	Computati	om	a Smusue	Minn			CARL STREET, S		
Paper Num	ber	ECC II								
aper (xumoer		Year 11		Credits	14	Course Code	23K3SECC2			
Category	Core	Semester	11	)				Total		
Instructio	Instructional Hours		Lecture		Tutorial		Practice	13040		
per week		w.		*						

#### List of Experiments:

プラリンフロロロロロ

- 1. Entering a letter, aligning, spell check and printing.
- 2. Creating tables, inserting rows and columns and formatting.
- 3. Creating main document, data source and using mail merge facility.
- 4. Prepare frequency distribution using Excel function.
- 5. Preparing Pie chart and Bar charts.
- Calculation of Statistical constants using Excel functions.
- Calculation of correlation and regression Co-efficient.
- 8. Creating a new presentation in Power Point, numbering and copying slides.
- Changing fonts and colors, inserting Clip Art and Formatting options.
   Inserting Bullets and Picture, Creating Tables and Inserting Auto shapes.



K.N. C. THANJAVUR

TitleoftheCourse		Testing of Statistical Hypothesis								
PaperNum	ber	Core VII	-	T 6 12	10	Cour	rse	23K4S07		
Category	Core	Year	П	Credits	3	Code		<b>35</b> (35)(30)		
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perweek	MARKUMAN	2   1			-		3			
Pre-requisi		Estimation theory and distribution theory								
Objectives	of theCours	Themain of 1. To n 2. To u 3. To u 4. To a	ojective nake far ndersta ndersta pply tes	s ofthis countiliar with to make the concern and the Likel of the Likel of the sample	rseare: esting concept of Mos ihood ratio les from ur	cepts t Powe tests iknow	n dist	tributions		
CourseOutl	in the second se	Simple and Type-II err Neyman Pe Unit II Likelihood Equality of	or – Mearson I	oosite hypoost Powerfu emma – Sir test – Test eans of nor	thesis — C I test — Ur mple probl s of mean	Critica niform ems.	l reg ly M a no – te:	tive Hypothesis - ion - Type-I and ost powerful test - rmal population - st for variance of		
3		Unit III Chi-square	tests, I	Distribution	of quadra	atic fo	rms,	ormal populations.  Test of equality of and Regression		
		Manager and the	L 190	4 31-4 31				ests - one sided a		



	Unit-V  Nonparametric methods – Confidence interval for distribution quantiles – Tolerance limits for distributions. Sign test, Wilcoxon test.
nert	Questionsrelatedtotheabovetopics, from various competitive examination rsUPSC/TRB/NET/UGC-CSIR/GATE/TNPSC/otherstohesolved (Tobediscussedduring the Tutorialhour)
questionpaper)	Knowledge, Problem Solving, Analytical ability, Professional
Skillsacquiredfromthis	The state of the s
Course Recommended Text	Robert V. Hogg and Allen T.Craig (1978), Introduction to     Mathematical Statistics, 4 <sup>th</sup> edition, Macmillan Publishing Co.,
	Inc. New York  2. An Introduction to Probability and Statistics (2001), Rohatgi.V.K, and A.K.Md.EhsanesSaleh, John Wiley & Sons
Reference Books	<ol> <li>GuptaS.C. and Kapoor V.K. (1991): Fundamentals of Mathematical Statistics, Sultan Chand &amp; Sons.</li> <li>Goon A.M. Gupta M.K. and Das Gupta B (1980): An outline of Statistical Theory, Vol.II World Press Calcutta.</li> <li>Mood A.M. Graybill F.A. and Boes D.C.B (1980): Introduction to the Theory of Statistics 3/e, McGraw Hill, New</li> </ol>
	York. 4. Gibbons, J.D. (1971): Non-Parametric Statistical Inference,
Website and	e-books, tutorials on MOOC/SWAYAM courses on the subject
e-Learning Source	http://fisher.stats.uwo.ca/faculty/kulperger/SS3858/Handouts/np-lemma.pdf
	https://www.sciencedirect.com/topics/mathematics/uni
	ormly-most-powerful-test https://www.probabilitycourse.com/chapter8/8_4_5_lik
	elihood ratio tests.php
	https://www.statisticshowto.com/probability-and-
	statistics/statistics-definitions/parametric-and-non-
	parametric-data/



### CourseLearningOutcome(forMappingwithPOsandPSOs)

#### Studentswill beableto

CLO-1 frame hypotheses about population in real life research

CLO-2identify suitable testing procedure for given hypotheses

CLO-3compare two populations using samples taken from them

CLO-4 Compare populations in its means and variances separately

CLO-5 identify situations to apply parametric and nonparametric tests

CLO-6interpret results of a hypothesis testing

	7001	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7	PSO8	PSO9
	PSO1	FS02	1505	c c	M	S	s	s	s
CLO1	S	S	M	<u> </u>	N.C	G	S	s	s
CLO2	S	S	S	<u>s</u>	<u>I</u> VI	b.	6	S	M
CLO3	S	S	S	M	8	IVI	9	c	M
CLO4	S	s	S	M	S	<u>s</u>	8	<u> </u>	IVI
CLO5		g	S	M	M	s	S	S	M
CLO6	E = 200 c	M	M	S	М	s	s	s	M

## CO-PO Mapping (Course Articulation Matrix) S-Strong, M-Medium, W-Weak

CO/PO	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	3	3	3	3	3
CO2	3	3	3	3	3
CO3	3	3	3	3	3
CO4	3	3	3	3	3
CO5	3	3	3	3.	3
Weightage	15	15	15	15	15
Weighted percentage of Course Contribution to Pos	3.0	3.0	3.0	3.0	3.0

Level of Correlation between PSO's and CO's

TitleoftheCourse	Acruaria	Actuarial Statistics							
PaperNumber	Core VII	I				W.E.	<del></del>		
Category Core	Year Semest	II V	Credits	4	Code		23K4S0S		
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	Ann	itMort nuities	:Endowments,	Annuities.	Ассип	ulat	mortality-lifetab ions.Assurances.		
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Skillsacquiredfromthis Course	Knowledge, Problem Solving, Analytical ability, Professional Competency, Professional Communication and Transferrable Skill LH, Cook (1957): Life and other
Recommended Text	Hooker, P.F., Longley, L.HCook (1937). Entrangements, Cambridge.     Alistair Neill (1977): Lifecontingencies, Heinemannprofessional publishing.    Life Life Life (1977)   Life Contingencies   Heinemannprofessional publishing.
Reference Books	Study material of IADIFOA of Actualian Societies     Hosack I.B., Pollard J.H. and Zehnwirth, B. (1999): introductory st atistics with applications in general insurance, Cambridge University.
Website and e-Learning Source	e-books, tutorials on MOOC/SWAYAM courses on the subject

CourseLearningOutcome(forMappingwithPOsandPSOs) Studentswill beableto

CLO1: To explain the utility theory and insurance terminologies.

CLO2: Toarticulatetheinsuranceandannuitybenefitsthroughmultiplelifefunctions evaluationforspecialmortalitylaws.

 ${\bf CLO3} To describe the various types of premium and their numerical evaluations. \\$ 

CLO4: To explain implementation of the Life insurance policies.

CLO5: TodescribeInsurancepayableatthemomentofdeathandattheendoftheyear ofdeath-levelbenefitinsurance.

CLO6: To understand real life problems related to insurance

	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7	PSO8	PSO9
CL01		s	М	s	М	S	S	s	s
CLO2		S	s	s	M	s _	S	s	s
CLO3		S	S	M	s	М	s	s	M
CLO4		S	s	М	S	s	s	s	M
CLO5		s	s	М	M	s	S	s	М
CLO6		М	М	s	M	S	S	S	М

CO-PO Mapping (Course Articulation Matrix) S-Strong, M-Medium, W-Weak



			PSO3	PSO4	PSO5
CO/PO	PSO1	PSO2	P803	- 2	3
COI	3	3	3		3
CO2	3	3	3	_ 3	
CO3	3	3	3	3	13
	3	3	3	3	_ 1 3
C04	3	12	3	3	3
CO5	3	3	15	15	15
Weightage	15	15			2.0
Weighted percentage of Course Contribution to Pos	3.0	3.0	3.0	3.0	3.0

Level of Correlation between PSO's and CO's

HOD OF STATISTICS
K.N.G.A.C. (W) (AUTO)
THANJAVUR



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Title of the	Course	Barri .	Practical -	III (C	Calculator I	aseu- Di		-	
Paper Nur	nber		Elective -V		Credits	2	Cour		23K4SECS5P
Category	Core	235	Year II		Credits	-	Code		
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	b.		er	1.00	l torial	LabPrac	tice	To	tal
Instruction	ial Hours		Lecture	Lu	oriai		VII WARREST	2	
Per week			1	1	1 dintribu	ion theory	110.00		
Pre-requis	ite		Estimation t	heory	and distribu	lou moor)			= 70
Objectives Course	of	the	6. To u 7. To u 8. To ap	ake fai idersta idersta iply tes	nular with the concurrence of th	ept of Mos ihood ratio les from u	tests	n dis	tributions
Course Ou	t line		Unit I Statis	stical     Comp   or – M	Hypothesis posite hypo ost Powerfi	– Null a thesis – ( I test – Ui	nd Alt Critical niform	terna L reg	tive Hypothesis - gion - Type-I and fost powerful test -
S #2		***	Equality of	two n	neans of no	mal popu	lations	- te	ormal population - est for variance of normal populations.
			624			Variance			, Test of equality of
獎。			two sided	tests -	- Variance	known a	nd Va	arian	tests - one sided a
			Variance ur Unit-V			and two	sided		Variance known a
			Non	oaramo	etric metho	ds – Con	fidenc	e in	terval for distribu



	quantiles - Tolerance limits for distributions, Sign test, Wilcoxon test.
=	quantiles - Tolerance littles for the
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ExtendedProfessionalCo	Questionsrelatedtotheabovetopics, nonvariouseon-particular and an activity of the state of the s
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ofinternal component	(Tobediscusseddumgme -
only, Not to be included in	
theExternalExamination	
questionpaper)	Knowledge, Problem Solving, Analytical ability, Professional  Knowledge, Problem Solving, Analytical ability, Professional
Skillsacquiredfromthis	Knowledge, Problem Solving, Analytical action, Competency, Professional Communication and Transferrable Skill  Competency, Professional Communication and Transferrable Skill  Allen T. Craig (1978), Introduction to
Course	T a D L A V LIAGO SINI ANDI L.O. B.
Recommended Text	Mathematical Statistics, 4 <sup>th</sup> edition, Macmillan Publishing Co.,
	I New York
	B 1 1 111 and Statistics (2001)
	Rohatgi. V.K., and A.K. Mu. Elisanosa and
	5. GuptaS.C. and Kapoor V.K. (1991) : Fundamentals of
Reference Books	5. GuptaS.C. and Kapool Visco Chand & Sons.  Mathematical Statistics, Sultan Chand & Sons.  Mathematical Statistics, Sultan Chand & Sons.  Mathematical Statistics, Sultan Chand & Sons.
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	The state of the s
	7. Mood A.M. Grayoff F.A. and John McGraw Hill, New Introduction to the Theory of Statistics 3/e, McGraw Hill, New
	Construction
	8. Gibbons, J.D. (1971): Non-Parametric Statistical Inference,
	M. Committelli
Vebsite and	e-books, tutorials on MOOC/SWAYAM courses on the subject
-Learning Source	- 一
	http://fisher.stats.uwo.ca/faculty/kulperger/SS3858/Han
	douts/np-lemma.pdf
	https://www.sciencedirect.com/topics/mathematics/uni
	ormly-most-powerful-test
22	https://www.probabilitycourse.com/chapter8/8 4 5 lil
	elihood ratio tests.php
· • • • • • • • • • • • • • • • • • • •	https://www.statisticshowto.com/probability-and-
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CourseLearningOutcome(forMappingwithPOsandPSOs) Water Charles

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Studentswill beableto

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CLO-1frame hypotheses about population in real life research

CLO-2identify suitable testing procedure for given hypotheses

CLO-3compare two populations using samples taken from them

CLO-4 Compare populations in its means and variances separately

CLO-5 identify situations to apply parametric and nonparametric tests

CLO-6interpret results of a hypothesis testing

WEUKSSO			PSO3	PSO4	PSO5	PSO6	PSO7	PSO8	PSO9
	PSO1	PSO2	PSU3	1304		c	ĸ	s	S
CL01	S	s	М	<u>S</u>	М	<u> </u>	9	e	S
CLO2	38130	S	s	S	M	8	9	P	-
		<u> </u>	c	М	s	М	8	<u>s</u>	VI
CL03		P			8	S	s	S	М
CLO4	S	S	8	IVI		c	k	S	M
CLO5	5	S	s	M	М	P	-	6	M
CLO6	Thomas year 500	M	М	S	М	s	<u> </u>	Р	IVI

CO-PO Mapping (Course Articulation Matrix) S-Strong, M-Medium, W-Weak

Washington Company		PSO2	PSO3	PSO4	PSO5
СО /РО	PSO1	PS02	2	3	3
CO1	3	3	3	- 2	- 3
CO2	3	3	3	3	
	3	3	3	3	3
CO3	2	3	3	3	3
CO4	2		3	3	3
CO5	3	13	15	15	15
Weightage	15	15	15		-
Weighted percentage of Course Contribution to Pos	3.0	3.0	3.0	3.0	3.0

Level of Correlation between PSO's and CO's

5 AUG 2023

HOD OF STATISTICS K.N.G.A.C. (W) (AUTO) THANJAVUR

Title of the	Course	Economi	0.8	Official Statis	ies						
Paper Nun	nber	Elective VI					Cour	se	70 TO TO		
Category Core		Year	Year II		3		Code		23K4SECS6:1		
100 m		Semest Er	17								
	1 II correct	Lecture	-1	Tutorial	1	abPri	retice	Total			
Instruction Per week	mt Hours	3	1						14		
Pre-requis	ite	Not needed									
Objectives Course	The second secon	Not needed Themain objectives offhis couloction  1. To understand inconfection 2. To know Indian ee 3. To know index nur 4. To know time serie 5. To learn demand a				mic n	nd agric	ultur	al surveys		

#### Course Out line

Indian Statistical System: Data Collection for Governance - NSSO and its role in national data collection. NSSO reports and publications

#### Unit II

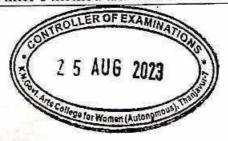
Economic Statistics: Information collection for Socio-Economic Survey - Agricultural, Industrial, Crime Statistics and Statistical methods applied to analyse large volumes of data

#### Unit III

Index numbers: Basic problems in construction of index numbers. Methods- Simple and Weighted aggregate-Average of price relatives-Chain base method. Criteria of goodness-Unit test, Time Reversal Factor Reversal and Circular tests. Base Shifting, Splicing and deflating index numbers. Wholesale and Consumer price index numbers. Index of industrial production.

#### Unit-IV

Time Series: Measurement of Trend: Graphic, Semi-averages, Moving averages. Least Squares - Straight line, Second degree parabola, Exponential curve, Modified Exponential curve, Gompertz curve and Logistic curve. Measurement of Seasonal variation by Ratio-to-Moving average method. Exponential smoothing, Holt Winter's method and Box-Jenkinson's method(only algorithm).



Website and -Learning Source	e-books, tutorials on MOOC/SWAYAM courses on the subject
Reference Books	<ol> <li>SpyrosMakridakis, StevenC. WheelwrightandRobJ .Hyndman(2003):ForecastingMethodsand Applications,3<sup>rd</sup> Edition ,John Wileyand Sons Inc</li> <li>IrvingW.Burr(1974):AppliedStatisticalMethods,AcademicPress.</li> </ol>
ExtendedProfessionalCo mponent (is a part of of of of of the component only, Not to be included in the External Examination question paper)	Unit-V Demand Analysis: Introduction-Demand and supply, partial and cross elasticities of elasticity of demand and supply, partial and cross elasticities of demand. Types of data required for estimating elasticity. Methods of estimating demand functions: Leontief 's and Pigou's methods. Engel's law and Engel's curves. Pareto's law of law of income distribution. Utility function.  Questionsrelatedtotheabovetopics, from various competitive examinations UPSCIES-ISS/TRB/NET/UGC-CSIR/GATE/TNPSC/otherstobesolved (Tobediscussed during the Tutorial hour)  Knowledge, Problem Solving, Analytical ability, Professional Competency, Professional Communication and Transferrable Skill  5. Gupta S.C. and Kapoor V.K. (2007): Fundamentals of Applied Statistics, 4 <sup>th</sup> edition, Sultan Chand & Sons Publishers, New Delhi.  6. Gupta S.P. (2011): Statistical Methods, Sultan Chand & Sons Publishers, New Delhi.  7. Spyros Makridakis, Steven C. Wheelwright and Rob J. Hyndman (2003): Forecasting Methods and Applications, 3 <sup>rd</sup> Edition, John Wileyand Sons Inc.  8. Websites of Government of India – Ministry of Statistics & Programme Implementation
	Unit-V Demand Analysis: Introduction-Demand and Supply, Price



## Coursel.earningOutcome(forMappingwithPOsandPSOs)

CLO-1:understand Indian official statistics and offices related to it

CLO-2understand Indian surveys for collecting official statistics

CLO-3know uses of index numbers

CLO-5 to understand economic India by knowing agricultural and economic surveys

CLO-6to know the time series and prediction

			T 1	nco5	PSO6	PSO7	PSO8	PSO9
PSO1	PSO2	PSO3	PSO4	P803	7,500	S	s	s
}	S	М	S	М	5	g g	S	S
	S	S	S	М	8	6	S	S
	s	s	S	<u>s</u>	M	<u> </u>	8	М
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	k:	М	S	М	s	S	S	ĮMI
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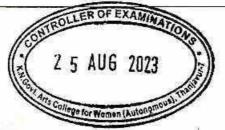
CLO-PSO Mapping (Course Articulation Matrix) S-Strong, M-Medium, W-Weak

	nco1	PSO2	PSO3	PSO4	PSO5
CO/PO	PSO1	1502	3	3	3
CO1	3	3		3	3
CO2	3	3	3		12
CO3	3	3	3	3	_
	3	3	3	3	3
CO4	3	3	3	3	3
CO5	15	15	15	15	15
Weightage		13	12		<del></del>
Weighted percentage of Course Contribution to Pos	3.0	3.0	3.0	3.0	3.0

Level of Correlation between PSO's and CO's

HOD OF STATISTICS K.N.G.A.C. (W) (AUTO) THANJAVUR

	the Course	Econometric	s/Po	pulation St	ioles	XII			
Paper	Number		- Contract		lective -	Cours	e T	US#WINS252	1
Category	Core	Year Semester	VI	Credits	3	Code	73	K4SECS6:2	1
		Lecture	T -	Cutorial	Lab Pr	actice		Total	4
	ional Hours	\$160 D. W. C. W. C	-	847				5	2011
	week	4 1.To identify		ioto cources	of data w	ith basic	vital statis	tics analyses	
53.70.000	ves of the urse	<ol> <li>To relate the</li> <li>To utilize the</li> <li>To analyze the</li> </ol>	e popu ne mort the bir	ality table to th rate used t	find the s o describe	urvival a	nd death rain the pop	ates ulations	
Course	Outline	model buildir General linea	hind l ng, rol ir mod	ouilding economics (GLM).E	etimetion	under l	inear rest		-
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omponent (	is a part of	Morbidity Ra Definition, pro Unit V Ferti Crude Birth R Fertility Rate - Replacement Specific Fertil Questions rel examinations	ates: Interpretation of the control	s, uses and sates Feneral Ferti s Reproduct Fertility - Beasures - The to the above C / TRB / I	imple pro lity Rate - ion Rate ( irth order eory and l	Age Spe GRR) - I statistics Problems	ecific Fert Net Repros - Child	ility Rate - Tota oduction Rate ( Women ratio -	al NRR Orde
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omponent ( ternal compot to be ince ternal I estion pape kills acquire	is a part of conent only, luded in the Examination r) ed from this rse	Morbidity Ra Definition, pro Unit V Ferti Crude Birth R Fertility Rate Replacement Specific Fertil Questions rel examinations others to be s (To be discuss Knowled	ites: In opertic ility R ate - C - Gros t level lity Me lated t s UPS solved ssed d dge, ency, l	neidence pros, uses and sates Feneral Ferti s Reproduct Fertility - Beasures - The to the above C / TRB / I uring the T  Problem Professiona	imple pro lity Rate - ion Rate ( irth order eory and le topics, to NET / UC utorial h	Age Spectroller  Age Spectroller  Statistics  Problems  from var  GC – CS  our)  Analy  unication	ce fates, ecific Fert Net Repros - Child ious con IR / GA  rtical a n and Tr	ility Rate - Total oduction Rate (I Women ratio - npetitive TE / TNPSC /	al NRR Orde



	<ol> <li>Koutsoyiannis, A. (2004): Theory of Econometrics, 2nd Edition,</li> <li>Palgrave Macmillan Limited, 4. Maddala, G.S. and Lahiri, K. (2009):</li> <li>Introduction to Econometrics, 4th Edition, John Wiley &amp; Sons.</li> <li>Gupta S.P. &amp; Kapoor V.K., Fundamentals of Applied Statistics, Sultan</li> <li>Chand &amp; Sons, 2019.</li> <li>Peter R Cox, Demography, 5th Edition, Vikas Publishing House, 1979.</li> <li>Agarwal S.N, India's Population Problems, Tata McGraw Hill, 1981.</li> </ol>
	8. Srinivasan, K, Basic Demographic Techniques and Applications New Delhi, 1998.
Webside	https://www.cdc.gov/csels/dsepd/ss1978/lesson3/section1.html

## Course Learning Outcome (for Mapping with POs and

PSOs) Students will be able to

CLO-1 Distinguish between proper and improper fractions. Express an algebraic fraction as the sum of its partial fractions.

CLO-2 Demonstrate the knowledge to determine the sums, expansion and approximation of series including binomial, exponential, logarithmic and fourier.

CLO-3 Solve problems about polynomials with real coefficients, imaginary and irrational roots. Explain the relationship between the derivative of a function as a function and the notion of the derivative.

CLO-4 Calculate limits of a function.

CLO-5 Obtain the nth derivative in successive differentiation. Apply Euler's theorem on homogenous function

CLO-6 Obtain the mathematical knowledge and skills for the better understanding of statistics as a mathematical science

	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7	PSO8	PSO9
CL01	S	S	М	М	М	S	М	S	М
CLO2	S	S	S	S	М	S	М	S	М
CLO3	S	S	S	М	S	S	М	S	S
CLO4	S	S	S	М	S	S	S	S	M
CLO5	S	S	М	М	М	S	S	S	М
CLO6	S	S	S	S	М	S	. S	М	M

# CLO-PRO Mapping (Course Articulation Matrix) Bastrong, MaMedium, Wawk

CLO-PRO Mapping (Course Wealt		Action to the second second	1 1/803	PSO4	PSO5
СО/РО	19901	PBO2	17000	3	3
COI	4	STREET, STREET	,	3	3
CO2	1	and the last of th	- 3	3	3
CO3	3	CONTRACTOR OF STREET	$-\frac{g}{q}$	3	3
CO4	3	<i>II</i>	4	3	3
CO5	3	i i	15	15	15
Weightage	15			3.0	3.0
Weighted percentage of Course Contribution to Pos	3.0	3.0	3.0		)

Ontribution to Pos Level of Correlation between PSO's and CO's

5 AUG 2073

HOD OF STATISTICS

little of the	Course	Practical -	V (5	Statistical Softw	are Osing			
Paper Nun	ther	SEC - VI (I	)isc	ipline specific)				
S CHAIL MINNEY ( WISS COMPACTIVES AND )		Year	11	Credits	2	Course	23K4SSEC6	
Category	Cine	Semester	17	Credits	977	CONTRACTOR AND ADDRESS OF THE PARTY OF THE P	Total	
Instructional Hours		Lecture		Tutorial	Lab P	ractice	Total	
per week	CONTRACTOR CONTRACTOR		ent.		2		2	

#### Objectives:

The main objectives of this course are:

- 1.To enable the students to gain practical knowledge of test of significance in large and small samples.
- 2. To provide practical application of hypothesis testing based on single sample and two samples, using averages and proportions.
- 3. To provide practical application knowledge of the life insurance environment.
- Understand the methods of computing assurance benefits and premiums of various insurance plans and to apply the various methods in framing mortality tables.

#### Programming Exercises:

- 1. Large Sample tests for means, proportions
- 2. Large Sample tests for standard deviations and correlation coefficient.
- 3. Small sample tests for single mean.
- 4. Small sample tests for difference of means and correlation coefficient.
- 5. Paired t -test.

- Chi square test for goodness of independence of attributes.
   Non parametric test for single and related samples
- n. Sign Test, b. Wilcoxon signed rank test
- 8, Non parametric test for two independent samples
- a. Median test, b. Wilcoxon Mann Whitney U-test
- 9. Creating an Actuarial table to input interest rate.
- 10. Creating functions Increasing and Decreasing life insurances.
- 11.Increaing and decreasing annuities both due and immediate.
- 12. Calculates the values of risk free rate.

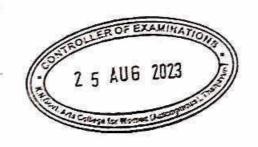


#### Note:

5 questions are to be set without omitting any unit. All questions carry equal marks.
Any 3 questions are to be answered in 3 hours duration.

### Examinations Distribution of Marks

Examinations Distribution of Market	75 Marks
University Examinations (Written Practical)	25 Marks
CLA (Including Practical Record)	100 Marks
Total	



The second secon	Survey Sampling and In	dian Official Com-						
litle of the Course	were VIII	Con	rse 23K4SSEC7					
Paper Number	1 7656	lits 2 Cod	· · · · · · · · · · · · · · · · · · ·					
Category Core	year	Coo						
	Pemen	5 matica	Total					
	Lecture Tutorial	Lab Practice	2					
Instructional Hours	Lecture		12					
Per weck	Probability theory							
Pre-requisite		is course are:	of Stochastic Processes,					
Objectives of th Course	Alore POOR HILLIAM		of Stochastic Processes, astic Processes, various , Morkov and others). icity, stationarity and					
Course Out line	UNIT I  Concept of population versus sampling, sampling; non-proprinciple of sample su	bability and probab	nplete enumeration pling errors. Types ility sampling, basic					
	population mean, to estimates, estimates	otal and proportion  of their variance	without replacement, sample, estimates of:  a, variances of these es and sample size ic sampling with SRS e of linear trend and					
	Introduction to Ratio and regression methods of estimation, first approximation to the population mean and total (for SRS of large size), variances of these estimates and estimates of these variances, Estimation of population mean and its variance, comparison (with and without randomly formed clusters). Relative efficiency of cluster sampling with SRS in							
	terms of intra class correlation. Concept of sub sampling.							



	Present official statistical system in India, Methods of collection of official statistics, their reliability and limitations.  Role of Ministry of Statistics & Program Implementation (MoSPI), Central Statistical Office (CSO).
	UNIT V National Sample Survey Office (NSSO), and National Statistical Commission. Government of India's Principal publications containing data on thetopics such as population, industry and finance.
Component (is a part of internal component only, Not to be included in the External Examination	Questionsrelatedtotheabovetopics, from various competitive examinatio nsUPSC/TRB/NET/UGC-CSIR/GATE/TNPSC/otherstobesolved (Tobediscussedduring the Tutorial hour)
questionpaper) Skills acquired from this	Knowledge, Problem Solving, Analytical ability, Professional Competency, Professional Communication and Transferrable Skill
course Recommended Text	<ol> <li>Cochran W.G. (1984):Sampling Techniques (5)         Eastern.     </li> <li>Sukhatme, P.V., Sukhatme, B.V. Sukhatme, S.         Asok, C. (1984). Sampling Theories of Survey With         Application, IOWA State University Press and Indian         Society of Agricultural Statistics     </li> <li>Murthy M.N. (1977): Sampling Theory &amp; Statistical         Methods, Statistical Pub. Society, Calcutta.     </li> </ol>
Reference Books	<ol> <li>Goon A.M., Gupta M.K. and Dasgupta B. (2001):         Fundamentals of Statistics (Vol.2), World Press.</li> <li>Guide to current Indian Official Statistics, Central Statistics Office, GOI, New Delhi.</li> </ol>
Website and -Learning Source	e-books, tutorials on MOOC/SWAYAM courses on the subject  http://ocw.jhsph.edu/courses/statmethodsforsamplesu- eys/pdfs/lecture2.pdf  https://www.questionpro.com/blog/stratified-random-
	2 5 AUG 2023

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https://www.scribbr.com/methodology/systematichttp://home.iitk.ac.in/~shalab/sampling/chapter7-samplingvarying-probability-sampling.pdf http://mospi.nic.in/

Course Learning Outcome (for Mapping with POs and PSOs) Students will be able to

- CLO-1Understand stochastic nature of random variable and different stochastic process
- CLO-2know about transition matrix and its calculations
- CLO-3understand Markov chain and its applications
- CLO-4 understand Markov process and its applications
- CLO-5 unserstandrenewel process and its applications
- CLO-6know about various stochastic modeling and its applications

			nco2	PSO4	PSO5	PSO6	PSO7	PSO8	PSO9
	PSO1	PSO2	PSO3	1004	100	c	S	s	S
CL01	S	S	Μ	S	M	8	-	C	c
75 C 1 C 1 C 1		c	S	S	M	S	S	S	3
CLO2	76-2 m	9	9	-	e	M	S	M	S
CLO <sub>3</sub>	s	S	<u>s</u>	<u> </u>	0		G	C C	M
CLO4	S	S	S	M	S	S	>	9	112
Same Selection	F	6	c	М	М	s	M	S	M
CLO <sub>5</sub>	S	5	0	1.41		C)	c c	M	M
CLO6	S	S	M	S	M	<b>P</b>	<b>P</b>	μνι	r

## CO-PO Mapping (Course Articulation Matrix) S-Strong, M-Medium, W-Weak

00 m0	PSO1	PSO2	PSO3	PSO4	PSO5
CO/PO	2	3	3	3	3
CO1	3	3	2	3	3
CO2	3	3	3		
CO3	3	3	3	3	3
CO4	3	3	3	3	3
C05	3	3	3	3	3
Weightage	15	15	15	15	15
Weighted percentage of Course Contribution to Pos	3.0	3.0	3.0	3.0	3.0

Level of Correlation between PSO's and CO's

K.N.G.A.C. (W) (AUTO)

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		The second secon	and the second second second second second	CT 414 3
ES	ISNVIRONMISNTAL.	23K4ISVB	Inst. Hrs 2	Credit 2
December 1	STUDIES		1	

CO	STATEMENT	
Ī	To learn the concept and Importance of Environment	
2	To create awareness about the Biodiversity and its conservation	× ×
3	To understand the various pollution, its causes and its prevention	
4	To understand the environmental Laws	
5	To understand the Environmental Agencies	

Unit I: Environment- Definition- Concept, Components and Importance. Ecosystem-Structure and function- Pool chain, food web and Ecological pyramids.

Unit II: Biodiversity- Definition- Importance- flora and fauna of India- Endangered and threatened species in India- Conservation strategies (Insitu and Exsitu)

Unit III: Environmental pollution- Definition- Agents/ causes effects and control measures of air, water, land and Noise pollution- Nuclear hazards.

Unit IV: Environmental Laws and Ethics-Wild life Act- Water act- Air act- and Environmental protection Act- Environmental Ethics (Libertarian Extension- Ecological Extension- Conservation Ethics)

Unit V: Environmental Agencies- National (Department of Environment, forest and wildlife) International (UNICED- Earth Summit- Only one Earth)- Man and Biosphere (MAB).

#### Text Book:

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- (1) K. Kumaraswamy, A. Alagappa Moses, M. Vasanthy, "Environmental Studies", Bharathidasan University, Trichy- 620 024.
- (2) P. Chandrasekaren, "Sutrusuzhal payilvugal", U.G.C Core Module Course in Environmental Studies, T K Publication, Pudukkottai. -
- (3) V. Kumaresan, "Plan Ecology and Phytogeography".
- (4) D. Dharmaraj, "Environmental Science".
- (5) N.Arumugam, "Environmental Studies".
- (6) B. Chandrasekaran, "Environmental Studies".

#### Reference:

- (1) P. D. Sharma, "Ecology and Environment".
- (2) Purohit, "A Text Book of Environmental Sciences".

4 5 AUG 2023

(3) M. P. Mishara, "Our Property and Pollution Control and Future Strategies".

Title of the Cour	'se	Quantita	tive	Aput	uae				
Panas Nambar		ECC-D	(1	7		1	- Gara		
Paper Number Category Core		Year	II	91-310-2-11	Credits	3			23K4SECC3:1
Category Core		Semest	IV				Coa	e.	
		Er						Tres	<u></u>
Instructional Ho	urs	Lecture	Tutorial LabPractice Total objectives of this course are: To understand Indian official statistical collection To know Indian economic and agricultura to know index numbers and consumer prior to know time series analysis To learn demand analysis and its concepts the decimal fractions, simplification, square oblems on numbers.  To blems on ages, surds and Indices, percent decimal fractions, collems on numbers.  To blems on ages, surds and Indices, percent decimal fractions, square oblems on numbers.  To blems on ages, surds and Indices, percent decimal fractions, collems on Trains Pipon or Mixture, Area, Volume and Surface Analysis and Indices, percent decimal fractions, square oblems on Trains Pipon or Mixture, Area, Volume and Surface Analysis and Indices, percent decimal fractions, square oblems on Trains Pipon or Mixture, Area, Volume and Surface Analysis and Indices, Problems on Trains Pipon or Mixture, Area, Volume and Surface Analysis and Indices, Problems on Trains Pipon or Mixture, Area, Volume and Surface Analysis and Indices, Problems on Trains Pipon or Mixture, Area, Volume and Surface Analysis and Indices, Problems on Trains Pipon or Mixture, Area, Volume and Surface Analysis and Indices, Problems on Trains Pipon or Mixture, Area, Volume and Surface Analysis and Indices, Problems on Trains Pipon or Mixture, Area, Volume and Surface Analysis and Indices, Problems on Trains Pipon or Mixture, Area, Volume and Surface Analysis and Indices, Problems on Trains Pipon or Mixture, Area, Volume and Surface Analysis and Indices, Problems on Trains Pipon or Mixture, Area, Volume and Surface Analysis and Indices, Problems on Trains Pipon or Mixture, Area, Volume and Surface Analysis and Indices, Problems on Trains Pipon or Mixture, Area, Volume and Surface Analysis and Indices, Problems on Trains Pipon or Mixture, Area, Volume and Surface Analysis and Indices, Problems on Trains Pipon or Mixture, Area, Volume and Surface Analysis and Indices, Problems on Trains Pipon or Mixture, Area, Volume and Surface Analysis	1211					
Per week				-		-		ــــــــــــــــــــــــــــــــــــــ	
Pre-requisite		Not need	led	40.00					
Objectives o Course	f the	1. 2. 3.	To col To To	unde llectio know know	rstand Ind n Indian eco index nun	nomic ar	nd agric consur	ultur ner pi	al surveys rice index
Course Out line	Unit I  Numbers- operations on numbers, H.C.F and L.C.M. of numbers, decimal fractions, simplification, square roots and cube roots, problems on numbers.  Unit II								
		Proportio Unit IV Time an	n. d D	oistano	e, Prob	lems on	Train	ıs Pi	pes and Cistern
		Unit V Simple Interest, Compound Interest, Stocks and Shares, True Discountand Bankers Discount.							
tendedProfession	Zierthone-cycles and					SANTA PARTY CONTRACTOR	nvariou	scon	petitiveexaminat
	1950 W								
Property of the second	uded in								
	thic	17 1	1	D 11	construent of the second		and Williams		
illsacquiredfrom	uns i	Knowle	age	Probl	em Solvin	o Analyti	calabil	ity D	rofessional

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Recommended Text	1. Quantitative Aptitude - Dr.R.S.Aggarwal
	1. Quantitative Aptitude - Dr.R.S.Aggarwal
Reference Books	1
Website and	e-books, tutorials on MOOC/SWAYAM courses on the subject
e-Learning Source	ongo ) Students will be able to

## Course Learning Outcome (for Mapping with POs and PSOs) Students will be able to

- CLO-1:understand Indian official statistics and offices related to it
- CLO-2understand Indian surveys for collecting official statistics
- CLO-3know uses of index numbers
- CLO-4 know demand analysis and its need
- CLO-5 to understand economic India by knowing agricultural and economic surveys
- CLO-6to know the time series and prediction

13-0				pcO4	PSO5	PSO6	PSO7	PSO8	PSO9
	PSO1	PSO2	PSO3	PSO4	1303	C	C	S	S
CLO1	S	S	M	S	M	8	3	<u> </u>	9
		S	S	s	M	S	S	8	5
CLO2		5	9	c	S	M	S	S	<u>s</u>
CLO3	S	S	8	9	5	c	S	s	M
CLO <sub>4</sub>	S	S	S	M	8	<u> </u>		C	M
CLO5		S	s	M	M	S	<u> </u>	<u> </u>	101
	VALUE OF THE PARTY	9	M	S	M	S	S	S	M
CLO6	<b>o</b>	P	k/-	207		N= C-1 D-1			

## CLO-PSO Mapping (Course Articulation Matrix) S-Strong, M-Medium, W-Weak

	PSO1	PSO2	PSO3	PSO4	PSO5
CO/PO	r501	1502	3	3	3
CO1	3	3		3	3
CO2	3	3	3	3	3
C03	3	3	3	3	3
66,2761,000,000 - 100 -	3	3	3	3	3
CO4	2		2	3	3
CO5	3	3	- 12-	1.5	15
Weightage	15	15	15	15	15
Weighted percentage of Course Contribution to Pos	3.0	3.0	3.0	3.0	3.0

Level of Correlation between PSO's and CO's



HOD OF STATISTICS K.N.G.A.C. (W) (AUTO) THANJAVUR

I itleofthe(		Stochast	ic Pr	ocess				707		
PaperNum		Core IX	40000		W=011		- 12	- CV-	D2777000	
Category	Core	Year	III		Credits	5	Cour		23K5S09	
		Semest er	V				Code	5.5		
Instruction	nalHours	Lecture	\$	Tut	orial	LabPi	ractice	To	tal	
perweek		4		2		-	200	6		
Pre-requis	ite	Probabili	ity th	eory						
Objectives e	of theCours	1. T	o stu he m roper o 1	dy thost interest	important t and characte the noti	cepts of ypes of cristics	Stochas (Poisson,	tic I Mor	chastic Processes, Processes, various kov and others). stationarity and	
		Process transitio Classific Unit II Markov	- Nn peation	Marko proba n of S ins –	bilities: Catates and Catates	Define the property of th	nition ar  - K  Stability	of a	esses – Stationary kamples – Higher gorov equations.  Markov System – imensional randon	
		Postula: process	Pro tes of	f Pois rela	sson proces ted distribi	s Propei itions. I	ties of P Pure Bir	oisso th pr	Poisson Process on Process - Poisso ocess - Yule-Furn eath Process.	
.0x		Unit-I	1					Signal II		
			wal e						ncepts and example rem – Basic Renew	
16 15		Unit-V	¥	3 15 1	000e					
		Applica	ation	e in	Ctoobootin	N & - I - I			ystems and Mode	



	infinite) steady state solution-simple problems with finite and infinite capacities.
mponent (is a part ofinternal component only, Not to be included in the External Examination	Questionsrelatedtotheabovetopics, from various competitive examinations upscribed in supscribed in s
questionpaper) Skillsacquiredfromthis course	Knowledge, Problem Solving, Analytical ability, Professional Competency, Professional Communication and Transferrable Skill
Recommended Text	<ol> <li>Medhi, J. (2019): Stochastic Processes, New Age International Publishers.</li> <li>KantiSwarup, Gupra.P.K. Man Mohan., (2010): Operations Research, Sultan Chand &amp; Sons</li> </ol>
Reference Books	<ol> <li>Karlin ,S. and Taylor, H.M.(1975): A first course in Steeland Processes, Academic Press, New York.</li> <li>Ross, S.M. (1983): Stochastic Processes. John Wiley Eastern Ltd. New York.</li> </ol>
Website and a-Learning Source	e-books, tutorials on MOOC/SWAYAM courses on the subject
	http://www.randomservices.org/random/
	https://www.britannica.com/science/stochastic-process

CourseLearningOutcome(forMappingwithPOsandPSOs)

Studentswill beableto

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CLO-1Understand stochastic nature of random variable and different stochastic process

CLO-2know about transition matrix and its calculations

CLO-3understand Markov chain and its applications

CLO-4 understand Markov process and its applications

CLO-5 unserstandrenewel process and its applications

CLO-6know about various stochastic modeling and its applications



	-	-		197234	PSO5	PSO6	PSO7	PSO8	PSO9
	PSO1	PSO2	PSO3	PSO4	ratio	117.70	c.	S	5
CLO1	4	S	M	<u> </u>	M	2	2	6	S
C1/O2	No.	Q	S	S	М	8	<u> </u>	13	-
The second second	And in case of the last		C)	v.	S	M	S	M	P
CLO3			3		K!	K	s	S	M
CLO4	8	S	<u>S</u>	M	2		1.1	S	M
CLO5	4	S	S	M	M	)	101	1.4	M
CLO6		S	M	S	M	<u>s</u>	<u>s</u>	JVI	PV1

## CO-PO Mapping (Course Articulation Matrix) S-Strong, M-Medium, W-Weak

		Tivios	PSO3	PSO4	PSO5
CO/PO	PSO1	PSO2	7,500	3	3
COI	3	3		2	3
CO2	3	3	3	3	- 2
CO3	3	3	3	3	-13-
28 CANCELLOS	3	3	3	3	3
CO4	2	7	3	3	3
CO5	3	- 10	15	15	15
Weightage	15	15			0.00
Weighted percentage of Course Contribution to Pos	3.0	3.0	3.0	3.0	3.0

Level of Correlation between PSO's and CO's

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Titleofthe(	ourse	Regressio	n Analy	sis								
PaperNum		Core X		Credits	5	Cour	se	23K5S10				
Category	A CONTRACTOR OF THE PARTY OF TH	Year	m	Creaus		Code		li lu				
APONT I WAS MILE . W. C.		Semest V										
		er		<u> </u>	LabPrac	tice	Total					
Instruction	alHours	Lecture	Lecture Tutorini				6					
perweek		4										
Pre-requis	ite	Linear reg	Linear regression analysis, Estimation theory  Themain objectives of this course are:  Themain objectives of this course and nonlinear relationships									
Objectives e	of theCours	1. To be or 2. To its 3. To	tweenvalented. teach properti	erstand in riables and Linear Re	training t	the stu nodels,	its	s in applications assumptions and ore using Linear				
		model pa hypothese estimation new obse through of  Unit II  Standa of model estimator Tests	Standard Gauss Markov setup, least square estimation of model parameters, variance covariance of least squares estimators, estimation of error variance  Tests of hypotheses – significance of regression									
		coefficies hypothes	(ANOVA, R <sup>2</sup> and adjusted R <sup>2</sup> ), individual regression coefficients, subset of regressor variables, general linear hypotheses- Confidence intervals and regions, prediction intervals, detecting hidden interpolation.									
		normality fit of the	plots for check iers. Test for Lack orrelation. Analytical and weighted le									



squares- Detection of influential observations - Cooks statistic, DFFITS, DFBETAS. Variance stabilizing transforms and transforms to linearize the model, analytical methods for selecting a transform, generalized and weighted least squares.Dummy (or indicator variables) - general concepts and their use Unit-IV Multicollinearity - sources, effects, diagnostics, Methods of dealing with multi collinearity (collection of additional data, model respecification, Ridge regression). Selection of Variables - forward selection, backward elimination and stepwise regression (algorithms only) Unit-V Nonlinear regression - transformation to a linear model, their use and limitations, initial estimates (starting values), parameter estimation using iterative procedures - Gauss-Newton, steepest Descent, Marquardt's compromise. Count data- Poisson Regression - variables selection- Non parametric regression. Questions related to the above topics, from various competitive examinatio ExtendedProfessionalCo part nsUPSC/TRB/NET/UGC-CSIR/GATE/TNPSC/otherstobesolved mponent (is a component (TobediscussedduringtheTutorialhour) ofinternal only, Not to be included in theExternalExamination questionpaper) Skillsacquiredfromthis Knowledge, Problem Solving, Analytical ability, Professional Competency, Professional Communication and Transferrable Skill course Recommended Text 1. Montgomery, D. C., Peck, E. A. and Vining, G. G. (2003): Introductionto Linear regression analysis, third edition, John Wiley and Sons, Inc. 2. Zar, J.H. (2006): Biostatistical Analysis, fourth edition, Pearsoneducation. 3. Douglas C. Montgometry (2012)Introduction to Linear Regression Analysis. 4. Iain Pardoe (2012): Applied regression Modeling, second edition, Wiley

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Reference Books	<ol> <li>Draper, N.R. and Smith, H. (2003): Applied Regression Analysis, third edition, John Wiley and Sons, Inc.</li> <li>Johnston, J. (1984): Econometric methods, third edition, McGrawfill International.</li> <li>A. Sen, M. Srivastava, Regression Analysis         Theory, Methods, and Applications, Springer-Verlag, Berlin, 2011.     </li> </ol>
Website and e-Learning Source	Berlin,2011.  e-books, tutorials on MOOC/SWAYAM courses on the subject  http://home.iitk.ac.in/~shalab/regression/Chapter2-Regression- SimpleLinearRegressionAnalysis.pdf  http://www.mit.edu/~6.s085/notes/lecture3.pdf  https://ncss-wpengine.netdna-ssl.com/wp- content/themes/ncss/pdf/Procedures/NCSS/Nonlinear_Regression.pdf
	https://data.princeton.edu/wwws509/notes/c4.pdf http://home.iitk.ac.in/~shalab/reg ression/Chapter15-Regression- PoissonRegressionModels.pdf

CourseLearningOutcome(forMappingwithPOsandPSOs)

Studentswill beableto

CLO-1Estimating model parameters and testing it

CLO-2understand linear and nonlinear models assumptions

CLO-3check model adequacy

CLO-4 know about variable selection

CLO-5 know about nonlinear regression models

CLO-6choose model if some of the basic assumptions are violated also



	_	T Table 1	1 2202	PSO4	PSO5	PSO6	PSO7	PSO8	PSO9
	PSO1	PSO2	PSO3	P304	1505	6	S	S	S
CLO1	s	s	M	<u>s</u>	M	P -	0	c	g
CLO2	8	S	s	S _	M	<u>s</u>	S	B	6
	7 1 2 2 2 1 2 2 2 2 2 2 2 2 2 2 2 2 2 2	c	c	S	s	M	S	M	8
CLO3	WALL TO SEE	5	0		c	S	s	S	M
CLO4	S	<u>s</u>	8	IVI	0	<u></u>	N	S	M
CLO5	ŝ	S	S	Μ	M	<u> </u>	IVI		N. /
CLO6		s	М	S	М	S	S	M	ĮVI.

## CO-PO Mapping (Course Articulation Matrix) S-Strong, M-Medium, W-Weak

	DCOL	PSO2	PSO3	PSO4	PSO5
CO/PO	PSO1	1302	2	3	3
CO1	3	3	3		2
CO2 .	3	3	3	3	3
C03	3	3	3	3	3
CO4	2	3	3	3	3
	3	2	3	3	3
C05	3	3	-	16	15
Weightage	15	15	15	15	12
Weighted percentage of Course Contribution to Pos	3.0	3.0	3.0	3.0	3.0

Level of Correlation between PSO's and CO's

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N.G.A.C. (W) (AUTO)

Title of the Course	Practical -		(Core	2-1X & X)	******			
Paper Number	Core XI (P				-	Cou	Course	
C	Year	III		Credits	5	The Activities	de	23K5S11P
Category Core	Semester	V	9700 DESPRESSES				Total	
Instructional Hours	Lecture 4		Tutorial		Lab Pi	ractice	6	
per week			0.000	2			0	
Course  Course Outline	The main objectives of this course are:  1. To enable the students to gain practical knowledge stochastic process problems.  2. Demonstrate the fitting of linear regression models for real time data.  3. Infer model adequacy through various model selection process.  UNIT I  Transition probability Matrix – Stationarity of Markov Chain and graphical							
	Process. Unit III Queuing Server exp Unit-IV Simple lin regression Unit –V	Sys one near	tems ential o	– Single sequeuing systems	erver exp tem havin	onential ng finite ca interval e	queuin apacity estimati	on of simple line
W	Normality of residuals — Multicollinearity in simple and multiple line regression — Heteroscedasticity and auto correlation in simple and multipregression.							

#### Note:

#### Question Paper Setting:

5 questions are to be set without omitting any unit. All questions carry equal marks. Any 3 questions are to be answered in 3 hours duration.

#### **Examinations Distribution of Marks**

University Examinations (Written Practical) CIA (Including Practical Record)

Total

75 Marks 25 Marks 100 Marks



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Titleofthe	Course	PROJEC							
PaperNumber		CC-XII			1000	Cou	rde	23K5S12PW	
THE RESERVE OF THE PARTY OF THE	Core	Year	111	10	Credits	"			
		Semest Er			Code		gr -		
Instruction	allloure	Lecture	1	Tutorial		LabPractice		Total	
perweek	millours			-				6	
Pre-requis	ite							-	



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HOD OF STATISTICS N.N.G.A.C. (W) (AUTO) THANJAVUR

Title of t	he Course	Statistical Q	uality	Control	E032-74		
	Number	Elective- VI	() 	12-24-34-3-3		Course	23K5SECS7:1
	Core	Year .	m v	Credits	3	Code	Michigan Parameter Communication Communicati
Category	Core	Semester		l'utorial	Lab Pr	actice	Total
Instruction	onal Hours	Lecture		0.1			4
per	week	3	ــيـــــــــــــــــــــــــــــــــــ	nation theor	v and Dist	ribution th	neory
Pre-re	quisite	e The main ob	Estin	nation incor	rce are.		terminologies, need of control limits of
		defects, no f defects, no f defects.  3. To educate its imple rejecting.  4. To define defective consumer.  5. To facility attributes.	te acception of the control of the c	nit (u-chart) eptance sam tion, com etance quality of the lot for an acce	pling plan pute the ty level (A ; and co ptance sa to under sampling	and discoprobability AQL) and impute the impling plates and the plans,	control charts for ol chart for number uss the procedure of ty of accepting or lot tolerance percent producer's risk and an.  difference between the advantages and
Course	Outline	Industry – C	auses ninolo	of variation	s in Qual ication li	ity – Uses mits, Tole runs and	ontrol techniques in of Shewart's Contro rance limits, 3σ
		Quality cont	rol. B trol cl t (R-C	asis of sub p arts variab Chart) , Stan	grouping les:Contro	ol Chart to	its applications in ages and Limitations or Mean (Xbar- Cha art (S-Chart) - Proce

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Control Chart for Number Of Defects Per Unit (U-Chart).

27	Unit III
	Acceptance sampling plans for attributes -Types of Acceptance Sampling plans, Methods of Inspection: 100%  Acceptance Sampling plans, Advantages and
	Inspection and Sampling Inspection,  Limitations of Acceptance Sampling. Terms used in acceptance sampling plans: Lot, Lot Size, Sample Size, Lot Quality, Acceptance Number, Probability of accepting a lot (Pa), Acceptance Quality Level (AQL), Lot Tolerance Percent Defective (LTPD), Producer's Risk, Consumer's Risk, AOQ, AOQL, ATI and ASN.
	Unit-IV Rectifying Sampling Plans. Single and Double sampling plans. OC, AOQ, ATI and ASN curves for Single and Double sampling plans.
	Unit-V Acceptance sampling for variables known and unknown sampling plans (one sided specification only) -Determination of n and k for one
Extended Professional Component (is a part of internal component only, Not to be included in the External Examination question paper)	Questions related to the above topics, from various day examinations UPSC / TRB / NET / UGC - CSIR / GATE / TNPSC / others to be solved (To be discussed during the Tutorial hour)
Skills acquired from this Course	Knowledge, Problem Solving, Analytical ability, Professional Competency, Professional Communication and Transferrable Skill
Recommended Text	<ol> <li>Douglas C. Montgomery (2005): Introduction to Statistical Quality Control, John Wiley &amp; Sons, New York.</li> <li>(Unit V: Chapter 16 (pages 670 to 680)</li> <li>Gupta S.C and V.K.Kapoor (2007): Fundamentals of Applied Statistics, Sultan Chand Sons, New Delhi</li> <li>Mahajan, M (1998): Statistical Quality Control, DhanpatRao. Co, New Delhi.</li> </ol>
Reference Books	<ol> <li>Gupta, R.C.(1974): Statistical Quality Control.</li> <li>Ekambaram, S K. (1963): Statistical basis of Acceptance sampling, Asia Publishing House.</li> <li>Grant, E,L. and Laven Worth, R.S.: Statistical Quality Control McGraw Hill.</li> </ol>
Website and e- Learning Source	e-books, tutorials on MOOC/SWAYAM courses on the subject

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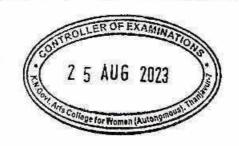
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# Course Learning Outcome (for Mapping with POs and PSOs) Students will be able to

- CLO-1 understand Industrial applications of Statistics
- CLO-2 understand statistical process control and methods for it
- CLO-3 understand attribute and variable control chart and interpret process based on it
- CLO-4 understand the situations using special purpose control charts
- CLO-5 know various product control techniques

CLO-6 To do numerical problems and able to get critical thinking to solve problems To explore real life problems

			To serve and T	2001	PSO5	PSO6	PSO7	PSO8	PSO9
	PSO1	PSO2	PSO3	PSO4	1303		S	s	S
CL01	S	S	S	S	S	S			
		S	S	S	M	S	S	S	
CLO2	S	_ 5			c	M	S	S	S
CLO3	S	S	S	S	3	23M	-	S	M
CLO4	S	S	S	S	S	S	S	3	1.5
			M	М	M	S	M	M	M
CL05	S	S	IVI		- A	S	S	M	M
CL06	S	S	M	S	М			, W-Wea	

CO-PO Mapping (Course Articulation Matrix) S-Strong, M-Medium, W-Weak

	DCO1	PSO2	PSO3	PSO4	PSO5
CO/PO	PSO1	1302	3	3	3
CO1	3	3	3	3	3
CO2	3	3	2	3	3
CO3	3	3	3	3	3
C04	3	3	3	3	
C05	3	3	3	3	15
Weightage	15	15	15	15	. 15
Weighted percentage of Course Contribution to Pos	3.0	3.0	3.0	3.0	3,0

Level of Correlation between PSO's and CO's

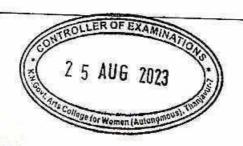


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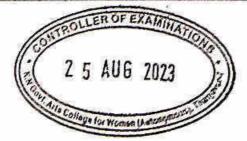
Title of the	Course		on And I	nventory			-	7
Paper Nur	nber	EC VII			3	Cou	rse	23K5SECS7:2
Category	Core	Year	7,000.00	Credits	25.00	Code	В	
10	1	Semest V		1		li li		
	552	er		1	Lab Pr	actice	Tot	al
Instruction	al Hours	Lecture	25520	torial	- W		4	
Per week		3	1			ina da	cribe	the meaning and
Objectives Course	of th	ob	jective of	inventory i	the los	ol of in	vento	ory ventory control.
Course Out		technique, Advantage Simple pr of general	Methors and Li oblems.	odology o mitations o Generation	of simu f simulat of randor bers. Mo	lation, ion. Ev m num	sim ent – bers -	lying simulation models type simulation various method simulation and i
		control - ] - Cost as control. To Model): M	Reasons ssociated he conce fodel: I	for maintain with Inve pt of EOQ  — Derivation	ning Inventories - Determon of EO	entories - Facto inistic O mod	– Ty ors a Inver lel w	cientific Inventory  pes of Inventory  ffecting Inventory  ntory Model (EC)  ith uniform rate  ead time is zero
		Unit III	erminist	OQ model				Shortages :Mod

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Website and e-Learning Source	e-books, tutorials on MOOC/SWAYAM courses on the subject
Reference Books	Kanthi Swarup, Gupta, P.K. & Man Mohan : Operations  Research – Suttan Chand & Sons – New Delhi.
Recommended Text	Kanthi Swarup, Gupta, P.K. & Man Mohan : Operations  Research – Suttan Chand & Sons – New Delhi.
questionpaper) Skillsacquiredfromthis course	Knowledge, Problem Solving, Analytical ability, Professional Competency, Professional Communication and Transferrable Skill
only,Not to be included in theExternalExamination	Questions related to the above topics, from various competitive examinations UPSC / TRB / NET / UGC — CSIR / GATE / TNPSC / others to be solved  (To be discussed during the Tutorial hour)
	Inventory problems with uncertain demand — Determining optimum buffer stock. Systems of Inventory control — Pized order quantity system (O-System), Periodic Review System (P- System) — simple problems. Comparison between O-System and P- System.
	Sporting allowed and lead time is zero - sample problems.  Model : V - Derivation of 1300 model with finite production, shortings allowed and lead time is zero - simple problems.  Unit V
	tinit IV  Deterministic inventory problem with Shortages (Model : IV -
	Model: III - Derivation of EOO model with uniform rate of demand, finite production rate, no shortage and lead time is zero



Course Learning Outcome (for Mapping with POs and PSOs) Students will be able to CLO-1 Distinguish between proper and improper fractions. Express an algebraic fraction as

CLO-2 Demonstrate the knowledge to determine the sums, expansion and approximation of

CLO-3 Solve problems about polynomials with real coefficients, imaginary and irrational roots. Explain the relationship between the derivative of a function as a function and the notion of the derivative.

CLO-5 Obtain the nth derivative in successive differentiation. Apply Euler's theorem on CLO-4 Calculate limits of a function.

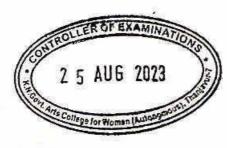
CLO-6 Obtain the mathematical knowledge and skills for the better understanding of statistics homogenous function as a mathematical science

themat	ical scie	ence	100		PEOF	PSO6	PSO7	PSO8	PSO9
	PSO1	PSO2	PSO3	PSO4	PSO5	1000		g	M
		S	М	М	М	S	M		NA.
CLO1	S		9	g	М	S	М	S	M
CLO2	S	S	5	<b>3</b>	0	S	M	S	S
CLO3	S	S	S	M	2	<u> </u>	C	S	M
CLO4	S	S	S	M ·	S	S	0	-	NA
- 10.00		α	М	М	M	S	S	S	M
CLO5	S	3	141	-	М	S	S	M	M
CLO6	S	S	S	S	IVI			1	

CLO-PSO Mapping (Course Articulation Matrix) S-Strong, M-Medium, W-Weak

CLO-PSO Mapping (Course A		PSO2	PSO3	PSO4	PSO5
CO/PO	PSO1	PS02		3	3
	3	1 3	3	- 2	3
CO1	3	3	3	3	
CO2	2	13	3	3	3
CO3	3	12	3	3	3
CO4	3	3			3
	3	3	3	3	- 10
CO5	15	15	15	15	15
Weightage	13				0.0
Weighted percentage of Course Contribution to Pos	3.0	3.0	3.0	3.0	3.0

Level of Correlation between PSO's and CO's



Title of th	e Course	Summer	Inte	rnsni	p – Indust				
Paper Nu	Paper Number		CC- XII			12	Cou	rse 23K51	
The second section is a second	Core	Year	111		Credits	2	Cod	CINCIN:	
	- Control	Semest Er	V					Total	
Instructional Hours		Lecture		Tutorial		LabPractice		10tai	
er week				-					
Pre-requis	ite	90					antibe to the		



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Title of	the Course	Design of Ex	perin	ients				
	Number	Core XIII			Course			23K6S13
WALLSTON OF THE PARTY OF THE PA		Year	ш	Credits	6	Code		
Category	Core	Semester	VI	Tutorial	Lab Pra	actice		Total
Instruct	ional Hours	Lecture	4	2	-			7
	week	5		Lin	ear mode	ls		
Pre-r	equisite	eThe main ob		of this cou	rse are:			
Co	urse	Experiments 2. To b squares, Hy factorial exp	and a uild st per Gr perime	oretical know analysis of varong theoretical know arong theoretication so that it is presented by the property of the property	cal found quares, factoriter and in	ation in O ctrorial an ntra blocks nethodolog	ortho nd fra s, sp gy 3	gonal latin actional lit plot,
Course Outline		Randomizaturit – Methourvature m Unit II Analysistinteraction)	ods of varion of varion	- Fairfield S riance - One altiple range st - Tukey's	on of exp Smith's vi way, Tw test; New test – Tra	erimental ariance la o way, cla	unit w). assif	of experimental as – (Maximum fication (without est – Duncan's – Square root,
		angular and log transformations.  Unit III  Completely Randomized Design (CRD) and its analysis – Randomized block design (RBD) abd uts abaktysus – RBD – More than one but equal number of observations per cell – Latin Square Design (LSD) and its analysis.  Unit-IV  Missing plot techniques – Meaning – Least Square method of estimating one missing observation – RBD and LSD – Two observations missing in RBD and LSD – Analysis of covariance technique in CRD and RBD (without derivation).						
		Unit-V Factorial e	experi	ment – Defi	nition – 2 es of con	$2^2$ , $2^3$ and founding	3 <sup>2</sup> f g – P	actorial experimeration



Extended Professional Component (is a part of internal component only, Not to be included in the External Examination question paper)	Questions related to the above topics, from various competitive examinations UPSC / TRB / NET / UGC – CSIR / GATE / TNPSC / others to be solved (To be discussed during the Tutorial hour)  Knowledge, Problem Solving, Analytical ability, Professional
Skills acquired from this Course	Competency, Professional Communication
Recommended Text	<ol> <li>Das, M.N. and Giri N.C (1979): Design and Analysis of Experiments, Wiley Eastern, New Delhi.</li> <li>Gupta S.C. and Kapoor V.K (2007): Fundamentals of Applied Statistics, Sultan Chand and Sons, New Delhi.</li> </ol>
Reference Books	<ol> <li>Kempthorne, (1956): Design and Analysis of Experiments, John Wiley, New York.</li> <li>Montgomery . D. (1985): Design of Experiments, John Wiley and Sons.</li> </ol>
Website and e- Learning Source	e-books, tutorials on MOOC/SWAYAM courses on the subject

### Course Learning Outcome (for Mapping with POs and PSOs)

Students will be able to

- CLO-1 To understand analysis of variance and experimental designs
- CLO-2 To have strong theoretical knowledge in Orthogonal latin squares, Hyper Graeco Latin squares
- CLO-3 Know factorial and fractional factorial experiments, PIBD, inter and intra blocks, split plot, analysis covariance
- CLO-4 To understand clinical trial concepts and Response surface methodology
- CLO-5To do numerical problems and able to get critical thinking to solve problems
- CLO-6 To choose suitable experiment and do it for real life problems



				PSO9				
PSO1	PSO2	PSO3	PSO4	PSO5		C	S	S
	S	М	S	S			S	S
	S	S	S	М	(\$\)		S	S
	S	S	S	S	M			М
	S	S	М	S	S	-	E HE SA	М
		M	М	М	S	53-71127		М
4		M	S	М	S	S	IVI	1
֡֡֜֜֜֜֜֜֜֜֜֜֜֜֜֜֜֜֜֜֜֜֜֜֜֜֜֜֜֜֜֜֜֜֜֜֜	PSO1 S S S S S S	S S S S S S S S S	S S M S S S S S S S S S S S M	S         S         M         S           S         S         M         S           S         S         S         S           S         S         S         S           S         S         S         M           S         S         M         M           S         S         M         M	S         S         M         S         S           S         S         M         S         S           S         S         S         S         M           S         S         S         S         S           S         S         S         M         S           S         S         M         M         M	PSO1         PSO2         PSO3         TSO3           S         S         M         S         S         S           S         S         S         S         M         S           S         S         S         S         M         S           S         S         S         M         S         S           S         S         M         M         S         S           S         S         M         M         S         M         S	PSO1         PSO2         PSO3         PSO4         TSO5           S         S         M         S         S         S           S         S         S         S         M         S         S           S         S         S         S         M         S         S           S         S         S         M         S         S         S           S         S         M         M         M         S         M           S         S         M         S         M         S         S	PSO1         PSO2         PSO3         PSO4         PSO5         FSO5         FSO5 <th< td=""></th<>

## CO-PO Mapping (Course Articulation Matrix) S-Strong, M-Medium, W-Weak

			DCO2	PSO4	PSO5
	PSO1	PSO2	PSO3	3	3
CO /PO	3	3	3	3	3
CO1		3	3	3	
CO2	3	3	3	3	3
CO3	3	3	3	3	3
CO4	3	3	+ - 2	3	3
C05	3	3	1 - 1 -	15	15
	15	15	15	1.3	
Weightage		8 8	3.0	3.0	3.0
Weighted percentage of Course Contribution to Pos	3.0	3.0	3.0		A AND AND A STATE OF THE STATE

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Level of Correlation between PSO's and CO's

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Title of t	he Course	Demograph	ıy				13			
	Number	Core - XIV	/			Course				
, ape.	.,,,,,,,	Year	Ш		6	Code	23K6S14			
Category	Core	Semester VI		Credits			Total			
L		Lecture		Tutorial	Lab Pr	actice	7			
	onal Hours week	5		2	-					
Pre-re	equisite	eThe main of		of this cou	rse are:	135				
Objectives Cou	of th	1. Learn pol 2. To learn 3. To under 4. To learn	pulation fertility stand L migrati	n and demog and mortali ife table use ion effect	ty measures					
Course Out line		Unit I			civil regi nic data –	istration – methods o	population census of improvements.			
		Unit II  Fertility and mortality measurements – general and specific rates – standardized rates – age pyramid of sex composition gross and net reproduction rates.								
			Unit III  Life table – structure – construction – relationship between the function of a life table – abridged life table – population estimation – growth rates – gross and net reproduction rates component method of population projection – forces of mortality – Gompertz and Makeham's law – logistic curve fitting and its use.							
			Unit-IV Spatial distribution of population – migration – kinds of migration – factors important in migration analysis – migration defining period and boundary – migration data by vital statistics and survival ratio and National Growth rate methods							
		Unit-V Component transition the method of the component transition transiti	ts of pone	opulation gr - Methods or ion, Leslie	owth and of populat matrix, L	l change – tion projection cu	Demographic ction – component rve and its graduation			
ktended Prof	essional	Questions 1	elated	to the abov	e topics,	from vari	ous competitive			
omponent (is		examinatio	ns UP	SC/TRB/	NET / U	GC – CSI	R / GATE / TNPSO			
ternal compo	nent only.	others to be	solve	d						
ot to be inclu	ded in the			during the	Cutorial l	nour)				
ternal Exam	HILLION									

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Skills acquired from this course	Knowledge, Problem Solving, Analytical ability, Professional Competency, Professional Communication and Transferrable Skill
Recommended Text	1. Berclay, G.W.(1959): Techniques of Population Analysis 2. Benjamin, B (1968): Health and Vital Statistics, Allen & Unwin
21	Srivastava, 3. O.S.(1983): A text book of Demography, Vikas Publishing. 4. Bogue, Donald J: Principles of Demography (1976) John Willey, New York  1. Pathak. K.B. and Ram. F (1992): Techniques of Demography
Reference Books	Wiley Eastern.  R (1986): Technical Demography, Wiley Eastern
Website and e-Learning Source	e-books, tutorials on MOOC/SWAYAM courses on the subject

### Course Learning Outcome (for Mapping with POs and PSOs)

Students will be able to

CLO-1 to understand need of population study and its registration system

CLO-2 to understand fertility and mortality effect on population

CLO-3 to understand life table and its usage to real problems

CLO-4 to get effect of migration in population

CLO-5 to understand population growth and its effect

CLO-6: to understand the need of population study for a government

-	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7	PSO8	PSO9
CLO1	S	S	S	S	S	S	S	S	S
CLO2	S	S	S	S	М	S	S	S	S
CLO3	S	S	S	S	S	М	S	S	S
CLO4	S	S	S	S	S	S	S	S	M
CLO5	S	S	М	М	М	S	М	М	М
CLO6	S	S	М	S	M	S	S	M	М

CO-PO Mapping (Course Articulation Matrix) S-Strong, M-Medium, W-Weak



· West of		DCO2	PSO3	PSO4	PSO5
CO/PO	PSO1	PSO2	7 1100	3	3
CO1	3	3	3	3	3
CO2	3	3	3	3	3
CO3	3	3,	3	3	3
CO4	3	3	3	3	3
CO5	3	3	3	15	15
Weightage	15	15	15	13	
Weighted percentage of Course Contribution to Pos	3.0	3.0	3.0	3.0	3.0

Level of Correlation between PSO's and CO's



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Title of the	be Course	Practical - 1	(11 Cor.)			,	Towns and the same
	Number	Core XV (P.				Course Code	25UST CP1
raper	, omize.	Year	111	Credits	6		
Category	Core	Semester	VI		Lab Pr	actice	Total
	and Hours	Lecture		Tutorial			
Instructi	onal Hours week	5		2			

#### Objectives:

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The main objectives of this course are:

- 1. Apply the theoretical concepts and solve the problems based on one missing observation and two missing observations in RBD and LSD.
- 2. Analyse and interpret data for  $2^2$ ,  $2^3$  and factorial experiments by using Yates Algorithm.
- Apply the methods of estimating net migration rates.
- Execute the various fertility measures vources of demographic data.

#### Programming Exercises:

- One Way ANOVA Loading and preparing data, Interpreting the results & Visualizing one way ANOVA.
- Two Way ANOVA Preparing data, performing two way ANOVA . Visualizing two way ANOVA with results.
- 3. Repeated Measures ANOVA- Understanding repeated measures designs, preparing and analyzing data and result.
- 4. Missing plot techniques Estimating One missing observation, Two missing observations in LSD.
- Estimating One missing observation, Two missing observations in RBD.
- Factorial Experiments Analysis of 2<sup>2</sup> factorial experiments using Yates algorithm.
- Analysis of 2<sup>3</sup> factorial experiments using Yates algorithm.
- Analysis of 3<sup>2</sup> factorial experiments.
- 9. Measures of Population size, growth and composition.
- 10. Age sex distribution analysis
- 11. Fertility and mortality analysis
- 12. Demographic Modeling Using Life tables, Modeling fertility and mortality rates.



#### Note:

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5 questions are to be set without omitting any unit. All questions carry equal marks.

Any 3 questions are to be answered in 3 hours duration.

## Examinations Distribution of Marks

75 Marks University Examinations (Written Practical) 25 Marks CIA (Including Practical Record)

100 Marks Total

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K.N.G.A.C. (W) (AUTO)

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Fitle of the Course	Operatio	ns Rese	earch							
Paper Number	Elective	- VIII	Credits	13	Cour	se.	23K5SECS8:1			
Category Core	Year	HE	Creaus	***	Code					
	Semest	VI	1							
	er	1		Lab Pr	actice	Tot	al			
Instructional Hours	Lecture	Lecture Tutorial Lab Practice 7								
Per week	5	2		1						
Pre-requisite	Linear al	gebra		1751100 Talabase						
Objectives of t Course	1. 2. 3. 4. 5.	Trans  Game Repla Netwo	eement probl ork analysis	olems ems						
Course Out line	solution									
	Least	Transportation problem(TP) - TP formulation- North-West Corner, Least cost, Vogel's Approximation method - UV-method - Assignment problem and algorithm.								
		Unit III								
	- Solut	Theory of Games – Basic definition – Maximin and Minimax criterion – Solution of Games with saddle points – Two-by-Two (2x2) Games without saddle point – principle of dominance – problems based on dominance rule – Graphical method for (2xn) and (mx2) games.								
4.3	Unit-I	/			*******	000000				
	mainter constar increas Replac	Replacement problems – Replacement policy for items who maintenance cost increases with time and the value of money remaintenance. Replacement policy for items whose maintenance increases with time and the value of money also changes with time Replacement of items that fail completely – Group replacement policy.								
	Unit-V Constr	Unit-V Network analysis by CPM/PERT: Basic Concept Constraints in Network - Construction of the Network - Tin								
	calcula	itions -	- Concept o	f slack a	and flo	at in	Network Analysis			
			ROLLEROF							



	Network crashing – Finding optimum project duration and minimum project cost.  Questionsrelatedtotheabovetopics, from various competitive examination as UPSC/TRB/NET/UGC-CSIR/GATE/TNPSC/others to be solved advantage of the control
mponent (is a part ofinternal component only, Not to be included in the External Examination	nsUPSC/TRB/NET/UGC Control (Tobediscussedduringthe Tutorialhour)
questionpaper) Skillsacquiredfromthis course	Knowledge, Problem Solving, Analytical ability, Professional Competency, Professional Communication and Transferrable Skill 5. Kanti Swarup, P.K. Gupta and Manmohan (2007) Operations
Recommended Text	<ol> <li>Kanti Swarup, P.K. Gupta and Press.</li> <li>Research, Sultan Chand Sons, New Delhi.</li> <li>S.D. Sharma (2002): Operations Research: Kedarnath and Ramnath, Meerut.</li> <li>J.K. Sharma (2002): Operations Research: Theory and application, Macmillan, India Ltd.</li> </ol>
Reference Books	<ol> <li>Taha: Operations Research, PHI.</li> <li>F.S. Hiller and Liberman (1994): Operations Research, CB Publishers and Distributions, New Delhi.</li> </ol>
Website and e-Learning Source	e-books, tutorials on MOOC/SWAYAM courses on the subject

Course Learning Out come(forMappingwithPOsandPSOs)

#### Studentswill beableto

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- CLO-lunderstand optimization techniques and solving set of equations with constraints
- CLO-2solve problems of linear programming
- CLO-3understand transportation problems and its applications
- CLO-4 solve problems using games theory
- CLO-5 do replacement problems and solve it
- CLO-6do network analysis and get problem solving skills



			1	PSO4	PSO5	PSO6	PSO7	PSO8	PSOS
ANTENNA SANGERA	PSO1	PSO2	PSO3	Lucia		The second second	K2	S	4
CLOI	S	S	M	8	M	2	-	DESCRIPTION OF A	C)
	- Septiment	e e	S	S	M	8	3	2	-
CLO2	Name and Address of the Owner,		e	Q	S	M	S	M	8
CLO3	<u>s</u>	<u>S</u>	5			C.	k.	S	M
CLO <sub>4</sub>	S	S	<u>S</u>	<u>M</u>	5	3	H6-11-110	ra	h.4
CLO5	Q.	S	S	M	M	8	M	7	IV.
CLO6	Fall Estina	S	M	S	М	8	8	M	M

### CO-PO Mapping (Course Articulation Matrix) S-Strong, M-Medium, W-Weak

CO/PO	PSO1	PSO2	PSO3	PSO4	PSO5
COI	3	$-\frac{1}{3}$	3	3	3
C02	3	3	3	3	3
CO3	3	3	3	3	3
CO4	3	3	3	3	3
CO5	3	3	3	3	3
Weightage	15	15	15	15	15
Weighted percentage of Course Contribution to Pos	3.0	3.0	3.0	3.0	3.0

Level of Correlation between PSO's and CO's

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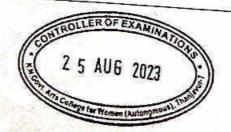
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K.N.G.A.C. (W) (AUTO)

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Title of the C	Course	Bayesian	Inferenc	e				- participant
Paper Numb	The state of the s	Elective \	VIII _		10	Com	ren	23K6SECS8:2
	ore	Year	III	Credits	3	<b>-</b>		20110000
		Semest VI				Core	1	
		er					T	
Instructional	Hours	Lecture	Tut	orial	Lab Pra	etice	Tot	ai
Per week	Lean mak.	5	2		7			
Pre-requisite		Estimation	theory a	nd Distribu	tion theory	r		
Objectives Course	of the	To fle:	develop xibility a	the Bayesiand be able to	an frame v o demonst	vork forate.	or data	a analysis and i
Course Out li		Bay posterior desquared err Unit-II: G Gerestimate in distribution Unit-III: B Bay posterior desorterior desorteri	yesian polistribution for loss (in ENERA) meralization terms of as. Conjugation in the ensity regretal and coefficier	in. Bayes estin 0-1 loss.  LIZTION (  on to convert the postering the priors and in the postering terval estingtions. Interpriors.	or risk. the mation: OF FUNCTION OF FUNCTION OF FUNCTION OF THE PROPERTY OF TH	a prediction and the control of the	s. E. pr rs, ex ION e interpintery	tervals. Highes dence coefficient pretation of the
The state of the s	aj h	Propriate	101111 OI	sting of I the prior o Prior odd's	listribution	for a	pecif Bay	ication of the
		4				3000		



	Unit-V: BAYESIAN FACTORS OF TYPES OF HYPOTHESIS
	PROBLEMS
	Bayes factor for various types of testing hypothesis problems depending upon whether the null hypothesis and the alternative hypothesis are simple or composite.
ExtendedProfessionalCo mponent (is a part ofinternal component only,Not to be included in	Questionsrelatedtotheabovetopics, from various competitive examinations UPSC/TRB/NET/UGC-CSIR/GATE/TNPSC/otherstobesolved (Tobediscussed during the Tutorial hour)
theExternalExamination	
questionpaper)	
Skillsacquiredfromthis	Knowledge, Problem Solving, Analytical ability, Professional Competency, Professional Communication and Transferrable Skill
course Recommended Text	Berger, J.O.: Statistical decision theory and Bayesian analysis, Springler Verlag.
	Robert, C.P. and Casella, G.Monte Carlo : Statistical methods, Springer Verlag.
	Leonard, T. and Hsu, J.S.J.: Bayesian methods, Cambridge University press.
Reference Books	Degroot, M.H.: Optimal statistical decisions, McGraw Hill.
	Bernando, J.M. and Smith, A.F.M. :Baysian theory, John Wiley and sons.
	Robert, C.P.: The Bayesian choice: A decision theoretic motivation, Springer.
A CONTRACTOR OF THE PARTY OF TH	



	e-books, tutorials on MOOC/SWAYAM courses on the subject
Website and	e-books, tutorials on MOOC/S WATAN 5557
e-Learning Source	

Course Learning Outcome (for Mapping with POs and PSOs)

Studentswill beableto

CLO-1understand Industrial applications of Statistics

CLO-2 understand statistical process control and methods for it

CLO-3 understand attribute and variable control chart and interpret process based on it

CLO-4 understand the situations using special purpose controlcharts

CLO-5 know various product control techniques

CLO-6 Todonumericalproblemsandabletoget criticalthinkingtosolveproblems

Toexplorereallifeproblems

	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7	PSO8	PSO9
CL01	S	S	S	s	S	S	S	S	S
CLO2	S	S	s	s	М	S	S	S	S
CLO3	S	S	s	s	s	М	S	s	s
CLO4	S	S	s	S	S	s	S	s	М
CLO5	S	S	М	М	М	S	М	M	М
CLO6	S	s	М	S	М	S	S	М	М

#### CO-PO Mapping (Course Articulation Matrix) S-Strong, M-Medium, W-Weak

CO/PO	PSO1	PSO2	PSO3	PSO4	l noor
CO1	3	3	2	1304	PSO5
CO2	3	1,	3	3	3
C03	2	- <del>  3</del>	3	3	3
C04	3	3	3	3	3
CO5	3	3	3	3	3
	3	3.	3	7	
Weightage	15	15	15	1,5	3
Weighted percentage of	2.0			15	15
Course Contribution to Pos	3.0	3.0	3.0	3.0	3.0

Level of Correlation between PSO's and CO's

2 5 AUG 2023

K.N.G.A.C.(W) (AUTO) THANJAVUR

Title of t	the Course	Introduction	n to R	anguage/ 1	ython		531.504 331.445.6905-51		
	Number	SEC-8	1.0			Course	TANKECE C8		
	voite	Year	III	Credits	2	Code	23K6SSEC8		
Category	Core	Semester	VI		Lab Pr	actice	Total		
Instructi	onal Hours	Lecture	Т	utorial	Labri	actics	2		
	week	2	355546	Ti	1 of D/	Python			
Pre-re	equisite	Upon completing this course, students will be able to:							
A REPORT OF STREET, ST	res of the urse	and analysis implications 2. Insta 3. Impo	elop a re s using F s to othe all and u ort data re basic	egular work R and R Stu rs. se R packat	dio and c ges for sp ety of ext using co	ommunicat ecific appli ernal sourc ntrol and da	e the results and cation.		
Commo	Outline	Operators in Accessing of Creating list Unit – II Datatypes a Built-in fun VectorOper	n R.Crea lata fran ts-Manij nd R Ob ctions. ( ations o eating ar	ating data from the second pulating list objects - Acceptore and Vectors - V	ame-Ope g data fra element pting Inp ctors-Ac /ector Ar	rations on one of the mes from versing lut from key cessing eleration.	board-Important		
	Outme	Matrices-M Statements, statement-if for loop-bre Unit – IV Introduction Operations, Unit – V	atrix tra Loops, else() f ak state to pyth Basic (	nspose.R P - Looping ( unction-sw ment-next s non – Data t Operators.	rogramm Over Nor itch() fur statement ypes, Va	ing Structunvector Sets action-repeat t ariables, Ba	at loop-while loo sic Input – Outpu		
kills acquir Cou	ed from this	Knowledg	ge, Prob	Functions, Tuples, Dictionaries and data Processing.  Knowledge, Problem Solving, Analytical ability, Professional  Competency, Professional Communication and Transferrable Sk					

The

12



References Books	1. Hadley Wickham: "R Packages" Latest Edition - Shroll
	O'Reilly Publisher.  2. Charles Severance: "Python for Everybody: Exploring Data
	in Python 3.

## Course Learning Outcome (for Mapping with POs and PSOs)

Students will be able to

CLO-1 Students will able to install, code and use basic R programming & Python

CLO-2 Describe key terminologies, concepts and techniques employed in statistical analysis

CLO-3 Understand how to write simple coding

CLO-4 Compile and run the program

CLO-5 Interpret the result

	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7	PSO8	PSO9
CLO1	S	S	М	М	М	S	М	S	М
CLO2	S	S	S	S	M	S	M	S	M
CLO3	S	S	S	· м	S	S	M	S	S
CLO4	S	S	S	M	S	S	S	S	М
CLO5	S	S	M	M	М	S	S	S	M

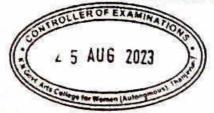
CLO-PSO Mapping (Course Articulation Matrix) S-Strong, M-Medium, W-Weak

CO/PO	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	3	3	3	3	3
CO2	3	3	3	3	3
CO3	3	3	3	3	3
CO4	3	3	3	3	3
CO5	3	3	3	3	3
Weightage	15	15	15	15	15
Weighted percentage of Course Contribution to Pos	3.0	3.0	3.0	3.0	3.0

Level of Correlation between PSO's and CO's

# Allied courses

Fitle of the Course			Allied - Sta	tistics Fo	r Mathema	tics -I
Paper Number	EC -IV					
Category Core	Year Seme	111	Credits	4	Course Code	23K3MECS4:1
lustructional	Lecture	=== (	Tutorial	Lab Pr	ractice	Total
Hours per week	4		- attorias			4
Pre-requisite		*		Basis of St	GIN SUMBASTICATE	
Objectives of the Course	variables, 2. To	probab introdu	ility distribution of the statist	on. ical conce	pts and dev	theory, random elop analytical skills. matical Expectation
Course Outline	Condition Distributi Mathema function ( UNIT II Binomial Application Properties Unit III Skewness Definition Merits an coefficier demerits - Skewness Unit IV Method of Fitting of Unit V C Definition Karl Per coefficier Regression	al proba on func- tical Ex- concept Discr- and Poi ons - Sin s and Aj Measur s - Measur s - Measur s - Measur d demen d demen d demen correlation - Type arson's and - Re- on equat	ability – Randetions – Margin pectation – Mo only) – Tehel ete and Conti- isson Distribut mple Problems oplications - S res of Central an, Median, I rits – Range, Ondard deviation are of Skewness Fitting quare – Fitting Curve and Exp tion and Regress and method correlation of egression line ions.	om variable al and Comment generated by chev's in nuous Distington Protection	e ( discrete nditional Dierating functional Dierating functions nequality - Stributions ivations - Pl distribution olems.  y, Measures ometric measuration, Measures ometric measuration, Measures of Valearson's and ght line and Curves - Singuring correand Spearession coefficient coefficient of valearson's and spearession	rion - Characteristic Simple Problems.  Properties and n - Derivations - s of Dispersion and an , Harmonic mean - ean deviation and their briation - Merits and d Bowley's Coefficient of second degree Parabola, mple Problems.  Ilation - Scatter diagram arman's rank correlatio officients - Properties
Skills acquired from this Course	Professio	ge, Prol nal Con	blem Solving, imunication ar	Analytic nd Transfe	al ability, I rrable Skill	Professional Competency



	1. Gupta S. C and Kapoor V. K (2004), Fundamentals of Mathematical
Legences	1. Gunta S. C and Kapoor V. K (2004), I information of the Statistics (11st edition), Sultan Chand & Sons, New Delhi. Statistics, (11st edition), Sultan Chand & Sons, New Delhi. Statistics, Sultan Chand & Sons, New Delhi. Statistical Methods, Sultan Chand & Sons, New Delhi.
Bniks	
	Delhi. Despi Kapoor V. K (2005), Statistics (7th Edition), Sultan
	Chand & Sons New Delin. T. Craig, Joseph W. McKean, Introduction to
	memerical Sansac Federal Wiley Eastern Ltd., Publishers, New
	Debi.
	and Sons. I amaduation to Probability theory and Mathematical
	Statistics, Wiley Eastern Ltd., Fubilistics Methods, Sultan Chand & Sons
	New Delhi.  O. Vintal P. R. Mathematical Statistics, Margham Publications, Chennai.  Hoel P. G. Introduction to Mathematical Statistics, Asia Publishing
	Horse New Delhi.
Weblinks	House, New Delhi.  Intost//seeing-theory.brown.edu/probability-distributions/index.html  https://www.kullabs.com/classes/subjects/units/lessons/notes/notedetail/9557/  https://www.stat.berkeley.edu/~stark/SticiGui/Text/location.html  https://www.originlab.com/index.aspx?go=Products/Origin/DataAnalysis/Cu
	rveFitting https://www.bmj.com/about-bmj/resources- readers/publications/statisticssquare-one/11-correlation-and-regression

## Course Learning Outcome (for Mapping with POs and PSOs)

Students will be able to
CLO-1 Understand the random experiments in real life
situations CLO-2 Understand the axioms of probability in real
life situations. CLO-3 Compute Bernoulli trials and understand
the rare case population CLO-4 Learn the usage of central
tendencies, dispersion and skewness. CLO-5 Obtain the
relationship between two random variables.



									THE PARTY OF THE P
	7001	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7	PSO8	PSO9
	PSO1	PS02	1505	THE STREET		S	M	S	M
CLO1	S	S	M	M	M				M
CLO2	S	S	S	S	M	S	M	S	IVI
CLO2	٥				S	S	М	S	S
CLO3	S	S	S	М					М
CLO4	S	S	S	M	S	S	S	S	
	100.00			×4	М	S	S	S	M
CLO5	S	S	M	М	IVI	100			

CLO-PSO Mapping (Course Articulation Matrix) S-Strong, M-Medium, W-Weak

	7001	PSO2	PSO3	PSO4	PSO5
CO/PO	PSO1	P302	2	3	3
CO1	3	3 -	3	2	3
CO2	3	3	3	3	2
CO3	3	3	3	3	3
	3	3	3	3	3
C04	- 2	3	3	3	3
CO5	3	15	15	15	15
Weightage	15	13	1.5	13	2000
Weighted percentage of Course Contribution to Pos	3.0	3.0	3.0	3.0	3.0

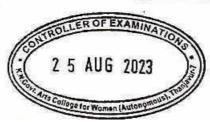
Level of Correlation between PSO's and CO's

CONTROLLER OF EXAMINATIONS

2 5 AUG 2023

HOD OF STATISTICS K.N.G.A.C. (W) (AUTO) THANJAVUR

Fitle of the	Course	. (4)		s and Financial				
	<b>V</b>	Flective -	-IV	(Discipline Spec	cific)	-12		23K3MECS4:2
Paper Nun		Year	II	Credits	4	Cour		
Category Core		Semest	III			Code	3	
	N <sub>E</sub>				LabPra	otice	Tot	al
nstruction	al Hours	Lecture		Tutorial	Labrra	ence	4	7//
Per week	IMI IXVIII	4					(0.00)	
Pre-requis	ite	Basic Ari	thme	ctives of this co				
Course		11	apj To	proximation for solve mathemat	the proble	112 01 14	Tereston	t used numerica natical analysis. ally
	28	expecta probab Binom randon increm	ation ilitie ial p n w nents.		eral rand models	ete Stoo lom W with	chasti valks, state	c Processes, Geometric dependent
		Tools stochast Introduc forward	Ne ic ir ction pric	eded For Op tegration, and to derivatives e, future price. scount bonds.	stochastic : Forward	differ	rentia racts,	l equations. spot price,
		market relation Model with p	ng D ts, pr onship ls in period	erivatives: Arbit icing futures, pu p between strike Finance: Disci I one. Models in Fi	nt-call pari e price and rete time	ty for l d option process	Europ n pric s- bin	ean options, e. Stochastic omial model



	options, Hedging portfolios: Delta, Gamma and Theta hedging. Binomial Model for European options: Cox-Ross- Rubinstein approach to option pricing, Discrete dividends.  Rubinstein approach to option pricing, Discrete dividends.  UNIT V Solution of Simultaneous Linear Algebraic Equations: Guass - Elimination Method, Guass - Jordan Method, Guass - Jacobi Method, Elimination Method, Guass - Jordan Method, Guass - Interpolation
	Guass —Seidel Method, Fine 1911-64 for Equal intervals: Newton's Forward Interpolation Formula and Newton's Backward Interpolation Formula, Evaluation of missing torms
Component (is a part of internal component only, Not to be included in the External Examination	Questionsrelatedtotheabovetopics, from various competitive examinations of the state of the stat
Question paper) Skills acquired from this	Knowledge, Problem Solving, Analytical ability, Professional
Course Recommended Text	Competency, Professional Communication and Transferrable Skill  1. Kandasamy, P., Thilagavathy, K. (2003): Calculus of Finite Differences and Numerical Analysis, S.Chand Publications.  2. Balasubramaniam and Venkatraman(1972): Numerical mathematics part I and II by Rochouse and Sons
Reference Books	<ol> <li>Kalavathy, S., and Thomson. (2004): Numerical Methods, Vijay Nico::le Publications.</li> <li>Gupta, B.D. (2004): Numerical Analysis, Konark Publications.</li> <li>Venkatachalapathy, S.G. (2004): Calculus of Finite Differences and Numerical Analysis, Margam Publications.</li> <li>Gerald Wheatley, (1970): Applied Numerical Analysis, Pearson Education Publications.</li> <li>Jain, M.K., Iyengar, S.R., Jain, R.K., (1994): Numerical Methods Problems and Solutions, New Age International Publishers.</li> </ol>
Website and e-Learning Source	e-books, tutorials on MOOC/SWAYAM courses on the subject  www.nptel.com

CourseLearningOutcome(forMappingwithPOsandPSOs)

Studentswill beableto



- CLO-1Solve numerically equations that cannot have direct solution
- C1.O-2solve system of linear equations
- CLO-3understand the need of interpolation
- CLO-4 handle numerical differentiation
- CLO-5 do integration numerically
- CLO-6 get a foundation on algorithms to solve a mathematical problem

		necess	PSO3	PSO4	PSO5	PSO6	PSO7	PSO8	PSO9
****	PSO1	PSO2	1503	N. 4	М	S	S	S	M
CLO1	We to the same of	<u>S</u>	G G	C C	M	S	S	S	M
CLO2	-	8	5	2	C C	M	S	S	M
CLO3	ALCOHOL: NAME OF TAXABLE PARTY.	8	8	M	<u> </u>	C C	k	K!	М
CLO4	<u>s</u>	8	S	M	8	2	0	6	M
CLO <sub>5</sub>	S	S	М	M	M	8	5	3	N. f
CLO6	S	M	M	S	M	S	S	S	IVI

#### CO-PO Mapping (Course Articulation Matrix) S-Strong, M-Medium, W-Weak

CO/PO	PSO1	PSO2	PSO3	PSO4	PSO5
COL	3	3	3	3	3
CO2	3	3	3	3	3
CO3	3	3	3	3	3
CO4	3	3	3	3	3
CO5	3	3	3	3	3
Weightage	15	15	15	15	15
Weighted percentage of Course Contribution to Pos	3.0	3.0	3.0	3.0	3.0

Level of Correlation between PSO's and CO's

2 5 AUG 2023

M.G.A.C. (W) (AUTO) THANJAVUR

1			Allie	d – Statistics	For Math	ematics - I	I Practical
Title of the	e Cours	iel			<del></del>		
Paper No	umber	EC-V				Course	23K4MECS5P
	2317	Year	11	Credits	2	Code	23K4WEC55
Category	Core	Semester	IV		Lab Pr	ontice	Total
Instruct	ional	Lecture	7	Tutorial	Lab Fr	actice	2
Hou per we	rs	2		7 <b>-</b> 2		i alumi	related to various
Objectives Cours	of the	activities lik	e proc	duction, consi	umpuon, e.		s related to various bank transactions,
		Computat (absolute an UNIT – II (	ion of d relat Curve	Measures of	central re i) -Coeffici	ent of Ske	wness. and second degree
Course Ou	tline	UNIT – III Distributio Normal distr  UNIT – IV Computatior	Theorems — Fribution  Corre	retical Distri Fitting of Bin on – Testing t	butions omial distr he Goodne cegression co-efficier	ibution, Poss of fit.	oisson distributions and
95	L P S	arge sample roportions a mall sample	tests e tests tests	fference of I with regard	to Mean, I Proportions to Mean, I	Difference 5. Difference	between Means, between Means and ence of attributes.

Note:

Question Paper Setting:

5 questions are to be set without omitting any unit. All questions carry equal marks. Any 3 questions are to be answered in 3 hours duration.

#### **Examinations Distribution of Marks**

University Examinations (Written Practical) CIA (Including Practical Record)

25 Marks 100 Marks

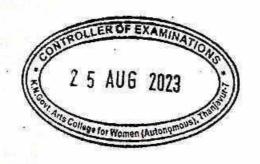
75 Marks

Total

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OF STATISTICS
KNG.A.C. (W) (AUTO)
THANJAVUR

Title of the	Course	e	Λ	Allied – Stati	stics For IV	Tathematic.	
Paper Ni	ımber	EC-VI			· ·	Course	23K4MECS6:1
Category Con		Year	IV	Credits	3	Code	23K4WEC50.1
Cittegory	Core	Semester		utorial	Lab Pra	ctice	Total
Instruct		Lecture	<u>1</u>	utoriai			4
Hour per we		4			8-25-8		
Pre-requ	Water Committee			В	asis of Stati	stics	for estimating
Objectives Course	2	unknown pa 2. To in chisquare te	ntroduc st	timetica			nesis, significance and t Estimation —
Course Out	line an Po U Sa M Sin Ex	Maximum like f these esting INIT – III Toncept of Stand Alternation of a templing distriction, Different mple Problem IT – V Temple sact sample	relihoo nators - Test of tatistica ve Hyp st - Ne test of ributio ence of ems. st of Si test b Correl	- Interval esti Significance al Hypothesis othesis – Cri yman-Pearso Significance n – Standard Means, Prop ignificance ( pased on 't' ation coeffic	MLE) and I mation (constical region on Lemma.  (Large Salerror – Largortions and Small Sandard F. Di	Methods of neept only).  and Compose — Type I are  mple Tests ge sample and Difference  uple Tests) stributions	site Hypothesis – Null and Type II Errors –  tests with regard to e of Proportions –
cills acqu from this Course	iredKn	owledge, P	robler		Analytical d Transfer	ability, Prorable Skill	ofessional Competenc



References Books	New Delhi.  3. Goon A M, Gupta M K, Das Gupta B: Fundamentals of Statistics (Vol.), The World Press Pvt. Ltd., Kolkata.  4. Mood A. M, Graybill F, A and Boes D. C (1983), Introduction to the
	theory of Statistics, McGraw Hill, New Delhi.  Sancheti, D. C. and Kapoor, V. K. Statistics (7th Edition), Sultan Chand & Sons, New Delhi.  Snedecor G.W and Cochran W.G., Statistical Methods, Oxford Press and IBH.  Agarwal B. L, Basic Statistics, Wiley Eastern Ltd., Publishers, New Delhi.  Arora P. N, Comprehensive Statistical Methods, Sultan Chand & Sons, New Delhi.  Vittal P. R, Mathematical Statistics, Margham Publications, Chennai.  Robert V. Hogg, Elliot A. Tanis, Probability and statistical inference, Macmillan.
	http://www.sjsu.edu/faculty/gerstman/StatPrimer/estimation.pdf https://www.tutorialspoint.com/statistics/ https://www.statisticshowto.datasciencecentral.com/ https://www.investopedia.com/terms/c/chi-square-statistic.asp http://onlinestatbook.com/2/introduction/inferential.html

Course Learning Outcome (for Mapping with POs and

PSOs) Students will be able to

CLO-1 Know the importance of good estimators.

CLO-2 understand the importance of maximum likelihood estimator CLO-3 know the difference types of estimators Cramer

Rao inequality. CLO-4 Learn the importance of statistical hypothesis for large samples.

CLO-5 Learn the importance of statistical hypothesis for small samples.

S	Sawiy			PSO6	PSO7	PSO8	PSO9
200 S	M	M	М	S	М	S	М
S	S	S	М	S	М	S	M
S	S	М	S	S	М		
S	S	M	S		T- 100 - 100	Cons.	S
S	M	M			-1-	- S	M
	S	S S	S S M	S S M S S M S	S S M S S S M S S	S S M S S M S S S S S	S         S         M         S         S         M         S           S         S         M         S         S         S         S



CLO-PSO Mapping (Course Articulation Matrix) S-Strong, M-Medium, W-

CLO-PSO Mapping (Course Weak	PSO1	PSO2	PSO3	PSO4	3
CO/PO	1301	3	3	3	3
CO1	$\frac{3}{3}$	3	3	3	3
CO2	$\frac{3}{3}$	3	3	3	3
CO3	$\frac{3}{2}$	3	3	3	3
CO4	- 3	3	3	3	15
CO5	15	15	15	15	ļ
Weightage		B W.	3.0	3.0	3.0
Weighted percentage of Course Contribution to Pos	3.0	3.0	3.0	हमागळ () <u>() () () () () () () () () () () () () (</u>	

Level of Correlation between PSO's and CO's

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HOD OF STATISTICS HOD OF STATISTICS K.N.G.A.C. (W) (AUTO) K.N.G.A.C. (W) (AUTO)

Title of	he Course	Actuarial Sta	itistics				100 100 100 100 100 100 100 100 100 100			
	Number	EC - VI		· · · · · · · · · · · · · · · · · · ·	The same of the sa	Course	e TOWNECSO			
Paper	Number	Year	II	Credits	3	Code	MANUTUCOS.			
Category	Core	Semester	IV	Energy Main	1510-9	5.400000000	Total			
T .4	onal Hours	Lecture		<b>Futorial</b>	Lab Pra	letice	4			
1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	week	4	The second		***	حلاحات				
The second second	-th-line and the state of the s	40 K	ALC: The state of	Basi	c arithmeti	C				
a selection of	quisite	The main obje	ectives	of this course	e are:					
Objectives of the Course		<ol> <li>It develops a greater understanding of statistical principles and their application in actuarial statistics.</li> <li>Describe the core areas of actuarial practice and relate to those areas actuarial principles, theories and models.</li> <li>It gives the understanding of the application knowledge of the life</li> </ol>								
Course	Outline	insurance environment.  Unit I  Simple and compound interest, present value and accumulated values of fixed rate, varying rate of interest								
5 * 23	* 2		Annuities: Endowments, Annuities, Accumulations, Assurances, Family income benefits.  Unit III Policy Values: Surrender values and paid up policies, industrial assurances, Joint life and last survivorship, premiums.							
	•	tables. Pension pensions, benet Unit-V Principles of in	funds: fits dep surance surance	Capital sum endent on m	s on retirer arriage. wment. wh	ment and	ances. Decrement death, widow's ssurance, Net al premium under			
tended Professional mponent (is a part of ernal component only, t to be included in the ternal Examination estion paper)		Questions relate	ed to the PSC / be solve	TRB / NET , ved	/UGC – C	arious co SIR / GA	mpetitive ATE / TNPSC / I A			
Skills acquired Cours		Knowledge Competency	, Prob	em Solving,	Analytica	al ability,	Professional ransferrable Skill			



Recommended Text	1. Hooker, P.P., Longley, L.HCook (1957): Life and other contingencing Cambridge.  2. Alistnir Neill(1977): Life contingencies, Heinemann professions
Reference Books	<ol> <li>Alistair Neill(1977): Life contagences, publishing.</li> <li>Gupta and Kapoor (2001) Fundamentals of Applied Statistics</li> <li>Study material of IAI/IFoA of Actuarial Societies</li> <li>Hosack, LB., Pollard, LH. and Zehnwirth, B.(1999): introductory statistics with applications in general insurance, Cambridge University.</li> <li>c-books, tutorials on MOOC/SWAYAM courses on the subject</li> </ol>
Website and c- Learning Source	c-books, linorials on Woods and

Course Learning Outcome (for Mapping with POs and

PSOs)

Students will be able to

CLO1: To explain the utility theory and insurance terminologies.

CLO2: To articulate the insurance and annuity benefits through multiple life functions evaluation for special mortality laws.

CLO3: To describe the various types of premium and their numerical evaluations.

CLO4: To explain implementation of the Life insurance policies.

CLO5: To describe Insurance payable at the moment of death and at the end of the year of death-level benefit insurance.

CLO6: To understand real life problems related to insurance

	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7	PSO8	PSO9
CL01	S	S	М	S	М	S	S	S	S
CLO2	S	S	S	S	М	S	S	S	S
CLO3	S	S	S	М	S	М	S	S	M
CLO4	S	S	S	М	S	S	S	S	М
CLO5	S	S	S	М	М	S	S	S	M
CLO6	S	М	М	S	М	S	S	S	М

CO-PO Mapping (Course Articulation Matrix) S-Strong, M-Medium, W-Weak



CO/PO	PSO1	PSO2	PSO3	PSO4	PSO5
C01	3	3	3	3	3
CO2	3	3	3	3	3
C03	3	3	3	3	3
CO4	3	3	3	- 3	3
CO5	3	3	3	3	3
Weightage	15	15	15	15	15
Weighted percentage of Course Contribution to Pos	3.0	3.0	3.0	3.0	3.0

Level of Correlation between PSO's and CO's

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HOD OF STATISTIES K.N.G.A.C. (W) (AUFO) THANJAVUR

	SEMESTER -III									
	Skill Enhancement Course SEC-6									
	TISTICAL APPLICATIONS FOR GEOGRAPHY -1- 23K3	GECS4:1								
STA	TISTICAL APPLICATIONS FOR GEOGRAM									
	TEACHING HOURS: 4		· · · · · · · · · · · · · · · · · · ·							
TINITE!	WAR COUNTY I CO	1132								
UNIT	me wite the basic knowledge of data of									
CO1	To understand Inc need of bank									
CO2	To understand the need of basic statistical methods  To understand the need of basic statistical methods  To get the knowledge diagrammatic representation of statistical methods  To explore the basic knowledge of Time series and moving average  To explore the basic knowledge of statistical analysis									
CO3	To explore the basic knowledge of Time series and moving	- 300								
CO4	To explore the basic knowledge of statistical analysis  To acquire the knowledge of statistical analysis									
CO5	A gasement Unit	NO. OF	COURSE							
CO6	DETAILS	HOURS	OBJECTIVES:							
UNIT	tit I tobles									
	Collection of data and formation of statistical tables-	12	COI							
I	Importance of cross tabulation-									
1	Importance of cross tabulary	- Hiller Salawie Ersc								
II	Measures of Central Tendency: Mean- Median- Mode-	12	CO2							
	Measures of Central Tendency: Mean Deviation- Measures of Dispersion: Range- Mean Deviation- Measures of Dispersion: Range- Mean Deviation-									
	Standard Deviation-Rank Contraction									
	Variation.									
	Variation.  Diagrammatic Representation of Data- Bar, Histogram –	12	CO3							
	Frequency Polygon and Curve - Ogives- Lorenz Curve-	12								
111										
	Gini Coefficient	X 28 - 2								
	Time Series - Graphical Method - Semi Average -	12	CO4							
IV		Blakes	- 21-							
### R	Moving Average.									
	Hypothesis Testing - 'T' Test - 'F' Test - Chi-Square	12	CO5							
V	Test.	\$257E								
2752										
VI	Assessment Unit  LEARNING OUTCOMES	0								
UNIT	C.L collection and its source	es Samolii	ng is very							
	Understands the Purposes of data confection and its source	d the purpo	se of the study.							
	Understands the Purposes of data confection and its sources of the study.  essential to choose according to the types of data types and the purpose of the study.  Understands of facts of hypothesis testing and need of hypotheses in research									
	Understands of facts of hypothesis testing and need of hypotheses in research analysis. Explore the types of hypothesis and its significance and confidence level.									
	analysis. Explore the types of hypothesis and its significance and confidence is									
	Examine the relationship between Farametric and Policy of Variable 1. Chi aguera test "C" test "E" test Analysis of Vari	Examine the relationship between Parametric and Non-parametric procedures through Chi-square test, 'T' test, 'F' test, Analysis of Variance (ANOVA).								
in the second	through Chi-square test, 1 test, 1 test, 7 tes	A								
VI	Assessment Unit TEXT BOOK:									



HOD A.C. (W) (AUTO)

	I Destinal Geography Books and Allied pyt Ltd.
1	SahaPijushkanti (2010): Advanced Practical Geography, Books and Allied pvt Ltd.
2	Parulia A M (2006): Practical Geography, Anmol Publishers.
/2500	Zulfequar Ahmed Khan M.D (1997): Text book of Practical Geography, Concept
3	Zullequar Anmed Khaii W.B (1997).
	Publishing Company, New Delhi.
WEB SC	OURCE: Letien methods statistics/
1	http://www.albert.io/blog/data-collection-methods-statistics/
2	http://www.albert.io/blog/data-confection-methods/second-methods/s

	PO											
CO/PO/PSO	I Disp knowledge and skill	2 Skilled communicator	3 critical thinker and problem solver	4 Sense of inquiry	5 Team player/worker	6 Skilled project manager	7 Digitally efficient	8 Ethical awareness/ reasoning	9 National and International perspective	10 Lifelong learners		
CO1	3	2	1	2	1		2	1	1	2		
CO2	3	2	1	2	1	I	2	1	1	2		
CO3	3	2	1	2	2	3	2	1	1	2		
CO4	3	2	1	3	1	1	2	1	1	2		
CO5	3	2	2	3	1	3	2	1	2	2		
Copc5635 CO/PO/PSO	3	2	1	2	1	2	2	1	1	2		
Pc5635 Average Correlation Average	3	2	1	2	1	2	2	1	1	2		



	APPLIED STATISTICS - I -23K3C TEACHING HOURS : 4	1937 (S. 1937)	
UNIT	To acquire the basic knowledge of data collection  To acquire the basic knowledge statistical methods		
CO1	to bourge vnottledge of car		ds.
CO2	I m Jamatana Tille Hood Or At Cialle	tical metho	ids
CO3	To acquire the basic knowledge of basic statistical methods  To understand the need of basic statistical methods  To get the knowledge diagrammatic representation of statis  To explore the basic knowledge of Time series and movin  To explore the basic knowledge of statistical analysis	g average	
CO4	To explore the basic knowledge of Time services	568	
CO5	To acquire the knowledge of		COURSE
C06	1 4 coment   Inii	NO. OF	COURSE
UNIT	ASSESSMENT OM DETAILS	HOURS	OBJECTIVES
I	Census method – sampling method, Non – probability sampling – Judgement sampling, Quota sampling – advantages and disadvantages, probability sampling – Simple random sampling, stratified random sampling, systematic sampling – sampling errors.	12	COI
п	Vital statistics – Definition – Methods Fertility – crude birth rate, specific birth rate, general birth rate, total fertility rate, gross reproduction rate and Net reproduction rate – problems. Mortality – crude death	12	CO2
ш	Eigen values and Eigen vectors – power of matrix,  Inverse of matrix – Cayley Hamilton – theorem  (without proof) – simple problems	12	CO3
IV	Algebra — Binomial theorem — Expansion of rational fractions, summation of the series, approximation Exponential series — expansion — summation of the series — logarithmic series — summation of the series— simple problems.	5.	CO4
V	Matrices - Definition, Types of Matrices - Operations of matrices, Hamilton matrix, Orthogonal matrix, Rank matrix. System of linear equations - Consistency - no homogeneous linear equations, homogeneous linear equations, simple problems.	of 12 n-	CO5
VI	Assessment Unit	_	
/1505/6		rc.	
UNIT	LEARNING OUTCOM	ES	



	Understands of facts of hypothesis testing and need of hypotheses in research analysis. Explore the types of hypothesis and its significance and confidence level.  Examine the relationship between Parametric and Non-parametric procedures through Chi-square test, 'T' test, 'F' test, Analysis of Variance (ANOVA).
VI	Assessment Unit
Text Books and Reference	<ol> <li>Singaravelu – Allied Mathematics – (paper II) (1998)</li> <li>S.P. Gupa – Statistical Methods (Revised Edition 2001)</li> <li>S.P. Gupta – Fundamental of Applied Statistics.</li> </ol>
1	SahaPijushkanti (2010): Advanced Practical Geography, Books and Allied pvt Ltd.
2	Bagulia A.M (2006): Practical Geography, Anmol Publishers.
3	Zulfequar Ahmed Khan M.D (1997): Text book of Practical Geography, Concept Publishing Company, New Delhi.
WEB SO	URCE:
1	http://www.albert.io/blog/data-collection-methods-statistics/
2	http://sciencing.com/difference-between-cluster-factor-analysis-8175078.html

15k9						PO	91			
CO/PO/PSO	1 Dispknowledge and skill	2 Skilled	3 critical thinker and probl	4 Sense of	5 Team. player/worker	6 Skilled project manager	7 Digitally efficient	8 E	9 National and Interna tional perspe	10 Lifelong learners
CO1	3	2	1	2	1	1	2	1	1	2
CO2	3	2	1	2	1	1	2	1	<b>S</b> [[]	2
CO3	3	2	1	2	- 2	3	2	1	1	2
CO4	3	2	1	3	1	I	2	1	1	2
CO5	3	2	2	3	1	3	2	1	2	2
Copc5635	3	2	1	2	1	2	2	ī	İ	2
Pc5635 Average Correlation Average	3	2	Ĭ.	2	I	2	2	1	1	2

HIN.G.A.C. (W) (AUTO)
THANJAVUR

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	SEMESTER –IV		1011011			
	Skill Enhancement CourseSEC-6					
TATISTI	CAL APPLICATIONS FOR GEOGRAPHY PRACTICAL	AL-II -				
	23K4GECS5P (Calculator Based)					
UNIT	TEACHING HOURS: 2					
CO1	LEARNING OBJECTIVES					
CO2	To acquire the basic knowledge of data collection To understand the need of basic statistical methods	2000 W.Comp = 0				
CO3		-tiItl				
CO4	To get the knowledge diagrammatic representation of statis  To explore the basic knowledge of Time series and movin	stical metho	ods			
CO5	To acquire the knowledge of statistical analysis	g average				
CO6	Assessment Unit		7-10-1			
UNIT	DETAILS	NO. OF	COURSE			
_	DETRIES	HOURS	OBJECTIVES			
500 State 5 do	Diagrammatic Representation of Data- Bar, Histogram -	HOURS	OBSECTIVES			
I		12	COI			
	Frequency Polygon and Curve - Ogives- Lorenz Curve-					
	Gini Coefficient					
	Measures of Central Tendency: Mean- Median- Mode-					
П	Measures of Dispersion: Range-Mean Deviation-	10				
	Standard Deviation-Rank Correlation- Coefficient of	12	CO2			
	Variation.					
	Karl Pearson's - Bowley's - methods. Correlation and					
m	Rank Correlation- Coefficient of Variation.					
	Wood Company of the C	12	CO3			
180,1885	Time Series - Graphical Method - Semi Average -		2 2 2			
IV	Moving Average.	12				
****		1	CO4			
	Hypothesis Testing - 'T' Test - 'F' Test - Chi-Square		1			
V	Test. Analysis of Variance(ANOVA)	12				
VI		12	CO5			
Y L	Assessment Unit		+			
	Understande the P	9				
	Chucialania ine Phraoces af I		18 / -			
	essential to choose according to the types of data types a  Understands of facts of hypothesis testing and need of	nd the num	ling is very			
28 - 7	Understands of facts of hypothesis testing and need of analysis. Explore the types of hypothesis and its significant	hypoth	oose of the study			
	analysis. Explore the types of hypothesis and its signific	nypoineses	in research			
	analysis. Explore the types of hypothesis and its signific Examine the relationship between Parametric and Non-through Chi-square test, 'T' test, 'F' test, Analysis of Vi	ance and co	ontidence level.			
VI	through Chi-square test, 'T' test, 'F' test, Analysis of Va Assessment Unit	parametric	procedures			
	Assessment Unit	mance (A)	NOVA).			



						PC	)			Ψ
CO/PO/PSO	l Disp knowledge and skill	2 Skilled communicator	3 critical thinker and problem solver	4 Sense of inquiry	5 Team playenworker	6 Skilled project manager	7 Digitally efficient	8 Emical awareness reasoning	9 National and International perspective	10 Lifelong leamers
COI	3	2	1	2	1	1	2	i i	j.	2
CO2	3	2	T.	2	1	1	2	1	1	2
CO3	3	2	ī	2	2	3	2	1	T.	2
CO4	3	2	1	3	1	1	2	1	1	2
COS	3	2	2	3	1	3	2	1	2	2
Cope5635 CO/PO/PSO Pc5635 Average	3	2	T.	2	t.	2	2	1	1 (0)	2
Correlation Average										

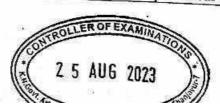
HOD OF STATISTICS

N.N.G.A.C. (W) (AUTO)

THANJAVUR



K = 12 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	SEMESTER-IV		
	Chill Enhancement Course SEC-6	10.1	
15	EARCH ANALYTICAL TECHNIQUES - III - 23K4G	ECS6:1	
RES	EARCH ANALYTICAL TECHNIQUES - III		
	TEACHING HOURS ; ·		
UNIT	To understand the need of data sources and significance of	sampling in	n research.
CO1	To understand the need of data sources and significance of	g and also	parametric and
CO2	To have empirical knowledge on types of types		
0.0000000000000000000000000000000000000	non-parametric		12 12 12 12 1
CO3		al Research	
CO4	To assess the need for multivariate analysis in Google To design and thorough understanding in trend surface and	models	
COS	Assessment Unit		GOVIDGE
C06	DETAILS	NO. OF	COURSE
UNIT	DETAILS	HOURS	OBJECTIVES
1	Data Collection - Data Sources - Data Types - Primary, Secondary - Sampling - Simple Random - Stratified - Nesting.	12	CO1
П	Hypothesis Testing – Needs and Types of hypothesis – Goodness of fit and significance and confidence levels – Parametric and Non – Parametric procedures: Chi – square test, 't' test, 'F' test, Analysis of Variance(ANOVA)	12	CO2
m	Bivariate Analysis: Scatter diagram – Simple linear – Spearman's Rank and Product Moment Correlation Coefficients, Regression – Residuals and their Mapping.	12	CO3
IV	Multivariate Analysis: Basic Principles and elements of Factor Analysis – Principal – Cluster Analysis.	12	CO4
V	Trend Surface and Models: Gravity Models – Population Potential – Index of Concentration – Growth rate Scalogram.	12	CO5
VI	Assessment Unit		1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 -
UNIT	LEARNING OUTCOMES		
1	Understands the Purposes of data collection and its sourcessential to choose according to the types of data types ar	ces. Sampl	000 - 641 1
п	analysis. Explore the types of hypothesis and its significant Examine the relationship between Parametric and Non-performing through Chi-square test. 'T' test 'E' test. A polysical for the square test.	ypotheses nce and co arametric	in research nfidence level. procedures
ш	Understands Bivariate Analysis, and methods to be follo economic data analysis through scatted diagrams, simple		



VALUE -	correlation and product moment correlation coefficients and residuals and their mapping.
IV	mapping.  Multivariate Analysis and Explore the basic Principles and elements of Factors  Analysis, apply factor analysis in SPSS (principal component analysis for a set of population data based to acquire the knowledge for data analysis and interpretation.
VI	Assessment Unit TEXT BOOK:

						PC	)		- <u> </u>	
CO/PO/PSO	1 Disp knowledge and skill	2 Skilled communicator	3 critical thinker and problem solver	4 Sense of inquiry	5 Team player/worker	6 Skilled project manager	7 Digitally efficient	8 Ethical awareness/ reasoning	9 National and International perspective	10 Lifelong learners
COI	3	2	1	2	Í	1	2	1	1	2
CO2	3	2	1	2	1	1	2	1	1	2
CO3	3	2	1	2	2	3	2	1	1	2
CO4	3	2	1	3	1	1	2	I	j	2
CO5	3	2	2	3	1	3	2	1	2	2
Cope5635 CO/PO/PSO	3	2	1.	2	1	2	2	1	1	2
Pc5635 Average Correlation Average	3	2	I	2	1	2	2	I	1	2
	1	TINET		SE	MESTI	ER –III	,			

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FING A.C. (M) (AUTO)
THANJAVUR

	SEMESTER -IV		
	Skill Enhancement Course SEC-6		115 3H
	APPLIED STATISTICS – III – 23K4	GECS6:2	
	TEACHING HOURS: 4		
UNIT	on in course		•
CO1	to a to the send at an attrophic of S	ampling in	research.
CO2	To understand the need of data sources and significance of sources are sources and significance of sources and significance of sources are sources are sources and significance of sources are sources and significance of sources are sources are sources and significance of sources are sources are sources are sources.	and also pa	rametric and non-
	parametric		
CO3	To have depth understanding on the bivariate analysis	Dagaarah	
CO4	To assess the need for multivariate analysis in Geographical	Research	
CO5	To design and thorough understanding in trend surface and n	nodels	
CO6	Assessment Unit	NO OF	COURSE
UNIT	DETAILS	NO. OF HOURS	OBJECTIVES
1	Analysis of Time series – uses, components of time series, measurements of trend – Free hand method, Semi – average method moving Average method and Method of least squares – Problems.	12	COI
п	Business forecasting: steps in methods of forecasting, choice of forecasting – theories of business forecasting.	12	CO2
III leidhigh	Integration — Definition. Important results (simple problems). Integration by the method of substitution (9 important formulas). Trigonometric Substitution- simple problems.	12	CO3
IV	Integration of Rational algebraic function. Type I $\int P(x)/Q(x)$ - problems. Integration by the method of	12	CO4
	partial fractions- Simple problems. Type II – partial fractions. Type III – $\int \frac{dx}{ax + bx + c}$ and simple problems.		
a partie	Reduction formula for		
Y	∫sin <sup>n</sup> xdx,∫cos <sup>n</sup> xdx,∫sin <sup>m</sup> xcox <sup>n</sup> xdx,∫tan <sup>n</sup> xdx - simple problems.	12	CO5
VI	Assessment Unit		
NIT			10
	LEARNING OUTCOMES		<u> </u>



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1	Understands the Purposes of data collection and its sources. Sampling is very ensential to choose according to the types of data types and the purpose of the study.
п	Understands of facts of hypothesis testing and need of hypotheses in research analysis. Explore the types of hypothesis and its significance and confidence level.  Examine the relationship between Parametric and Non-parametric procedures through Chi-square test, "I" test, "I" test, Analysis of Variance (ANOVA).
ш	Understands Hivariate Analysis, and methods to be followed to analyses for socio economic data analysis through scatted diagrams, simple linear and regression, Rank correlation and product moment correlation coefficients and residuals and their mapping.
17	Multivariate Analysis and Explore the basic Principles and elements of Factors Analysis, apply factor analysis in SPSS (principal component analysis for a set of population data based to acquire the knowledge for data analysis and interpretation.
VI	Assessment Unit
Fext Books and Reference	<ol> <li>Calculus Vol-II, S.Narayanan, T.K.Manicavachagom Pillay(2010).</li> <li>A. Singaravelu – Allied Mathematics – I (2002).</li> <li>S.P.Gupta – StatisticalMethods (Revised Edition 2001).</li> </ol>

	7000					PO		,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,		
СОДРОДРЅО	1 Disp inowheigh and skill	2 SEDed	3 critical tricker and pro	4 Sense of inquiry	5 Team playerworker	6 Skilled project manager	7 Digitally efficient	S T	9 National and Intern ation al	10 Lifelong learners
COL	3	2	1	2	1	1	2	ı	I	2
CO2	3	2	1	2	1		2	1	1	2
CO3	3	2	1	2	2	3	2	1	1	2
CO4	3	2	T I	3	1	1	2	1	- <u>i</u>	
CO5	3	2	2	3	1	3	2	1		2
Cope5635	3	2	1	2		- 2	2	124	2	2
CO/PO/PSO Pc5635 Average Correlation Average	3	2	1	2	ľ	2	2	1	1 L	2



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	T									Marks	
Subject Code	Credits Category T L L D O							Inst. Hours	CIA	External	Total
23K3BBECBB3:1	(EC-III)						3	4	25	75	100
	Learning Objectives										
	Vine 21 (2017) 4500 A 1 (1 (1 (1 (1 (1 (1 (1 (1 (1 (1 (1 (1 (			200						- A	
CLO1	Apply the Measures of Central Te	endend	cy i	n bı	ısin	ess					
CLO2	Understanding the Measures of	Varia	atio	n							
CLO3	Analyze of Time Series										2
CLO4	Understand Index Numbers and S	tatisti	cal	qua	lity	COI	ntro			11-	
CLO5	Testing of hypothesis										
UNIT	Details							No. of Hours		Learning Objectives	
	Introduction — Meaning and Definition of Statistics — Collection and Tabulation of Statistical Data — Presentation of Statistical Data — Graphs and Diagrams— Measures of Central Tendency — Arithmetic Mean, Median and Mode — Harmonic Mean and Geometric Mean							12		CLO1	
Ĭ	Statistical Data - Presentation of - Graphs and Diagrams- Mea	of Sta asures Media	s o	f C	ent	ral		12		CL	.01
ī	Statistical Data – Presentation of – Graphs and Diagrams- Mea Tendency – Arithmetic Mean, N – Harmonic Mean and Geometric Measures of Variation – Standard deviation – Quartile deviation- Standard kurtosis – Lorenz Curve – Simple Scatter Diagram – Karl Pearson's	of Sta asures Media ic Media d Dev kewno	an.	on -	Mo Mo	ral de		12		)	.02
T TI	Statistical Data – Presentation of – Graphs and Diagrams- Mea Tendency – Arithmetic Mean, I – Harmonic Mean and Geometric Measures of Variation – Standard deviation – Quartile deviation- Standard kurtosis – Lorenz Curve – Simple	of Sta asures Media ic Media d Dev kewne corr s Corr	an a an. riati ess relat	on - and tion	enti Mo	ral de ean		•	!	CI	



		12	CLO5	
	Testing of hypothesis - Chi-Square test, T Test, F Test,	12	CLOS	
V	ANOVA.	60		
	Course Outcomes	<u> </u>		
	Course		100 0 00082	
Course Outcomes	On Completion of the course the students will		n Outcomes	
		PO1,PO	02,PO4,PO6	
CO1	Measures of Central Tendency	POI	,PO2,PO6	
CO2	Measures of Variation	Thirt cook		
C03	Analyze of Time Series	POI	,PO2,PO6	
		PO1	,PO2,PO6	
CO4	Understand Index Numbers	6x = 30		
CO5	Test Hypothesis	PO2,PO8		
000	a contract of the contract of			
	Reading List	10 22 10		
	772/	Marcham	Publication	
1.	37.9	Margham	Publications	
	P.R. Vittal, Business Mathematics and Statistics,			
1.	P.R. Vittal, Business Mathematics and Statistics, Chennai, 2004.	Delhi,200	7.	
2.	P.R. Vittal, Business Mathematics and Statistics, Chennai, 2004.  S.P. Gupta, Statistical Methods, Sultan Chand & Sons, New S.P. Gupta, Elements of Business Statistics, Sultan Cha	Delhi,200	7. S,	
1. 2. 3.	P.R. Vittal, Business Mathematics and Statistics, Chennai,2004.  S.P. Gupta, Statistical Methods, Sultan Chand & Sons, New S.P. Gupta, Elements of Business Statistics, Sultan Cha NewDelhi,2007.  J.K. Sharma, Business Statistics, Pearson Education, New J.	Delhi,200 and & Sons Delhi,200	7. 5,	
1. 2. 3.	P.R. Vittal, Business Mathematics and Statistics, Chennai,2004.  S.P. Gupta, Statistical Methods, Sultan Chand & Sons, New S.P. Gupta, Elements of Business Statistics, Sultan Chan NewDelhi,2007.	Delhi,200 and & Sons Delhi,200	7. 5,	
1. 2. 3.	P.R. Vittal, Business Mathematics and Statistics, Chennai,2004.  S.P. Gupta, Statistical Methods, Sultan Chand & Sons, New S.P. Gupta, Elements of Business Statistics, Sultan Chan NewDelhi,2007.  J.K. Sharma, Business Statistics, Pearson Education, New I Business Statistics & OR - Dr. S. P. Rajagopalan, Tata Mcc References Books	Delhi,200 nd & Son Delhi,200 Graw-Hill	7. S,	
1. 2. 3.	P.R. Vittal, Business Mathematics and Statistics, Chennai,2004.  S.P. Gupta, Statistical Methods, Sultan Chand & Sons, New S.P. Gupta, Elements of Business Statistics, Sultan Cha NewDelhi,2007.  J.K. Sharma, Business Statistics, Pearson Education, New Business Statistics & OR - Dr. S. P. Rajagopalan, Tata Medical Sta	Delhi,200 nd & Son Delhi,200 Graw-Hill	7.	

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-	Hazarika Padmalochan, A textbook of Business S	tatistics , S.Chand Publications
3.	Hazarika Padmalochan, A Textoook of Padmalochan,	. A. La Duniness
4.	Vohra ND, Business Statistics: Text and Problem Analytics, Mc Graw Hill ,2021	
5.	Alexander Holmes, Barbara Illowsky and Susan Statistics, 12 <sup>th</sup> Media Services, 2017	Dean, Introductory Business
	Web Resources	
1	https://theintactone.com/2019/09/01/ccsubba-20/	1-business-statistics/
2	https://ug.its.edu.in/sites/default/files/Business%	20Statistics.pdf
3	http://www.statisticshowto.com	
4	https://statisticsbyjim.com/basics/measures-centr	
5	https://www.toppr.com/guides/business-mathem	atics-and-statistics/index-numbers
	Methods of Evaluation	
<del></del>	Continuous Internal Assessment Test	
Internal	Assignments	25 Marks
Evaluation	Seminars	
	Attendance and Class Participation	
External Evaluation	End Semester Examination	75 Marks
	Total	100 Marks
	Methods of Assessment	
Recall (K1)	Simple definitions, MCQ, Recall steps, Concep	ot definitions
Understand/	MCQ, True/False, Short essays, Concept e	
	DE EVAL	enductions, Short summary of

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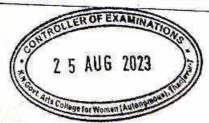
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Comprehend (K2)	overview
(33.47	Suggest idea/concept with examples, Suggest formulae, Solve problems.
Application (K3)	Observe, Explain
7020	Problem-solving questions, Finish a procedure in many steps, Differentiate
Analyze (K4)	between various ideas, Map knowledge
Evaluate (K5)	Longer essay/ Evaluation essay, Critique or justify with pros and cons
	Check knowledge in specific or offbent situations, Discussion, Debating or Presentations

		n/03	PO3	PO4	PO5	PO6	PO7	PO8
	POI	PO2		9	S	S	M	S
CO1		<u>s</u>	M	N	M	S	М	S
CO2	<u>S</u>	S	M	M	C	S	М	S
CO3	S	S	M	M	9	0	М	9
CO4	S	S	M	M	M	S		0
CO5	S	S	M	S	S	S	M	S

CO-PO Mapping (Course Articulation Matrix)

	PSO1	PSO2	PSO3	PSO4	PSO5
CO/PO	CONTRACTOR SE	1502	3	3	3
CO1	3	3		3	3
CO2	3	3	3	, A.	3
CO3	3	3	3	3	14
CO4	3	3	3	3	3
	3	3	3	3	3
CO5	15	15	15	15	15
Weightage	13	13			);
Weighted percentage of Course Contribution to PO's	3.0	3.0	3.0	3.0	3.0

Level of Correlation between PSO's and CO's



HOD OF STATISTICS
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THANJAVUR

litle of the Course	Statistics	Tablesia	thematics oline Speci	ïe)		
Paper Number	The state of the s		Credits	3	Cou	
Category Core	Vear	11		GIS .	Code	e
0	Semester	111				71-72
	Lecture	Trut	orial	Lab Pra	retice	Total
nstructional Hours Per week	3			-		4
	Calculus -	Basic ar	ithmetic			
Objectives of the Course	1. The lear know the 2. It I know and	e overand ruing to owledge coreius. nelps the owledge d applied	anthematics and unders students to and skill ac problems i	which anding de enhance to quired by nathem students to	finition the abil them t atics.	to create deep interest in operate deep interest in operate and balances, concepts, principles and lity of learners to apply the solve specific theoretical depth a range of generic skewick activities.
Course Outline	Judgement probability sampling, Unit-II V specific bit rate and N	t sampling sample systemate systemate statistical statistical rate, Net repro	ng, Quota ing – Sin tic sampling stics – Defi general bir	sampling ple rando y — sampli nition — M h rate, tot	- adva	on – probability sampling antages and disadvantage mpling, stratified randors.  Fertility – crude birth rality rate, gross reproduction of the content of th
	Unit-III of matrix problems  Unit-IV summatio – summat	Eig — Ca Algebra n of the ion of th	gen values a ayley Ham – Binomia series, ann	nd Eigen ilton – th	- Exp	s – power of matrix, Inve (without proof) – sim ansion of rational fraction conential series – expans – summation of the seri
	Unit-V N	Aatrices Hamilton	- Definit	on, Type	matrix	Matrices — Operations c, Rank of matrix. System togeneous linear equations

	" - countions, simple problems.
Component (is a part of	(16 be discussed
Question paper) Skills acquired from this Course	Knowledge, Problem Solving, Analytical ability, Professional Competency, Professional Communication and Transferrable Skill  1. Duraipandian, P. and Udaya Baskaran, S. (2014): Allied  1. Duraipandian, P. and Udaya Company Pvt. Ltd.
Recommended Text	Mathematics, Vol. 1 (1975).  2. Vittal, P.R. (2012). Allied Mathematics, Margham Publications.  3. Narayanan, S ManickavachagamPillai(1993): Ancillary Mathematics, Book II: (Containing Differential Calculus) S.
Reference Books	<ol> <li>Viswanathan Pvt, Ltd.</li> <li>Narayanan,S and ManickavachagamPillai (1993): Ancillary Mathematics (Vol. II,Part I): (Containing Trignometry) S. ViswanathanPvt. Ltd.</li> <li>Narayanan, S and ManickavachagamPillai (1993): Ancillary Mathematics, Book I: (Containing Algebra). S. Viswanathan Pvt.Ltd.</li> <li>S.J.Venkatesan (2019), Algebra,Sri Krishna Publications, Chennai-77, skhengg1999@gmail.com</li> </ol>
Website and e-Learning Source	e-books, tutorials on MOOC/SWAYAM courses on the subject

Course Learning Outcome(for Mapping with POs and PSOs)

Students will be able to

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CLO-1 Distinguish between proper and improper fractions. Express an algebraic fraction as the sum of its partial fractions.

CLO-2 Demonstrate the knowledge to determine the sums, expansion and approximation of series including binomial, exponential, logarithmic and fourier.

CLO-3 Solve problems about polynomials with real coefficients, imaginary and irrational roots. Explain the relationship between the derivative of a function as a function and the notion of the derivative.



CLO-4 Calculate limits of a function.

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CLO-5 Obtain the nth derivative in successive differentiation. Apply Euler's theorem on

CLO-6Obtain the mathematical knowledge and skills for the better understanding of statistics as a mathematical science

			T	nco4	PSO5	PSO6	PSO7	PSO8	PSO9
1	PSO1	PSO2	PSO3	PSO4	1303	200		g	M
CL01	S	S	M	M	M	8	IM		N 1
		c	g	S	M	S	Μ	S	IVI
CLO <sub>2</sub>	S	S	3		G	R	М	S	s
CLO3	S	S	S	M	3	2	G	e	м
CLO4	9	S	S	M	S	S	>	3	
			M	М	м	S	S	S	M
CLO5	<u> </u>	0	IVI	LYL		c c	c	м	M
CLO6	S	S	S	S	M	<u> </u>	β	h.,	

## CLO-PSO Mapping (Course Articulation Matrix) S-Strong, M-Medium, W-Weak

CO MO	PSO1	PSO2	PSO3	PSO4	PSO5
CO/PO	3	3	3	3	3
C01	3	3	3	3	3
CO2 CO3	3	3	3	3	3
C04	3	3	3	3	3
C05	3	3	3	3	3
Weightage	15	15	15	15	15
Weighted percentage of Course Contribution to Pos	3.0	3.0	3.0	3.0	3.0

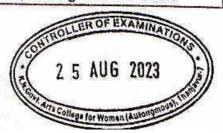
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Level of Correlation between PSO's and CO's

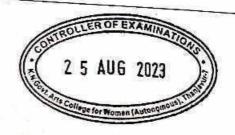
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									100		Marl	GS .
Subject Coo	le	Subject Name	Caregory	1.e	4.	Р	o	Credits	Inst. Hours	CLA	External	Total
23КЗВВЕСВ	B4:1	OPERATION RESEARCH (EC-IV)	Gen eric Elec tive	Y		•	-	3	4	2.5	75	100
	T to	Learning Obstruction to Operations Resear	jective ch def	s initi	on	nnd	CO	ncep	ot Es	sentia	ıl feat	urcs
CLO1	ol	rt.pp.										
CLO2	sc	ormulation of Transportation production.										
CLO3	M	xpressing Assignment problem faximization case and Sequencin	g Probl	lem.	55							-
CLO4		nalyse Network models and conts.	constru	ctin	g n	etw	ork	- cr	itica	l pat	h, va	rious
CLO5	^	malyse Game Theory and Decisi	on The	ory				017.220			_0,,	To and the left
UNIT	0.	Details	e lo anti-							of urs		ective
	ger for	near Programming problem -Conneral mathematical model of LPF mulation, Graphical method of the problems.	, steps	of l	P	mod	lel	•	1	2	C	LO1
11	Tra tra	nnsportation problem- Basic defin nsportation problem as LPP, find	nitions. ling an	, for	mu ial l	latic	on c	of	1	2	C	LO2



	feasible solution- North -west corner rule, row minima method, column minima method, least cost entry method-Vogel's approximation method to find the optimal solution.		
m	Assignment problem-Hungarian method- Minimization and Maximization case, unbalanced assignment problem. Sequencing Problem-Processing n jobs on 2 machines, processing n jobs on 3 machines, processing n jobs on machines.	12	CLO3
IV	Network models-PERT and CPM — difference between PERT and CPM- constructing network- critical path, various floats, three-time estimates for PERT	12	CLO4
v	Game Theory- Maximin-Minmax criterion, Saddle point, Dominance property, Graphical method for solving 2xn and mx2 game. Decision Theory -statement of Baye'stheorem application - decision trees.	12	CLO5
		60	
Course		F.com	SER IN
Outcomes	On Completion of the course the students will	Program	Outcomes
C01	Analyse Linear Programming	PO1,1	PO2,PO6
CO2	Analyse Transportation problem	PO1,1	PO2,PO6
CO2	Analyse Transportation problem  Analyse Assignment problem		PO2,PO6
	N N	PO1,1	27
C03	Analyse Assignment problem	PO1,1	PO2,PO6
CO3	Analyse Assignment problem  Analyse Network models  Analyse Game Theory and Decision Theory  Reading List	PO1,1	PO2,PO6
CO3	Analyse Assignment problem  Analyse Network models  Analyse Game Theory and Decision Theory  Reading List	PO1,1	PO2,PO6
CO3 CO4 CO5	Analyse Assignment problem  Analyse Network models  Analyse Game Theory and Decision Theory  Reading List	PO1,1	PO2,PO6



Internal Evaluation	Continuous Internal Assessment Test Assignments	25 Marks
	Methods of Evaluation	
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4	A STATE OF THE STA	
3	https://www.kellogg.northwestern.edu / webe	
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1	chromesztension://efaidnbmmmibpzejpczylole m/wp-content/uploads/2/721/04/Operations-P	esesan surver
5.	P. Gupta, 14. Aruna Ram, 16. Fractu Quantitative Techniques, Pirst edition, Hi Web Resources	
4.	India- Hew Dellii	" (2012). Operations Personal and
3.	Hamdy A Taha, Operation Research	) - An Introduction prentice Hall o
a	V.K. Kapour, Introduction to operation	nal Research Sulven Chand & some
2.,	Chenna - 17: P.K. Guptaë, Man Mohan, Problen Chand & sons - Hey Delhi	in in the second
Ti	P.R. Vittal& V. Malini, Operative Chemat - 17.	Properties Properties Subse
	References Bunks	Marchum Pulylicadients
3.	Chemmi 2019	
1.	International Journal of Operations research  DR H. Premori, Elements of Operation Pe	comen, Marphan printerior



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	Seminars	
	Attendance and Class Participation	
External Evaluation	End Semester Examination	75 Marks
	Total	100 Marks
	Methods of Assessment	Company of the compan
	Simple definitions, MCQ, Recall steps, Conce	ept definitions
Recall (K1)	0.000	
Understand/ Comprehend (K2)	MCQ, True/False, Short essays, Concept overview	
Application (K3)	Suggest idea/concept with examples, Sug Observe, Explain	ggest formulae, Solve problems,
Analyze (K4)	Problem-solving questions, Finish a procedule between various ideas, Map knowledge	lure in many steps, Differentiate
Evaluate (K5)	Longer essay/ Evaluation essay, Critique or ju	stify with pros and cons
Create (K6)	Check knowledge in specific or offbeat sit Presentations	tuations, Discussion, Debating or
DE ROYA CHINESEN SELLI GEN		

## Mapping with program outcomes

·····	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
CO1	S	S	M	M	M	S	М	S
CO2	S	_ S	M	M	S	S	М	S
CO3	S	S	М	М	S	S	М	C
CO4	S	S	M	М	M	S	M	0
CO5	S	S	M	M	M	S	M	S

CO-PO Mapping (Course Articulation Matrix)



СОЛО	PSO1	PSO2	PSO3	PSO4	PSO5
110	rsor	W IEWERIELE	3	3	3
CO1	3	3	3	2	3
CO2	3	3	3	3	2
CO3	3	3	3	3	3
CO4	3.	3	3	3	3
CO5	3	3	3	3	3
Weightage	15	15	15	15	15
Weighted percentage of Course Contribution to PO's	3.0	3.0	3.0	3.0	3.0

Level of Correlation between PSO's and CO's



HOD OF STATISTICS K.M.G.A.C. (W) (AUTO) THANJAVUR

Time Berieu / Index Mambers Title of the Course Pleetive 14 Paper Number 17111.60 23KABBEL BB42 Vient 1 4116 Category Core tiementer 19 Lale Practice Total Tulmin Hanra Lecture Instructional per week Pre requisite On successful completion of this course, students will be side Objectives of History. to neguine the knowledge of time series data and its applications. Course Outline the growth curves and their fitting. To compute the different index numbers in real life problems. To calculate the seasonal indices by various methods. To malyse the importance of a good index number. that Time Series Definition, uses, Additive Model, Multiplicative Models, Components - Secular Trend, Seasonal variation - Measurement of Frence Craphical method, Method of Semi - Averages, Method of Moving Averages and Method of Least Squares. UNIT Historyconent of Beasonal Variations Method of Bimple Averages, Patio to Moving Average method, Ratio to Trend Method and Link Relative Method - Cyclic Variation and ltregadur Buctontions. Unit III Growth Curves Modified 10(ponential Curve and its Fitting - Method of Three Selected Points - Method of Partial Sams - Fitting of Compertz Curve Logistic Curve, De-Sensonalisation of data - Measurement of Cyclic Course Outline variations by residual approach, Unit IVIndex Mumbers Definition, tises, Types, Problems involved in the construction of Index Numbers - Construction of Index Numbers - Simple aggregate method and Simple average of Price relatives method. Weighted Index Numbers – Laspeyre's, Pausche's, Dorbish Bowley's, Marshall Edge worth's Index Numbers and Fisher's Ideal Index Number. Unit V Tests for adequacy Time Reversal Test, Factor Reversal Test, Unit test and Cyclic test. Definition of Deflation, Splicing, Inflation, and Real wages. Construction of Weighted Average of Price relatives Index Numbers using A.M & G.M. Pixed Base Index Numbers and Chain Base Index



Component (is a part of	Questions related to the above topics, from various competitive examinations UPSC / TRB / NET / UGC - CSIR / GATE / TNPSC / others to be solved (To be discussed during the Tutorial hour)
External Examination question paper) Skills acquired from this Course Recommended Books.	Solving Analytical ability, Professional
2. 3. Ti W 4.	nternational Publications, 2005.  Pillai RSN and Bagavathi V, Statistics, S. Chand & Co., 2010.

## Course Learning Outcome (for Mapping with POs and

PSOs) Students will be able to

CLO-1 Understand the time series concept

CLO-2 estimate the trend values using various methods

CLO-3 concept and purposes of index numbers

CLO-4 understand the notation and formulae concerning the use.

CLO-5 understand time series data its components and its application in various fields.



and the same of th		T 10000	D0013	PS04	PS05	PSO6	PSO7	PSO8	PSO9
	1801	1802	PS03	1001	M	S	М	S	M
CLOS	<u> </u>	8	M	M4	-	e	м	S	М
CLOS	8	8	S	S	M	0	···	Q	S
clas	\$	8	8	М	S	S	IMI	-	M
CLON	S	8	8	M	S	S	S	S	IVI
CLOS	S	Š	M	М	М	s	S	S	M

CLO-ISO Mapping (Course Articulation Matrix) S-Strong, M-Medium, W-Wesk

co/ro	PSO1	PSO2	PSO3	PSO4	PSO5
001	13	3	3	3	3
C02	3	3	3	3	3
cos	3	3	3	3	3
CO4	3	3	3	3	3
C05	3	3	3	3	3
Weightage	15	15	15	15	15
Weighted percentage of Course Contribution to Pos	3.0	3.0	3.0	3.0	3.0

Level of Correlation between PSO3s and CO's

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