

COMPUTER ORIENTED STATISTICAL METHODS (MA303BS) COURSE PLANNER

I. COURSE OVERVIEW:

The students will improve their ability to think critically, to analyze a real problem and solve it using a wide array of mathematical tools. They will also be able to apply these ideas to a wide range of problems that include the Engineering applications.

II. PREREQUISITE:

- 1. Basic knowledge of Probability.
- 2. Basic knowledge of Statistics.
- 3. Basic knowledge of calculation of basic formulas.
- 4. Basic knowledge of permutations and combinations.
- 5. Mathematics courses of first year of study.

III. COURSE OBJECTIVE: To learn

- The theory of Probability, and probability distributions of single and multiple random variables.
 The theory of Probability, and probability distributions of single and multiple random
- 2. The sampling theory and testing of hypothesis and making inferences.
- 3. Stochastic process and Markov chains.

IV.COURSE OUTCOMES: After learning the contents of this paper the student must be able to

No	Description	Bloom's Taxonomy Level
1.	Understand the concepts of probability and	L1: Remember
	distributions to some case studies.	L2: Understand
2.	Evaluate Mathematical Expectation and Discrete	L1: Remember
	Probability Distributions.	L2: Understand
3.	Apply Continuous Normal Distribution and	L3: Apply
	Fundamental Sampling Distributions.	
4.	Analyze testing hypothesis of Sample Mean and	L3: Apply
	Sample Proportion.	
5	Understand the concept of Stochastic Processes	L1: Remember
	and Markov Chains.	L2: Understand

V. HOW PROGRAM OUTCOMES ARE ASSESSED:

	Program Outcomes	Level	Proficiency
			Assessed by
	Engineering knowledge: To Apply the knowledge of		
	mathematics, science, engineering fundamentals, and		Assignments,
PO1	Computer Science Engineering to the solution of complex	3	Tutorials and
	engineering problems encountered in modern engineering		Mock Exams.
	Problem analysis: Ability to Identify, formulate, review		Assignments,
	research literature, and analyze complex engineering	2	Tutorials and
PO2	problems related to Computer Science reaching substantiated		Exams.
	conclusions using first principles of mathematics, natural		

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	Design/development of solutions: Design solutions for	V	
	complex engineering problems and design system	-	
PO3	components or processes that meet the specified needs with		
	appropriate consideration for the public health and safety, and		
	Conduct investigations of complex problems: Use research-		
PO4	based knowledge and research methods including design of	-	
	experiments, analysis and interpretation of data, and synthesis		
	Modern tool usage: Create, select, and apply appropriate		
PO5	techniques, resources, and modern Computer Science	-	
	Engineering and IT tools including prediction and modeling		
	The engineer and society: Apply reasoning informed by the		
PO6	contextual knowledge to assess societal, health, safety, legal	-	
200	and cultural issues and the consequent responsibilities		
	Environment and sustainability : Understand the impact of	_	
D07	Computer Science Engineering professional engineering		
PU/	solutions in societal and environmental contexts, and		
	demonstrate the knowledge of and need for sustainable		
PO8	Ethics : Apply ethical principles and commit to professional		
	ethics and responsibilities and norms of the engineering	-	
POQ	Individual and team work : Function effectively as an		
107	individual, and as a member or leader indiverse learns, and in		
	Communication : Communicate effectively on complex	_	
	engineering activities with the engineering community and		
PO10	with society at large, such as, being able to comprehend and		
	write effective reports and design documentation, make		
	Project management and finance: Demonstrate knowledge		
PO11	and understanding of theengineering and management	-	
1011	principles and apply these to one's own work, as a member		
	and leader in a team to manage projects and in		
PO12	Life-long learning: Recognize the need for, and have the	_	
	preparation and ability to engage inindependent and life-long	-	
1: Slig	ht (Low) 2: Moderate 3: Substantial (High))	4: None
	(Medium)		

VI. HOW PROGRAM SPECIFIC OUTCOMES ARE ASSESSED:

	Program Specific Outcomes	Level Proficiency
		assessed by
PSO1 methodologi mathematica	nathematical concepts: To use mathematic es to crack problem using suital l analysis, data structure and suital	calAssignments,ble2Tutorials andbleExams.

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	Foundation of Computer System: The ability to interpret		
PSO2	the fundamental concepts and methodology of computer	-	
	systems. Students can understand the functionality of		
	Foundations of Software development: The ability to		
	grasp the software development lifecycle and		
PSO3	methodologies of software systems. Possess competent	-	
	skills and knowledge of software design process.		
	Familiarity and practical proficiency with a broad area of		

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1: Slight (Low)2: Moderate (Medium)3: Substantial (High)4: NoneVII. SYLLABUS:

UNIT - I

Probability: Sample Space, Events, Counting Sample Points, Probability of an Event, Additive Rules, Conditional Probability, Independence, and the Product Rule, Bayes' Rule.

Random Variables and Probability Distributions: Concept of a Random Variable, Discrete Probability Distributions, Continuous Probability Distributions, Statistical Independence.

UNIT - II

Mathematical Expectation: Mean of a Random Variable, Variance and Covariance of RandomVariables, Means and Variances of Linear Combinations of Random Variables, Chebyshev's Theorem.

Discrete Probability Distributions: Introduction and Motivation, Binomial, Distribution, Geometric Distributions and Poisson distribution.

UNIT - III

Continuous Probability Distributions : Continuous Uniform Distribution, Normal Distribution, Area sunder the Normal Curve, Applications of the Normal Distribution, Normal Approximation to the Binomial, Gamma and Exponential Distributions.

Fundamental Sampling Distributions: Random Sampling, Some Important Statistics, Sampling Distributions, Sampling Distribution of Means and the Central Limit Theorem, Sampling Distribution of S2, t –Distribution, F-Distribution.

UNIT - IV

Estimation & Tests of Hypotheses: Introduction, Statistical Inference, Classical Methods of Estimation.: Estimating the Mean, Standard Error of a Point Estimate, Prediction Intervals, Tolerance Limits, Estimating the Variance, Estimating a Proportion for single mean, Difference between Two Means, between Two Proportions for Two Samples and Maximum Likelihood Estimation.

Statistical Hypotheses: General Concepts, Testing a Statistical Hypothesis, Tests Concerning a Single Mean, Tests on Two Means, Test on a Single Proportion, Two Samples: Tests on Two Proportions.

UNIT - V

Stochastic Processes and Markov Chains: Introduction to Stochastic processes- Markov process.Transition Probability, Transition Probability Matrix, First order and Higher order



Markov process, n-step transition probabilities, Markov chain, Steady state condition, Markov analysis.

GATE SYLLABUS:

Section1: Engineering Mathematics

Discrete Mathematics: Propositional and first order logic. Sets, relations, functions, artial orders and lattices. Groups. Graphs: connectivity, matching, coloring. Combinatorics:counting, recurrence relations, generating functions.

Linear Algebra: Matrices, determinants, system of linear equations, eigen values and eigenvectors, LU decomposition.

Calculus: Limits, continuity and differentiability. Maxima and minima. Mean value theorem. Integration.

Probability: Random variables. Uniform, normal, exponential, poisson and binomial distributions. Mean, median, mode and standard deviation. Conditional probability and Bayes theorem.

Section 2: Digital Logic

Boolean algebra. Combinational and sequential circuits. Minimization. Number representations and computer arithmetic (fixed and floating point).

Section 3: Computer Organization and Architecture

Machine instructions and addressing modes. ALU, data-path and control unit. Instruction pipelining. Memory hierarchy: cache, main memory and secondary storage; I/O interface (interrupt and DMA mode).

Section 4: Programming and Data Structures

Programming in C. Recursion. Arrays, stacks, queues, linked lists, trees, binary search trees, binary heaps, graphs.

Section 5: Algorithms

Searching, sorting, hashing. Asymptotic worst case time and space complexity. Algorithm design techniques: greedy, dynamic programming and divide-and-conquer.Graph search, minimum spanning trees, shortest paths.

Section 6: Theory of Computation

Regular expressions and finite automata. Context-free grammars and push-down automata. Regular

and contex-free languages, pumping lemma. Turing machines and undecidability.

Section 7: Compiler Design

Lexical analysis, parsing, syntax-directed translation. Runtime environments. Intermediate code generation.

Section 8: Operating System

Processes, threads, inter-process communication, concurrency and synchronization. Deadlock. CPU

scheduling. Memory management and virtual memory. File systems.

Section 9: Databases

ER-model. Relational model: relational algebra, tuple calculus, SQL. Integrity constraints, normal forms. File organization, indexing (e.g., B and B+ trees). Transactions and concurrency control.

Section 10: Computer Networks

Concept of layering. LAN technologies (Ethernet). Flow and error control techniques, switching. IPv4/IPv6, routers and routing algorithms (distance vector, link state). TCP/UDP and sockets,



congestion control. Application layer protocols (DNS, SMTP, POP, FTP, HTTP). Basics of Wi-Fi. Network security: authentication, basics of public key and private key cryptography, digital signatures and certificates, firewalls.

IES SYLLABUS:

Matrix: Matrix theory, Eigen values & Eigen vectors, system of linear equations

Differential Equations: Numerical methods for solution of non-linear algebraic equations and differential equations

Partial differential equations: Partial derivatives, linear, nonlinear and partial differential equations, initial and boundary value problems

VIII. LESSON PLAN-COURSE SCHEDULE:

Session	Week No	Unit	ΤΟΡΙϹ	Link for PPT	Link for PDF	Course learning outcomes	Teaching Methodologi es	Reference
					UNIT –	1		
1.		1	Introduction to probability	https://drive.g oogle.com/dri ve/folders/1P7 4qitEpsYrwhtl e- Q4R2_QuLQ 2iJakL?usp=s haring	https://driv e.google.co m/drive/fol ders/1P74q itEpsYrwht le- Q4R2_Qu LQ2iJakL? usp=sharin g	Define probability	Talk & Chalk	T1,T2, R1
2.	1		Sample Space, Events, Counting Sample Points	https://drive.go ogle.com/drive/ folders/1P74qit EpsYrwhtle- Q4R2_QuLQ2i JakL?usp=shari ng	https://drive. google.com/ drive/folder s/1P74qitEp sYrwhtle- Q4R2_QuL Q2iJakL?us p=sharing	Define sample point, event and sample space	Talk & Chalk	T1,T2, R1
3.			Probability of an Event, Additive Rules	https://drive.go ogle.com/drive/ folders/1P74qit EpsYrwhtle- Q4R2_QuLQ2i JakL?usp=shari ng	https://drive. google.com/ drive/folder s/1P74qitEp sYrwhtle- Q4R2_QuL Q2iJakL?us p=sharing	Solve problems on additive rule	Talk & Chalk	T1,T2, R1
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				<u>https://drive.go</u>	<u>nttps://drive.</u>			
				<u>ogle.com/drive/</u>	google.com/d			
			Tutorial /	folders/IP/4qit	rive/folders/1			
			Bridge Class #	Eps Yrwhtle-	<u>P/4qitEpsYr</u>			
			1	<u>Q4R2_QuLQ21</u>	whtle-			
			-	<u>JakL?usp=shari</u>	<u>Q4R2_QuLQ</u>			
				<u>ng</u>	2iJakL?usp=s			
					haring			
				UNI	T-3			
25.				https://drive.go	https://drive.	Find		
				ogle.com/drive/	google.com/d	Continuous		
			Continuous	folders/1P74qit	rive/folders/1	Probability		
			Probability	EpsYrwhtle-	P74qitEpsYr	Distribution	Talk &	T2,T3,
		3	Distribution	Q4R2_QuLQ2i	whtle-	Districturion	Chalk	R1
		5	Distribution	JakL?usp=shari	Q4R2_QuLQ			
				<u>ng</u>	2iJakL?usp=s			
					haring			
26.	7			https://drive.go	https://drive.	Find		T2,T3,
				ogle.com/drive/	google.com/d	Continuous		R1
			Continuous	folders/1P74git	rive/folders/1	uniform		
				EpsYrwhtle-	P74qitEpsYr	Probability	Talk &	
			Uniform	Q4R2 QuLO2i	whtle-		Chalk	
			Distribution	JakL?usp=shari	O4R2 OuLO	Distribution		
				ng	2iJakL?usp=s			
					haring			
2.7	-		Normal	https://drive.go	https://drive.	Apply	Talk &	T2.T3
27.		I	- , 01111111			- -PP -J	1 un to	· _, · .,

	-				2	Surfie Water English	1 - 1
		Distribution	ogle.com/drive/	google.com/d	Normal	Chalk	R1
			folders/1P74qit	rive/folders/1	Distribution		
			EpsYrwhtle-	P74qitEpsYr			
			<u>Q4R2_QuLQ2i</u>	whtle-			
			<u>JakL?usp=shari</u>	<u>Q4R2_QuLQ</u>			
			<u>ng</u>	2iJakL?usp=s			
				<u>haring</u>			
28.			https://drive.go	https://drive.	Find areas		T2,T3,
			ogle.com/drive/	google.com/d	under the		R1
			folders/1P74qit	rive/folders/1	normal curve		
		Area sunder the	EpsYrwhtle-	P74qitEpsYr		Talk &	
		Normal Curve	Q4R2_QuLQ2i	whtle-		Chalk	
			JakL?usp=shari	Q4R2_QuLQ			
			ng	2iJakL?usp=s			
			_	haring			
29.			https://drive.go	https://drive.	Find		
_, .			ogle.com/drive/	google.com/d	applications		
			folders/1P74ait	rive/folders/1	of normal		
		Applications of	EpsYrwhtle-	P74aitEpsYr		Talk &	T2,T3,
		the Normal	O4R2 OuLO2i	whtle-	distribution	Chalk	R1
		Distribution	IakL?usp=shari	$04R^2$ OuLO		Chuik	
			no	2iIakL?usp=s			
			<u></u>	haring			
30			https://drive.go	https://drive	Find normal		Т2 Т3
50.		Normal	ogle com/drive/	google com/d			12,13, D1
		Approximation	folders/1P7/ait	rive/folders/1	approximatio		K1
		to the	EncVrwhtlo	$\frac{1100/1010003/1}{P7/aitEpsVr}$	ns to all	Talk &	
		Binomial,	$\frac{DPS TI WILLE-}{O4P2 Out O2}$	<u>r /4qitEps 11</u>	probability	Challe	
		Gamma and	<u>Q4K2_QuLQ21</u> Jold Pusp_shori	$\frac{\text{white-}}{\text{O4P2}}$ Out O	distributions	Chaik	
	0	Exponential	Jake susp-share	$\underline{\text{Q4K2}}$ $\underline{\text{QuLQ}}$			
	0	Distributions.	ng	$\frac{21JaKL}{usp=s}$			
21			1. ((De		
51			nups://drive.go	<u>nups://drive.</u>	Denne		
			ogle.com/drive/	google.com/d	sampling		
		Fundamental	tolders/IP/4qit	rive/folders/1	distribution	T - 11 - 0	T_{2} T_{2}
		Sampling	EpsYrwhtle-	P/4qitEpsYr			12,13,
		Distribution	Q4R2 QuLQ2i	whtle-		Chalk	KI
			JakL?usp=shari	Q4R2 QuLQ			
			<u>ng</u>	2iJakL?usp=s			
				haring			
32.			https://drive.go	https://drive.	Define		T2,T3,
		Random	ogle.com/drive/	google.com/d	random	Talk &	R1
		Sampling	folders/1P74qit	rive/folders/1	sampling	Chalk	
		Sumpring	EpsYrwhtle-	P74qitEpsYr		Citaix	
			Q4R2 QuLQ2i	whtle-			

_						A market	CILLE MARCHULATION	
				JakL?usp=shari	O4R2 OuLO			
				ng	2iJakL?usp=s			
					haring			
				https://drive.go	https://drive			
				ogle com/drive/	google com/d			
				folders/1P7/git	rive/folders/1			
			Tutorial /	EneVryhtle	$\frac{1100/1010003/1}{P74aitEpsVr}$			
			Bridge Class #	$\frac{DPS \Pi WILLC-}{O4P2 Out O2}$	<u>174qttDps11</u>			
			2	<u>U4K2_UuLU21</u> JakI 2ucp_chari	$\frac{\text{white-}}{\text{O4P2}}$ Out O			
				<u>Jakt (usp-shari</u>	$\underline{\text{Q4K2}}$ $\underline{\text{QuLQ}}$			
				ng	$\frac{21JaKL}{usp=s}$			
					haring			
	1		-	I Mid E	xaminations		I	
33.				https://drive.go	https://drive.	Define		
			Some	ogle.com/drive/	google.com/d	statistics		
			Important	folders/1P74qit	rive/folders/1			
		3	Statistics	EpsYrwhtle-	P74qitEpsYr		Talk &	T2,T3,
			Sempling	<u>Q4R2_QuLQ2i</u>	whtle-		Chalk	R 1
				<u>JakL?usp=shari</u>	<u>Q4R2_QuLQ</u>			
			Distributions	<u>ng</u>	2iJakL?usp=s			
					<u>haring</u>			
34.				https://drive.g	https://drive	Apply		T2,T3,
			Sampling	oogle.com/dri	.google.com	central limit		R 1
			Distribution of	ve/folders/1P7	/drive/folder	theorem		
			Manual the	4qitEpsYrwhtl	<u>s/1P74qitEp</u>		Talk &	
			Means and the	<u>e-</u>	sYrwhtle-		Chalk	
			Central Limit	Q4R2_QuLQ	Q4R2_QuL			
			Theorem	2iJakL?usp=s	Q2iJakL?us			
				haring	p=sharing			
35.	9			https://drive.go	https://drive.	Apply S2		
				ogle.com/drive/	google.com/d	Distribution		
				folders/1P74git	rive/folders/1	Distribution		
				EnsYrwhtle-	P74aitEpsYr		Talk &	T2 T3
			Sampling of S2	$O4R^2 Oul O^2i$	whtle-		Chalk	R1
				Jakl 2usp-shari	$\frac{\text{where}}{\text{O4R2}}$ Oul O		Chaik	K1
				<u>sake:usp=snarr</u>	2iJakI 2usp-s			
				ng	<u>2IJaKL:usp-s</u>			
26	-			https://drive.go	https://drivo	Apply t and		то то
30.				<u>mups://drive.go</u>	<u>mups://drive.</u>	Apply t and		12,13,
				ogle.com/drive/	google.com/d	F		KI
			t –Distribution	folders/IP/4qit	rive/folders/1	Distribution	T - 11 - 0	
			and F-	EpsYrwhtle-	P/4qitEpsYr			
			Distribution	<u>Q4R2_QuLQ2i</u>	whtle-		Chalk	
				JakL?usp=shari	<u>Q4R2_QuLQ</u>			
				<u>ng</u>	2iJakL?usp=s			
					<u>haring</u>			

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37				https://drive.	https://driv	Understan		
			Evaluation	google.com/	e google c	d		
			of surface	drive/folders/	om/drive/f	u 1		
			and	1P7/aitEpsV	$\frac{\text{olders}/1P7}{\text{olders}/1P7}$	application		
			volume	<u>1174qttDps1</u>	$\frac{010015/117}{4aitEmaVr}$		Talk &	
			using	<u>rwnie-</u>	$\frac{4queps 11}{14}$			
			MATLAB	<u>Q4R2 QuL</u>	while-		Chaik	
			(contents	<u>Q2iJakL?usp</u>	<u>Q4R2_Qu</u>			
			beyond the	<u>=sharing</u>	<u>LQ2iJakL?</u>			
			syllabus)		<u>usp=sharin</u>			
			5 ,		g			
				U	NIT – 4			
38				https://drive.go	https://drive.	Define		
			Statistical	ogle.com/drive/	google.com/d	inference and		
			Inference	folders/1P74qit	rive/folders/1	classical		
			Classical	EpsYrwhtle-	P74qitEpsYr	methods of	Talk &	T2,R1,
				Q4R2_QuLQ2i	whtle-	estimation	Chalk	R2
			Methods of	JakL?usp=shari	Q4R2_QuLQ	estimation		
			Estimation	ng	2iJakL?usp=s			
					haring			
39				https://drive.go	https://drive.	Find mean		T2,R1,
				ogle.com/drive/	google.com/d	and error of		R2
			Estimating the	folders/1P74qit	rive/folders/1	noint		112
			Mean. Standard	EpsYrwhtle-	P74gitEpsYr		Talk &	
			Error of a Point	O4R2 OuLO2i	whtle-	estimate	Chalk	
			Estimate	JakL?usp=shari	$\overline{O4R2}$ OuLO		Chuik	
		4	Estimate	no	2iIakL?usp=s			
		4			haring			
40	10			https://drive.go	https://drive	Find		
40			Prediction	ogle com/drive/	google com/d	L'IIIU		
			Intervals	folders/1D7/ait	rive/foldors/1	intervals and		
			Tolerance	EncVerruhtla	$\frac{11VC}{101UCLS}$	limits of	Tall &	T2 P1
				<u>Eps r rwittle-</u>	$\frac{r / 4 q \Pi E p S I I}{W h t l c}$	estimate	$\frac{1}{C} \frac{1}{1} = \frac{1}{2}$	12,111,
			Linnus,	$\frac{\sqrt{4K2}}{\sqrt{4K2}}$	$\frac{\text{whee-}}{\text{O4D2}}$		Cnalk	K2
			Estimating the	JakL (usp=shari	$\frac{Q4K2}{Q4K2}$			
			Variance	ng	$\frac{21JaKL?usp=s}{1}$			
					naring			
41				https://drive.go	https://drive.	Apply		T2,R1,
				ogle.com/drive/	google.com/d	Estimating a		R2
			Estimating a	folders/1P74qit	rive/folders/1	Proportion		
			Proportion for	EpsYrwhtle-	P74qitEpsYr	for single	Talk &	
			single mean	<u>Q4R2_QuLQ2i</u>	whtle-	mean	Chalk	
			single incan	<u>JakL?usp=shari</u>	<u>Q4R2_QuLQ</u>			
				<u>ng</u>	<u>2iJakL?usp=s</u>			
					<u>haring</u>			
42			Difference	https://drive.go	https://drive.	Apply	Talk &	T2,R1,

			1	1	E Sasarina	WELLE MADE EDUCATION		
		between Two	ogle.com/drive/	google.com/d	estimation of	Chalk	R2	
	11	Means,	folders/1P74qit	rive/folders/1	difference			
			EpsYrwhtle-	<u>P74qitEpsYr</u>	between two			
			<u>Q4R2_QuLQ2i</u>	whtle-	means			
			<u>JakL?usp=shari</u>	Q4R2_QuLQ				
			<u>ng</u>	<u>2iJakL?usp=s</u>				
				<u>haring</u>				
43		"	https://drive.go	https://drive.	Apply		T2,R1,	
		Two	ogle.com/drive/	google.com/d	Proportions		R2	
		Proportions for	folders/1P74qit	rive/folders/1	for Two			
		Two Samples	EpsYrwhtle-	P74qitEpsYr	Samples	Talk &		
		and Maximum	<u>Q4R2_QuLQ2i</u>	whtle-	~	Chalk		
		Likelihood	<u>JakL?usp=shari</u>	<u>Q4R2_QuLQ</u>				
		Estimation.	<u>ng</u>	2iJakL?usp=s				
				<u>haring</u>				
44			https://drive.go	https://drive.	Define			
		General	ogle.com/drive/	google.com/d	Statistical			
		Concents	folders/1P74qit	rive/folders/1	Hypothesis			
		Concepts,	EpsYrwhtle-	P74qitEpsYr	nypounosis	Talk &	T2,R1,	
		Testing a	Q4R2_QuLQ2i	whtle-		Chalk	R2	
		Statistical	JakL?usp=shari	Q4R2_QuLQ				
		Hypothesis	ng	2iJakL?usp=s				
			_	haring				
45			https://drive.go	https://drive.	Apply Tests		T2.R1.	
			ogle.com/drive/	google.com/d	Concerning a		R2	
		Teste	folders/1P74qit	rive/folders/1	Single Mean		1.2	
		Tests	EpsYrwhtle-	P74qitEpsYr	Single Mean	Talk &		
		Concerning a	O4R2 OuLO2i	whtle-		Chalk		
		Single Mean	JakL?usp=shari	O4R2 OuLO		Cirwin		
			ng	2iJakL?usp=s				
				haring				
46			https://drive.go	https://drive				
			ogle.com/drive/	google.com/d				
			folders/1P74ait	rive/folders/1				
		Tutorial /	EpsYrwhtle-	P74qitEpsYr				
		Bridge Class	O4R2 OuLO2i	whtle-				
		#3	JakL?usn-shari	04R2 Out 0				
			no	2iJakL?uen-e				
			<u>***5</u>	haring				
47			https://drive.go	https://drive	Apply Tests	<u> </u>	+	
			ogle.com/drive/	google com/d	Concerning			
	12	Tests on Two	folders/1P74ait	rive/folders/1	Two Mass	Talk &	T2,R1,	
		Means	EpsYrwhtle-	P74aitEpsYr	i wo wiean	Chalk	R2	
			O4R2 Out O2i	whtle-				
				<u>minite</u>				

				and a second sec	Vice Brazil Title Carlos	_	
		JakL?usp=shari	Q4R2_QuLQ				
		ng	2iJakL?usp=s				
			haring				
48		https://drive.go	https://drive.	Solve		T2,R1,	
		ogle.com/drive/	google.com/d	problems on		R2	
		folders/1P74qit	rive/folders/1	mean testing			
	Problems on	EpsYrwhtle-	P74qitEpsYr	6	Talk &		
	mean test	Q4R2_QuLQ2i	whtle-		Chalk		
		<u>JakL?usp=shari</u>	<u>Q4R2_QuLQ</u>				
		<u>ng</u>	2iJakL?usp=s				
			<u>haring</u>				
49	Test on a	https://drive.go	https://drive.	Apply Test			
	Single	ogle.com/drive/	google.com/d	of Single			
	Proportion	folders/1P74qit	rive/folders/1	Proportion			
		EpsYrwhtle-	P74qitEpsYr	1	Talk &	T2,R1,	
		<u>Q4R2_QuLQ2i</u>	whtle-		Chalk	R2	
		<u>JakL?usp=shari</u>	<u>Q4R2_QuLQ</u>				
		<u>ng</u>	2iJakL?usp=s				
			haring				
50	Tests on Two	https://drive.go	https://drive.	Apply Test		T2,R1,	
	Proportions.	ogle.com/drive/	google.com/d	of Two		R2	
		folders/1P74qit	rive/folders/1	Proportion	_ 4		
		EpsYrwhtle-	P74qitEpsYr		Talk &		
		Q4R2_QuLQ2i	whtle-		Chalk		
		<u>JakL?usp=shari</u>	<u>Q4R2_QuLQ</u>				
		<u>ng</u>	2iJakL?usp=s				
			<u>haring</u>				
5	Applications	https://drive.go	https://drive.	Understand			
1	of Signals and	ogle.com/drive/	google.com/d	application			
	Systems	folders/1P74qit	rive/folders/1		T 11 0		
	(content beyond	EpsYrwhtle-	<u>P74qitEpsYr</u>		Talk &		
	the syllabus)	Q4R2 QuLQ2i	whtle-		Chalk		
		JakL?usp=shar1	<u>Q4R2_QuLQ</u>				
		ng	$\frac{21JakL?usp=s}{1}$				
			haring				
52			https://drive.				
			google.com/d				
	Mash Test		rive/folders/1				
	WIOCK I est -		<u>P/4qitEpsYr</u>				
	11		whtle-				
			$Q4K2_QuLQ$				
			<u>21JaKL?usp=s</u>				
			naring				
UNIT – 5							

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53			Introduction to	https://drive.go	https://drive.	Define		
			Stochastic	ogle.com/drive/	google.com/d	Stochastic		
			processes	folders/1P74qit	rive/folders/1	processes		
				EpsYrwhtle-	P74qitEpsYr		Talk &	Т1,Т3,
				Q4R2_QuLQ2i	whtle-		Chalk	R2
				<u>JakL?usp=shari</u>	Q4R2 QuLQ			
				<u>ng</u>	2iJakL?usp=s			
					<u>haring</u>			
54			Markov process	https://drive.go	https://drive.	Define		T1,T3,
				ogle.com/drive/	google.com/d	Markov		R2
				folders/1P74qit	rive/folders/1	process		
				EpsYrwhtle-	P74qitEpsYr	1	Talk &	
		5		Q4R2_QuLQ2i	whtle-		Chalk	
				JakL?usp=shari	Q4R2_QuLQ			
				ng	2iJakL?usp=s			
	12				<u>haring</u>			
55	15		Transition	https://drive.go	https://drive.	Define		
			Probability	ogle.com/drive/	google.com/d	Transition		
			5	folders/1P74qit	rive/folders/1	Probability		
				EpsYrwhtle-	P74qitEpsYr	Trobubling	Talk &	T1,T3,
				Q4R2 QuLQ2i	whtle-		Chalk	R2
				JakL?usp=shari	Q4R2 QuLQ			
				ng	2iJakL?usp=s			
				-	haring			
56			Transition	https://drive.go	https://drive.	Find		T1.T3.
00			Probability	ogle.com/drive/	google.com/d	Transition		R2
			Motrix	folders/1P74git	rive/folders/1	Probability		112
			IVIALIIX	EpsYrwhtle-	P74gitEpsYr	Flobability	Talk &	
				O4R2 OuLO2i	whtle-	Matrix	Chalk	
				JakL?usp=shari	$\overline{O4R2}$ OuLO		Chunx	
				ng	2iJakL?usp=s			
					haring			
57		1		https://drive.go	https://drive	Solve		
57				ogle com/drive/	google.com/d	problems on		
				folders/1P74ait	rive/folders/1			
			Problems on	EnsYrwhtle-	P74aitEneVr	stochastic	Talk &	T1 T3
			stochastic	$O4R^2 Out O^2$	whtle-	process	Chalk	R2
			process	Iakl Juen-chari	04R2 Out 0		Cilaik	
	14			no	2ilakl 2uen-e			
				<u>115</u>	haring			
50				https://drive.go	https://drivo	Evolucto		T1 T2
50			Einst 1	ogle com/drive/	nups.//urive.	Evaluate	T - 11 - 9	11,13,
			First order	folders/1D74 ait	rive/folders/1	First order		K2
			Markov process	$\frac{1010018/11^2/44011}{12}$	$\frac{11Ve/101ders/1}{D74aitEraV}$	Markov	Chalk	
				<u>Eps r rwhtle-</u>	<u>P/4qitEpsYr</u>	process		

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				Q4R2_QuLQ2i	whtle-					
				JakL?usp=shari	Q4R2 QuLQ					
				ng	2iJakL?usp=s					
					haring					
59			Higher order	https://drive.go	https://drive.	Evaluate				
57			Markov process	ogle com/drive/	google.com/d	Ligher order				
			interno v process	folders/1P74git	rive/folders/1	Inglier order				
				EneVrwhtle	$\frac{1100,101000,1}{101000,1}$	Markov	Talk &	т1 т3		
				$\frac{DPS \Pi WILLC-}{O4P2 Out O2}$	<u>1 /4qttEps 11</u>	process	Chall	D_{2}		
				<u>U4K2_UuLU21</u>	<u>white-</u>		Chaik	KZ		
				Jake (usp=shari	$\underline{\text{Q4K2}}$ $\underline{\text{QuLQ}}$					
				ng	21JakL?usp=s					
					haring					
60			n-step	https://drive.go	https://drive.	Find n-step		T1,T3,		
			transition	ogle.com/drive/	google.com/d	transition		R2		
			probabilities	folders/1P74qit	rive/folders/1	probabilities				
			-	EpsYrwhtle-	P74qitEpsYr	-	Talk &			
				Q4R2_QuLQ2i	whtle-		Chalk			
				JakL?usp=shari	Q4R2_QuLQ					
				ng	2iJakL?usp=s					
					haring					
61				https://drive.go	https://drive.	Define				
				ogle.com/drive/	google.com/d	Markov				
				folders/1P74git	rive/folders/1	abain				
				EnsYrwhtle-	P74gitEpsYr	Chan	Talk &	T1.T3		
			Markov chain	O4R2 Oul O2i	whtle-		Chalk	R2		
				Jakl Juen-chari	$\frac{\text{where}}{\text{O4R2}}$ Out O		Chaik	112		
				<u>Jake:usp=sharr</u>	<u>Q4R2_QuLQ</u>					
				ng	$\frac{213aKL}{usp-s}$					
(2)				1	<u>haring</u>	D. (*		T1 T2		
62				<u>nttps://drive.go</u>	<u>nttps://drive.</u>	Define		11,13,		
				ogle.com/drive/	google.com/d	Steady state		R2		
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			condition	Q4R2_QuLQ2i	whtle-		Chalk			
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				<u>ng</u>	<u>2iJakL?usp=s</u>					
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63				https://drive.go	https://drive.	Understand				
				ogle.com/drive/	google.com/d	Markov				
				folders/1P74qit	rive/folders/1	analysis				
			Markov	EpsYrwhtle-	P74qitEpsYr		Talk &	T1,T3,		
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64		https://drive.go	https://drive.	Solve		T1,T3,
		ogle.com/drive/	google.com/d	problems on		R2
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			<u>haring</u>			
65	Applications	https://drive.go	https://drive.	Understand		
	in Fluid	ogle.com/drive/	google.com/d	application		
	Dynamics and	folders/1P74qit	rive/folders/1			
	Aerodynamics	EpsYrwhtle-	P74qitEpsYr		Talk &	
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	syllabus)	<u>JakL?usp=shari</u>	Q4R2_QuLQ			
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			<u>haring</u>			
66		https://drive.go	https://drive.			
		ogle.com/drive/	google.com/d			
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	1	<u>Q4R2_QuLQ2i</u>	whtle-			
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		<u>ng</u>	2iJakL?usp=s			
			haring			
		II Mid I	Examinations			

THST/

SUGGESTED BOOKS:

TEXT BOOKS:

1. Ronald E. Walpole, Raymond H. Myers, Sharon L. Myers, Keying Ye, Probability & Statistics for Engineers & Scientists, 9th Ed. Pearson Publishers.

2. S C Gupta and V K Kapoor, Fundamentals of Mathematical statistics, Khanna publications.

3. S. D. Sharma, Operations Research, Kedarnath and Ramnath Publishers, Meerut, Delhi

REFERENCE BOOKS:

- 1. T.T. Soong, Fundamentals of Probability And Statistics For Engineers, John Wiley & Sons Ltd, 2004.
- 2. Sheldon M Ross, Probability and statistics for Engineers and scientists, Academic Press.



4: None

IX. MAPPING COURSE OUTCOMES LEADING TO THE ACHIEVEMENT OF PROGRAM OUTCOMES AND PROGRAM SPECIFIC OUTCOMES:

utcomes	Program Outcomes (PO)										Program Specific Outcomes (PSO)				
Course O	P01	P02	P03	P04	P05	P06	P07	PO8	PO9	PO10	P011	P012	PSO1	PSO2	PSO3
Ι	3	3	-	-	-	-	-	-	-	-	-	-	2	-	-
II	2	2	-	-	-	-	-	-	-	-	-	-	2	-	-
III	3	2	-	-	-	-	-	-	-	-	-	-	2	-	-
IV	3	2	-	-	-	-	-	-	-	-	-	-	2	-	-
V	2	1	-	-	-	-	-	-	-	-	-	-	1	-	-
AVG	2.	2.	-	-	-	-	-	-	-	-	-	-	1.8	-	-
	6	0													

3: Substantial(High)

1: Slight(Low) 2: Moderate (Medium) QUESTION BANK: (JNTUH) DESCRIPTIVE QUESTIONS: UNIT- I

Short Answer Questions

S.No	Questions	Blooms taxonomy	Course outcome
		level	
1	A random variable x has the following probability function:		1
	X 0 1 2 3 4 5 6 7	Understand	1
	$\begin{array}{ c c c c c c c c } P(x) & 0 & k & 2k & 2k & 3k & k^2 & 2k^2 \\ \hline & & & & & & & & & & & \\ \hline & & & & &$		
	Find (i) k (ii) $P(x<6)$ (iii) $P(x > 6)$		
2	Let X denotes the minimum of the two numbers that		
	appear when a	Understand	1
	pair of fair dice is thrown once. Determine		
	(i) Discrete probability distribution (ii) Expectation (iii) Variance.		
3	Define Event and Sample space	Remember	1
4	If the probability density function of Random variable	Understand	
	$f(x) = k \Box 1 \Box x^2 \Box 0 \Box x \Box 1$ then find (i) k (ii)		1
	P[0.1 <x<0.2]< td=""><td></td><td></td></x<0.2]<>		
5	Find the probability distribution for sum of scores on dice if we throw two dice.	Understand	1
6	State Conditional probability and Bayes theorem.	Remember	1

CSE II YEAR I SEM



		25	-25
7	The function $f(x)=Ax^2$, in $0 < x < 1$ is valid probability	Understand	1
	density function then find the value of A.		
8	State Addition and Product Rules	Remember	1
9	A continuous random variable has the probability		
	density function		
	$\Box kxe^{\Box \Box X}$, for $x \Box 0, \Box \Box 0$	Understand	1
	$f(x) \square$	Chiefstund	1
	Determine (i) k (ii) Mean (iii) Variance.		
10	Out of 24 mangoes, 6 mangoes are rotten. If we draw	Understand	
	two mangoes,		1
	Obtain probability distribution of number of rotten		1
	mangoes that can be drawn.		

Long Answer Questions

		Blooms	Course
S.N	Questions	taxonomy	outcome
0		level	
11	A coin is tossed 9 times. Find the probability of getting	Understand	1
10	five heads.	D 1	
12	getting four heads.	Remember	l
13	Assume that 50% of all engineering students are good		
	in Mathematics. Determine the probability that among	Understand	1
	18 engineering students exactly 10 are good in		
	Mathematics.		
14	Average number of accidents on any day on a national	Understand	
	highway is 1.8. Determine the probability that the		1
15	If a bank received on the average 6 had abagues per	Understand	1
15	day find the probability that it will receive 4 had	Understand	1
	cheques on any given day.		
16	20% of items produced from a goods factory are	Understand	1
	defective. If we choose 5 items randomly then find		
	probability of non defective item.		
17	Explain probability mass function and probability	Remember	1
	density of random variables.		1
18	Out of 800 families with 5 children each, how many		
	would you expect to have (i)3 boys (ii)5girls	Understand	1
	(iii)either 2 or 3 boys ? Assume equal probabilities		
	for boys and girls.		
19	Average number of accidents on any day on a		
	national highway is 1.8. Determine the probability	Understand	1
	that the number of accidents is		
	(i) at least one (ii) at most one.		
20	A shipment of 20 tape recorders contains 5 defectives		
	find thestandard deviation of the probability	Understand	1
	distribution of the number of defectives in a sample of		



UNIT - II

Short Answer Questions

		Blooms	Course
S.No	Questions	taxonomy	outcome
		level	
1	If X is Poisson variate such that $P(X=1) = 24P(X=3)$ then find the mean.	Understand	2
2	If a Poisson distribution is such that $P(X \Box 1) \Box \Box P($	Understand	2
	$X \square$ 3)then find (i) $P(X \square 1)$ (ii) $P(X \square 3)$ (iii) $P(2 \square$	Understand	2
	$X \square 5$).		
3	If X is a random variable then Prove E[X+K]=	Understand	
	E[X]+K		2
	where 'K' constant.		
4	Prove that $\Box^2 \Box E(X^2) \Box \Box^2$.	Understand	2
5	4 coins are tossed 160 times. Fit the Binomial distribution of getting number of heads.	Understand	2
6	Prove that the Poisson distribution is a limiting case of Binomial	Remember	2
	distribution.		
/	example.	Remember	2
8	Explain about Poisson distribution.	Remember	2
9	If $f(x) = k e^{\Box x}$ is probability density function in	Understand	2
	the interval, $\Box \Box x \Box \Box$, then find i) k ii) Mean iii) Variance iv) P(0 <x<4).< td=""><td></td><td></td></x<4).<>		
10	The variance and mean of a binomial variable X with	Understand	2
	parameters n and p are 4 and 3. Find i) $P(X=1)$ ii) $P(X \Box 1)$ iii)		
	P(0 < X < 3).		

Long Answer Questions

S.No	Questions	Blooms taxonomy level	Course outcome
11	The probability if no misprint in a book is $e^{\Box 4}$ then find probability that a page of book contains exactly two misprints.	Understand	2
12	Determine the binomial distribution for which the mean is 4 and variance 3	Understand	2
13	If X is Discrete Random variable then Prove that Variance $(a X + b) = a^2 Variance(X)$.	Understand	2
14	Out of 20 tape recorders 5 are defective. Find the		

CSE II YEAR I SEM

		ž	Magatian ratif avail ton court
	standard deviation	Understand	2
	Of defective in the sample of 10 randomly chosen tape recorders. Find (i) $P(X=0)$ (ii) $P(X=1)$ (iii)		
	P(X=2) (iv) $P(1.$		
15	A car-hire firm has two cars which it hires out		
	day by day. The number of demands for a car o n	Understand	2
	each day is distributed as a Poisson distribution		
	with mean 1.5. Calculate the proportion of days		
	(i) no which there is no demand (ii) on which		
	demand is refused.		
16	The average number of phone calls per minute		
	coming into a switch board between 2 P.M. and 4	Understand	2
	P.M. is 2.5. Determine the probability that during		
	one particular minute (i) 4 or fewer calls		
	(ii) more than 6 calls.		
17	Two coins are tossed simultaneously. Let X denotes	Understand	2
	the number of heads then find i) $E(\mathbf{X})$ ii) $E(\mathbf{X}^2)$ iii) $E(\mathbf{X}^3)$ iv) $V(\mathbf{X})$		
18	Derive variance of the Poisson distribution	Remember	2
10	Explain about Dinamial distribution	Domombor	2
19	Explain about Binomial distribution.	Keinenider	2
20	In eight throws of a die 5 or 6 is considered a	Understand	2
	success. Find the mean		

UNIT - III

Short Answer Questions

		Blooms	Course
S.No	Questions	taxonomy	outcome
		level	
1	If X is normally distributed with mean 2 and	Apply	
	variance 0.1, then		3
	find P ($x \Box 2 \Box 0.01$)?		
2	In a Normal distribution, 7% of the item are under	Apply	3
	35 and 89% are under 63. Find the mean and standard deviation of distribution		
3	If X is a normal variate with mean 30 and standard	Apply	3
C	deviation 5. Find the probabilities that i) $P(26 \square X \square 40)$		C
	ii) P(X □45).		
4	The mean weight of 500 male students at a certain	Apply	
	college is /5kg and the standard deviation is /kg		3
	how many students weigh		
	I) Between 60 and 78 kg ii) more than 92kg.		
5	The mean and standard deviation of the box obtained by		
	1000	Apply	3
	students in an examination are respectively 34.5 and 16.5.		
	Assuming the normality of the distribution. Find the		
	approximate		
	number of students expected to obtain marks between 30		



		2	- B- B-
	and 60.		
6	Define population? Give an example.	Remember	3
7	Define sample? Give an example.	Remember	3
8	Define parameter and statistic.	Remember	3
9	Prove that Mean = Mode in Normal distribution.	Remember	3
10	Derive median of the Normal distribution.	Remember	3

Long Answer Questions

		Blooms	Course
S.No	Questions	taxonomy	outcome
		level	
11	For a normally distributed variate with mean 1 and standard deviation 3. Find i)P $(3.43 \square X \square 6.19)$ ii)P $(-1.43 \square X \square 6.19)$.	Apply	3
12	If the masses of 300 students are normally distributed with mean 68 kgs and standard deviation 3 kgs. How many students have masses (i) greater than 72 kg (ii) less than or equal to 64 kg (iii) between 65 and 71 kg inclusive.	Apply	3
13	The marks obtained in Statistics in a certain examination found to be normally distributed. If 15% of the students greater than or equal to60 marks, 40% less than 30 marks. Find the mean and standarddeviation.	Apply	3
14	A population consists of five numbers 2,3,6,8 and 11. Consider all possible samples of size two which can be drawn with replacement from this population. Find i) The mean of the population. ii) The standard deviation of the population. iii) The mean of the sampling distribution of means. iv) The standard deviation of the sampling distribution of means	Apply	3
15	If the population is 3, 6, 9, 15, 27 i)List all possible samples of size 3 that can be taken without replacement from the finite population. ii) Calculate the mean of each of the sampling distribution of means. iii) Find the standard deviation of sampling distribution of means.	Apply	3
16	The mean height of students in a college is 155 cms and standard deviation is 15. What is the probability that the mean height of 36 students is less than 157 cms.	Apply	3
17	A random sample of size 100 is taken from an infinite population	Apply	3

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	having the mean 76 and the variance 256. What is the probability that x will be between 75 and 78.		
18	A population consists of 5, 10, 14, 18, 13, 24.		
	Consider all possible samples of size two which		
	can be drawn without replacement from this	Apply	3
	population. Find		5
	i). The mean of the population.		
	ii). The standard deviation of the population.		
	iii). The mean of the sampling distribution of means.		
	iv). The standard deviation of the sampling		
10	distribution of means.		
19	A population consists of five numbers4, 8, 12, 16,		
	20, 24. Consider all possible samples of size two		
	which can be drawn without replacement from this	Apply	3
	population. Find		
	1). The mean of the population.		
	11). The standard deviation of the population.		
	iv) The standard deviation of the sampling		
	distribution of means.		
20	Samples of size 2 are taken from the population 1. 2.		
	3, 4, 5, 6. Which can be drawn with replacement?		
	Find	Apply	2
	i). The mean of the population.	rr J	3
	ii). The standard deviation of the population.		
	iii).The mean of the sampling distribution of means.		
	iv). The standard deviation of the sampling		
	distribution of means.		

UNIT - IV

Short Answer Questions

		Blooms	Course
S.No	Questions	taxonomy	outcome
		level	
1	sample of 64 students have mean weight 70 kg can	Apply	4
	this be regarded		
	as a sample from population with mean weight 56		
	kg and S.D 25kg.		
2	A sample of 900 members has mean of 3.4 and		
	S.D of 2.61 is this sample has been taken from a	Apply	4
	large population mean 3.25		
	and S.D 2.61. Also calculate 95% confidence		
	interval.		
3	It is claimed that a random sample of 49 tyres has		
	a mean life of 15200 kms this sample was taken	Apply	4
	from population whose mean		
	is 15150 kms and S.D is 1200 km test 0.05 level		
	of significant.		
4	In 64 randomly selected hour production mean and	Apply	

			And the second sec
	S.D of production are 1.038 and 0.146 At 0.05 level of significant does this enable to reject the null hypothesis = 1 againist alternative hypothesis : >1.		4
5	A trucking company rm suspects the claim that average life of certain tyres is at least 28000 miles to check the claim rm puts 40 of this tyres on its truck and gets a mean life time of 27463 miles with a S.D 1348 miles can claim be true.	Apply	4
6	The mean height of 50 male students who participated in sports is 68.2 inches with a S.D of 2.5. The mean height of male students who have not participated in sports is 67.2 inches with a S.D of 2.8. Test the hypothesis that the height of the students who participated in sports more than the students who have not participated in sports.	Apply	4
7	Students who have not participated in sports. Studying the flow of traffic at two busy intersections between 4pm and 6pm to determine the possible need for turn signals. It was found that on 40 week days there were on the average 247.3 cars approaching the first intersection from the south which made left turn, while on 30 week days there were on the average 254.1 cars approaching the first intersection from the south made left turns . the corresponding samples S.DS are 15.2and 12. Test the significant difference of two means at 5% level.	Apply	4
8	A manufacturer claims that at least 95% of the equipment which he supplied to a factory conformed to specifications. An examination of sample of 200 pieces of equipments received 18 were faulty test the claim at 0.05 level.	Apply	4
9	Among the items produced by a factory out of 500, 15 were defective. In another sample of 400, 20 were defective test the significant difference between two proportions at 5% level.	Apply	4
10	A manufacturer produced 20 defective articles in a batch of 400. After overhauled it produced 10 defective in a batch of 300. Has a machine being improved after over hauling.	Apply	4

Long Answer Questions

S.No	Questions	Blooms taxonomy level	Course outcome
11	A sample of 400 items is taken from a population whose		
	standard deviation is 10. The mean of sample is 40. Test	Apply	

CSE II YEAR I SEM

		Amountain refine tendio Gannersky	
	whether the sample has come from a population with mean 38		4
	also calculate 95% confidence interval for the population.		
12	The means of two large samples of sizes 1000 and 2000		
	members are 67.5 inches and 68.0 inches respectively. Can the	Apply	4
	samples be regarded as drawn from the same population of S.D		
	2.5 inches.		
13	An ambulance service claims that it takes on the average 8.9		
	minutes to reach its destination In emergency calls. To check		
	on this claim the agency which issues license to Ambulance	Apply	4
	service has then timed on fifty emergency calls getting a mean		
	of 9.2 minutes with 1.6 minutes. What can they conclude at 5%		
	level of significance?		
14	Experience had shown that 20% of a manufactured product is		
	of the top quality. In one day's production of 400 articles only	Apply	4
	50 are of top quality Test the hypothesis at 0.05 level.		
15	According to norms established for a mechanical aptitude test		
	persons who are 18 years have an average weight of 73.2 with	Apply	4
	S.D 8.6 if 40 randomly selected persons have average 76.7 test		
	the hypothesis: =73.2 against alternative hypothesis : >73.2.		
16	A sample of 100 electric bulbs produced by manufacturer		
	'A' showed a mean life time of 1190 hrs and s.d. of 90 hrs		
	A sample of 75 bulbs produced by manufacturer 'B'	Apply	4
	Showed a mean life time of 1230 hrs with s.d. of 120 hrs.		-
	Is there difference between the mean life times of the two		
	brands at a significance level of 0.05.		
17	In a random sample of 60 workers, the average time taken by		
	them to get to work is 33.8 minutes with a standard deviation	Apply	4
	of 6.1 minutes .Can we reject the null hypothesis $\Box \Box$ 32.6	11.2	
	minutes in favour of alternative null hypothesis $\Box \Box$ 32.6 at \Box		
	\Box 0.05 level of significance.		
18	On the basis of their total scores, 200 candidates of a civil		
	service examination are divided into two groups; the first		
	group is 30% and the remaining 70%. Consider the first	Apply	1
	question of the examination among the first group. 40 had the	11.5	4
	correct answer. Whereas among the second group, 80 had the		
	correct answer. On the basis of these results, can one conclude		
	that the first question is not good at discriminating ability of		
	the type being examined here.		
19	A cigarette manufacturing firm claims that brand A line of		
	cigarettes outsells its brand B by 8% if it is found that 42 out of	Apply	4
	a sample of 200 smokers prefer brand A and 18 out of another	rr*-J	т
	sample of 100 smokers prefer brand B. Test whether 8%		
	difference is a valid claim.		
20	If 48 out of 400 persons in rural area possessed 'cell' phones		
20	while 120 out of 500 in urban area. Can it be accented that	Annly	1
	the proportion of 'cell' phones in the rural area and Urban	· •PP•J	4
	area is same or not Use 5% of level of significance		
	area is sume of not. Ose 570 of level of significance.		



UNIT - V Short Answer Questions

		Blooms	Course
S.No	Questions	taxonomy	outcome
		level	
1	Define Stochastic Process.	Remember	5
2	What is First Passage Time.	Remember	5
3	What is Absorbing State.	Remember	5
4	Define Markov Process.	Remember	5
5	Define First Order Markov Process.	Remember	5
6	Define Higher Order Markov Process.	Remember	5
7	Define Markov Chain.	Remember	5
8	What is Transition Probability.	Remember	5
9	Define Time Inhomogeneous Process.	Remember	5
10	What is parameter estimation	Remember	5

Long Answer Questions

		Blooms	Course
S.No	Questions	taxonomy	outcome
		level	
11	Explain about state space	Understand	5
12	Explain about Discrete Stochastic Variable	Understand	5
13	Explain about Continuous Stochastic Variable	Understand	5
14	Explain about time of Absorption.	Understand	5
15	Explain about Recurrence time.	Understand	5
16	Explain about m-order Markov Process.	Understand	5
17	Explain about Transition Probability Matrix.	Understand	5
18	Explain about n-step Transition Probabilities.	Understand	5
19	Explain about steady state condition.	Understand	5
20	Explain about Markov Analysis.	Understand	5

OBJECTIVE QUESTIONS (JNTUH)

UNIT - I

1. Suppose a fair six-sided die is rolled once. If the value on the die is 1, 2, or 3, the die is rolled a second time. What is the probability that the sum total of values that turn up is at least 6?

a)	2/3	b)	5/12	c)	10/21	d)) 1	1/	6
----	-----	----	------	----	-------	----	-----	----	---

2. In random exp	eriment, observation	s of random variable a	tre classified as
a) functions	b) trials	c) compositio	on d) events
3. Probability dis	tribution of discrete	random variable is clas	ssified as
a) probability ma	ass function b)) interior mass function	n
c) probat	oility mass function	d) continuous ma	ass function
4. Types of proba	ability distributions b	y taking their function	ns of considerations must
include			
a) posterior prob	ability distribution	b) discrete proba	ability distribution
c) contin	uous probability distr	ribution d) both b	b and c
5. Out of all the	ne 2-digit integers bet	tween 1 and 100, a 2-c	digit number has to be selected at
random. W	hat is the probability	that the selected num	ber is not divisible by 7?
a) 77/90	b) 12/9	0 c) 78/9	d) 13/20
6. Value which is	s obtained by multiply	ying possible values o	f random variable with
probability of	occurrence and is eq	ual to weighted average	ge is called
a) expect	ed value b) weig	thed value c) cum	ulative value d) discrete value
7. Tail or head, o	ne or zero and girl ar	nd boy are examples of	t .
a) complementar	y events b) non complementary (events
c) function	onal events	a) non-functiona	al events
8. If number of	intals are 8 and proba	idinity of success are 0	.65 then mean of negative
probability d	b) 12 21	\sim 8.65	d) 5 20
If two fair coins	are flipped and at les	c) 0.05 ast one of the outcome	u_{j} 5.20
what is the n	robability that both c	outcomes are heads?	s is known to be a head,
a) $\mathbf{R} > 0$	b) $\mathbf{R} > = 0$	c) $R < 0$	d) $R = 0$
10. If value of	of p is 0.60 and value	of n is 3 whereas rand	dom variable x is equal to 4 then
value of	z-score of distributio	on is	······
a) 0.59 t) 1.59	c) 2.59	d) 2.68
11. If X and	Y are independent ra	ndom variable then E((XY)=
12. Let X be	a random variable w	hich is uniformly chos	sen from the set of positive odd
numbers	less than 100.then th	e expectation $E(X)$ is	
. if k is a constar	t then variance(k)=_		
14. A six face	ed fair dice is rolled a	a large no. of times the	e mean of the outcomes is
15. Maximun	n value of a probabili	ity is	
16. The proba	ability of getting a tai	il in tossing a coil is	
17. The mean	of the probability di	stribution of the numb	per on face of a die in throwing
a die is			
18. if $f(x) = A$	x^2 in $0 \le x \le 1$ is a p	robability distribution	function then A=
19. A coin is	tossed 3 times. The p	probability of obtaining	g two heads will be
20 The mean	of the probability di		an of boods abtained in two flins
20. The mean	of the probability di	stribution of the numb	ber of neads obtained in two mps

NIT - II				
1. 2600 application 0.78 then standa	ns for home mortgage a rd deviation of binomi	are received by a b al probability distr	ank and pr ibution is d) 202	robability of approval is
2. The mean of the	binomial distribution	is	u) 202	.0
a) npq	b) nq/p	c) np /q		d) np
3. If the probability	of defective bulb is 0.	.2 then the mean is		
a) 50	b) 80	c) 100		d) 120
4. In a binomial d	istribution p=			
a) q	b) 1+q	c) 1-q		d) none
5. In a negative bina) discrete randomc) discrete negative	omial distribution of p n variable e binomial variabled) d	robability, random b) continuous w iscrete waiting tim	variable i vaiting tim e random	is also classified as le random variable variable
6. In Poisson proba	bility distribution, if va	alue of λ is integer	then distri	ibution will be
a) positive mo	b) bim	odal c)	unimodal	d) negative modal
7. If mean of binon distribution is	nial probability distribu	ition is 25 then me	an of Pois	son probability
a) 25	b) 40	c) 5	0	d) 70
8. A fair coin is toss	ed six times. Find the	probability of getti	ng four he	ads
a) 15/64	b) 5/16	c) 3/10	d) non	ie
9. In binomial proba	bility distribution, suc	cess and failure ge	nerated by	r trial is respectively
denoted by				
a) p-q	b) p+q	c)]	p and q	d) a and b
10. How many possib	ble outcomes are there	for a binomial dist	ribution	
a) 0	b) 1	c) 2	2	d) 3
11. The variance of a	Poisson distribution is			
12. A coin is tossed 3	times. The probability	of obtaining two	heads will	be
13. The mean of Pois	son distribution is			
14. The mean of bino	mial distribution is	·		
15. The value of p in	a binomial distribution	in terms of q is	1	
16. If the mean is 4 and 17. The height of the mean is 4 and 17.	nd variance is 2 of bind	mial distribution t	hen $p=$	
17. The binomial dist	ribution whose mean is	s 5 and variance is	10.18	
18. $p+q=$	in a binomial distric	oution	1	
19. If mean of the bin	omial distribution is 8	and variance is 6 t	nen mode	of this distribution
20. The variance of a	binomial distribution is	S		
NIT - III				
1. If μ is equal to 8 th	en standard deviation of	of exponential prob	pability dis	stribution is
a) 0.125	b) 0.225	c) 0.325	d) 0.425	
2. In normal distribut	ion the mode is equal t	0	,	

a) me	an	b) med	lian	c) a or b	d) a&b		
3. If	z-score of norm	nal distribution	n is 2.5, mear	n of distribu	tion is 45 and standard deviation		
of	normal distribu	tion is 3 then v	alue of x for a	normal dist	ribution is		
a) 37 .	.5	b) 47.5	c) 67.5	d) 97	.5		
4 Co	onsidering norm	al distribution	spread is incr	eased and h	eight of curve is decreased for		
a) sm	aller value of v	ariance b) sm	aller value of s	standard dev	viation		
c) lar	ger value of va	riance d) lar	ger value of st	andard devi	ation		
5 Th	e function $f(x)$ =	kx in 0 < x < 1	s a valid proba	bility densit	\mathbf{v} function if \mathbf{k} =		
2. III a)		b) 2	s u vullu probu	c) 3	d) 4		
6. In	standard norma	l probability d	istribution, z-s	core of dist	ribution will be zero if		
a) x=	= μ	b) $x < \mu$	c) x	> u	d) all of above		
7. If f	$f(\mathbf{x}) = k \exp(-x/5)$),x ≥ 0 is a p 1	obability de	nsity func	tion, then k =		
a) 1/	′3	b) 1/	c) 1/6	5	d) none		
8.	If μ is equal to	25 then value of	of mean for ex	ponential pr	obability distribution is		
a) 0.0	04	b) 0.07	c) 0.	.08	d) 0.40		
0 5	$\mathbf{J} \mathbf{E}(\mathbf{V}) \mathbf{f}_{\mathbf{v}} = \mathbf{I} \mathbf{v}$		· · · · · · · · · · · · · · · · · · ·	$f(w) = \int_{-\infty}^{1} (w) dw$	(x + 1), 2 < x < 4		
9. Fin	Id E(X) for the	probability der	isity function	$f(x) = \begin{cases} 8 \\ 0 \end{cases}$	otherwise		
a)	2.063	b) 3.069	c) 3	.083	d) none		
10. In	a random varia	bles V(aX+b)	=				
a)	aV(X)+b	b) $a^2 V(X)$	c) a ²	$^{2}V(X) + b$	d) none		
11. Th	e mean of gam	na distribution	is	_			
12.The	12. The variance of gamma distribution is						
13. If μ =5 and σ =2the equation of normal distributions is							
14. Tł	14. The mean of exponential distribution is						
15. The area under the whole normal curve is							
16. The distribution in which mean, median, mode are equal is							
17. The variance of exponential distribution is							
18. If X be a normal variate with mean 10 and variance 4 then $p(X < 11) =$							
19. In the standard normal curve the area between $z = -1$ and $z = 1$ is nearly							
20. In	a normal distri	bution mean de	eviation: stand	ard deviation	n=		

UNIT - IV

1.	The value set for α is known as					
	a. 1	the rejection level	b. the acceptance level			
	c. 1	the significance level	d. the error in the hypothesis test			
2.	The	hypothesis that an analyst	is trying to prove is called the			
	a.	elective hypothesis	b. alternative hypothesis			
	c.	optional hypothesis	d. null hypothesis			

- 3. A type II error occurs when
 - a. the null hypothesis is incorrectly accepted when it is false



- b. the null hypothesis is incorrectly rejected when it is true
- c. the null hypothesis is incorrectly rejected when it is true
- d. the test is biased
- 4. Suppose a 95% confidence interval for the proportion of Americans who exercise regularly is 0.29 to 0.37. Which one of the following statements is FALSE?
 - a). It is reasonable to say that more than 25% of Americans exercise regularly.
 - b). It is reasonable to say that more than 40% of Americans exercise regularly.
 - c). The hypothesis that 33% of Americans exercise regularly cannot be rejected.
 - d). It is reasonable to say that fewer than 40% of Americans exercise regularly.
- 5. In hypothesis testing, a Type 2 error occurs when
 - a). The null hypothesis is not rejected when the null hypothesis is true.
 - b). The null hypothesis is rejected when the null hypothesis is true.
 - c). The null hypothesis is not rejected when the alternative hypothesis is true.
 - d). The null hypothesis is rejected when the alternative hypothesis is true.
- 6. By taking a level of significance of 5% it is the same as saying
 - a) We are 5% confident the results have not occurred by chance
 - b) We are 95% confident that the results have not occurred by chance
 - c) We are 95% confident that the results have occurred by chance
 - d) None of the above
- 7. Two types of errors associated with hypothesis testing are Type I and Type II. Type II error is committed when
 - a) We reject the null hypothesis whilst the alternative hypothesis is true
 - b) We reject a null hypothesis when it is true
 - c) We accept a null hypothesis when it is not true
 - d) all the above
- 8. For a random sample of 9 women, the average resting pulse rate is x = 76 beats per minute, and the sample standard deviation is s = 5. The standard error of the sample mean is a)0.557 b)0.745 c)1.667 d)2.778
- 9. Which of the following is true of the null and alternative hypotheses?
 - a) Exactly one hypothesis must be true b) both hypotheses must be true
 - c) It is possible for both hypotheses to be true d) It is possible for hypothesis to be true
- 10. A null hypothesis can only be rejected at the 5% significance level if and only if:
 - a) A 95% confidence interval includes the hypothesized value of the parameter
 - b) A 95% confidence interval does not include the hypothesized value of the parameter
 - c) The null hypothesis is void d) An alternative hypothesis is void
- 11. Null hypothesis is defined as_____
- 12. Alternate hypothesis is defined as_____
- 13. Type II error in hypothesis testing is_____
- 14. A hypothesis is true but rejected this is an error of type_____
- 15. A single tail test is used when _____
- 16. A die is thrown 256 times an even digit turns up 150 times then die is _____



- 17. A die is thrown 100 times an even digit turns up 10 times then die is _
- 18. Random sample of 400 products contains 52 defective items standard error of proportion is_____
- 19. A hypothesis is false but accepted this is an error of type____
- 20. 500 eggs are taken from a large consignment and 50 are found spoiled standard error of proportion is_____

UNIT - V

1.	The collection of all s	ample functions c	constituteso	f a random	n process
	a) statistical mean	b) ensemble	c) variance	;	d)none
2.	A random process can	n be characterized	by avera	ages	
	a) 1	b) 2	c) 3		d)none
3.	Practically, no proces	s is statio	onary		
	a) wide sense	b) normal sense	e c) strict ser	nse	d) none
4.	A stochastic variable	which takes finite	number of values	is called	
	a) discrete	b) continuous	c) gaussiar	1	d) none
5.	A markov process is	if the transition	n probabilities are	independe	ent of time
	a) homogeneous	b) non homoge	eneous c) time hor	mogeneous	s d) none
6.	A markov process is	if the state	space is discrete		
a) :	markov analysis b) m	arkov chain	c) markov recurr	ence d) not	ne
7.	Stochastic process is	also known as	process		
	a) statistic	b) parameter	c) random	l	d) none
8.	A stochastic variable	which takes range	e of values is calle	d	-
	a) discrete	b) continuous	c) gaussiar	1	d) none
9.	In general, the ensem	ble averages and t	ime averages of a	random pr	ocess are
a) 1	moderate b) sa	ime	c) different	d) non	ie
10.	The random process i	s a random variab	le which is	on time	•
a) i	independent	b) dependent	c) statistic	al	d)none
11.	The random process a	t a particular time	instant is a		
12.	A markov process is d	efined as			
13.	The time of absorption	n is			
14.	A markov chain is def	ined as			
15.	The transition probabi	lity is defined as_			
16	A stationary random p	ocess is defined a	IS		
17.′	The recurrence time of	a random process	s is		
18	A random process with	time averages eq	ual to ensemble a	verages is 1	referred to as
	process				
19. J	A markov analysis is d	etined as	c		
20. 1	A true strict sense rand	om process range	s from to		

WEBSITES:

- 1. www.geocities.com/siliconvalley/2151/matrices.html
- 2. www.mathforum.org/key/nucalc/fourier.html
- 3. www.mathworld.wolfram.com
- 4. www.eduinstitutions.com/rec.htm
- 5. <u>www.isical.ac.in</u>
- 6. http://nptel.ac.in/courses/111108066/
- 7. http://nptel.ac.in/courses/111106051/
- 8. http://nptel.ac.in/courses/111102011/
- 9. http://nptel.ac.in/syllabus/syllabus.php?subjectId=111103019

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JOURNALS:

INTERNATIONAL

- 1. Journal of American Mathematical Society
- 2. Journal of differential equations Elsevier
- 3. Pacific Journal of Mathematics
- 4. Journal of Australian Society
- 5. Bulletin of "The American Mathematical Society"
- 6. Bulletin of "The Australian Mathematical Society"
- 7. Bulletin of "The London Mathematical Society"

NATIONAL

- 1. Journal of Interdisciplinary Mathematics
- 2. Indian Journal of Pure and Applied Mathematics
- 3. Indian Journal of Mathematics
- 4. Proceedings of Mathematical Sciences
- 5. Journal of Mathematical and Physical Sciences.
- 6. Journal of Indian Academy and Sciences

LIST OF TOPICS FOR STUDENT SEMINARS:

- 1. Orthogonal trajectory.
- 2. Natural law of growth and decay.
- 3. Newtons law of cooling.
- 3. Evaluation of double and triple integration.
- 4. Geometrical interpretation of curl and divergent.

CASE STUDIES / SMALL PROJECTS:

- 1. Describe about the Quadratic forms and its nature.
- 2. Discuss about the Concept of simple harmonic motion and electrical circuits in detail.
- 3. Describe about the geometrical meaning of double and triple integration.
- 4. Discuss about the orthogonal trajectory with examples.
- 5. Discuss the applicability of vector integral theorem.