FOUR-YEAR UNDERGRADUATE PROGRAM (OLD)

under

THE NEW CURRICULUM AND CREDIT FRAMEWORK, 2022

NEW SYLLABUS

for

STATISTICS

(w.e.f. the academic session 2023-2024)



UNIVERSITY OF NORTH BENGAL

Raja Rammohunpur, P.O. - NBU Campus District - Darjeeling, Pin - 734013, West Bengal, India

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	CREDIT AND HO	OURS						
L	Lecture	1 Credit	1 Hour					
Т	Tutorial	1 Credit	1 Hour					
Р	Practical							
PNLB	Practical Non-Lab Base	1 Credit	2 Hours					
PLB	Practical Lab Based	1 Credit	2 Hours					
	PAPER TYPE							
ТН	Theory							
TH+PNLB	Theory + Practical Non-Lab	Theory + Practical Non-Lab Base						
TH+PLB	Theory + Practical Lab Base	d						

CREDIT & MARK DISTRIBUTION

						Marks Di	stribution
Sl. No.	Course Type		Course Level	Course Credit	Full Marks	Non-practical Based Course (TH)	Practical Based Course (TH+PLB/ TH+PNLB)
1	Major Course	MAJ	100-400	4 (3+1)	75	60+10*+5#	40+20+10*+5*
2	Minor Course	MIN	100-300	4 (3+1)	75	60+10*+5#	40+20+10*+5#
3	Skill Enhancement Course	SEC	100	3 (2+1)	75		40+20+10*+5#
4	Multidisciplinary Course	MDC	100	3	75	60+10*+5*	
5	Value Added Course	VAC	100	4 (3+1)	75		
6	Ability Enhancement Course	AEC	100	2	50		
7	Vocational Course ^{\$}	VOC		4			
* Cont	inuous Evaluation (10 Marks)						
# Clas	s Attendance (5 Marks)						
\$ Optio	onal: In case of Certificate Level/ Diploma	Level Exit					

<u>4-Year</u>	Und	ergra	aduate Statistics Co	<u>ourse S</u>	truc	tur	<u>'e</u>	
			SEMESTER-1					
Paper Code	Paper Level	Paper	Paper Description	Paper Type	Full Marks	Cro L	edit T/P	Page No.
STAMAJ-101	100	MAJ	Descriptive Statistics - I	TH+PNLB	75	3	1	7
STASEC-101	100	SEC	R-Programming: label-1	TH+PLB	75	2	1	9
STAMIN-101	100	MIN	Statistical Methods and Probability-I	TH+PNLB	75	3	1	10
UPOAMDC 11001-11021	100	MDC	MDC-POOL A	TH	75	3		
UBNG/UHIN/UNEP/ USAN/UURD/UEN GAEM10001	100	AEC	MIL Bengali/MIL Hindi/MIL Nepali/MIL Sanskrit/MIL Urdu/Alternative English	ТН	50	2		
UINDVAC 1202A/120B	100	VAC	Understanding India / Digital Marketing	TH	75	4		
			SEMESTER - 2					
Paper Code	Paper Level	Paper	Paper Description	Paper Type	Full Marks	Cro L	edit T/P	Page No.
STAMAJ-102	100	MAJ	Probability and Probability Distributions-I	TH+PNLB	75	3	1	13
STASEC-102	100	SEC	R-Programming: label-2	TH+PLB	75	2	1	15
STAMIN-102	100	MIN	Statistical Methods and Probability-I	TH+PNLB	75	3	1	16
UPOBMDC 12022-12042	100	MDC	MDC-POOL B	TH	75	3		
UENGAEL10001	100	AEC	Compulsory English	TH	50	2		
UENVVAC11001	100	VAC	Environmental Education	TH	75	4		
			SEMESTER-3					
Paper Code	Paper	Paper	Paper Description	Paper	Full	Cr	edit	Page
	Level	Tuper		Туре	Marks	L	T/P	No.
STAMAJ-203	200	MAJ	Descriptive Statistics - II	TH+PNLB	75	3	1	19
STAMAJ-204	200	MAJ	Probability and Probability Distributions-II	TH+PNLB	75	3	1	20
STAMAJ-205	200	MAJ	Linear Algebra and Mathematical Analysis-I	TH+PNLB	75	3	1	21
STASEC-103	100	SEC	R-Programming: label-3	TH+PLB	75	2	1	23
STAMIN-203	200	MIN	Statistical Methods and Probability-II	TH+PNLB	75	3	1	24
UBNG/UHIN/UNEP/ USAN/UURD/UEN GAEM20002	100	AEC	MIL Bengali/MIL Hindi/MIL Nepali/MIL Sanskrit/MIL Urdu/Alternative English	ТН	50	2		

			SEMESTER-4											
	Paper Paper Full Credit Page													
Paper Code	Level	Paper	Paper Description	Туре	Marks	L	T/P	No.						
STAMAJ-206	200	MAJ	Sampling Distribution	TH+PNLB	75	3	1	27						
STAMAJ-207	200	MAJ	Statistical Inference	TH+PNLB	75	3	1	28						
STAMAJ-208	200	MAJ	Numerical Analysis and Mathematical Analysis-II	TH+PNLB	75	3	1	30						
STAMIN-204	200	MIN	Statistical Methods and Probability-II	TH+PNLB	75	3	1	31						
UPOCMDC 24043-24063	200	MDC	MDC-POOL C	TH	75	3								
UENGAEL20002	100	AEC	Compulsory English	TH	50	2								

DETAILED SYLLABUS

SEMESTER-1 (MAJOR, SKILL ENHANCEMENT, AND MINOR COURSES)

Semester-1											
Paper Description	Descriptive S	tatistics - I	Paper Code				STAN	/IAJ-1	01		
Paper (Type)	Major Course (Theory + PNLB)			Credit]	Mark	s	
Paper Level	Class Hours	Sem. End Exam.	L	Т	Р	Total	TH	PRC	CE	ATT	Total
100	5 Hours/week	2 Hours	3		1	4	40	20	10	5	75

Descriptive Statistics - I	3 Credits (3 Hours / week) 45L
Unit 1	3L
Introduction: Definition and scope. Nature of Statistics, Uses of Statistics, and Statistics	stics in relation to
other disciplines, Abuses of Statistics.	
Unit 2	7L
Types of Data: Primary and secondary data. Concepts of population and sample,	, quantitative and
qualitative data, cross-sectional and time-series data, discrete and continuous data.	
Scales of measurement: Nominal, ordinal, interval and ratio.	
Unit 3	10L
Presentation of data: Tabular and graphical. Frequency distributions, cumu	ilative frequency
distributions and their graphical representations. Histogram, Pie chart, Ogive, Bar plo	ot, etc.
Unit 4	25L
Concept of univariate data.	
Measures of Central Tendency: Mean, Weighted mean, Median, Mode, Geomet	ric and harmonic
means, Properties, merits and limitations, relation between these measures.	
Measures of Dispersion: Range, Mean deviation, Variance, Standard deviation	n, Coefficient of
variation, Gini's Coefficient and Lorenz Curve.	
Moments: Moments, Skewness and Kurtosis.	
Quantiles and measures based on them. Box Plot, Outliers.	
Reference Books	
1. Goon, A.M., Gupta, M.K. and Dasgupta, B. (2002): Fundamentals of Statistic	cs, Vol. I& II, 8th
Edn. The World Press, Kolkata.	
2. Miller, Irwin and Miller, Marylees (2006): John E. Freund's Mathematic	al Statistics with
Applications, (7th Edn.), Pearson Education, Asia.	
3. Mood, A.M., Graybill, F.A. andBoes, D.C. (2007): Introduction to the The	eory of Statistics,
3rd Edn. (Reprint), Tata McGraw-Hill Pub. Co. Ltd.	
4. Tukey, J.W.(1977) : Exploratory Data Analysis, Addison-Wesley Publishing	Co.
5. Agresti, A. (2010): Analysis of Ordinal Categorical Data, 2nd Edition, Wil	ey. Freedman, D,
Pisani, R. and Purves, R. (2014): Statistics, 4th Edition, W. W. Norton & Con	mpany.
6. Yule G.U & Kendall M.G. (1950): An Introduction to the Theory of Statistics	s, C Griffin

Descriptive Statistics – I (Practical): List of Practical

1. Diagrammatic representation of data.

2. Problems based on construction of frequency distributions, cumulative frequency distributions and their graphical representations.

- 3. Problems based on measure of
 - i. central tendency
 - ii. dispersion
 - iii. pooled mean, variance and coefficient of variation
 - iv. moments, skewness and kurtosis
 - v. quantiles and measures based on them, construction of box plot

		Semester-	L								
aper Description	R-Programmi	ing: label-1	I	Paper	r Co	de		STAS	SEC-1	01	
Paper (Type)	Skill Enhancer (Theory +	nent Course PLB)		Cr	edit]	Mark	KS	
Paper Level	Class Hours	Sem. End Exam.	L	Т	Р	Total	TH	PRC	CE	ATT	Tota
100	4 Hours/week	2 Hours	2		1	3	40	20	10	5	75
	R-Progr	ramming: label	-1					2	Cree Hours / 30I	dits week)	
		Unit I							5L		
Introduction to	R: What is R? W	/hy R? Advantages	of R	over	othe	er Prog	ramm	ing La	ingua	ges. R	
Studio: R comi	mand Prompt, R sc	cript file, comments	5 – F	land	ing 1	Раскад	es in	R: Ins	stallin	g a R	
Package, Few o	commands to get s	started: installed pac	скаде	S(), I	Раска	age De	escript	10n(),	nelp()), find	
digits Special	Values functions : N	JA Inf and inf	nom	кеуб	oaru	- F1110	ing ie	wer ui	gits of	1 more	
uigns – Special	values functions . Iv	Unit 2							101		
Looding and h	andling Data in P	• Catting and Sattir	a the	Wo	rking	Diroo	tory	gotuv		-	4
dir() P CSV E	Giles Input as a CS	V file Reading a CS	Ig the		ondir	g Direc	Tory –	file Ar	1(), se	ng the	
CSV File Writi	ng into a CSV and E	v me, Reading a Co) V I I	ic, ic	caun	ig the i		inc, Ai	laryZi	ing the	2
		Fycel File									
R-Function: fu	nction definition B	Excel File.	nste()	sum	n) m	nin() n	nax()	sea()	sumn	narv()	
R-Function: fu	nction definition, B	Excel File. Suilt in functions: pa). user-defined fund	uste(),	sum call	ı(), n ing a	nin(), n a funci	nax(),	seq(), calling	sumn a fu	nary(),	
R-Function: furange(), mean() without an argument of the second	nction definition, B), median(), apply() ment, calling a funct	Excel File. Suilt in functions: pa), user-defined func- tion with argument v	uste(), etion, values	sum call	ı(), n ing a	nin(), n a funct	nax(), tion, c	seq(), calling	sumn a fu	nary(),	
R-Function: fur range(), mean() without an argument of the second seco	nction definition, B , median(), apply() ment, calling a funct	Excel File. Suilt in functions: pa), user-defined func- tion with argument v Unit 3	uste(), etion, values	sum call	ı(), n ing a	nin(), n a funct	nax(), tion, c	seq(), calling	sumn a fu 15I	nary(),	
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R-Function: fu range(), mean() without an argun Descriptive Sta for a single Vari	nction definition, B , median(), apply() ment, calling a funct itistics: Spotting Pro- iable - R –Pie Charts	Excel File. Suilt in functions: pa), user-defined func- tion with argument v Unit 3 oblems in Data with s: Pie Chart title and	uste(), etion, values Visua Colo	sum call llizat	i(), n ing a ion: v	nin(), n a funct visually Percen	nax(), tion, c / Chec tages :	seq(), calling king D	sumn a fu 15I Distrib	nary(), inction utions egend,	
R-Function: fu range(), mean() without an argun Descriptive Sta for a single Vari 3D Pie Chart – J	nction definition, B n, median(), apply() ment, calling a funct itistics: Spotting Pro- iable - R –Pie Charts R Histograms – Bar	Excel File. Built in functions: path built in functions: path built argument w Unit 3 Deblems in Data with s: Pie Chart title and Charts: Bar Chart L	uste(), ction, values Visua Colo abels,	sum call llizat rs – S	i(), n ing a ion: v Slice e and	nin(), n a funct visually Percen Colors	nax(), tion, c / Chec tages :	seq(), calling king D and Ch	sumn a fu 15I Distrib nart L	nary(), inction utions egend,	
R-Function: fu range(), mean() without an argun Descriptive Sta for a single Vari 3D Pie Chart – I Data Range, Fre	nction definition, B nction definition, B median(), apply() ment, calling a funct itistics: Spotting Pro- iable - R –Pie Charts R Histograms – Bar equencies, Mean, Me	Excel File. Built in functions: path built in functions: path built argument w Unit 3 built bu	uste(), ction, values Visua Colo abels, ndard	sum call llizat rs – S . Title	i(), n ing a ion: v Slice e and iatio	nin(), n a funct visually Percen . Colors n.	nax(), tion, c / Chec tages : s.	seq(), calling king D and Ch	sumn a fu 15I Distrib hart L	nary(), inction utions egend,	
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R-Function: fu range(), mean() without an argun Descriptive Sta for a single Vari 3D Pie Chart – I Data Range, Free 1. Sandip Raksh	nction definition, B nction definition, B n median(), apply() ment, calling a funct ntistics: Spotting Pro- iable - R –Pie Charts R Histograms – Bar equencies, Mean, Me nit, R Programming	Excel File. Suilt in functions: pa), user-defined func- tion with argument w Unit 3 oblems in Data with s: Pie Chart title and Charts: Bar Chart L edian and Mode, Sta Reference for Beginners, McG	uste(), ction, values Visua Colo abels, ndard es	sum call	i(), n ing a ion: Slice e and iatio Educa	nin(), n a funct visually Percen . Colors n. ation (I	nax(), tion, c / Chec tages : s.	seq(), calling king D and Ch	sumn a fu 15I Distrib nart La ISBN	nary(), inction putions egend, I: 978-	
R-Function: fu range(), mean() without an argun Descriptive Sta for a single Vari 3D Pie Chart – I Data Range, Fre 1. Sandip Raksh 93-5260-455-5.	nction definition, B nction definition, B netion (), apply() ment, calling a funct itistics: Spotting Pro- iable - R –Pie Charts R Histograms – Bar equencies, Mean, Me nit, R Programming	Excel File. Soult in functions: pa built in functions: pa built in functions: pa tion with argument w Unit 3 bblems in Data with s: Pie Chart title and Charts: Bar Chart L edian and Mode, Sta Reference for Beginners, McG	uste(), ction, values Visua Colo abels, ndard es	sum call lizat rs – S Title I Dev Hill F	ion: v Slice e and iatio	nin(), n a funct visually Percen Colors n. ation (I	nax(), tion, c / Chec tages : 3.	seq(), calling king D and Ch	sumn a fu 15I Distrib nart La	nary(), inction putions egend, I: 978-	
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Semester-1											
Paper Description	Statistical Me Probability-I	thods and	Paper Code					STAN	4IN-1	01	
Paper (Type)	Minor (Theory + 1	Minor Course (Theory + PNLB) Credit Ma			Mark	s					
Paper Level	Class Hours	Sem. End Exam.	L	Т	Р	Total	TH	PRC	CE	ATT	Total
100	5 Hours/week	2 Hours	3		1	4	40	20	10	5	75

	Statistical	Methods and Probability-I	3 credits (3 Hours / week)
		Unit 1	10L
Intro	duction: Definition and scope of	of Statistics, concepts of statistical population and sample.	
Data:	quantitative and qualitative, attr	ibutes, variables, scales of measurement - nominal, ordinal,	
interv	al and ratio. Frequency distribut	ion, Presentation: tabular and graphic, including histogram	
		Unit 2	15L
Descr	viptive Statistics: Measure of cen	ntral tendency; measures of dispersion, moments and	
quarti	les, measure of skewness and ku	rtosis for both grouped and ungrouped data.	
		Unit 3	10L
Prob	ability: Introduction, random e	xperiments, sample space, events and algebra of events.	
Defin	itions of Probability - classical,	statistical, and axiomatic. Conditional Probability, laws of	
additi	on and multiplication, independe	ent events, theorem of total probability, Bayes' theorem and	
		Unit 4	10L
Rand	lom Variables: Discrete an	d continuous random variables, p.m.f., p.d.f., c.d.f.	
Illust	rations of random variables a	nd its properties. Expectation, variance, moments and	
mom	ent generating function.		
Sugges	sted Readings		
1.	Goon, Gupta and Dasgupta:	Fundamentals of Statistics, World Press	
2.	Gupta & Kapoor:	Fundamentals of Mathematical Statistics, S Chand	
4.	Kendal and Stuart:	Advanced Theory of Statistics, PHI	
5.	Gupta S C:	Fundamentals of Statistics, Himalaya Publishing	
Hous	e		
6.	Spiegel & Stephens,	Statistics, Mc Graw Hill International	

Statistical Methods and Probability-I (Practical)

List of Practical

1. Preparation of frequency table. Plots of Histogram, frequency polygon and ogive from a set

of given data

2. Measure of central tendency, dispersion, moments, skewness and kurtosis of frequency distribution

3. Application problems based on Classical Definition of Probability.

4. Application problems based on Bayes' Theorem.

DETAILED SYLLABUS

SEMESTER-2 (MAJOR, SKILL ENHANCEMENT, AND MINOR COURSES)

		Semester-2	2								
Paper Description	Probability and Pro Distributions-I	bability	Paper Code S'					ΓΑΜΑ	AJ-10	2	
Paper (Type)	Major Cours (Theory + PN	se LB)	Credit				-	Mark	S		
Paper Level	Class Hours	Sem. End Exam.	L	Т	Р	Total	ТН	PRC	CE	ATT	Tot
100	5 Hours/week	2 Hour	3		1	4	40	20	5	75	
	Probability and I	Probability Dis	trib	utio	ns-l	[3 (3	Crea Hours / 45I	dits week)	
		Unit 1							5L	,	
Probability	: Introduction, randor	n experiments, sar	nple	spac	e, e	vents	and a	lgebra	of e	events.	
Definitions	of Probability – classica	l, statistical, and axi	omat	ic.							
		Unit 2							10I		
Conditional	Probability, laws of a	ddition and multipl	icatio	on, ir	depe	ndent	events	, theor	em o	f total	
probability,	Bayes' theorem and its	applications.									
		Unit 3							15I		
Random va	ariables: Discrete rand	om variables, p.m.f	. and	l c.d.	f., st	atemer	nt of p	oropert	ies of	c.d.f,	
illustrations	and properties of rando	m variables.									
Continuous	random variables, p.d.f	and c.d.f., illustrati	ons a	ind p	roper	ties, u	nivaria	te tran	sform	ations	
with illustra	tions.										
		Unit 4							15I		
Mathemati	cal Expectation: One	Dimensional rando	om va	ariab	le an	d their	r prop	erties.	Prob	ability	
generating f	unction. Moments. Mor	nent generating func	tion.				~				
Standard c	liscrete probability di	stributions: Unifor	m, E	31non	nal,	Poissoi	n, Geo	ometric	, Neg	gative-	
Binomial, H	Typer-Geometric.										
		Reference B	ooks								
1. Goo	on, A.M., Gupta, M.K.	and Dasgupta, B. (2	2002)): Fu	ndam	entals	of Sta	tistics,	Vol.	I& II,	
8th	Edn. The World Press, 1	Kolkata.									
2. Fell	er, W. (1968): An Intro	duction to Probabilit	y The	eory	& its	Applic	cations	, John	Wiley	Ι.	
3. Goo	on, A.M., Gupta, M.K.	& Dasgupta, B. (199	94): A	An O	utline	e of St	tatistic	al The	ory (V	/ol-1),	
Wo	rld Press.										
4. Par	zen, E. (1972): Modern	Probability Theory a	ind it	s Apj	olicat	ions, Jo	ohn W	iley .			
5. Usp	bensky, J.V. (1937): Intr	oduction to Mathem	atical	l Prol	babili	ty, Mc	Graw	H1ll.			
6. Cac	oullos, T. (19/3): Exerc	rises in Probability. I	Naros	sa.							

- 7. Rahman, N.A. (1983): Practical Exercises in Probability and Statistics, Griffen.
- 8. Ross, S. (2002): A First Course in Probability, Prentice Hall.

Pr	obability and Probability Distributions-I (Practical) : List of Practical	1 Credit (2 Hours / week) 30L
1.	Application problems based on Classical Definition of Probability.	
2.	Application problems based on Bayes' Theorem.	
3.	Fitting of Binomial distributions for n and $p = q = \frac{1}{2}$.	
4.	Fitting of Binomial distributions for given n and p.	
5.	Fitting of Binomial distributions after computing mean and variance.	
6.	Fitting of Poisson distributions for given value of mean.	
7.	Fitting of Poisson distributions after computing mean.	
8.	Fitting of Negative-Binomial distribution.	
9.	Fitting of suitable distribution.	
10.	Application problems based on Binomial distribution.	
11.	Application problems based on Poisson distribution.	
12.	Application problems based on Negative-Binomial distribution.	

Semester-2												
Paper Description	R-Programming: label-2			Paper Code				STASEC-102				
Paper (Type)	Skill Enhancen (Theory + PL	nent Course B)	Credit			Marks						
Paper Level	Class Hours	Sem. End Exam.	L	Т	Р	Total	ТН	PRC	CE	ATT	Total	
100	4 Hours/week	2 Hour	2		1	3	40	20	10	5	75	

R-Programming: label-2

Unit 1

2 Credits
(2 Hours / week)
30L
5L

R-Function: function definition, Built in functions: paste(), sum(), min(), max(), seq(), summary(), range(), mean(), median(), apply(), user-defined function, calling a function, calling a function without an argument, calling a function with argument values.

Basic programming using "for", "if", "return", "which" etc.

Unit 2

25L

Probability distribution: Density, distribution function, quantile function and random sample generation from different discrete distribution, Plots for pmf, cdf. Fitting of discrete distributions.

References

1. Sandip Rakshit, R Programming for Beginners, McGraw Hill Education (India), 2017, ISBN: 978-93-5260-455-5.

2. Seema Acharya, Data Analytics using R, McGrawHill Education (India), 2018, ISBN: 978-93-5260-524-8.

3. Tutorials Point (I) simply easy learning, Online Tutorial Library (2018), R Programming, Retrieved from <u>https://www.tutorialspoint.com/r/r_tutorial.pdf</u>.

4. Andrie de Vries, Joris Meys, R for Dummies A Wiley Brand, 2nd Edition, John Wileyand Sons, Inc, 2015, ISBN: 978-1-119-05580-8

R-Programming: label-2 (Computer Practical)	1 Credit (2 Hours / week) 30L
Computer practical based on R-Programming: label-2	

	Semester-2											
Paper Description	Statistical Methods	and Probability-I]	Pape	r Co	de	S	TAMI	N-10	2		
Paper (Type)	Minor Cour (Theory + PN	rse NLB)		С	redit		Mark			S		
Paper Level	Class Hours	Sem. End Exam.	L	Т	Р	Total	ТН	PRC	CE	ATT	Total	
100	5 Hours/week	2 Hour	3		1	4	40	20	10	5	75	
Statistical Methods and Probability-I											edits / week)	
		Unit 1								10	L	
Introduction: D	Definition and scope of	Statistics, concepts	of st	tatisti	ical r	opulat	ion ar	nd sam	ple.			
Data: quantitativ	e and qualitative, attrib	outes, variables, scale	es of	meas	uren	nent - r	nomina	al, ordi	nal,			
interval and ratio	o. Frequency distribution	on, Presentation: tab	ular a	and g	raph	ic, incl	uding	histog	ram			
		Unit 2								15L		
Descriptive Statistics Measure of control tendency measures of dispersion, memorie and												
quartiles measure of skewness and kurtosis for both grouped and ungrouped data												
		Unit 3			oup					10	L	
Probability: Int	roduction, random ex	periments, sample s	pace,	eve	nts a	und alg	gebra	of eve	nts.			
Definitions of Pa	robability – classical, s	statistical, and axiom	atic.	Cone	litior	al Pro	babilit	y, law	s of			
addition and mu	ltiplication, independer	t events, theorem of	total	prob	abili	ty, Bay	es' the	eorem	and			
		Unit 4								10	L	
Random Vari	ables: Discrete and	continuous rando	om v	arial	oles,	p.m.f	., p.d	l.f., c.	d.f.			
Illustrations of	random variables an	d its properties. Ex	pect	atior	n, va	riance	, mon	nents a	and			
moment genera	ting function.											
Suggested Reading	ngs											
1. Goon, G	upta and Dasgupta:	Fundamentals of S	atist	ics, '	Worl	d Pres	S					
2. Gupta &	Kapoor:	Fundamentals of M	lathe	mati	cal S	statisti	cs, S (Chand				
4. Kendal a	nd Stuart:	Advanced Theory	of Sta	atisti	cs, F	ΡΗΙ						
5. Gupta S	C:	Fundamentals of S	atist	ics, l	Hima	ilaya F	Publis	hing				
House												
6. Spiegel &	& Stephens,	Statistics, Mc Grav	/ Hil	l Inte	ernat	ional						

Statistical Methods and Probability-I (Practical)

List of Practical

1. Preparation of frequency table. Plots of Histogram, frequency polygon and ogive from a set

of given data

2. Measure of central tendency, dispersion, moments, skewness and kurtosis of frequency distribution

3. Application problems based on Classical Definition of Probability.

4. Application problems based on Bayes' Theorem.

DETAILED SYLLABUS

SEMESTER-3 (MAJOR, SKILL ENHANCEMENT, AND MINOR COURSES)

Semester-3												
Paper Description	Descriptive Statistics - II			Paper Code				STAMAJ-203				
Paper (Type)	Major Course (Theory + PNLB)			Credit				Marks				
Paper Level	Class Hours	Sem. End Exam.	L	Т	Р	Total	ТН	PRC	CE	ATT	Total	
200	5 Hours/week	2 Hours	3		1	4	40	20	10	5	75	

Descriptive Statistics - II

3 Credits (3 Hours / week)

Bivariate data: Definition, scatter diagram, product moment correlation coefficient, linear regression, principle of least squares

Correlation Index, Correlation Ratio. Intra-class correlation coefficient.

Spearman's Rank correlation and Kendall's Tau (including tie cases).

Analysis of Categorical Data: Contingency table, association of attributes and

different measures, odds ratio, relative risk, Pearson's measure, Goodman-

Kruskal's Gamma

Reference Books

- Goon, A.M., Gupta, M.K. and Dasgupta, B. (2002): Fundamentals of Statistics, Vol. I& II, 8th Edn. The World Press, Kolkata.
- 2. Miller, Irwin and Miller, Marylees (2006): John E. Freund's Mathematical Statistics with Applications, (7th Edn.), Pearson Education, Asia.
- Mood, A.M., Graybill, F.A. andBoes, D.C. (2007): Introduction to the Theory of Statistics, 3rd Edn. (Reprint), Tata McGraw-Hill Pub. Co. Ltd.
- 4. Tukey, J.W.(1977) : Exploratory Data Analysis, Addison-Wesley Publishing Co.
- Agresti, A. (2010): Analysis of Ordinal Categorical Data, 2nd Edition, Wiley. Freedman, D, Pisani, R. and Purves, R. (2014): Statistics, 4th Edition, W. W. Norton & Company.
- 6. Yule G.U & Kendall M.G. (1950): An Introduction to the Theory of Statistics, C Griffin

Descriptive Statistics – II (Practical): List of Practical

1 Credit (2 Hours / week)

1. Karl Pearson correlation coefficient.

- 2. Correlation coefficient for a bivariate frequency distribution.
- 3. Lines of regression, angle between lines and estimated values of variables.
- 4. Spearman's rank correlation.
- 5. Problems related to categorical data

Semester-3													
Paper Description	Probability and Probability Distributions-II			Paper Code				STAMAJ-204					
Paper (Type)	Major C (Theory +	Major Course (Theory + PNLB)			Credit				Marks				
Paper Level	Class Hours	Sem. End Exam.	L	Т	Р	Total	TH	PRC	CE	ATT	Total		
200	5 Hours/week	2 Hours	3		1	4	40	20	10	5	75		

3 Credits

Probability and Probability Distributions-II

(3 Hours / week)

Continuous random variables, p.d.f. and c.d.f., illustrations and properties, univariate transformations with illustrations. Two dimensional random variables: continuous type, joint, marginal and conditional, p.d.f., and c.d.f.. Independence of two variables.

Probability Inequalities: Markov & Chebyshev.

Standard continuous probability distributions: uniform, normal, exponential, Cauchy, beta, gamma, lognormal, logistic, double exponential and Pareto along with their properties and limiting/approximation cases

Two dimensional random variables: discrete type, joint, marginal and conditional p.m.f and c.d.f., statement of properties of c.d.f, independence of variables, trinomial distribution.

Bivariate Normal Distribution(BVN): p.d.f. of BVN, properties of BVN, marginal and conditional p.d.f. of BVN.

Reference Books

- 1. Goon, A.M., Gupta, M.K. and Dasgupta, B. (2002): Fundamentals of Statistics, Vol. I& II, 8th Edn. The World Press, Kolkata.
- 2. Feller, W. (1968): An Introduction to Probability Theory & its Applications, John Wiley.
- 3. Goon, A.M., Gupta, M.K. & Dasgupta, B. (1994): An Outline of Statistical Theory (Vol-1), World Press.
- 4. Parzen, E. (1972): Modern Probability Theory and its Applications, John Wiley .
- 5. Uspensky, J.V. (1937): Introduction to Mathematical Probability, McGraw Hill.
- 6. Cacoullos, T. (1973): Exercises in Probability. Narosa.
- 7. Rahman, N.A. (1983): Practical Exercises in Probability and Statistics, Griffen.
- 8. Ross, S. (2002): A First Course in Probability, Prentice Hall.

	Probability and Probability Distributions-II (Practical) : List of Practical	1 Credit (2 Hours / week)
1.	Fitting of suitable distribution.	
2.	Problems based on area property of normal distribution.	
3.	To find the ordinate for a given area for normal distribution.	
4.	Application based problems using normal distribution.	
5.	Fitting of normal distribution when parameters are given.	
6.	Fitting of normal distribution when parameters are not given.	

Semester-3												
Paper Description	Linear Algebra and Mathematical Analysis-I			Paper Code				STAMAJ-205				
Paper (Type)	Major Course (Theory + PNLB)			Credit				Marks				
Paper Level	Class Hours	Sem. End Exam.	L	Т	Р	Total	TH	PRC	CE	ATT	Total	
200	5 Hours/week	2 Hours	3		1	4	40	20	10	5	75	

Linear Algebra and Mathematical Analysis-I Linear Algebra

3 Credits (3 Hours / week)

Vector spaces, Subspaces, sum of subspaces, Span of a set, Linear dependence and independence, dimension and basis, dimension theorem. Algebra of matrices - A review, theorems related to triangular, symmetric and skew symmetric matrices, idempotent matrices, orthogonal matrices, singular and non-singular matrices and their properties. Trace of a matrix, Adjoint and inverse of a matrix and related properties

Determinants of Matrices: Definition, properties and applications of determinants for 3rdand higher orders, evaluation of determinants of order 3 and more using transformations. Symmetric and Skew symmetric determinants, product of determinants. Use of determinants in solution to the system of linear equations, row reduction and echelon forms, the matrix equations AX=B, solution sets of linear equations, linear independence, Applications of linear equations, inverse of a matrix.

Rank of a matrix, row-rank, column-rank, standard theorems on ranks, rank of the sum and the product of two matrices. Partitioning of matrices and simple properties. Characteristic roots and Characteristic vector, Properties of characteristic roots, Quadratic forms: Classification & canonical reduction. Linear transformation. Applications of Linear Algebra in Statistics.

Mathematical Analysis-I

Representation of real numbers as points on a line. Algebraic, Order and Completeness properties of R (Concepts only). Bounded and unbounded sets, neighbourhood of a point, Supremum and infimum. Functions, Countable, Uncountable sets and Uncountability of R. Sequences and their convergence, monotonic sequences, bounded sequences, squeeze theorem Limits of some special sequences such as n^n , $(1+1/n)^n$, $n^{(1/n)}$, Infinite series, positive termed series and their convergence, Comparison test, ratio test and root test. Absolute convergence of series, Leibnitz's test for the convergence of alternating series, Conditional convergence.

Reference Books

- 1. Lay David C (2000): Linear Algebra and its Applications, Addison Wesley.
- 2. Schaum's Outlines (2006): Linear Algebra, Tata McGraw-Hill Edition, 3rd Edition.
- 3. Krishnamurthy, V., Mainra V.P. and Arora J.L.: An Introduction to Linear Algebra (II, III, IV, V).
- 4. Biswas, S. (1997): A Textbook of Matrix Algebra, New Age International.

- 5. Gupta, S.C (2008): An Introduction to Matrices (Reprint). Sultan Chand & Sons.
- 6. Artin, M (1994): Algebra. Prentice Hall of India.
- 7. Datta, K.B (2002): Matrix and Linear Algebra. Prentice Hall of India Pvt. Ltd.
- 8. Hadley, G (2002): Linear Algebra. Narosa Publishing House (Reprint).
- 9. Searle, S.R (1982): Matrix Algebra Useful for Statistics. John Wiley & Sons.
- 10. Chakraborty, Arnab (2014): Linear Algebra, first edition. Sarat Book House.

Linear Algebra and Mathematical Analysis-I (Practical) : List of Practical	1 Credit (2 Hours / week)
1. Vector dependence and independence	
2. Vector orthogonalization	
3. Rank of a matrix	
4. Singularity and non-singularity of a matrix	
5. Solution of system of homogeneous equations	
6. Solution of system of non-homogeneous equations	
7. Finding characteristic roots and vector of a matrix	
8. Identification of a quadratic forms (like pd, psd, nd, nnd etc.)	

Semester-3												
Paper Description	R-Programming: label-3			Paper Code				STASEC-103				
Paper (Type)	Skill Enhand (Theory	cement Course + PLB)	Credit				Marks					
Paper Level	Class Hours	Sem. End Exam.	L	Т	Р	Total	TH	PRC	CE	ATT	Total	
100	4 Hours/week	2 Hours	2		1	3	40	20	10	5	75	

R-Programming: label-3 Unit 1

2 Credits

(2 Hours / week)

R-Function: function definition, Built in functions: paste(), sum(), min(), max(), seq(), summary(), range(), mean(), median(), apply(), user-defined function, calling a function, calling a function without an argument, calling a function with argument values.

Basic programming using "for", "if", "return", "which" etc.

Unit 2

R as a graphing calculator: Introduction to plotting. Plot (), lines(), abline(). No details about the graphics parameters except colour and line width. Barplot, Pie chart and Histogram. Box plot. Scatter plot and simple linear regression using $lm(y \sim x)$.

Matrix operations in R: Creation. Basic operations. Extracting submatrices.

Loading data from a file: read.table () and read.csv (). Mention of head=TRUE and head=FALSE. Dataframes. Mention that these are like matrices, except that different columns may be of different types.

Problems on discrete and continuous probability distributions, Sampling distribution, Inference and Algebra with Mathematical analysis.

References

1. Sandip Rakshit, R Programming for Beginners, McGraw Hill Education (India), 2017, ISBN: 978-93-5260-455-5.

2. Seema Acharya, Data Analytics using R, McGrawHill Education (India), 2018, ISBN: 978-93-5260-524-8.

3. Tutorials Point (I) simply easy learning, Online Tutorial Library (2018), R Programming, Retrieved from https://www.tutorialspoint.com/r/r tutorial.pdf.

4. Andrie de Vries, Joris Meys, R for Dummies A Wiley Brand, 2nd Edition, John Wileyand Sons, Inc, 2015, ISBN: 978-1-119-05580-8

R-Programming: label-3	(Computer Practical)
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1 Credit

Computer practical based on R-Programming: label-3

		Semester-3	3									
Paper Description	Statistical Me Probability-II	thods and	I	Pape	r Co	de		STAN	1IN-2	203		
Paper (Type)	Minor C (Theory +	course PNLB)		Cı	redit			-	Mark	rks		
Paper Level	Class Hours	Sem. End Exam.	L	Т	Р	Total	тн	PRC	CE	ATT	Total	
200	5 Hours/week	2 Hours	3 1 4 40 20 10							5	75	
Statistical Methods and Probability-II											edits	
Unit 1												
Bi-variate and Multiv	variate Analysis:	Scatter diagram, reg	gressi	on, c	urve	betwe	en two	o varial	bles			
and concept of error i	in regression, prin	ciples of least squa	res; f	fitting	g of	first, s	econd	and th	nird			
degree. Concept of correlation coefficient & its properties, correlation ratio, polynomial regression												
and correlation index.	Rank correlation	coefficient due to	Spea	arma	n an	d Ken	dall. P	artial	and			
		Unit 2										
Analysis of Categor	rical Data: Fund	amental set of freq	uenc	ies, (cons	istenc	y of d	ata;				
Measures of associat	tion and continge	ency-table; Associa	tion	of a	ttrib	utes ar	nd var	ious				
measurement of asso	ociation; Analysis	s of data on two ch	aract	ters a	and 1	three c	haract	ters,				
		Unit 3										
Standard Probab	oility distribu	tions: Uniform,	Binoi	mial,	Poi	sson, H	Iyper-	geome	tric,			
Gamma, Beta, Expone	ential and Normal	Distributions with the	neir p	orope	rties	and us	es. Sta	atemen	t of			
the general properties of	of a bi-variate nori	nal distribution.										
Suggested Readings												
1. Goon, Gupta a	and Dasgupta: F	Fundamentals of St	atisti	cs, V	Worl	d Pres	S					
2. Gupta & Kapo	oor: F	Fundamentals of M	athe	mati	cal S	Statisti	cs, S (Chand				
4. Kendal and St	uart: A	Advanced Theory of	of Sta	tisti	cs, F	PHI						
5. Gupta S C:	F	Fundamentals of St	atisti	cs, I	Hima	alaya F	Publisl	ning				
House												

6. Spiegel & Stephens, Statistics, Mc Graw Hill International

Statistical Methods and Probability-II (Practical)

1 Credit 30L (2 Hours / week)

List of Practical

- 1. Calculation of correlation co-efficient from bivariate data
- 2. Calculation of rank correlation co-efficient from qualitative data
- 3. Fitting of regression line by least square method
- 4. Fitting of binomial distributions
- 5. Fitting of Poisson distributions
- 6. Problems based on area property of normal distribution
- 7. To find the ordinate for a given area for normal distribution
- 8. Fitting of normal distribution

DETAILED SYLLABUS

SEMESTER-4 (MAJOR, SKILL ENHANCEMENT, AND MINOR COURSES)

		Semester-4	4								
Paper Description	Sampling Dis	tribution]	Pape	r Co	de		STAN	/IAJ-2		
Paper (Type)	Major Co (Theory +	ourse PNLB)		C	redit				Mark		
Paper Level	Class Hours	Sem. End Exam.	L	Т	Р	Total	TH	PRC	CE	ATT	Total
200	5 Hours/week	2 Hours	3		1	4	40	20	10	5	75

Sampling Distribution

3 Credits

Discrete Case: Function of discrete random variables and their distributions.

(mainly Binomial and Poission distribution related functions)

Continuous Case: Derivation of the sampling distribution of sample mean and variance for a normal population, standard errors of sample mean, sample variance and sample proportion.

Exact sampling distribution: Definition and derivation of p.d.f. of χ^2 with n degrees of freedom (d.f.), nature of p.d.f. curve for different degrees of freedom, mean, variance, m.g.f., additive property of χ^2 distribution.

Exact sampling distributions: Student's and Fisher's t-distributions, Derivation of its p.d.f., nature of probability curve with different degrees of freedom, mean, variance and limiting form of t distribution.

Snedecor's F-distribution: Derivation of p.d.f., nature of p.d.f. curve with different degrees of freedom, mean, variance. Distribution of 1/(n,m). Relationship between t, F and χ^2 distributions.

Distribution of sample correlation coefficient in the null case.

Order Statistics: Introduction, distribution of the rth order statistic, smallest and largest order statistics. Joint distribution of r-th and s-th order statistics, distribution of sample median and sample range.

Reference Books

- 1. Goon, A.M., Gupta, M.K. and Dasgupta, B. (2003): An Outline of Statistical Theory, Vol. I,4th Edn. World Press, Kolkata.
- 2. Rohatgi V. K. and Saleh, A.K. Md. E. (2009): An Introduction to Probability and Statistics.2ndEdn. (Reprint) John Wiley and Sons.
- 3. Hogg, R.V. And Tanis, E.A. (2009): A Brief Course in Mathematical Statistics. PearsonEducation.
- 4. Johnson, R.A. and Bhattacharya, G.K. (2001): Statistics-Principles and Methods, 4th Edn.John Wiley and Sons.
- 5. Mood, A.M., Graybill, F.A. and Boes, D.C. (2007): Introduction to the Theory of Statistics,3rd Edn. (Reprint).Tata McGraw-Hill Pub. Co. Ltd.
- 6. Hogg R.V. & Craig A.T. (1978): Introduction to Mathematical Statistics, Prentice Hall.
- 7. Casella, G. and Berger R.L (2002). : Statistical Inference, 2nd Edn. Thomson Learning

Sampling Distribution (Practical) : List of Practical

1 Credit (2 Hours / week)

Practical using calculator based on the topic of sampling distribution

		Semester-4	4								
Paper Description	Statistical Infe	erence]	Pape	r Co	de		STAN	/IAJ-2		
Paper (Type)	Major Co (Theory +	ourse PNLB)		C	redit			-	Mark		
Paper Level	Class Hours	Sem. End Exam.	L	Т	Р	Total	TH	PRC	CE	ATT	Total
200	5 Hours/week	2 Hours	3		1	4	40	20	10	5	75

3 Credits

Statistical Inference

(3 Hours / week)

Problems of Statistical Inference: Population & parameter, random sample & statistic, Point and Interval Estimation, Confidence level, Testing of Hypothesis,

Null and alternative hypotheses, level of significance, Type I and Type II errors, their probabilities and critical region. Sampling distribution of a statistic.

Exact tests and confidence intervals: classical and p-value approaches. Binomial proportion(s),Poisson mean(s), Univariate Normal mean (s), standard deviation(s), Standard tests related to Bivariate normal parameters.

Limit laws: Sequence of random variables, convergence in probability, convergence in mean square and convergence in distribution and their interrelations, W.L.L.N. and their applications, De-Moivre Laplace Limit theorem, Statement of Central Limit Theorem (C.L.T.) for i.i.d. variates, applications of C.L.T.

Estimation: Concepts of estimation, unbiasedness, sufficiency, consistency and efficiency. Factorization theorem. Complete statistic, Minimum variance unbiased estimator (MVUE), Rao- Blackwell and Lehmann-Scheffe theorems and their applications. Cramer-Rao inequality (statement and applications) and MVB estimators. Methods of Estimation: Method of moments, method of maximum likelihood estimation, method of minimum Chi-square and statements of their properties

Principles of test of significance: Null and alternative hypotheses (simple and composite), Type- I and Type-II errors, critical region, level of significance, size and power, Most powerful test, uniformly most powerful test, Neyman- Pearson Lemma (statement and proof of sufficiency part only) and its applications to construct uniformly most powerful test, unbiased test (definition only). Likelihood ratio test, properties of likelihood ratio tests (without proof).

Reference Books

- Goon, A.M., Gupta, M.K. and Dasgupta, B. (2003): An Outline of Statistical Theory, Vol. I,4th Edn. World Press, Kolkata.
- 2. Rohatgi V. K. and Saleh, A.K. Md. E. (2009): An Introduction to Probability and Statistics.2ndEdn. (Reprint) John Wiley and Sons.

- 3. Hogg, R.V. And Tanis, E.A. (2009): A Brief Course in Mathematical Statistics. PearsonEducation.
- 4. Johnson, R.A. and Bhattacharya, G.K. (2001): Statistics-Principles and Methods, 4th Edn.John Wiley and Sons.
- Mood, A.M., Graybill, F.A. and Boes, D.C. (2007): Introduction to the Theory of Statistics, 3rd Edn. (Reprint). Tata McGraw-Hill Pub. Co. Ltd.
- 6. Hogg R.V. & Craig A.T. (1978): Introduction to Mathematical Statistics, Prentice Hall.
- 7. Casella, G. and Berger R.L (2002). : Statistical Inference, 2nd Edn. Thomson Learning

Statistical Inference (Practical) : List of Practical	1 Credit
	(2 Hours / week)

- 1. Testing of significance for single proportion and difference of two proportions
- 2. Testing of significance for single Poisson mean and difference of two Poisson means.
- 3. Testing of significance and confidence intervals for single mean and difference of two means.
- 4. Testing of significance and confidence intervals for single standard deviation and difference of two standard deviations.
- 5. Testing of parameters under bivariate normal distribution.
- 6. Unbiased estimators (including unbiased but absurd estimators).
- 7. Consistent estimators, efficient estimators and relative efficiency of estimators.
- 8. Maximum Likelihood Estimation.
- 9. Estimation by the method of moments, minimum Chi-square.
- 10. Type I and Type II errors.
- 11. Most powerful critical region.
- 12. Uniformly most powerful critical region.
- 13. Power curves.
- 14. Likelihood ratio tests for simple null hypothesis against simple alternative hypothesis.
- 15. Likelihood ratio tests for simple null hypothesis against composite alternative hypothesis.

		Semester-4	4								
Paper Description	Numerical Ar Mathematical	alysis and Analysis-II]	Pape	r Co	de		STAN	ЛАЈ-2	08	
Paper (Type)	Major Co (Theory +	ourse PNLB)		C	redit				Mark		
Paper Level	Class Hours	Sem. End Exam.	L	Т	Р	Total	TH	PRC	CE	ATT	Total
200	5 Hours/week	2 Hours	3		1	4	40	20	10	5	75

Numerical Analysis and Mathematical Analysis-II

3 Credits (3 Hours / week)

Numerical Analysis

Numerical Analysis: Polynomials and Difference Tables. Approximation of functions and Weierstrass Theorem (statement). Lagrange and Newton formulae for Interpolation. Trapezoidal and Simpson's 1/3 Rules for approximations of definite integrals. Approximate solutions of Numerical Equations by Fixed-point Iteration and Newton-Raphson methods. Conditions of convergence.

Mathematical Analysis-II

Review of limit, continuity and differentiability. Indeterminate form, L' Hospital's rule. Rolle's and Lagrange's Mean Value theorems. Taylor's theorem with lagrange's form of remainder (without proof). Taylor's series expansions of sinx, $\cos x$, e^x , $(1+x)^n$, $\log(1+x)$. Maxima and Minima of Functions. Successive Differentiation.

Integral Calculus: definite integral (definition). Statements of properties, Fundamental Theorem of Integral Calculus. Improper Integral, Beta and Gamma functions: properties and relationship between them.

Functions of two variables and Partial Derivatives. Maxima and Minima of such Functions. Constrained Maximization and minimization, use of Lagrange Multiplier. Double Integral (intuitive-graphical approach), change of order of integration, transformation of variables and Jacobians (statement of relevant theorems and their uses)

Reference Books

- 1. Scarborough, J.B. (1966): Numerical Mathematical Analysis. Oxford and IBH Publishing.
- 2. Jain, M. K., Iyengar, S. R. K. and Jain, R. K. (2003): Numerical methods for scientific and engineering computation, New age International Publisher, India.
- 3. Mukherjee, Kr. Kalyan (1990): Numerical Analysis. New Central Book Agency.
- 4. Sastry, S.S. (2000): Introductory Methods of Numerical Analysis, 3rd edition, Prentice Hall of India Pvt. Ltd., New Del.
- 5. Scarborough, J.B. (1966): Numerical Mathematical Analysis. Oxford and IBH Publishing.

Numerical Analysis and Mathematical Analysis-II (Practical) : List of
Practical1 Credit
(2 Hours / week)

Practical using calculator based on the topics of Numerical Analysis and Mathematical Analysis

		Semester-4	4								
Paper Description	Statistical Me Probability-II	thods and]	Pape	r Co	de		STAN	/IN-2		
Paper (Type)	Minor Co (Theory + 1	ourse PNLB)		C	redit]	Mark		
Paper Level	Class Hours	Sem. End Exam.	L	Т	Р	Total	ТН	PRC	CE	ATT	Total
200	5 Hours/week	2 Hours	3		1	4	40	20	10	5	75

Statistical Methods and Probability-II

3 credits (3 Hours / week)

Unit 1

Bi-variate and Multivariate Analysis: Scatter diagram, regression, curve between two variables and concept of error in regression, principles of least squares; fitting of first, second and third degree. Concept of correlation coefficient & its properties, correlation ratio, polynomial regression and correlation index. Rank correlation coefficient due to Spearman and Kendall. Partial and

Unit 2

Analysis of Categorical Data: Fundamental set of frequencies, consistency of data; Measures of association and contingency-table; Association of attributes and various measurement of association; Analysis of data on two characters and three characters,

Unit 3

Standard Probability distributions: Uniform, Binomial, Poisson, Hyper-geometric, Gamma, Beta, Exponential and Normal Distributions with their properties and uses. Statement of the general properties of a bi-variate normal distribution.

Suggested Readings

1.	Goon, Gupta and Dasgupta:	Fundamentals of Statistics, World Press
2.	Gupta & Kapoor:	Fundamentals of Mathematical Statistics, S Chand
4.	Kendal and Stuart:	Advanced Theory of Statistics, PHI
5.	Gupta S C:	Fundamentals of Statistics, Himalaya Publishing
Hous	e	
6.	Spiegel & Stephens,	Statistics, Mc Graw Hill International

Statistical Methods and Probability-II (Practical)

1 Credit 30L (2 Hours / week)

List of Practical

- 1. Calculation of correlation co-efficient from bivariate data
- 2. Calculation of rank correlation co-efficient from qualitative data
- 3. Fitting of regression line by least square method
- 4. Fitting of binomial distributions
- 5. Fitting of Poisson distributions
- 6. Problems based on area property of normal distribution
- 7. To find the ordinate for a given area for normal distribution
- 8. Fitting of normal distribution