VIJAYA COLLEGE, R V ROAD, BANGALORE – 560 004

DEAPARTMENT OF STATISTICS

ACADEMIC PLANNER & UNITIZATION OF SYLLABUS, 2024-25 (EVEN SEMESTER)

4th SEMESTER B.Sc, PAPER – 4 (Statistical Inference - I) (56 Hours, 2 Hours of Theory per week)

Month & Year	Session Number	Portions planned for one Hour	RP-3 Hrs NVP-1Hr
FEB-2025	1	Family of distributions, Introduction, definitions	
	2	Location and Scale families of distributions	
	3	**UNIT- 3: Testing of Hypotheses- Introduction**	
	4	Statistical hypotheses - null and alternative,	
MARCH-2025	5	Single parameter exponential family (Definition, Introduction)	
	6	Single parameter exponential family (Problems)	
	7	Simple and composite hypotheses. Type-I and Type-II errors	
	8	Unbiased estimation (Definition and Introduction)	
	9	Unbiased estimation, examples and problems	
	10	Finding unbiased estimators for given PMF/PDF	
	11	test functions. Randomized and non-randomized tests.	
	12	Size, level of significance, Power function, power of tests.	
	13	Consistency (definition and examples)	
	14	Invariance property of consistent estimators, problems	
	15	Critical region, p- value and its interpretation	
	16	Most Powerful (MP) and UMP test.	
	17	Efficiency and relative efficiency. Mean squared error	
	18	Mean squared error for comparison of estimators	
	19	Statement of Neyman-Pearson Lemma and its applications.	
	20	Statement of Neyman-Pearson Lemma and its applications.	
APRIL-2025	21	Sufficient statistics, Definition and Introduction	
	22	Neyman Factorization criterion, Problems	
	23	Statement of Neyman-Pearson Lemma and its applications.	
	24	Statement of Neyman-Pearson Lemma and its applications.	
	25	Fisher's Information function, its significance	

	26	Crammer – Rao Inequality and its applications	
	27	Statement of Neyman-Pearson Lemma and its applications.	
	28	Minimum Variance Unbiased Estimator (MVUE)	
	29	Problems based on MVUE	
	30	**Large and small samples tests of significance**. Tests for single mean,	
	31	Tests for single mean, equality of two means,	
	32	Minimum Variance Bound Estimator (MVBE)	
	33	Problems based on MVBE	
	34	Tests for equality of two means,	
	35	Test of equality of two variances for normal populations.	
	36	Maximum Likelihood Estimation (MLE)	
MAY- 2025	37	Properties of MLE and Computation of MLE	
	38	Tests for proportions.	
	39	Tests for proportions.	
	40	Moment estimators	
	41	Construction of Moment estimators	
	42	**UNIT- 4: Interval Estimation**	
	43	Confidence interval, confidence coefficient,	
	44	Computation of MLE	
	45	Moment estimation, concept, uses examples	
	46	Methods of constructing confidence intervals using pivotal quantities.	
	47	Construction of confidence intervals for mean, difference of two means,	
	48	Construction of confidence intervals for variance	
	49	Construction of confidence intervals ratio of variances,	
	50	Construction of confidence intervals for proportions, difference of two proportions	
	51	Construction of confidence intervals for correlation coefficient	

PRAVEEN N V
Assistant Professor

R PRAKASH
HOD

PRINCIPAL

VIJAYA COLLEGE, R V ROAD, BANGALORE – 560 004

DEAPARTMENT OF STATISTICS

ACADEMIC PLANNER & UNITIZATION OF SYLLABUS, 2024-25 (EVEN SEMESTER)

6th SEMESTER, PAPER – 7 (STAC11-T – Analysis of variance and Design of experiments (Theory))

(60 Hours, 4 Credits, Theory : 4 Hours/week, Lab : 4 Hours/Week/Batch, FAM*: 40, SAM**: 60, Duration of SEA exams : 2 Hours 30 Minutes)

Month & Year	Session Number	Portions planned for one Hour	RP-4 Hrs
FEB-2025	1	Unit 1-ANOVA : meaning & assumptions.	**RP**
	2	models	**RP**
	3	One way ANOVA- basics, model etc.	**RP**
	4	Analysis- estn. Of parameters	**RP**
	5	Sum of Squares, MSS, F cal etc..	**RP**
	6	Expectation of trss and ESS	**RP**
	7	Two-way ANOVA—basics, assumptions	**RP**
	8	Expectation of trss, BSS	**RP**
MARCH-2025	9	Expectation of ESS,.	**RP**
	10	Two-way ANOVA Multiple obs/cell—basics, assumptions	**RP**
	11	Expectation of trss, BSS	**RP**
	12	Expectation of ESS,.	**RP**
	13	Tukey method etc	**RP**
	14	UNIT 2: EXPERIMENTAL DESIGNS	**RP**
	15	Principles of design of experiments.	**RP**
	16	Principles of design of experiments	**RP**
	17	Principles of design of experiments	**RP**
	18	CRD- basics , model and analysis	**RP**
	19	CRD analysis continue	**RP**
	20	RBD design: basics, model, analysis	**RP**
	21	RBD analysis continuation	**RP**
	22	LSD design: basics, model etc..	**RP**
	23	LSD analysis continuation	**RP**

	24	LSD analysis continuation	**RP**
APRIL-2025	25	LSD analysis completion- anova table, inference etc..	**RP**
	26	Estimation of a missing observation in RBD and its analysis.	**RP**
	27	Estimation of a missing observation in LSD and its analysis.	**RP**
	28	DO	**RP**
	29	Introduction to incomplete block designs, BIBD and its analysis, Yuden square designs,	**RP**
	30	Introduction to incomplete block designs, BIBD and its analysis, Yuden square designs,	**RP**
	31	Introduction to incomplete block designs, BIBD and its analysis, Yuden square designs,	**RP**
	32	Introduction to incomplete block designs, BIBD and its analysis, Yuden square designs,	**RP**
	33	Factorial experiments—basic concepts	**RP**
	34	Basic concepts – main and interaction effects,	**RP**
	35	Basic concepts – main and interaction effects, and orthogonal contrasts in 2^2 factorial experiments.	**RP**
	36	Yates' method of computing factorial effects total.	**RP**
	37	Basic concepts – main and interaction effects, and orthogonal contrasts in 2^3 factorial experiments.	**RP**
	38	Yates' method of computing factorial effects total.	**RP**
	39	do	**RP**
	40	Basic concepts – main and interaction effects, and orthogonal contrasts in 2^2 and 2^3 factorial experiments.	**RP**
	41	Yates' method of computing factorial effects total.	**RP**
	42	do	**RP**
MAY-2025	43	Analysis of $2^2$and 2^3factorial experiments in RBD, Need for confounding.	**RP**
	44	Types of confounding - Complete and partial,	**RP**
	45	Confounding in a 2^3 - factorial experiment in RBD and its analysis.	**RP**
	46	Types of confounding - Complete Confounding in a 2^3 - factorial experiment in RBD and its analysis	**RP**
	47	do	**RP**
	48	Partial Confounding in a 2^3 - factorial experiment in RBD and its analysis	**RP**
	49	do	**RP**
	50	Revision of question papers	**RP**
	51	Revision of question papers	**RP**

*** FAM : Formative Assessment Marks**

**** SAM : Summative Assessment Marks**

R PRAKASH

VIJAYA COLLEGE, R V ROAD, BANGALORE – 560 004

DEAPARTMENT OF STATISTICS

ACADEMIC PLANNER & UNITIZATION OF SYLLABUS, 2024-25 (EVEN SEMESTER)

6th SEMESTER, PAPER – 8 (STAC16T – Applied Statistics)
(60 Hours, 4 Credits, Theory : 4 Hours/week, Lab : 4 Hours/Week/Batch, FAM*: 40, SAM**: 60, Duration of SEA exams : 2 Hours 30 Minutes)

Month & Year	Session Number	Portions planned for one Hour	Remarks
FEB-2025	1	Introduction to OR, Various Definitions	**NVP**
	2	Linear Programming Problem, Introduction	**NVP**
	3	Formulation of LPP	**NVP**
	4	**Unit 4: Demography (Vital Statistics)**	**RP**
	5	Graphical method of solving LPP	**NVP**
	6	Special cases	**NVP**
	7	Special cases continued	**NVP**
	8	Sources of demographic data.	**RP**
MARCH-2025	9	Canonical and Standard forms of LPP	**NVP**
	10	Basic, Basic Feasible, Non degenerate solution.	**NVP**
	11	Simplex Method – Applicability	**NVP**
	12	Measurement of Mortality: crude, specific death rates.	**RP**
	13	Simplex Algorithm	**NVP**
	14	Simplex Algorithm (Unique/Multiple/Unbounded/Infeasible)	**NVP**
	15	Big M Method	**NVP**
	16	Measurement of Mortality: standardized death rates. Infant mortality rate, maternal mortality rate.	**RP**
	17	Big M Method continued	**NVP**
	18	Duality in LPP	**NVP**
	19	Writing the Dual when Primal is given (special cases)	**NVP**
	20	Measurement of fertility: crude, age specific, general, and total fertility rates.	**RP**
	21	Transportation problem (TP), Definition, as an LPP	**NVP**
	22	IBFS (NWCR,VAM)	**NVP**

	23	Assignment Problem (AP) Definition, as an LPP	**NVP**
	24	Measurement of fertility: crude, age specific, general, and total fertility rates.	**RP**
APRIL-2025	25	Complete Enumeration vs Hungarian Method	**NVP**
	26	Game theory, Introduction, Definitions	**NVP**
	27	Minimax – Maximin Principle - problems	**NVP**
	28	Reproduction rates,	**RP**
	29	Dominance Rule - problems	**NVP**
	30	Mixed Strategy problem, 2 × 2 problem (Without saddle point)	**NVP**
	31	Graphical method 2 × n problem	**NVP**
	32	Reproduction rates contd.	**RP**
	33	Graphical method m × 2 problem	**NVP**
	34	Index number, Introduction and types	**NVP**
	35	Steps involved in the construction of Index numbers	**NVP**
	36	Life table: Components of a life table,	**RP**
	37	Price and quantity index numbers (various types)	**NVP**
	38	Construction of price and quantity index numbers by various methods	**NVP**
	39	Time Reversal Test (TRT)	**NVP**
	40	Life table: force of morality and expectation of life	**RP**
	41	Factor Reversal Test (FRT)	**NVP**
	42	Consumer Price Index numbers	**NVP**
MAY-2025	43	Steps involved in the construction of Price Index numbers	**NVP**
	44	Construction of a life table. Uses of a life table.	**RP**
	45	Family Budget method and Aggregative expenditure method	**NVP**
	46	Uses and Limitations of CPIN	**NVP**
	47	Introduction to Time series	**NVP**
	48	Construction of a life table.	**RP**
	49	Components of Time series	**NVP**
	50	Method of Moving averages	**NVP**
	51	Method of Least squares (Linear trend equation)	**NVP**
	52	Uses of a life table.	**RP**
	53	Method of Least squares (Second degree trend equation)	**NVP**
	54	Method of Least squares (Exponential trend equation)	**NVP**
	55	Seasonal Indices : Definition and uses	**NVP**
	56	Revision	**RP**

	57	Different methods of constructing Seasonal Indices, Interpretation	**NVP**
	58	Seasonal Indices by Method of Simple averages	**NVP**
	59	Seasonal Indices by Ratio to moving averages	**NVP**
	60	Revision	**RP**
	61	Discussion of previous year's question papers	**NVP**
	62	Discussion of previous year's question papers	**NVP**

*** FAM : Formative Assessment Marks**

**** SAM : Summative Assessment Marks**

PRAVEEN N V

Assistant Professor, Department of Statistics, Vijaya College, R V Road, Bangalore – 560 004

R PRAKASH

DEPARTMENT OF STATISTICS

Academic Year & Semester	2024 – 25, Second (SEP)
Title of the paper	Basic Statistics – II

Month & Year	Session Number	Portions planned for one Hour	RP-3 Hrs NVP-1Hr
FEB-2025	1	Random variables – Definition, types, examples	NVP
	2	**DISCRETE PROBABILITY DISTRIBUTIONS** Discrete uniform distribution. pmf, mean Variance	RP
	3	Bernoulli distribution. pmf, mean Variance	RP
	4	Mgf of Bernoulli distribution	RP
MARCH-2025	5	Probability distribution (Discrete and Continuous)	NVP
	6	Binomial distributions -mean, variance,	RP
	7	m.g.f. ,recurrence relations for moments of Binomial dist.	RP
	8	Poisson distributions -mean, variance,	RP
	9	Expectation and Variance of a Random variable	NVP
	10	m.g.f. ,recurrence relations for moments of Poisson dist.	RP
	11	Mean and variance of Negative-Binomial	RP
	12	MGF of NBD	RP
	13	Higher order Moments of a Random variables	NVP
	14	Joint and Marginal probability distributions	NVP
	15	geometric distribution – mean ,variance	RP
	16	, Lack of memory property of geometric distribution . Hyper geometric distribution–,	RP
	17	mean, variance of HGD	RP
	18	Independence of Random variables	NVP
	19	**UNIT 3: CONTINUOUS PROBABILITY DISTRIBUTIONS** Uniform, distributions – definition through p.d.f.s, mean, variance,	RP
	20	Exponential moments and m.g.f.	RP
APRIL-2025	21	Additive property of Exponential distn.	RP
	22	Moments about Origin & Mean	NVP
	23	Gamma distn. Mean,variance,	RP
	24	Mgf and Additive property of Gamma distn.	RP
	25	Gamma with 2 parameters	RP
	26	Distribution function and its properties	NVP
	27	Beta -1 distribution- mean variance	RP
	28	Beta -2 distribution- mean variance	RP
	29	**Normal distribution**: Chief characteristics of normal distribution ,	RP
	30	Covariance and Correlation coefficient of a Random variable	NVP

	31	Standard normal distribution-definition, median, mode, odd and even ordered moments and m.g.f, linear combination of normal variates.	RP
	32	odd and even ordered moments	RP
	33	m.g.f, linear combination of normal variates.	RP
	34	Moment Generating Function (MGF)	NVP
	35	**UNIT 4: LIMIT THEOREMS AND SIMULATION:** Chebyschev's inequality – proof and its use in approximating probabilities for various discrete and continuous distributions	RP
	36	do	RP
MAY- 2025	37	do	RP
	38	Construction of MGF	NVP
	39	Convergence of Binomial distribution to Normal distribution.	RP
	40	Convergence of Poisson distribution to Normal distribution	RP
	41	Convergence of Gamma distribution to Normal distribution.	RP
	42	Properties of MGF (With proof)	NVP
	43	Statement of central limit theorem and its applications.	RP
	44	Statement of central limit theorem and its applications.	RP
	45	Introduction to simulation. Monte Carlo method	RP
	46	Properties of MGF (With proof)	NVP
	47	Generation of random observations from binomial distribution, simple illustrations.	RP
	48	Generation of random observations from Poisson distribution, simple illustrations	RP
	49	Generation of random observations from exponential distribution, simple illustrations	RP
	50	Derivation of Moments from MGF	NVP
	51	Generation of random observations from Normal distribution, simple illustrations.	RP
	52	Generation of random observations from Normal distribution, simple illustrations..	RP
	53	Revision of model question papers.	RP
	54	Revision of model question papers	NVP
	55	Revision of question papers	RP
	56	Revision of question papers	RP

PRAVEEN N V
Assistant Professor

R PRAKASH
HOD

PRINCIPAL