BHARATHIAR UNIVERSITY; COIMBATORE –641 046
DEPARTMENT OF STATISTICS

M.PHIL - STATISTICS (FULL-TIME / PART –TIME) SYLLABUS –1999-2000 ONWARDS)

PAPER-I
RESEARCH METHODOLOGY

UNIT- 1 : Concept of Research in Statistics – Thesis and Assignment writing.

UNIT- 2 : Probability Models useful in Acceptance Sampling:
Binomial, Poisson, Hypergeometric, Normal, Non-central 't' distributions and their inter-relationships with applications in Acceptance Sampling – various approximations to the above models.

UNIT-3 : Numerical Methods:
Applications of Newton's method of Successive Approximations – Rate of Convergence – Search Procedure for arriving at parameters of a Sampling Plan (Single Concepts only).

UNIT-4 : Evaluation of Probability:
Power Series approach of Summing Probabilities and their applications to Acceptance Sampling – Stochastic Models – Markov chains – Sampling Problem as a Stochastic Processes – Simple Applications

UNIT –5 : Algorithms for Computer Programmes:
Development of Algorithms for usage of Computer Programmes in Acceptance Sampling.
(Steps for obtaining the OC curves and other appropriate curves and for obtaining the parameters of the following plans only)

- Single Sampling Plan
- Double Sampling Plan
- Multiple Sampling Plan
- Sequential Sampling Plan
- Plans for isolated Lots
- MAPD Plans
- Chain Sampling Plans

REFERENCES

Para in the Syllabus	PORTION	Reference Material (representation By symbols)
1.	Concepts of Research – Thesis and Assignment writing	(A)
2.	Binomial,poisson,Hypergeometrics, Normal Non-Central ' t' distribution and their inter-relations and approximations	(B)
3.	Applications of Probability Models	(C)
	Applications of Newton's Method of Successive Approximations and other Numerical Methods – Rate of Convergence Applications to Acceptance Sampling	(D)
	Search Procedure for arriving at parameters of a Sampling Plan	(E)
4.	Evaluation of Probabilities and their applications to Acceptance Sampling	(F)
	Stochastic Models – Markov Chain Sampling Problem as a	(G)
	Stochastic Processes – Simple Applications	(H)
5.	Algorithms for computer Programmes (selected list)	(I)

References relating to Symbols:

(A) i. Reference to Statistics Encyclopaedia, Statistical Theory and Method abstract and different Journals in Statistics.

ii. Jonathan, Anderson et al. (1977), Thesis and Assignment Writing, Wiley Eastern Ltd.

(B) i. Hald,A., statistical theory of Sampling Inspection by Attributes, Academic Press Inc., 1981, 181-225.

ii. Sandiford,P.J., A New Binomial Approximation for use in Sampling from finite Populations, Journal of American Statistical Association, 55, 1960, 718-722.

iii. Burr,I.W., Some Approximate Relationships between Terms of Hypergeometric, Binomial and Poisson Distribution, Communications in Statistics, 1(4), 297-301, 1973.

iv. Pratt, J.W., A Normal Approximation for the Binomial F, Beta and other Common Related Tail Probabilities, Journal of American Statistical Association, 63 1968, 1457-83.

v. Eizenhart, Hastay and Wallis (1957), Technicques of Statistical Analysis, McGraw Hill, London, Chapter 11, Section 11.4.

(C) i. Rokshar,A.E., and Kane, G.E., The effect of Hypergeometric Probability Distribution on the Design of Sampling Plans for Small Lot Sizes, Journal of Industrial Engineering, Nov-Dec 1959, pp 467 –69.

ii. Stephens, L.J., A Closed form Solution for Single Sampling Acceptance Sampling Plans, Journal of Quality Technique, 10(4), 1978, pp.159-63.

(D) i. Vilenkin., N.Ya., Method of Successive Approximations, Mir Publishers, Moscow, I Edition, 1979.

ii. Soundararajan, V., Procedures and Tables for Construction and Selection of Chain Sampling Plans (ChSP-1), Parts I and II, Journal of Quality Technique 10, (2,3), 1978, 56-60 and 99-103 (application of numerical methods only).

(E) i. Schilling, E.G., Acceptance Sampling in Quality Control, Marcel Dekker Inc., New York, pp. 119-121.

ii. Guenther, W.C., Use of Binomial, Hypergeometric and Possion Tables to Obtain Sampling Plans, Journal of Quality Technique, 1, 1969, 105-109.

iii. Guenther, W.C., A Sample Size Formula for Hypergeometric, Journal of quality Technique,5,1973, pp. 167-170.

iv. Guenther, W.C., A Procedure for Finding Double sampling for Attributes, Journal of Quality Technique, 2, 1970, pp. 219 –225.

(F) i. Cambell, G.A., Probability Curves Showing Poission's Exponential Summation Bell systems Technical Journal, 2, pp.95-112, 1922.

ii. Dodgem H.F., A Sampling Inspection for Continuous Production, Annals Mathematical Statistics, 14, 1943, pp.264-79, (Power Series Approach only).

(G) i. Parzen,E., Stochastic Process, Holden Day Inc., San Francisco, 1962, (Markov Chains only)

(H) i. Burnett, T.L., Markov Chains and Attributes Sampling Plans, IBM Technical Report No.67, pp. 825-2175, IBM Federal Systems Division, Owege, New York 1967.

ii. Burges, A.R., Wilson, E., Multiple Sampling Plans Viewed as Finite Markov Chains, Technometric, 13, 1971, pp. 371-383.

(I) i. Schilling, E.G., Grasp – A General Routine for Atribute Sampling Plan

Evaluation, Journal of Quality technology, 10, 1978, pp. 125-130.

ii. Hughes, H.A., Dickinson, P.C., and Chow, D.A., A Computer Programme for the Solution of Multiple Sampling Plans, Journal of Quality Technology, 5, January 1973.

iii. Chow, B., Dinckinson, C., Hughes, H.A., A Computer Programme for the solution of Double Sampling Plans, Journal of Quality Technology, 4,1972, pp. 205-209.

iv. Nelson, P.R., A Computer Programme for MIL-STD-414 Sampling Procedure and Inspection by Variables for percent defective, Journal of Quality Technology, 9, 1977, pp. 82-86.

v. William, A., Hailey, Minimum Size single Sampling Plans, ASQC Annual Tech. Congr.Trans., San Franciswco, pp. 1108-1155, 1981.

vi. Snyder, D.C. and Storer, R.F (1972), Single Sampling Plans given and AQL-LTPD, Producer's and Consumer's Risk, Journal of Quality Technology, 4(3), p[p. 168-171.

BHARATHIAR UNIVERSITY; COIMBATORE –641 046
DEPARTMENT OF STATISTICS

M.PHIL - STATISTICS (FULL-TIME / PART –TIME) SYLLABUS –1999-2000 ONWARDS)

PAPER- II

STATISTICAL INFERENCE

UNIT - 1 : Some examples and definition concerning testing of Statistical hypothesis. An Outline for hypothesis testing. Randomized tests and critical functions. Sufficient Statistics and most powerful tests. Uniformly most powerful tests. Neyman – Pearson fundamental lemma. Distributions with monotone likelihood ratio. Unbiased tests. Likelihood ratio tests.

UNIT - 2 : Loss function, Risk function, Bayes and Minimax estimators, Pitman estimator, Admissibility of estimators

UNIT - 3 : Derivation of expected mean squares in analysis of variance of fixed, random and mixed models.

UNIT - 4: Incompletely specified models. Theoretical background for pooling procedures.
Review of literature. Examples illustrating the use of preliminary tests of significance. Formulation (only) of sometimes pool test procedures in analysis of variance of two-stage and three-stage nested designs.

UNIT-5: Derivation of power Function of Test Procedure based on a preliminary tests in a two-stage nested design with a Random Model. Confidence Limits for Mean and Variance using Preliminary tests of significance.

REFERENCES :

Para in the Syllabus	PORTIONS	Reference material (representation by numbers)
a.	Some Examples and Definiations concerning testing Statistical Hypothesis : An Outline for Hypothesis Testing	(1), (2)
b.	Randomised Tests and Critical Function	(3)
c.	Sufficient Statistics and most Powerful Tests, Uniformly Most Powerful Tests, Neyman-Pearson Fundamental Lemma, Distributions with Monotone likelihood ratio .	(2), (3), (4)
d.	Unbiased Tests, Likelihood Ratio Tests	(5)
e.	Loss Function: Risk Function, etc (II Para)	(3)
f.	Derivation of Expected Mean Squares in Analysis of Variance of Fixed, Random and Mixed Models	(6), (7)
g.	Incompletely Specified Models, Theoretical background for Pooling Procedures	(8)
h.	Review of Literature	(9) (10)
i.	Examples illustrating the use of PTS	(8) (9)
j.	SPT Procedures in ANOVA of two-stage and three-stage Nested Design	(11), (12),(13),(14)
k.	Derivation of Power Function of a Test Procedure in a two-stage Nested Design with a Random Model.	(15)
I.	Confidence Limits for Mean and Variance using PTS	(16)

References relating to numbers:

(1) Gunther, W.C(1973): Concepts of Statistical Inference , McGraw-Hill, Inc.

(2) Hogg.R.V. and Craig,A.T.(1970): Introduction of Mathematics Statistics, The Macmillon Co, New York.

(3) Mood,A.M., Grabill, F.A., and Boes, D.C.,(1974): Introduction to the Theory of Statistics, McGraw-Hill, Inc.

(4) Lehmann, E.L.,(1959): Testing Statistical Hypothesis, John Wiley and Sons, Inc., NewYork.

(5) Saxena H.C. and Surendran P.U.(1973): Statistical Inference, S.Chand and Co(P) Ltd, New Delhi.

(6) Lowell wine,R(1964): Statistics for scientist and Engineers, Prentice Hall, Inc. USA

(7) Montogomary, D.C.,(1976): Design and Analysis of Experiments, John Wiley and Sons, Inc., New York.

(8) Bozivich, H., Bancroft,T.A., Hartely, H.O., and Huntsberger,D.V.,(1956): Analysis of Variance Preliminary Tests, Pooling and Linear Models, WADC Technical Report, Vol.1.

(9) Bancroft,T.A.,(1964): Analysis and Inference for Incompletely Specified models involving the use of preliminary tests of significance, Biometric, 20,pp.427-442.

(10) Bancroft,T.A., and Han,C.p.,(1977): Inference based on Conditional Specification: A Note and a Bibiliography, International Statistical Review, 45, pp.117-127.

(11) Paul.A.E.,(1950): On Preliminary Tests for Pooling Mean Square in the Analysis of Variance, annals of Mathematical Statistics, 21, pp.539-556.

(12) Gupts V.P. and Srivastava S.R.,(1969): Bias and Mean Square of an Estimation procedure after two Preliminary /tests of Significance in ANOVA Model I, Sankhya Series A, 31, pp.319-332.

(13)Saxena,K.P. and Srivastava, S.R., (197): Inference for a Linear Hypothesis Model using two Preliminary Tests of Significance, Bulletin of Mathematical Statistics, 14, pp.83-102.

(14) Rao,C.V., and saxena,K.P.,(1979): A Study of Power of a Test Procedure based on two preliminary tests of Significance, Estadistica,33,pp.201-214.

(15) Bozivich, H., Bancroft,T.A., and Hartely, H.o.,(1956): Power of Analysis of Variance Tests Procedure for Certain Incomplete Specified Models, Annals Of Mathematical Statistics, 27,pp.1017-1043.

(16) Bennet,B.M.,(1955): On the use of Preliminary Tests in Certain Statistical Procedures, Annals Of Mathematical Statistics,8, pp.45-52