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Surat - 395 007.

M.A. : STATISTICS

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Paper No	Title of the paper	Marks		
		Int.	Ext.	Total
VI	Testing of Hypotheses & Decision Theory	30	70	100
VII	Linear Models & Design of Experiments	30	70	100
VIII	Mathematical Economics & Econometrics	30	70	100
IX	Operations Research	30	70	100
X	Introduction to Statistical Software	30	70	100
Practical paper-III	Practical Paper- III based on theory papers using statistical software	30	70	100
Practical paper-IV	Practical Paper- IV based on theory papers using statistical software	30	70	100
Project	At Some industry / firm /organization	Report 100	Viva 50	--
Viva – Voce		30	70	100
Total		390	560	950

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PAPER VI

TESTING OF HYPOTHESES& DECISION THEORY

Section-B : TESTING OF HYPOTHESES

Stating the problem of testing of hypotheses as a special case of general decision problem. Simple and composite hypotheses, Critical function and critical region, randomized test, non –randomized test, size of the test, Power function of a test. Generalized Neyman –Pearson's Lemma, Most Powerful test and Uniformly most Powerful test. UMP tests for families of distributions admitting monotone likelihood ratio, two sided hypotheses, use of least favourable distribution.

Unbiased ness for testing of hypotheses. Similar test.

Invariance in testing of hypotheses.

Wilks - Likelihood ratio test for simple and composite hypotheses.

Sequential testing of hypotheses.

REFERENCES

1. Furguson T.S.: "Mathematical Statistics"; Academic Press.
2. Kendall M.G. and Stuart A.: "The Advanced Theory of Statistics"; Vol. 2, Ed. IV, Charles and Griffin.
3. Lehman E.L.: "Testing Statistical Hypotheses"; Wiley Eastern.
4. Mood A.M., Grabill F. and Boes D.C.: "Introduction to the Theory of Statistics"; McGraw Hills, International Student Ed. III.
5. Rao C.R.: "Linear Statistical Inference and its Applications"; Wiley Eastern, EdII.
6. S. Wilkes: "Mathematical Statistics", Wiley New York.
7. S. Lacks: "The Theory of Statistical Inference"; Wiley New York.
8. Goon A. M., Gupta M. K. and Dasgupta B.: "An Outline of Statistical Theory" Vol.1, 2; World press.
9. Rohatgi V.K.: "Introduction to Probability Theory and Mathematical Statistics"; Wiley Eastern.

Section II : DECISION THEORY

Review of basic elements of statistical decision problem. Various inference problems viewed as decision problems. Generalized Bayes and extended Bayes rules.

Natural ordering of decision rules. Complete and essentially complete classes of decision rules. Admissibility of Bayes rules. Existence of Bayes decision rules and of Minim ax complete class when parameter space is finite and the risk set is closed and bounded from below.

Invariant decision problems, Invariant decision rules. Admissible minim as invariant rules.

Introduction to non-parametric test.

REFERENCES

1. Berger J.O.: “Statistical Decision Theory”; Springer –Verlag Pub. Co., New York.
2. Gibbons J.D.: “Nonparametric Statistical Inference”; McGraw Hills.
3. Ferguson T.S.: “Mathematical Statistics”; Academic Press.
4. Kendall M.G. and Stuart A.: “The Advanced Theory of Statistics”; Vol. 2., Ed. IV, Charles and Griffin.
5. Mood A.M., Grabill F. and Boes D.C.: “Introduction to the Theory of Statistics”; McGraw Hills, International Student Ed. III.
6. Sedney Segial : “Nonparametric Methods for Behavioral Sciences”; McGraw Hill.
7. Gibbons J.D. and Pratt J.W.: “Concepts of Nonparametric Theory”; Springer-Verlag**.**
8. Daniel W.W.: “Applied Nonparametric Statistics”; PWS-KENT publishing Co., Boston.
9. Conover W.J.: “Practical Nonparametric”; John Wiley.
10. Wald A.: “Sequential Analysis”; Wiley.

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PAPER VII

LINEAR MODEL& DESIGN OF EXPERIMENT

Section I: LINEAR MODEL

The general linear model: Gauss-Mark off set up, estimation of its parameters, least squares, and generalized least squares, Normal equations and least squares estimates. Estimation of linear parametric function, variance and co variances of least squares estimates, estimation of error variance, estimation with correlated observations, least square, estimates with restrictions on parameters, simultaneous estimates of linear parametric functions, Canonical form of the linear hypothesis model and Error and Estimation spaces.

Estimation of scale parameter in the general linear model by quadratic functions. Tests of hypotheses regarding parameters of a general linear model, tests involving linear functions of parameters, tests of sub hypotheses.

REFERENCES

1. Rao C.R. : “Linear Statistical Inference and its Applications”; 2nd Ed., John Wiley and Sons, Inc.
2. Searle S.R.: “Linear Models”.
3. Seber G.A. F.: “Linear Regression Analysis”.
4. Graybill F. A.: “An Introduction to Linear Statistical Models”.
5. Kshirsagar A.M.: “A Cause in Linear Models

Section II: DESIGN OF EXPERIMENT

General theory of analysis of experimental designs with one way elimination of heterogeneity (intrablock analysis only).

General properties of incomplete block design; Balanced incomplete block design and related designs, resolvable and affine resolvable BIB designs, partially balanced incomplete block designs with two associated classes.

General theory of analysis of experimental designs with two way elimination Ofheterogen (intrablock analysis only); you den square and Crossover design.

Missing plot technique. General theory of symmetric factorial experiments; concepts of total and partial confounding and 2n and and 3n confounded experiments.

Construction of (i) orthogonal Latin squares, (ii) Balanced incomplete block designs using finite geometries and (iii) total and partially confounded symmetric factorial experiments.

REFERENCES

1. Chakraborti M.C.: “Mathematics of Design of Experiments”.
2. Dey Aloke: “Theory of Block Designs”.
3. Raghva Rao D.: “Construction and Combinatorial Problems in Design of Experiments”.
4. Kempthorme O.: “The Design and Analysis of Experiments”.
5. Federer W.T.: “Experimental Designs”.
6. Das M. N. and Giri N.: “Design and Analysis of Experiments”.
7. Ogawa J.: “Statistical Theory of the Analysis of Experimental Designs”.
8. John P.W.M.: “Statistical Design and Analysis of Experiments”.
9. Joshi D. D.: “Linear Estimation and Design of Experiments”

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PAPER VIII

MATHEMATICAL ECONOMICS& ECONOMETRICS

Section I : MATHEMATICAL ECONOMICS

1. Input – Output Analysis :
2. Growth Models:
3. Time Series Analysis:
4. . Box-Jenkins Models, Introduction to Autoregressive (AR) Models, Moving Average (MA) Models, Mixed Autoregressive Moving Average (ARMA) Models; Autoregressive Integrated Moving Average (ARIMA) Models. Properties of these models. Forecasting Techniques.

REFERENCES

1. Kendall M. : "Time Series"; Charles Griffin and Company.
2. Box and Jenkins: "Time Series Analysis: Forecasting and Control"; Holden Day Pub.
3. Chatfield C.: "The Analysis of Time Series: Theory and Practice"; Chapman and Hall.
4. Waller Vancuels : "Applied Time Series and Box Jenkins Models".
5. Karmel .P.H.: "Applied Statistics for Economics".
6. Sen A.K.: "Growth Economics": Penguin Modern Economic Reading Edition.
7. Pillai S.: "Economic & Business Statistics"; Progressive Corporation Pvt. Ltd.
8. Mukhopadhyay P.: "Applied Statistics"; New Central Book Agency (P) Ltd.
9. Gupta S.C. and Kapoor V.K.: "Fundamentals of Applied Statistics"; Sultan Chand & Sons.

Section II : ECONOMETRICS

The nature and role of econometrics, Introduction to econometric models.
Single Equation method:
Multicolinearity:
Generalized least square method, Heteroscedastic disturbances, grouping of observations.
Autocorrelation:
Simultaneous Equation method:
Estimation methods:

REFERENCES

1. Apte P.G.: “Text Book of Econometrics”; Tata McGraw Hill.
2. Chatterjee and Price B.: “Regression Analysis by Example”; John Wiley & Sons.
3. Cramer: “Empirical Econometrics”; North Holland.
4. D.Gujarati: “Basic Econometrics”; McGraw Hill.
5. Intrilligtor H.D.: “Econometric Methods, Techniques and Applications”; Prentice Hall Pub. Co.
6. J.Jonston: “Econometric Methods”; McGraw Hill, Kogakusha Ltd.
7. Klein L.R.: “An Introduction to Econometrics”; Prentice Hall of India.
8. Kontsoyiannis A.: “Theory of Econometrics”; Mac Millan press.
9. Malinvad E.: “Statistical Methods in Econometrics”; North Holland.
10. Theil H. C.: “Introduction to the Theory and Practice of Econometrics”; John Wiley.
11. C. F. Charist : “Econometric Models and Methods”; John Wiley

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PAPER IX

Section I: OPERATIONS RESEARCH

1 Linear Programming:
2 Duality:
3 Transportation and Assignment Problems:
4 Inventory Management Systems:
5. Game Theory:

Section II: OPERATIONS RESEARCH

1. Sensitivity Analysis:
2. Integer Programming:
3. Replacement Theory:
4. PERT / CPM:
5. Sequencing:
6. Goal Programming:

REFERENCES

1. K. Swarup, Gupta P.K. and Man Mohan: “Operations Research”; S.chand & Co., New Delhi.
2. G. Hadley: “Linear Programming”; Oxford & IBH Pub. Co.
3. Murthy K.G.: “Linear and Nonlinear Programming”.
4. Kasana H.S. and Kumar K.D.: “Introductory Operations Research”; Springer.
5. Kapoor V.K.: “Operations Research”; S.Chand & Co., New Delhi.
6. Sharma S.D.: “Operations Research”; Kedar Nath Ram Nath & Co. Publishers, Meerut

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PAPER X

INTRODUCTION TO STATISTICAL SOFTWARES

Introduction and use of Mat lab, SYSSTAT, SPSS and other such statistical packages for analysis of practical problems.

Mat lab

Introduction:

Plotting:

Branching statement and program design:

Loops:

.User defined function:

SPSS

Introduction to SPSS

Preparing data for SPSS:

Procedure Statistics for Data Analysis:

REFERENCES

1. Chapman Stephen: "Mat lab programming for engineers"; Thompson Learning.
2. Rudra Pratap: "Getting started with Mat lab"; Oxford university press.
3. Marques J.P.: “Applied Statistics using SPSS, Statistica and Mat lab”; Springer-Verlag, London.
4. Miller R. L., Ciaran Acton and Fullerton D. A., John Malthy: "SPSS for Social Scientists”; Palgrave Macmilan.
5. Wagner W. E. III: “Using SPSS for Social Statistics and Research Methods;Wagner.
6. Einspruch E. L.:"An Introductory Guide to SPSS for Windows”; Einspruch .
7. Pandya K. and Bulsari S.: “Enjoy Statistics with SPSS for Windows”; Popula
8. Gaur A. S. and Gaur S. S.: "Statistical Methods for Practice and Research-A guide to data analysis using SPSS”; Gaur and Gaur.

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