

M.Com.-II (STATISTICS) SYLLABUS

W.E.F. JULY, 1994

PAPER-I OPERATIONS RESEARCH

1. Linear Programming problems.
 - 1.1 Introduction
 - 1.2 Formulation of L.P.P.
 - 1.3 Graphical method for solving linear programming problems. Technique of simplex method (upto three variables). slack & Surplus variables, Big M-Method, Artificial variables.
 - 1.4 Problems.
2. Transportation problem.
 - 2.1 Introduction.
 - 2.2 Transportation problem table.
 - 2.3. Methods for obtaining an initial basic feasible solution.
 - 1) The North west corner rule (ii) The Matrix minimum method.
 - iii) Vogel's approximation method. Modified Distribution Method (U.V.Method) for optimization. Balanced & Unbalanced T.P. problems.
 - 2.4 Problems.
3. Sequencing.
 - 3.1 Sequencing problems with n job tea machines.
 - 3.2 Optimal sequence algorithm problems with n jobs 3 machines.
 - 3.3 Problems.
4. Network scheduling by PERT/CPM.
 - 4.1 Basic concepts.
 - 4.2 Activities, node, network, critical path,
 - 4.3 Constrains in network.
 - 4.4 Construction of network. Time calculation in network critical path.
 - 4.5 Programme evaluation and review technique (PERT).
 - 4.6 PERT calculations Probability of meeting the schedule time.

BOOKS RECOMMENDED.

- 1) Operations Research by Kanti Swarup, Hira & Gupta.
- 2) Operations Research by H.A. Tala.
- 3) First course in linear programming - Jain Agrawal.
- 4) Operations Research - Goel & Mittal.

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PAPER-II DESIGN OF EXPERIMENTS

1. Introduction.
 - 1.1 Terminology in experimental Designs.
 - 1.2 Principles of an experimental designs.
Randomisation, replication and local control.
2. Completely randomised design (C.R.D.)
 - 2.1 Some examples and problems.
3. Randomised block design (RBD)
 - 3.1 Introduction.
 - 3.2 Statistical analysis of R.B.D. for one observation per unit.
 - 3.3 Examples and problems.
4. Latin square Design (L.S.D.)
 - 4.1 Introduction.
 - 4.2 Layout of L.S.D.
 - 4.3 Advantages and Disadvantages of L.S.D.
 - 4.4 Problems.
5. Efficiency of Design.
 - 5.1 Efficiency of RBD over CRD.
 - 5.2 Efficiency of LSD over RBD & CRD
6. Missing plot technique.
 - 6.1 R.F.D. with one missing.
 - 6.2 L.S.D. with one missing
 - 6.3 Problems.

BOOKS

- 1) Fundamentals of Applied Statistics - S.C. Gupta & V.K. Kapoor.
- 2) The Design & Analysis of Expts - Kempthorne.
- 3) Experimental Designs - Cochran & Cox.
- 4) Designs of Experiments - Das & Giri.

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Paper-III STATISTICAL INFERENCE, SAMPLING THEORY, AND OFFICIAL STATS.

1. Problem of estimation.
 - 1.1 Point estimation.
 - 1.2 Properties of estimators (i) Unbiasedness, (ii) Consistency (iii) Sufficiently (iv) efficiently.
 - 1.3 Problems based on Bernoulli, Binomial, Poisson, Geometric, Normal, Exponential & Gamma, distribution.
 - 1.4 Interval estimation.
(1- α)% confidence interval for mean, proportion.
 - 1.5 Examples and problems.

2. Testing of hypothesis.
 - 2.1 Simple and composite hypothesis.
 - 2.2 Errors of two kinds, critical region, level of significance.
 - 2.3 Computation of errors of two kinds (simple problems).
 - 2.4 Test of significance (One tailed test) for testing of hypothesis

i) $H_0 : \mu = \mu_0$	V/s $H_1 : \mu \leq \mu_0$	Large and Sample test. Large sample test only
ii) $H_0 : \mu_1 = \mu_2$	V/s $H_1 : \mu_1 \leq \mu_2$	
iii) $H_0 : P = P_0$	V/s $H_1 : P \leq P_0$	
iv) $H_0 : P_1 = P_2$	V/s $H_1 : P_1 \leq P_2$	
v) Paired t test.		
 - 2.5 χ^2 test of Goodness of fit, independence of two or more attributes.
 - 2.6 Examples.

3. Non-Parametric test.
 - 3.1 Run test, sign test, wilcoxon signed rank test, median test Mann-Whitney test. Kolmogorev Smirnov test.
 - 3.2 Examples and problems.

4. Sampling Design.
 - 4.1 Introduction.
 - 4.2 Methods of sampling.
 - i) Simple random sampling without and with replacement
 - ii) Stratified random sampling.
 - iii) Systematic sampling.
 Verification of unbiasedness of mean and variance for simple random sampling method.
 - 4.3 Estimation of population mean and population total for simple random sampling method.
 - 4.4 Examples.

5. Sample surveys.
 - 5.1 Problems in planning, execution and analysis of sample surveys.
 - 5.2 Sampling units, frame, questionnaire, requirements of good questionnaire.
 - 5.3 Sampling and non-sampling errors.
6. Official statistics.
 - 6.1 National Income.

Concept^{pt} of national Income, methods of estimating national Income. Gross National product, Income and expenditure method and social accounting method.
 - 6.2 Life tables.

Explanation of various functions of life table and their interrelationships, simple examples and problems.
 - 6.3 Census.

Methods of census de facto and de jure method, Important findings of 1981 and 1991 census.

BOOKS RECOMMENDED.

- 1) Mathematical statistics by Hogg and Craig.
- 2) Introduction to the theory of statistics.
by Mood, Graybill and Boes.
- 3) Sampling techniques by V.G. Cochran.
- 4) Fundamentals of applied statistics
by Gupta & Kapoor.
- 5) Mathematical statistics by Gupta and Kapur.
- 6) Fundamentals of statistics by S.P. Gupta.

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