

S.K.S.D. MAHILA KALASALA, UG & PG (AUTONOMOUS), TANUKU

(Grant-in-Aid Institution, Affiliated to Adikavi Nannaya University)

Re-accredited by NAAC with 'B++' Grade at 2.82 CGPA

BOARD OF STUDIES : 2022-2023

DEPARTMENT OF STATISTICS

The Board of Studies meeting was held on 12.09.2022 at 11.00 A.M. in the Department of **Statistics**.

Chair person	:	Sri. Ch. Naga Raju HOD, Department of Statistics
Members	:	Smt. A. Deepthi Lecturer in Statistics
University Nominee	:	Smt. R. Lakshmi Syamala HOD in Statistics Department C.R.R College for women's, Eluru
Subject Expert	:	Smt. A. Suhasini HOD in Statistics SDM Siddartha Mahila Kalasala, Vijayawada
Subject Expert	:	Smt. P. Sree Devi HOD.in Statistics ANR Degree College (A), Gudivada , Krishna Dt.,
Academician	:	Sri. G.Vara Prasada Rao Assistant Statistical Officer, Tahsildar Office, Gopalapuram
Alumni	:	Kum.K.Venkata Supriya Reddy 28-7-8, Sri Ramarao gari street, Ananthalakshmi nilayam Tanuku
Student Representatives	:	Kum. K.Gayatri Satwika III B.Sc., (MSCs) Kum. P. Adi Lakshmi III B.Sc., (MSCs)

Online Board of Studies Meeting held on 12 -09 -2022 at 11.00a.m in Zoom meeting.

Resolutions:

1. i) The Board Of Studies of the Department of **Statistics** resolved to approve the existing syllabus for the Academic year 2022-2023 (I,II,III ,IV&V Semesters) p re-scribed by the Adikavi Nannaya University, Rajamahendravaram with a deviation of 5-20% in curriculum wherever necessary after careful study and examining of the addition of topics.

Additional Topics :

- 1) **Paper –III : Crammer – Rao inequality**
- 2) **Paper – IV : Sampling theory, principles of sample sur vey, sampling and Non-Sampling error, types of sampling.**
- 3) **Paper –V : Official statistics – functions and organization Of SCO & NSSO**
- 4) **Paper – VIA : Integer programming problem – concept – applications of integerprograming, concept of non-linear programming. Problem.**
- 5) **Paper – VIIA : Stepping stone method, time – cost optimization method.**

ii) Resolved to approve the blue print and the model question papers displayed before the Board.

iii) It is resolved to adopt 70 marks for external & 30 marks for internal.

IA-I	IA-II	AVG	Attendance	Assignments/ Field Work	Online M.C.Q.	Total
15 Marks	15 Marks	15 Marks	5 Marks	5 Marks	5 Marks	30Marks

in examination pattern for I,II,III , IV & V semesters in this academic year 2022 -2023.

2. It is resolved to follow the additional curriculum which is adopted in the previous academic year.
3. It is suggested by the board member to follow the innovative methods of teaching i.e.
 - i) by using PPT's / Video's
 - ii) Virtual Class.
 - iii) Update information regarding CCELMS to students from time to time.
4. It is resolved to follow the suggested panel of names to the academic council for the appointment of Examiners and paper setters.
5. It is suggested by the board members to encourage teaching staff to organize and participate in seminars/workshop etc. and to prepare E-Content consisting of study material and plan teaching in online mode wherever necessary by showing stimulation and animated version of experiments.
6. It is suggested by the board members to organize University certificate course.
7. It is resolved to introduce study projects for Advanced Learners.
8. It is also resolved to authorize Chairman, Board of Studies to adopt any changes made by APSCHE/University in V semester papers.

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B.Sc I YEAR: STATISTICS SYLLABUS

I SEMISTER

PAPER – I Descriptive Statistics

w.e.f. 2020 -2021

UNIT-I

Introduction to Statistics : Importance of Statistics. Scope of Statistics in different fields. Concepts of primary and secondary data. Diagrammatic and graphical representation of data: Histogram, frequency polygon, Ogives, Pie. Measures of Central Tendency: Mean, Median, Mode, Geometric Mean and Harmonic Mean. Median and Mode through graph.

UNIT -II

Measures of Dispersion : Range, Quartile Deviation, Mean Deviation and Standard Deviation, Variance. Central and Non -Central moments and their interrelationship. Sheppard's correction for moments. Skewness and kurtosis.

UNIT -III

Curve fitting : Bi- variate data, Principle of least squares, fitting of degree polynomial. Fitting of straight line, Fitting of Second degree polynomial or parabola, Fitting of power curve and exponential curves.

Correlation: Meaning, Types of Correlation, Measures of Correlation: Scatter diagram, Karl Pearson's Coefficient of Correlation, Rank Correlation Coefficient (with and without ties), Bi -variate frequency distribution, correlation coefficient for bi-variate data and simple problems. Concept of multiple and partial correlation coefficients (three variables only) and properties

UNIT -IV

Regression : Concept of Regression, Linear Regression: Regression lines, Regression coefficients and its properties, Regressions lines for bi -variate data and simple problems. Correlation vs regression.

Attributes: Notations, Class, Order of class frequencies, Ultimate class frequencies, Consistency of data, Conditions for consistency of data for 2 and 3 attributes only , Independence of attributes , Association of attributes and its measures, Relationship between association and colligation of attributes, Contingency table: Square contingency , Mean square contingency, Coefficient of mean square contingency, Tschuprow's coefficient of contingency.

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B.Sc I YEAR: STATISTICS

PRACTICAL SYLLABUS

I SEMISTER

PAPER – I Descriptive Statistics

w.e.f. 2020 -2021

1. Graphical presentation of data (Histogram, frequency polygon, Ogives).
2. Diagrammatic presentation of data (Bar and Pie).
3. Computation of measures of central tendency (Mean, Median and Mode)
4. Computation of measures of dispersion (Q.D, M.D and S.D)
5. Computation of non-central, central moments, μ_1 and μ_2 for ungrouped data.
6. Computation of non-central, central moments, μ_1 and μ_2 and Sheppard's corrections for grouped data.
7. Computation of Karl Pearson's coefficients of Skewness and Bowley's coefficients of Skewness.
8. Fitting of straight line by the method of least squares
9. Fitting of parabola by the method of least squares
10. Fitting of power curve of the type by the method of least squares.
11. Fitting of exponential curve of the type and by the method of least squares.
12. Computation of correlation coefficient and regression lines for ungrouped data
13. Computation of correlation coefficient, forming regression lines for grouped data
14. Computation of Yule's coefficient of association
15. Computation of Pearson's, Tscherprows coefficient of contingency

Note: Training shall be on establishing formulae in Excel cells and derive the results. The excel output shall be exported to MS word for writing inference.

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B.Sc I YEAR: STATISTICS SYLLABUS

II SEMISTER

PAPER – II PROBABILITY AND PROBABILITY DISTRIBUTIONS

w.e.f. 2020 -2021

UNIT I:

Introduction to Probability:

Basic Concepts of Probability, random experiments, trial, outcome, sample space, event, mutually exclusive and exhaustive events, equally likely and favourable out- comes. Mathematical, Statistical, axiomatic definitions of probability. Conditional Probability and independence of events, Addition and multiplication theorems of probability for 2 and for n events. Boole's inequality and Baye's theorem and its applications in real life problems.

UNIT II:

Random variable:

Definition of random variable, discrete and continuous random variables, functions of random variable. Probability mass function. Probability density function, Distribution function and its properties. For given pmf, pdf calculation of moments, coefficient of skewness and kurtosis. Bivariate random variable meaning, joint, marginal and conditional Distributions, independence of random variables and simple problems.

Mathematical expectation :

Mathematical expectation of a random variable and function of a random variable. Moments and covariance using mathematical expectation with examples. Addition and Multiplication theorems on expectation. Definitions of M.G.F, C.G.F, P.G.F, C.F and their properties. Chebyshev and Cauchy – Schwartz inequalities.

UNIT III:

Discrete Distributions :

Binomial, Poisson, Negative Binomial, Geometric distributions : Definitions, mean, variances, M.G.F, C.F, C.G.F, P.G.F, additive property if exists. Poission approximation to Binomial distribution. Hyper –geometric distribution: Definition, mean and variance.

UNIT I V:

Continuous Distributions :

Rectangular, Exponential, Gamma, Beta Distributions: mean , variance, M.G.F, C.G.F, C.F. Normal Distribution: Definition, Importance, Properties, M.G.F, CF, additive property.

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B.Sc I YEAR: STATISTICS SYLLABUS

II SEMISTER

PAPER – II PROBABILITY AND PROBABILITY DISTRIBUTIONS

w.e.f. 2020 -2021

Practicals

List of Experiments:

1. Fitting of Binomial distribution -Direct method.
2. Fitting of binomial distribution - Recurrence relation Method.
3. Fitting of Poisson distribution -Direct method.
4. Fitting of Poisson distribution - Recurrence relation Method.
5. Fitting of Negative Binomial distribution.
6. Fitting of Geometric distribution.
7. Fitting of Normal distribution -Areas method.
8. Fitting of Normal distribution -Ordinates method.
9. Fitting of Exponential distribution.

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II B.Sc. STATISTICS SYLLABUS

SEMESTER – III,

Subject : STATISTICS

Paper III: STATISTICAL INFERENCE

(w.e.f.2020 -2021)

UNITI:

Concepts: Population, Sample, Parameter, statistic, Sampling distribution, Standard error. convergence in probability and convergence in distribution, law of large numbers, central limit theorem (statements only). Student's t – distribution, F – Distribution, χ^2 -Distribution: Definitions, properties and their applications.

UNITII:

Theory of estimation: Estimation of a parameter, criteria of a good estimator – unbiasedness, consistency, efficiency, & sufficiency and. Statement of Neyman's factorization theorem. Estimation of parameters by the method of moments and maximum likelihood (M.L), properties of MLE's. Binomial, Poisson & Normal Population parameters estimate by MLE method. Confidence Intervals.

Additional Input: Crammer's Rao inequality.

UNIT III:

Testing of Hypothesis : Concepts of statistical hypotheses, null and alternative hypothesis, critical region, two types of errors, level of significance and power of a test. One and two tailed tests. Neyman – Pearson's lemma. Examples in case of Binomial, Poisson, Exponential and Normal distributions.

UNITIV:

Large sample Tests; large sample test for single mean and difference of two means, confidence intervals for mean(s). Large sample test for single proportion, difference of proportions. standard deviation (s) and correlation coefficient(s).

Small Sample tests: t-test for single mean, difference of means and paired t –test. Chy-square test for goodness of fit and independence of attributes. F –test for equality of variances.

UNITV:

Non-parametric tests – their advantages and disadvantages, comparison with parametric tests. Measurement scale – nominal, ordinal, interval and ratio. One sample runs test, sign test and Wilcoxon – signed rank tests (single and paired samples). Two independent sample tests: Median test, Wilcoxon – Mann-Whitney U test, Wald Wolfowitz's runs test.

TEXT BOOKS:

1. BA/BSc II year statistics – statistical methods and infer ence – Telugu Academy by A.Mohanrao, N.Srinivasa Rao, Dr R.Sudhakar Reddy, Dr T.C.RavichandraKumar.
2. K.V.S. Sarma: Statistics Made Simple: Do it yourself onPC.PHI.

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II B.Sc. STATISTICS PRACTICAL SYLLABUS
SEMESTER – III,
Subject : STATISTICS
Paper III: STATISTICAL INFERENCE
(w.e.f.2020 -2021)

List of Experiments:

1. Large sample test for difference of means
2. Large sample test for single proportion
3. Large sample test for difference of proportions
4. Large sample test for difference of standard deviations
5. Large sample test for correlation coefficient
6. Small sample test for single mean
7. Small sample test for difference of means
8. Small sample test for correlation coefficient
9. Paired t-test(paired samples).
10. Small sample test for single variance(χ^2 -test)
11. Small sample test for difference of variances(F -test)
12. χ^2 - test for goodness of fit and independence of attributes
13. Nonparametric tests for single sample(run test, sign test and Wilcoxon signed rank test)
14. Nonparametric tests for related samples (sign test and Wilcoxon signed rank test)
15. Nonparametric tests for two independent samples (Median test, Wilcoxon -Mann- Whitney - U test, Wald - Wolfowitz's runs test)

Note: Training shall be on establishing formulae in Excel cells and deriving the results. The excel output shall be exported to MS Word for writing inferences.

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II B.Sc. STATISTICS SYLLABUS

SEMESTER – IV,

Subject : STATISTICS

Paper IV: SAMPLING TECHNIQUES AND DESIGN OF EXPERIMENTS

(w.e.f.2020 -2021)

UNIT I:

Simple Random Sampling (with and without replacement): Notations and terminology, various probabilities of selection. Random numbers tables and its uses. Methods of selecting simple random sample, lottery method, method based on random numbers.

Estimates of population total, mean and their variances and standard errors, determination of sample size, simple random sampling of attributes.

Additional Input: Sampling Theory , Principles of Sample survey, Sampling and non sampling errors, types of sampling.

UNIT II:

Stratified random sampling: Stratified random sampling, Advantages and Disadvantages of Stratified Random sampling, Estimation of population mean, and its variance. Stratified random sampling with proportional and optimum allocations. Comparison between proportional and optimum allocations with SRSWOR.

Systematic sampling: Systematic sampling definition when $N = nk$ and merits and demerits of systematic sampling – estimate of mean and its variance. Comparison of systematic sampling with Stratified and SRSWOR.

UNIT III:

Analysis of variance : Analysis of variance(ANOVA) –Definition and assumptions. One-way with equal and unequal classification, Two way classification.

Design of Experiments: Definition, Principles of design of experiments, CRD: Layout, advantages and disadvantage and Statistical analysis of Completely Randomized Design(C.R.D).

UNIT IV:

Randomized Block Design (R.B.D) and Latin Square Design (L.S.D) with their layouts and Analysis, Missing plot technique in RBD and LSD. Efficiency RBD over CRD, Efficiency of LSD over RBD and CRD.

Factorial experiments – Main effects and interaction effects of 2^2 and 2^3 factorial experiments and their Statistical analysis. Yates procedure to find factorial effect totals.

TEXT BOOKS:

1. Telugu Academy BA/BSc III year paper – III Statistics – applied statistics – Telugu academy by Prof. K.Srinivasa Rao, Dr D.Giri . Dr A. Anand, Dr V. Papaiah Sastry.
2. K.V.S. Sarma: Statistics Made Simple: Do it yourself on PC.PHI.

REFERENCE BOOKS :

1. Fundamentals of applied statistics : VK Kapoor and S C Gupta.
2. Indian Official statistics – MR Saluja.
3. Anuvarthita Sankyaka Sastram –TeluguAcademy.

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II B.Sc.

SEMESTER – IV,

Subject : STATISTICS

**Paper IV: SAMPLING TECHNIQUES AND DESIGN OF EXPERIMENTS
PRACTICAL SYLLABUS
(w.e.f.20 20 -2021)**

List of Experiments:

Sampling Techniques:

Estimation of population mean and its variance by

1. Simple random sampling with and without replacement. Comparison between SRSWR and SRSWOR.
2. Stratified random sampling with proportional and optimum allocation s. Comparison between proportional and optimum allocations with SRSWOR.
3. Systematic sampling with $N=nk$. Comparison of systematic sampling with Stratified and SRSWOR.

Design of Experiments:

4. ANOVA – one – way classification with equal and unequal number of observations
5. ANOVA Two-way classification with equal number of observations.
6. Analysis of CRD.
7. Analysis of RBD Comparison of relative efficiency of CRD with RBD
8. Estimation of single missing observation in RBD and its analysis
9. Analysis of LSD and efficiency of LSD over CRD and RBD
10. Estimation of single missing observation in LSD and its analysis
11. Analysis of 2^2 with RBD layout
12. Analysis of 2^3 with RBD layout

Note: Training shall be on establishing formulae in Excel cells and deriving the results. The excel output shall be exported to MS Word for writing inferences.

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II B.Sc. STATISTICS SYLLABUS

SEMESTER – IV,

Subject : STATISTICS

Paper V: APPLIED STATISTICS

(w.e.f.2020 -2021)

UNIT I:

Time Series: Time Series and its components with illustrations, additive, multiplicative models. Trend: Estimation of trend by free hand curve method, method of semi averages. Determination of trend by least squares (Linear trend, parabolic trend only), moving averages method.

UNIT II:

Seasonal Component : Determination of seasonal indices by simple averages method, ratio to moving average, Ratio to trend and Link relative methods, Depersonalization.

UNIT III:

Growth curves : Modified exponential curve, Logistic curve and Gompertz curve, fitting of growth curves by the method of three selected points and partial sums. De-trending. Effect of elimination of trend on other components of the time series

UNIT IV:

Index numbers: Concept, construction, problems involved in the construction of index numbers, uses and limitations. Simple and weighted index numbers. Laspeyres's, Paasche's and Fisher's index numbers, Criterion of a good index number, Fisher's ideal index numbers. Cost of living index number and wholesale price index number.

UNIT V:

Vital Statistics : Introduction, definition and uses of vital statistics, sources of vital statistics. Measures of different Mortality and Fertility rates, Measurement of population growth. Life tables: construction and uses of lifetables.

Additional Input : Official Statistics – Functions and organization of CSO & NSSO.

TEXT BOOKS:

1. Fundamentals of applied statistics : VK Kapoor and SC Gupta.
2. BA/BSc III year paper – III Statistics – applied statistics – Telugu academy by Prof.K. Srinivasa Rao, Dr D. Giri. Dr A. Anand, Dr V. Papaiah Sastry.

REFERENCE BOOKS:

1. Anuvarthita Sankyaka Sastram –Telugu Academy.
2. Mukopadhyay, P (2011). Applied Statistics, 2nd edition Revised reprint, Books and Allied Pvt. Ltd.
3. Brockwell, P.J. and Devis, R.A. (2003). Introduction to Time Series Analysis. Springer.
4. Chatfield, C. (2001). Time Series Forecasting., Chapman &Hall.
5. Srinivasan, K. (1998). Demographic Techniques and Applications. Sage Publications

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II B.Sc. STATISTICS PRACTICAL SYLLABUS
SEMESTER – IV,
Subject : STATISTICS
Paper V: APPLIED STATISTICS
(w.e.f. 2020 -2021)

List of Experiments:

Time Series:

1. Measurement of trend by method of moving averages(odd and even period)
2. Measurement of trend by method of Least squares(linear and parabola)
3. Determination of seasonal indices by method of simple averages
4. Determination of seasonal indices by method of Ratio to moving averages
5. Determination of seasonal indices by method of Ratio to trend
6. Determination of seasonal indices by method of Link relatives

Index Numbers:

7. Computation of simple index numbers.
8. Computation of all weighted index numbers.
9. Computation of reversal tests.

Vital Statistics:

10. Computation of various Mortality rates
11. Computation of various Fertility rates
12. Computation of various Reproduction rates.
13. Construction of Life Tables

Note: Training shall be on establishing formulae in Excel cells and deriving the results. The excel output shall be exported to M S Word for writing inferences.

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III B.Sc., (MSCs)

V - SEMESTER

Subject- STATISTICS

SYLLABUS

Paper –VI : Operations Research-I

UNIT -I:

Introduction of OR – Origin and development of OR – Nature and features of OR – Scientific Method in OR – Modeling in OR – Advantages and limitations of Models – General Solution methods of OR models – Applications of Operation Research. Linear programming problem (LPP) – Mathematical formulation of the problem – illustrations on Mathematical formulation of Linear programming of problem. Graphical solution of linear programming problems. Some exceptional cases – Alternative solutions, Unbounded solutions, non-existing feasible solutions by Graphical method.

UNIT II:

General linear programming Problem (GLP) – Definition and Matrix form of GLP problem, Slack variable, Surplus variable, unrestricted Variable, Standard form of LPP and Canonical form of LPP. Definitions of Solution, Basic Solution, Degenerate Solution, Basic feasible Solution and Optimum Basic Feasible Solution. Introduction to Simplex method and Computational procedure of simplex algorithm. Solving LPP by Simplex method (Maximization case and Minimization case)

UNIT III:

Artificial variable technique – Big-M method and Two-phase simplex method, Degeneracy in LPP and method to resolve degeneracy. Alternative solution, Unbounded solutions, Non existing feasible solution and Solution of simultaneous equations by Simplex method.

UNIT IV:

Duality in Linear Programming –Concept of duality – Definition of Primal and Dual Problems, General rules for converting any primal into its Dual, Economic interpretation of duality, Relation between the solution of Primal and Dual problem (statements only). Using duality to solve primal problem. Dual Simplex Method.

Post Optimal Analysis –Changes in cost Vector **C**, Changes in the Requirement Vector **b** and changes in the Coefficient Matrix **A**. Structural Changes in a LPP.)

Additional topics: Integer programming problem – concept – applications of integer programming. Concept of Non-linear programming problem.

REFERENCE BOOKS:

1. S.D. Sharma, Operations Research, Kedar Nath Ram Nath & Co, Meerut.
2. KantiSwarup, P.K.Gupta, Manmohn, Operations Research, Sultan Chand and sons, New Delhi.
3. J .K. Sharma, Operations Research and Application, Mc. Millan and Company, New Delhi.

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III B.Sc., (MSCs)

V - SEMESTER

Subject- STATISTICS

PRACTICAL SYLLABUS

Paper –VI : Operations Research-I

Practical/Lab to be performed on a computer using OR/Statistical packages

1. To solve Linear Programming Problem using Graphical Method with
 - (i) Unbounded solution
 - (ii) Infeasible solution
 - (iii) Alternative or multiple solutions.
2. Solution of LPP with simplex method.
3. Problem solving using Charnes –M method.
4. Problem solving using Two Phase method.
5. Illustration of following special cases in LPP using Simplex method
 - (i) Unrestricted variables
 - (ii) Unbounded solution
 - (iii) Infeasible solution
 - (iv) Alternative or multiple solutions.
6. Problems based on Principle of Duality.
7. Problems based on Dual simplex method.
8. Problems based on post optimality analysis

Practical's Skills Outcomes:

On successful completion of this practical course, student shall be able to:

1. Solve LPP using Graphical method
2. Solve the LPP using Simplex method, Big M method and Two Phase method
3. Solve the problems using principle of duality
4. Solve the Problems using Dual Simplex method
5. Solve the problems for Post Optimal Analysis

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III B.Sc., (MSCs)

V - SEMESTER

Subject- STATISTICS

SYLLABUS

Paper –VII : Operations Research-II

Objective: To enrich the knowledge of students with advanced techniques of linear programming problem alongwith real life applications.

UNIT I:

Transportation Problem - Introduction, Mathematical formulation of Transportation problem. Initial Basic feasible solution of Transportation problem –North–West corner rule, Lowest cost entry method, Vogel's approximation method. Method of finding optimal solution–**MODI** method(U–V method). Degeneracy in transportation problem, Resolution of degeneracy, U n– balanced transportation problem. Maximization TP. Transshipment Problem.

Additional Input : stepping stone method.

UNIT II:

Assignment Problem - Introduction , Mathematical formulation of Assignment problem, Reduction theorem (statement only), Hungarian Method for solving Assignment problem, U n–balanced Assignment problem. The Traveling salesman problem, Formulation of Traveling salesman problem as an Assignment problem and Solution procedure.

UNIT III:

Sequencing problem: Introduction and assumptions of sequencing problem, Sequencing of n jobs and one machine problem. Johnson's algorithm for n jobs and two machines problem– problems with n– jobs on two machines, algorithm for n jobs on three machines problem– problems with n– jobs on three machines, algorithm for n jobs on m machines problem, problems with n–jobs on m–machines.

UNIT IV:

Network Scheduling: Basic Components of a network, nodes and arcs, events and activities–Rules of Network construction – Time calculations in networks – Critical Path Method (CPM) and PERT.

Additional Input : Time cost optimization method.

UNIT V:

Game Theory: Two– person zero–sum games. Pure and Mixed strategies. Maximin and Minimax Principles – Saddle point and its existence. Games without Saddle point –Mixed strategies. Solution of 2 x 2 rectangular games. Graphical method of solving 2 x n and m x 2 games. Dominance Property.

REFERENCE BOOKS:

1. S.D. Sharma, Operations Research, KedarNath RamNath & Co, Meerut.
2. KantiSwarup,P.K.Gupta,Manmohn,OperationsResearch,SultanChandandsons, New Delhi.
3. J .K. Sharma, Operations Research and Application, Mc. Millan and Company, New Delhi.
4. Gass: Linear Programming. Mc Graw Hill.
5. Hadly: Linrar programming. Addison – Wesley.
6. Taha: Operations Research: An Introduction: Mac Millan.
7. Dr. NVS Raju; Operations Research, SMS education,

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III B.Sc., (MSCs)

V - SEMESTER

Subject - STATISTICS

PRACTICAL SYLLABUS

Paper –VII : Operations Research -II

Practical/Lab to be performed on a computer using OR/Statistical packages

1. IBFS of transportation problem by using North – West corner rule, Matrix minimum method and VAM
2. Optimum solution to balanced and unbalanced transportation problems by- MODI method (both maximization and minimization cases)
3. Solution of Assignment problem using Hungarian method (both maximization and minimization cases),
4. Solution of sequencing problem — processing of n jobs through two machines
5. Solution of sequencing problem – processing of n jobs through three machines
6. To perform Project scheduling of a given project (Deterministic case –CPM).
7. To perform Project scheduling of a given project (Probabilistic case –PERT).
8. Graphical method of solving for $m \times 2$ and $2 \times n$ games.
9. Solution of $m \times n$ games by dominance rule.
10. Linear programming method for solving $m \times n$ games.

Practical's Skills Outcomes:

On successful completion of this practical course, student shall be able to:

1. Find IBFS by using North – West corner rule, Matrix minimum method and VAM
2. Find Optimum solution to balanced and unbalanced transportation problems by MODI method (both maximization and minimization cases)
3. Find Solution of Assignment problem using Hungarian method (both maximization and minimization cases),
4. Find Solution of sequencing problem —processing of n jobs through two machines and three machines
5. Perform Project scheduling of a given project (Deterministic case –CPM) and(Probabilistic case–PERT).
6. Solve for $m \times 2$ and $2 \times n$ games using Graphical method
7. Find Solution of $m \times n$ games by dominance rule.
8. Solve $m \times n$ games by Linear programming method