D.K. GOVT. COLLEGE FOR WOMEN (A), NELLORE

SPSR NELLORE DISTRICT

Re-accredited by NAAC with A Grade

Recognized by UGC as "College with Potential for Excellence"

BOARD OF STUDIES

DEPARTMENT OF STATISTICS

2021-22

***

B.Sc., STATISTICS *(*WITH MATHMATICS*)*

REVISED SYLLABUS

CBCS/SEMESTER SYSTEM *(*W.E.F 2020-21 ADMITTED BATCH*)*

SEMESTER – I

Course Learning Outcomes

PAPER - I: DESCRIPTIVE STATISTICS

- The objective of this paper is to throw light on the role of statistics in different fields with special reference to business and economics.
- It gives the students to review good practice in presentation and the format most applicable to their own data.
- The measures of central tendency or averages reduce the data to a single value which is highly useful for making comparative studies.
- The measures of dispersion throw light on reliability of average and control of variability
- The concept of Correlation and Linear Regression deals with studying the linear relationship between two or more variables, which is needed to analyze the real life problems.
- The attributes gives an idea that how to deal with qualitative data.

B.Sc., STATISTICS (WITH MATHMATICS)

REVISED SYLLABUS

CBCS/SEMESTER SYSTEM (W.E.F 2020-21 ADMITTED BATCH)

SEMESTER – I

PAPER - I: DESCRIPTIVE STATISTICS

UNIT-I

Introduction to Statistics: Importance of Statistics. Scope of Statistics in different fields. Concepts of primary and secondary data. Measures of Central Tendency: Mean, Median, Mode, Geometric Mean and Harmonic Mean

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. Skewnes and kurtosis.

UNIT-III

Curve fitting: Bi-variate data, Principle of least squares, fitting of n^{th} 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).

UNIT-IV

Regression: Concept of Regression, Linear Regression: Regression lines, Regression coefficients and it’s properties, and simple problems.

UNIT-V

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.

Text Books:

1. V.K.Kapoor and S.C.Gupta: Fundamentals of Mathematical Statistics, Sulthand & Sons, New Delhi.
2. BA/BSc I year statistics - descriptive statistics, probability distribution – Telugu Academy- Dr M.Jaganmohan Rao,Dr N.Srinivasa Rao, Dr P.Tirupathi Rao, Smt.D.Vijayalakshmi.
3. K.V.S. Sarma: Statistics Made Simple: Do it yourself on PC. PHI

Reference books:

1. Willam Feller: Introduction to Probability theory and its applications. Volume –I, Wiley Goon AM, Gupta MK, Das Gupta B : Fundamentals of Statistics , Vol-I, the World Press Pvt.Ltd., Kolakota.
2. Hoel P.G: Introduction to mathematical statistics, Asia Publishing house.
3. M. JaganMohan Rao and Papa Rao: A Text book of Statistics Paper-I.
4. Sanjay Arora and Bansi Lal: New Mathematical Statistics: Satya Prakashan , New Delhi

Practicals:

Note: Minimum of 10 practicals should be Done

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 .Computation of Karl Pearson’s coefficients of Skewness and Bowley’s coefficients of Skewness.
6. Fitting of straight line by the method of least squares
7. Fitting of parabola by the method of least squares
8. Fitting of power curve of the type by the method of least squares.
9. Fitting of exponential curve of the type and by the method of least squares.
10. Computation of correlation coefficient and regression lines
11. Computation of Rank correlation coefficient
12. Computation of Yule's coefficients of association
13. Computation of Coefficients of Contingency

B.Sc., STATISTICS (WITH MATHMATICS)

REVISED SYLLABUS

CBCS/SEMESTER SYSTEM (W.E.F 2020-21 ADMITTED BATCH)

SEMESTER – II

PAPER - II: PROBABILITY THEORY AND DISTRIBUTIONS

Course Learning Outcomes

- This paper deals with the situation where there is uncertainty and how to measure that uncertainty by defining the probability, random variable and mathematical expectation which are essential in all research areas.
- This paper gives an idea of using various standard theoretical distributions, their chief characteristics and applications in analyzing any data.

B.Sc., STATISTICS *(WITH MATHMATICS)*

REVISED SYLLABUS

CBCS/SEMESTER SYSTEM (W.E.F 2020-21 ADMITTED BATCH)

SEMESTER – II

PAPER - II: **PROBABILITY THEORY AND DISTRIBUTIONS**

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 outcomes. 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

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 a given pmf, pdf calculation of Mean and Variance. Bivariate random variable - meaning, joint, marginal and conditional Distributions, independence of random variables

UNIT- III

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(Two variables Only).Definitions of M.G.F, C.G.F, P.G.F, C.F and their properties (Derivations not required).Chebyshev inequality.

UNIT-IV

Discrete Distributions: Binomial, Poisson, Negative Binomial, Geometric distributions: Definitions, means, variances, M.G.F, C.F, additive property if exists. Possion approximation to Binomial distribution. Hyper-geometric distribution: Definition, mean.

UNIT - V

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

Text Books:

1. V.K.Kapoor and S.C.Gupta: Fundamentals of Mathematical Statistics, Sultan Chand & Sons, New Delhi.
2. BA/BSc I year statistics - descriptive statistics, probability distribution - Telugu Academy- Dr M.Jaganmohan Rao,Dr N.Srinivasa Rao, Dr P.Tirupathi Rao, Smt.D.Vijayalakshmi.
3. K.V.S. Sarma: Statistics Made Simple: Do it yourself on PC. PHI

Reference books:

1. Willam Feller: Introduction to Probability theory and its applications. Volume –I, Wiley
2. Goon AM, Gupta MK, Das Gupta B : Fundamentals of Statistics , Vol-I, the World Press Pvt.Ltd., Kolakota.
3. Hoel P.G: Introduction to mathematical statistics, Asia Publishing house.
4. M. JaganMohan Rao and Papa Rao: A Text book of Statistics Paper-I.
5. Sanjay Arora and Bansi Lal: New Mathematical Statistics: Satya Prakashan , New Delhi 6. Hogg Tanis Rao: Probability and Statistical Inference. 7th edition. Pearson.

Practicals Paper – II:

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.

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.

BSC II YEAR : STATISTICS SYLLABUS

(With Mathematics Combination)

Semester – III CBCS

Paper – III : Statistical Inference

COURSE LEARNING OUTCOMES

- Students will acquire
- The applications and properties of Exact sampling distribution and to learn the concepts of population, sample and sampling distribution
- How to draw conclusions about parent population on the basis of a random sample.
- Understand various characteristics of estimators like consistency, Unbiasedness, Efficiency and sufficiency along with their importance in estimation theory.
- The concepts of confidence interval and confidence limits.
- How to develop the most powerful test for testing simple hypothesis against simple alternative hypothesis using Neyman – pearson lemma.
- The importance of Large and small sample tests and the applications of various non – parametric tests.

B.Sc., STATISTICS *(WITH MATHMATICS)*

REVISED SYLLABUS

CBCS/SEMESTER SYSTEM (W.E.F 2020-21 ADMITTED BATCH)

SEMESTER – III

(With Mathematics Combination)

Semester – III CBCS PAPER-3: STATISTICAL INFERENCE

UNIT-I

Concepts: Population, Sample, Parameter, statistic, Sampling distribution, Standard error. Student's t- distribution, F – Distribution, χ^2- Distribution: Definitions, properties and their applications (No need of derivatiions)

UNIT-II

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(Estimation of 95% and 99% confidence intervals of the Normal population Mean only)

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, Normal distributions.

UNIT – IV

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. 2-test for Goodness of fit and Independence of attributes. F-test for Equality of variances.

UNIT – V

Non-parametric tests- Definition, advantages and disadvantages, comparison with Parametric tests. Measurement scale- nominal, ordinal,. Sign, Run, Median tests for two Large Samples only

TEXT BOOKS

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

REFERENCE BOOKS:

1. Fundamentals of Mathematics statistics: VK Kapoor and SC Guptha.
2. Outlines of statistics, Vol II : Goon Guptha, M.K.Guptha, Das Guptha B.
3. Introduction to Mathematical Statistics : Hoel P.G.
4. Hogg Tanis Rao : Probability and Statistical Inference. 7th edition. Pearson.

Practicals - Paper –III

Note: Minimum of 10 practicals should be done

1. Large sample test for single mean
2. Large sample test for difference of means
3. Large sample test for single proportion
4. Large sample test for difference of proportions
5. Large sample test for difference of standard deviations
6. Large sample test for correlation coefficient
7. Small sample test for single mean
8. Small sample test for difference of means 9. 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. Sign test for two samples

BSC II YEAR: STATISTICS SYLLABUS

(With Mathematics Combination)

Semester – IV CBCS.

Paper IV : SAMPLING TECHNIQUES AND DESIGN OF EXPERIMENTS

COURSE LEARNING OUTCOMES

- The sampling techniques deals with the ways and methods that should be used to draw samples to obtain the optimum results, i.e., the maximum information about the characteristics of the population with the available sources at our disposal in terms of time, money and manpower to obtain the best possible estimates of the population parameters
- This paper throw light on understanding the variability between group and within group through Analysis of Variance
- This gives an idea of logical construction of Experimental Design and applications of these designs now days in various research areas.
- Factorial designs allow researchers to look at how multiple factors affect a dependent variable, both independently and together.

B.Sc., STATISTICS *(WITH MATHMATICS)*

REVISED SYLLABUS

CBCS/SEMESTER SYSTEM (W.E.F 2020-21 ADMITTED BATCH)

SEMESTER – IV

BSC II YEAR: STATISTICS SYLLABUS

(With Mathematics Combination)

Semester – IV PAPER IV: SAMPLING TECHNIQUES AND DESIGNS OF EXPERIMENTS

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

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, Advantages, disadvantages and Analysis. Missing plot technique in RBD and LSD.

UNIT V

Factorial experiments – Main effects and interaction effects of 22 and 23 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 SC Gupta.
2. Indian Official statistics - MR Saluja
3. Anuvarthita Sankyaka Sastram - Telugu Academy.

PRACTICALS - PAPER –IV

Note: Minimum of 10 practicals should be done 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 allocations. 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
8. Estimation of single missing observation in RBD and its analysis
9. Analysis of LSD
10. Estimation of single missing observation in LSD and its analysis
11. Analysis of 2^2 F.E with RBD layout
12. Analysis of 2^3 F.E 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

B.Sc., STATISTICS *(WITH MATHEMATICS)*

REVISED SYLLABUS

CBCS/SEMESTER SYSTEM (W.E.F 2020-21 ADMITTED BATCH)

SEMESTER – IV

BSC II YEAR: STATISTICS SYLLABUS

(With Mathematics Combination)

PAPER V: APPLIED STATISTICS

COURSE LEARNING OUTCOMES

- This paper deals the time series on simple description methods of data, explains the variation, forecasting the future values, control procedures.
- It gives an idea of using index numbers in a range of practical situations, limitations and uses
- The vital statistics enlighten the students in obtaining different mortality, fertility rates thus obtaining the population growth rates and construction and use of life tables in actuarial science.

B.A/B.Sc., STATISTICS *(WITH MATHEMATICS)*

REVISED SYLLABUS

CBCS/SEMESTER SYSTEM (W.E.F 2020-21 ADMITTED BATCH)

SEMESTER-IV

PAPER V: APPLIED STATISTICS

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

UNIT III

Growth curves: Modified exponential curve, Logistic curve and Grompertz curve, fitting of growth curves by the method of three selected points and partial sums. Use of Growth curves.

UNIT IV

Index numbers: Concept, construction, problems involved in the construction of index numbers, uses and limitations. Simple and weighted index numbers. Laspayer's, Paasche's, Dorbish - Bowley 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 life tables.(Derivations not required)

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 ed. 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
6. Srivastava O.S. (1983). A Text Book of Demography. Vikas Publishing House

PRACTICAL PAPER –V NOTE:

MINIMUM OF 10

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 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:

1. Computation of simple index numbers.
2. Computation of all weighted index numbers.
3. Computation of reversal tests.

Vital Statistics:

1. Computation of various Mortality rates
2. Computation of various Fertility rates
3. Computation of various Reproduction rates.
4. 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 MS Word for writing inferences.

BSC III YEAR: STATISTICS SYLLABUS
(With Mathematics Combination)
Semester-V CBCS.
Paper - V Sampling Techniques and Design of Experiments

COURSE LEARNING OUTCOMES

- The sampling techniques deals with the ways and methods that should be used to draw samples to obtain the optimum results, i.e., the maximum information about the characteristics of the population with the available sources at our disposal in terms of time, money and manpower to obtain the best possible estimates of the population parameters
- This paper throw light on understanding the variability between group and within group through Analysis of Variance
- This gives an idea of logical construction of Experimental Design and applications of these designs now days in various research areas.
- Factorial designs allow researchers to look at how multiple factors affect a dependent variable, both independently and together.

BSC III YEAR : STATISTICS SYLLABUS
(With Mathematics Combination)
Semester-V (CBCS.)
Paper - V-Sampling Techniques and Design of Experiments

Unit-I

Sampling Theory: Population, Census, Complete Enumeration , Limitations of Census method , Sampling Frame, Principle steps in a sample survey, Censes versus sample survey, Sampling and Non-sampling errors. Types of sampling - subjective, probability and mixed sampling methods, Advantages of Sampling over Complete Enumeration. Main Steps involved in Sample survey

Unit-II

Simple Random Sampling: Meaning of Samples and methods to draw , Methods of Selection Simple Random Sampling, estimation of population mean, Variances in SRSWR& SRSWOR. Comparison of SRSWR and SRSWOR, Merits and Demerits of SRS

Unit-III

Stratified random sampling: Proportional and optimum allocation of sample sizes in stratification. Variances in these methods. Systematic sampling: Systematic sampling when N = nk comparison of their relative efficiencies. Advantages and Disadvantages of above methods of sampling.

Unit-IV

Analysis of Variance: One way with equal and unequal classifications and two way classifications

Unit - V

Design of Experiments: Principles of experimentation in Designs, analysis of completely randomized Design (CRD), Randomized block design (RBD) and Latin square design (LSD) including one Missing observation.

Text Books:

1. Telugu Academy BA/B.Sc 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 SC Gupta.
2. Indian Official statistics - MR Saluja.
3. Anuvarthita Sankyaka Sastram - Telugu Academy

BSC III YEAR : STATISTICS SYLLABUS (With Mathematics Combination)
Semester-V CBCS.
Paper - VI Quality and Reliability

COURSE LEARNING OUTCOMES

- Students would be able to learn about Importance of statistical quality control in industry, Construction of control charts for variables and attributes and to draw conclusions and interpret the result.
- Students would be able to learn about acceptance sampling plans-single and double sampling plans of attributes
- Students would be able to know the concept of reliability and the role of Exponential distribution and its memory less property.
- Students would be able to estimate reliability function and to understand the concept of system reliability

BSC III YEAR : STATISTICS SYLLABUS (With Mathematics Combination)
Semester-V CBCS.
Paper - VI Quality and Reliability

Unit-I

Importance of SQC in industry, statistical basis of shewart control charts, uses of control charts. Interpretation of control charts, control limits, Natural tolerance limits and specification limits.

Unit – II

Variable Control Chart: Construction of $\bar{X}$, R charts for variables, Attribute control charts- NP, P charts, C chart.

Unit-III

Acceptance sampling plans: Scope, Producer's risk and consumer's risk . Concepts of AQL and LTPD.

Unit-IV

Sampling Plans: Single and double sampling plans, OC and ASN functions, Double and single Sampling plans for attributes using Binomial.

Unit-V

Reliability: Introduction, failure rates, Hazard function, estimation of reliability, exponential distribution as life model, its memoryless property.

Text Books:

1. BA/BSc III year paper - IV Statistics - applied statistics - Telugu academy by Prof.K.Srinivasa Rao, Dr D.Giri. Dr A.Anand, Dr V.Papaiah Sastry.
2. Fundamentals of applied statistics : VK Kapoor and SC Gupta
3. S.K Sinha: Reliability and life testing. Wiley Eastern.

Reference Books:

1. R.C.Gupta: Statistical Quality Control

. **THREE YEAR BA/B.SC (CBCS) DEGREE EXAMINATION**
THIRD YEAR: SEMESTER–VI

Elective Paper – VII (A): APPLIED STATISTICS

COURSE LEARNING OUTCOMES

- This paper deals the time series on simple description methods of data, explains the variation, forecasting the future values, control procedures.
- It gives an idea of using index numbers in a range of practical situations, limitations and uses
- The vital statistics enlighten the students in obtaining different mortality, fertility rates thus obtaining the population growth rates and construction and use of life tables in actuarial science.

THREE YEAR BA/B.SC (CBCS) DEGREE EXAMINATION
THIRD YEAR: SEMESTER–VI
Elective Paper – VII (A): APPLIED STATISTICS 3 Hrs/Week

Unit-I

Unit-I

Analysis of times series: Components of times series: meaning and examples, trend by least squares (straight line) methods and moving average methods. Seasonal indices by simple averages, ratio to moving average.

Unit-II

Index numbers: Meaning, problems involved in the construction of index Meaning, problems involved in the construction of index numbers, simple and weighted index numbers. Criteria of good index numbers. Fixed base and chain base index numbers. Cost of living index numbers, wholesale price index numbers

Unit-III

Cost of living index numbers, wholesale price index numbers, Fixed base and chain base index numbers .**Vital statistics**: Meaning, Definition, uses, sources of vital statistics, various Death rates-CDR,ASDR,STDR .

Unit-IV

Reproduction Rates: Birth rates -CBR,ASFR,GFR,TFR Measurement of population growth, crude rate of natural increase, Pearle's vital index, Gross Reproduction Rate [GRR], Net Reproduction Rates[NRR].

Unit-V

Life table: Introduction - Components and Construction of Life-table, Inter Relations and Force of mortality. **Abridged Life-table**: Concept and Construction of abridged Life-tables .Concepts of Official Statistics—NSSO, CSO, Importance of National Income (Definitions only)

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
3. Prof.K.Srinivasa Rao, Dr D.Giri. Dr A.Anand, Dr V.Papaiah Sastry.

Reference Books:

1. Indian Official statistics - MR Saluja.
2. Anuvarthita Sankyaka Sastram - Telugu Academy.

Practical's–Semester-VI Pape r-VII(A)Conduct any 6 of the following

1. Measurement of Linear Trend
2. Measurement of Seasonal Indices-Link Relatives method
3. Reversal tests.
4. Cost of living Index Numbers.
5. Mortality, Fertility& Re-production rates.
6. Life tables.
7. Any one of the above Using MS-Excel

Elective Paper – VII (B) : DEMOGRAPHY and VITAL STATISTICS
3 Hrs/Week

Unit-I

Population Theories: Coverage and content errors in demographic data, use of balancing equations and Chandrasekharan - Deming formula to check completeness of registration data. Adjustment of age data, use of Myer and UN indices, Population composition, dependency ratio.

Unit II

Vital Statistics: Introduction and sources of collecting data on vital statistics, errors in census and registration data. Measurement of population, rate and ratio of vital events, Measurements of Mortality: Crude Death Rate (CDR), Specific Death Rate (SDR), Infant Mortality, Rate (IMR) and Standardized Death Rates.

Unit – III

Vital Statistics: Stationary and Stable population, Central Mortality Rates and Force of Mortality. Life (Mortality) Tables: Assumptions, description, construction of Life Tables and Uses of Life Tables.

Unit-IV

Vital Statistics: Abridged Life Tables; Concept and construction of abridged life tables by Reed-Merrell method, Greville's method and King's Method. Measurements of Fertility: Crude Birth Rate (CBR), General Fertility Rate (GFR), Specific Fertility Rate (SFR) and Total Fertility Rate (TFR).

Unit –V

Vital Statistics: Measurement of Population Growth: Crude rates of natural increase, Pearl's

Vital Index Gross Reproduction Rate (GRR) and Net Reproduction Rate (NRR).

Suggested Reading:

1. Mukhopadhyay P. (1999): Applied Statistics, Books and Allied (P) Ltd.
2. K.Srinivasan: Basic Demographic Techniques and Application
3. Gun, A.M., Gupta, M.K. and Dasgupta, B. (2008): Fundamentals of Statistics, Vol. II, 9th Edition, World Press.
4. Biswas, S. (1988): Stochastic Processes in Demography & Application, Wiley Eastern Ltd.

5. Croxton, Fredrick E., Cowden, Dudley J. and Klein, S. (1973): Applied General Statistics, 3rd Edition. Prentice Hall of India Pvt. Ltd.,
6. Keyfitz N., Beckman John A.: Demogrphy through Problems S-Verlag New York.

PRACTICALS – SEMESTER-VI PAPER-VII(B)

1. Measurements of Mortality
2. Measurements of Fertility:
3. Life Tables (Real Population Method)
4. Life Tables (Hypothetical cohort method)
5. Construction of Abridged Life tables
6. Reproduction rates

THREE YEAR BA/B.SC (CBCS) DEGREE EXAMINATION
THIRD YEAR: SEMESTER–VI
Cluster Elective Paper – VIII (C1): OPTIMIZATION TECHNIQUES

LEARNING OUTCOMES

- Students must be able to know the origin and development of Operations Research,its scope and phases, advantages and disadvantages of operations research
- Students must be able to know about Linear Programming problem, its formulation, solution of LPP by Graphical method, exceptional cases in graphical method.
- Students must be able to understand the Simplex algorithm and solvation of problems,, Artificial Variable Technique, and Concept of degeneracy

THREE YEAR B.SC (CBCS) DEGREE EXAMINATION
THIRD YEAR: SEMESTER–VI
Cluster Elective Paper – VIII(C1) : OPTIMIZATION TECHNIQUES

3 Hrs/Week

UNIT –I

Introduction: Origin and development of OR, Nature and features of OR, Meaning and Definitions of OR, Applications and Limitations of OR.

UNIT – II

Linear Programming Problem: Introduction, Mathematical formulation of the LPP, Canonical and standard form of LPP. Graphical solution of a Linear Programming Problem , Problems.

UNIT – III

Solution of LPP: Definitions of BFS, IBFS, Degenerate solution, Slack and Surplus variables, Optimum solution, Computational procedure of Simplex method , Big- M method and Problems.

UNIT – IV

Transportation Problem: Introduction, Transportation Table, General Transportation problem Initial basic feasible solution(IBFS) by North West Corner Rule, Least cost method and Vogel's Approximation Method (VAM), Un-Balanced Transportation Problem

UNIT –V

Assignment problem: Introduction, Mathematical formulation of the problem, Optimal solution by Hungarian method. Un balanced assignment problem, The travelling salesman problem.

Text Book :

1. B.A/B.Sc III Year Paper-IV Statistics- Quality Reliability and Operations Research TeluguAcademy by Dr T.C.Ravichandra Kumar, Dr R.V.S.Prasad, Dr D.Giri, Dr.G.S.Devasena
2. Classical Optimization techniques by A.L.Cambo

List of reference books:

1. Taha, H. A. (2007): Operations Research: An Introduction, 8th Edition, Prentice Hall of India.
2. KantiSwarup, Gupta, P.K. and Manmohan (2007): Operations Research, 13th Edition, Sultan Chand and Sons.
3. S.Kalavathy, Operations Research, 4th Edition, Vikas Publishing

Practicals – Semester-VI Paper-VIII(A1)
Conduct any six of the following

1. Solution of LPP by Graphical Method
2. Solution of LPP by Simplex Method
3. Solution of LPP by Big M Method
4. Solution of TP by North West Corner Rule to find IBFS
5. Solution of TP by Least Cost Method to find IBFS
6. Solution of TP by VAM to find IBFS
7. Solution of Unbalanced TP
8. Solution of Assignment problem by Hungarian Method
9. Solution of unbalanced Assignment problem.
10. Solution of traveling salesman problem

THREE YEAR B.SC (CBCS) DEGREE EXAMINATION
THIRD YEAR: SEMESTER–VI
Cluster Elective Paper – VIII(C2) : NUMERICAL ANALYSIS

LEARNING OUTCOMES

Derive numerical methods for various mathematical operations and tasks, such as interpolation, differentiation, integration, the solution of linear and nonlinear equations, and the solution of differential equations. Analyse and evaluate the accuracy of common numerical methods.

THREE YEAR BA/B.SC (CBCS) DEGREE EXAMINATION
THIRD YEAR: SEMESTER–VI
Cluster Elective Paper – VIII(C2) : NUMERICAL ANALYSIS

3 Hrs/Week

UNIT – I

Finite Differences: Definitions of operators Δ, ∇ and E, - Properties - Relationship among operators-Difference Table- Uses- Estimation of single and Two Missing values- Newton's Binomial expansion rule- Problems

UNIT – II

Interpolation and Extrapolation: Assumptions- uses- Newtons's forward formula- Newtons back ward formula- Interpolation at unequal intervals- Divided differences-properties- Lagranges formula- Problems

UNIT – III

Central Difference: Gauss Forward and Backward formulae- Sterling's formula- Problems

UNIT – IV

Numerical Differentiation: First and Second order derivatives-Newton,s forward and Back ward Differentiation formulae-, Gauss Forward and Backward differentiation formulae- Sterling's - Problems

UNIT – V

Numerical Integration: Importance- General Quadrature rule- Trapezoidal Rule- Simpson's -1/3 Rule- Simpson's -3/8 Rule - Problems

List of reference books:

1. Statistical Methods by S.C.Gupta,
2. Gupta, S. C. and Kapoor, V.K. (2008): Fundamentals of Mathematical
3. Statistics, New Edition(Reprint), Sultan Chand & Sons
4. Statistics and Numerical methods by Dr. A. Singaravelu, ARS Publications.
5. Sankhya Visleshanam- Telugu Academy

Conduct any six of the following:

1. Newton's back ward formula
2. Lagrange's formula
3. Sterling's central difference formula
4. Bessel's central difference formula
5. Gauss forward differentiation formula
6. Gauss backward differentiation formula
7. Sterling's differentiation formula
8. Bessel's differentiation formula
9. Simpson's 1/3 and 3/8 rule

DK Govt. College for women (Autonomous), Nellore

CBCS SYLLABUS (Semester wise) 2021-22

B.Sc III year STATISTICS (With Mathematics)

Semester – VI CBCS

Cluster Elective Paper – VIII(C3) : Research Methodology and Project

Learning Outcomes

Cluster Elective Paper – VIII(C3) : Research Methodology

1. Students should understand a general definition of research design.
2. Students should know why educational research is undertaken, and the audiences that profit from research studies.
3. Students should be able to identify the overall process of designing a research study from its inception to its report.
4. Students should be familiar with ethical issues in educational research, including those issues that arise in using quantitative and qualitative research.
5. Students should know the primary characteristics of quantitative research and qualitative research.
6. Students should be able to identify a research problem stated in a study.
7. Students should be familiar with how to write a good introduction to an educational research study and the components that comprise such an introduction.
8. Students should be familiar with conducting a literature review for a scholarly educational study: a. The steps in the overall process. b. The types of databases often searched. c. The criteria for evaluating the quality of a study. d. The ways of organizing the material found. e. The different types of literature reviews.

DK Govt. College for women (Autonomous), Nellore

CBCS SYLLABUS (Semester wise) 2021-22

B.Sc III year STATISTICS (With Maths)

Semester – VI CBCS

Cluster Elective Paper – VIII(C3) : Research Methodology and Project

2 Hrs/Week

UNIT –I

A Review of fundamentals in Research Methodology and Research Problem

1.1 Meaning of Research

1.2 Definition of Research

1.3 Objectives of Research

1.4 Motivation of Research

1.5 Research Problem

- 1.5.1 Selecting the Problem
- 1.5.2 Source of the problem

UNIT – II

Review of Literature

2.1 Meaning of Review of Literature

2.2 Need of Review of Literature

2.3 Objective of Review of Literature

2.4 Source of Review of Literature

UNIT – III

Research Hypothesis

3.1 Meaning of Hypothesis

3.2 Definition of Hypothesis

3.3 Kinds of Hypothesis

Text Book:

1. 1.Research Methodology, C.R. Kothari
2. Fundamentals of Mathematical Statistics, S.C. Gupta, V.K.Kapoor

List of reference books:

1. 1.Rearch Methods in Education, Cohen,L. Lawrence M., & Morrison,K.
2. 2.Research Methodology, Kumar,R.
3. 3.Practical Research, Leedy,P.D.

D.K.GOVT.COLLEGE (AUTONOMOUS), NELLORE
MODEL QUESTION PAPER
(With Mathematics Combination)
I B. Sc Semester -1

Pape1: Descriptive statistics

Time: 3hours **Max.marks:70**

SECTION – A

Answer any FIVE Questions: - **5 X 4 = 20M**

1. Define Primary and Secondary data
2. Define mean and explain merits and demerits
3. Explain sheppard corrections for moments
4. Define Skewness? Mention various measures of Skewness?
5. Explain the Method of Fitting of Power Curve
6. What are the Properties of Correlation Coefficients
7. Define Regression Coefficients? Mention the Properties.
8. What are the Conditions of Consistency of Two Attributes data.

SECTION – B

Answer ONE Question from each unit. Each Question carries 10 marks.

5x10=50M

UNIT-I

9. Explain various measures of Central tendency.

OR

10. Find Mean, Median for the following data

C.I	0-20	20- 40	40-60	60-80	80-100
F	15	23	50	25	10

UNIT-II

11. Explain various measures of dispersion. State their merits and demerits.

OR

12. Define central, non-central moments. Derive central moments in terms of raw moments.

UNIT-III

13. Explain Fitting of a Second degree Parabola by Least Squares Method:FitParabola for the following data.

X	1960	1970	1980	1990	2000
Y	20	35	55	80	115

OR

14. Derive Rank Correlation Coefficient Formula (no ties)

UNIT-III

15. Derive regression line of Y on X .

OR

16. The equations of the two regression lines are 8x-10y+66=0, 40x-18y+214=0 and v(x)=9, then find

(a) Correlation Coefficient

(b)S.D of y

UNIT-IV

17. Explain Yules Coefficient of Association and Colligation and Show that $Q=2Y/(1+Y^2)$

OR

18. Explain Various Coefficients of Contingency in Manifold Classification

4.

D.K.GOVT.COLLEGE (AUTONOMOUS), NELLORE

MODEL QUESTION PAPER

(With Mathematics Combination)

I B. Sc Semester -2

Pape2: Probability theory and Distributions

Time: 3hours **Max.marks:70**

SECTION – A

Answer any FIVE Questions: - **5 X 4 = 20 M**

1. Define (a) Random experiment (b) Sample Space
2. State and Prove Boole's Inequality
3. Define (a) pmf
4. If the pdf of x is f(x)= x, 0<x<2 then find E(x)
5. Define Mathematical Expectation. Mention the Properties.
6. Define poisson distribution.
7. Define Geometric distribution. Mention the properties.
8. Derive additive property of Normal distribution

SECTION – B

Answer ONE Question from each unit. Each Question carries 10 marks.

5x10=50M

UNIT-I

9. Explain various definitions of Probability

OR

10. State and prove Multiplication theorem of Probability for n events

UNIT-II

11. Explain Distribution Function and its properties.

OR

12. Define the Concepts (a)Joint pdf (b) Marginal pdf (c) Conditional pdf (d) Independence of Random variables

UNIT-III

13. State and Prove Chebychev's Inequality.

OR

14. State and Prove Multiplication theorem on Mathematical Expectation.

UNIT-IV

15. Define Bionomial distribution and derive its mean and variance.

OR

16. Derive Poisson distribution as a limiting case of Binomial distribution.

UNIT-V

17. Define Normal distribution.Mention the Properties and Importance of Normal distribution.

OR

18. Define Gama distribution, find MGF of Gama distribution.

D.K.GOVT.COLLEGE (AUTONOMOUS), NELLORE

MODEL QUESTION PAPER

(With Mathematics Combination)

II B. Sc Semester -3

Pape3: Statistical Inference

Time: 3hours **Max.marks:70**

SECTION-1

Answer any FIVE Questions: - **5 X 4 = 20 M**

1. State Neyman- Factorization Theorem
2. Write Properties of MLE
3. Define the terms (a) Parameter (b) Statistic
4. Applications of t- distribution
5. Explain about null and alternate hypothesis
6. Test for single mean in case of large samples.
7. Critical region.
8. Run test.

SECTION – B

Answer ONE Question from each unit. Each Question carries 10 marks. **5x10=50M**

9. Define F distribution state it's properties and applications.

OR

10. Explain the concepts 1. Sampling distribution 2. Standard error 3. Polulation 4. chi-Square distribution

11. Explain the method of MLE also state its properties.

OR

12. Find 95% and 99% confidence intervals for the estimation of Normal mean

13. State and Prove Neyman pearson lemma

OR

14. Write about (a) One and two tailed tests (b) Two types of Errors (c) Most powerful test. (d) Level of significance.

15. Explain the large sample test procedure for testing two sample correlation coefficients .

OR

16. Paired t- test

17. What do you understand by Non- parametric tests. write its merits and Demerits of non parametric tests

OR

18. Explain the Median test for equality of two populations

D.K.GOVT.COLLEGE (AUTONOMOUS), NELLORE

MODEL QUESTION PAPER

(With Mathematics Combination)

II B. Sc Semester -4

Pape4: Sampling Techniques and Design of Experiments

Time: 3hours **Max.marks:70**

SECTION-1

Answer any FIVE Questions: - **5 X 4 = 20 M**

1. What is the advantage of sampling over complete census.
2. Explain SRSWOR
3. Describe the advantages of Stratified random sampling.
4. What are the fundamental assumptions underlying the AN0VA.
5. Write RBD And LSD ANOVA tables
6. Define a) Treatment b) Block
7. Main effects 2^2 factorial experiment
8. Merits of systematic sampling.

SECTION – B

Answer ONE Question from each unit. Each Question carries 10 marks. **5x10=50M**

9. Show that in SRSWOR sample mean square is an unbiased estimate of population mean square.

OR

10. Explain various methods of Simple Random Sampling.
11. Describe the advantages of stratified random sampling and explain about Neyman optimum allocation method

OR

12. Derive mean and variance of Systematic sampling.

13. Explain the ANOVA of Two-way Classification

OR

14. Explain the statistical analysis of CRD

15. Describe the analysis of Randomized Block Design.

OR

16. Explain the missing plot technique in LSD

17. Statistical analysis of 2^2 factorial experiment.

OR

18. Explain the Yate's procedure for 2^3 factorial analysis.

D.K.GOVT.COLLEGE (AUTONOMOUS), NELLORE
MODEL QUESTION PAPER
(With Mathematics Combination)
II B. Sc Semester -4
Pape5 : APPLIED STATISTICS

Time: 3hours **Max.marks:70**

SECTION -1

Answer any 5 Questions. Each question carries 4 marks. **5X4 = 20**

1.Define Time series and its additive model.

2.. Cyclical variations

3. Ideal Index Number

4. Cost of living index number

5. Growth curve

6. Uses of Vital Statistics

7.. Demerits of CBR

8. Method of simple averages.

SECTION – B

Answer ONE Question from each unit. Each Question carries 10 marks. **5x10=50M**

UNIT-I

9 . Explain the Components of Time Series

OR

10. Explain the Least Square trend by fitting of a Straight Line.

UNIT-II

11. Explain the method of Ratio to trend for calculating seasonal indeces.

OR

12. Write the iterative procedure of Link relatives method of finding seasonal

indeces.

UNIT-III

13**.** Explain the procedure of fitting Modified exponential curve.

OR

14. Compare Gompertz and Logistic curves.

UNIT-IV

15. Explain the construction of Various Weighted Index Numbers.

OR

16. Explain the various problems involved in the construction of index numbers.

UNIT-V

17. Define the various columns of a life-table and explain how a life table can be constructed from data usually available.

OR

18. Show that $m_x = \frac{2q_x}{2 - q_x}$

D.K.GOVT.COLLEGE (AUTONOMOUS), NELLORE

MODEL QUESTION PAPER

(With Mathematics Combination)

III B. Sc Semester -5

Paper – V: Sampling Techniques and Design of Experiments

Time: 3hours **Max.marks:70**

SECTION -1

Answer any 5 Questions. Each question carries 2 marks. **2X5 = 10**

1. Define sampling errors.
2. Write any two limitations of sampling.
3 What is variance of sample mean in SRSWR &SRSWOR.
4 Define Proportional allocation .
5. Define Systematic Sampling.
6. State Assumptions in ANOVA.
7. Define term Randomization in Principles of experimentation.
8. Write error degrees of freedom in RBD MPT

SECTION -2

Answer any 5questions. Each question carry 4 marks **4x5=20**

1. What are the basic principles of sample survey ?
2. What is the advantage of sampling over complete census.
3. Explain SRSWOR
4. Describe the advantages of Stratified random sampling.
5. What are the fundamental assumptions underlying the AN0VA.
6. Write RBD And LSD ANOVA tables
7. Define a) Treatment b) Block
8. Description of CRD

SECTION –3

Answer ONE Question from each unit. Each Question carries 8marks

5x8= 40

UNIT –I

1. What are the types of sampling techniques and explain.

OR

2. What are the main steps involved in the sample theory?

UNIT –II

3. Show that in SRSWOR V ($\bar{y}$) = $\frac{S2}{n}\frac{N-n}{N}$

OR

4. Distinguish between SRSWOR AND SRSWR.

UNIT –III

5. If population consists of a linear trend, then show that

$$V\left(\bar{y}_{st}\right)_{opt} \leq V\left(\bar{y}_{st}\right)_{prop} \leq V\left(\bar{y}_{st}\right)_{ran}$$

OR

6. Explain Optimum Allocation Method and Proportion Allocation Methods in Stratified Random Sampling.

UNIT -- IV

7. Explain the ANOVA of Two-way Classification.

OR

8. Explain ANOVA of one-way classification.

UNIT – V

9. Describe the analysis of Randomized Block Design.

OR

10. Explain the Missing plot Technique in Latin Square Design.

D.K.GOVT.COLLEGE (AUTONOMOUS), NELLORE

MODEL QUESTION PAPER

(With Mathematics Combination)

IIIB. Sc Semester -5

Paper – VI: Quality and Reliability

Time: 3hours **Max.marks:70**

SECTION --1

Answer any 5 Questions. Each question carries 2 marks. **2X5 = 10**

1. Define SQC.
2. What are the control charts for variables?
3. Reasons for variation.
4. Rectifying sampling plans.
5. Control limits for C- chart.
6. Define the term Reliability.
7. Hazard rate Formula.
8. AOQ

SECTION – 2

Answer any 5questions. Each question carry 4 marks **5x4 = 20**

9. Necessity of SQC
10. Define (a) Lot(b)Sample
11. Applications of Mean and Range charts
12. Explain about Variable Control Charts
13. Need of Acceptance Sampling Plans.
14. Producer's & Consumer,s Risk
15. .Failure rates
16. Explain (a) MTTF (b) MTBF

SECTION – 3

Answer 1 Question from each Unit. Each Question carries 8 marks. 5x8 = 40

UNIT—1

17. . Explain Role of Normal Distribution in SQC.

OR

18. Explain (a) Tolerance Limits (b) Specification Limits

UNIT—2

19.. Explain the construction of Mean and Range charts.

OR

20. Explain the construction of P^- chart.

UNIT—3

21.. Write the need of Acceptance sampling plans

OR

22.. Write about (a) AQL (b) LTPD (C) AOQ

UNIT—4

23.. Explain algorithm of Double Sampling Plan.

OR

24. Derive the OC function of SSP.

UNIT—5

25. Explain the Memory less Property of Exponential Distribution.

OR

26. . Exponential Distribution as a life modal—Explain.

D.K.GOVT.COLLEGE (AUTONOMOUS), NELLORE

MODEL QUESTION PAPER

(With Mathematics Combination)

III B.Sc Semester -6

Paper – VII: Applied Statistics

Time: 3hours **Max.marks:70**

SECTION --1

Answer any 5 Questions. Each Question carries 2 marks. **2X5=10**

1. What are the examples of Irregular Variations.
2. Define cost of living index number.
3. Methods of calculating seasonal variations.
4. National income.
5. Define NRR.
6. Abridged Life table.
7. Write various Reproduction rates.
8. GRR

SECTION –2

Answer any FIVE Questions. **5x4 =20**

9. Define Time series and its additive model.
10. Cyclical variations
11. Ideal Index Number
12. Fixed and Chain base Index Numbers
13. Define CSO & NSSO .
14. Uses of Vital Statistics
15. Pearle's Vital Index
16. Demerits of CBR

SECTION –3

Answer all Questions choosing ONE from each unit **5X8=40**

UNIT-I

17. Explain the Components of Time Series

OR

18. Explain the Least Square trend by fitting of a Straight Line.

UNIT-II

19. Explain the construction of Various Simple Price Index Numbers.

OR

20. Explain the terms TRT, FRT, UNIT & CIRCULAR TEST

UNIT-III

21. Explain the following terms (a) Crude death rate (b) Specific death rate (c) Standard death rate

OR

22. Describe about various Methods of construction Cost of Living Index Number

UNIT-IV

23. Define terms ASFR, GFR and TFR

OR

24. Define NRR and GRR

UNIT-V

25. Define the various columns of a life-table and explain how a life table can be constructed from data usually available.

OR

26. Show that $m_x = \frac{2q_x}{2 - q_x}$

D.K.GOVT.COLLEGE (AUTONOMOUS), NELLORE

MODEL QUESTION PAPER

(With Mathematics Combination)

IIIB. Sc Semester -6 CBCS

Paper – VIII(C1): Optimization Techniques

Time: 3hours **Max.marks:70**

SECTION –1

Answer any 5 Questions. Each Question carries 2 marks. **2X5=10**

1. What is LPP?
2. Define Basic solution.
3. Travelling salesman problem.
4. Mathematical formulation of Transportation problem.
5. What are the models of OR.
6. When will you obtain unbounded solution in graphical method?
7. Define IBFS in Transportation problem.
8. Scope of OR.

SECTION –2

Answer any FIVE Questions. **5x4 = 20**

9. Define OR and give its Applications.
10. Explain Graphical procedure for solving LPP
11. Define (a) Slack variable (b) Surplus variable
12. Unbalanced Transportation Problem.
13. Mathematical formulation of Assignment Problem.
14. Define (a) BFS (b) IBFS
15. Limitations of OR.
16. Degenerate Solution of LPP.

1.

SECTION --3

Answer all Questions choosing ONE from each unit **5X8=40**

UNIT—I

17. Explain origin and development of OR.

OR

18.. Define OR. Give its meaning, nature and features of OR.

UNIT—II

19. Solve the following LPP Graphically.

Max $z = 3x_1 + 4x_2$

Subject to constraints: $4x_1 + 2x_2 \leq 80$; $2x_1 + 5x_2 \leq 180$ and $x_1, x_2 \geq 0$.

OR

20. Explain Canonical and Standard forms of LPP with an example.

UNIT—III

21. Explain Big M- Algorithm

OR

22..Solve the following LPP using simplex method

Max $Z = x_1 + x_2$

Subject to constraints: $-x_1 + 2x_2 \leq 8$; $x_1 + 2x_2 \leq 12$; $x_1 - 2x_2 \leq 3$ and $x_1, x_2 \geq o$

UNIT—IV

23. Solve the following Transportation Problem using VAM

	D	E	F	G	Available
A	11	13	17	14	250
B	16	18	14	10	300
C	21	24	13	10	400
Demand	200	225	275	250	

OR

24. For finding IBFS explain the methods of (a) NWCR (b) LCM

UNIT—V

25.. Explain Hungarian technique for finding optimum Assignment schedule.

OR

26. Explain about Travelling salesman problem.

D.K.GOVT.COLLEGE (AUTONOMOUS), NELLORE

MODEL QUESTION PAPER

(With Mathematics Combination)

IIIB. Sc Semester -6 CBCS

Paper – VIII(C2): Numerical Analysis

Time: 3hours **Max.marks:70**

SECTION –1

Answer any 5 Questions. Each question carries 2 marks. **5X2=10**

1. Define displacement operator (E).
2. Find $\Delta(2x)$ if h=1.
3. Write any two properties of backward difference operator.
4. Numerical integration.
5. State Newton-Gauss forward formula.
6. State Relationship between ordinary differences and central differences.
7. Find E(4x+1) when h=2
8. Newton-Gregory forward formula.

SECTION –2

Answer any FIVE Questions. **5x4 = 20**

9. Explain the term Interpolation
10. Define Forward and Backward difference operators
11. Central Differences
12. Numerical differentiation
13. Trapezoidal Rule
14. Any two Relationships of Δ and E operators
15. Binomial Expansion formula
16. State Lagrange's formula

SECTION --3

Answer all Questions choosing ONE from each unit **5X8=40**

UNIT—I

17.Explain the properties of Δ, ∇ and E, - operators.

OR

18.. Estimate the missing values using Binomial Expansion's formula

X:	2	4	6	8	10	12	14
Y:	1.4	-	3.5	4.7	-	8.7	10.8

UNIT—II

19.State and prove Newton-Gregory forward difference formula.

OR

20.. Estimate the value of f(x) when x = 41 using Lagrange's formula

X:	12	19	25	34
f(x):	56	85	101	91

UNIT—III

21. State and prove Sterling's formula.

OR

22..State and prove Newton-Gauss forward formula.

UNIT—IV

23. Find the first two derivatives of Gregory forward difference formula.

OR

24.Find the first two derivatives of f(x) at x = 30

X:	10	15	20	25	30	35
f(x):	22.2	28.5	34.2	45.2	56.8	61.5

UNIT—V

25. Derive Simpson's1/3rd rule from general quadrature formula.

OR

26.Find the value of $\int \frac{1}{1+x2}$ dx in $[0,1]$ by dividing 10 equal parts using Simpson's

3/8th formula and compare it with actual value.

D.K.GOVT.COLLEGE (AUTONOMOUS), NELLORE

PRACTICAL MODEL QUESTION PAPER

(With Mathematics Combination)

Answer any TWO of the following Practicals **Max. Marks: 50**

1. Procedure and Formulae =3 marks
2. Calculations =15 marks
3. Result and Inference = 2 mark (2x 20 = 40 marks)
4. Record (10 marks)
5. Total = 50 marks

CERTIFICATE COURSE ON MS-EXCEL &SPSS

- Objective of this course : By the end of the course students will be able to
- To use SPSS (Statistical Package for Social Sciences)
- To use MS-Excel
- Analyze the data using SPSS and MS-Excel
- To assist in field based results.

SYLLABUS

UNIT-I: Introduction to MS-Excel 15 Hours

Introducing Microsoft Excel: Starting Excel, Worksheets and Workbook, Understanding the User Interface, Quick Access Toolbar, Formula Bar, Worksheet Area, Status Bar, Creating New Excel Workbook, saving excel workbook and Opening Existing Excel Workbook. Entering and formatting data, Organizing Data in Excel Tables, Inserting Cut or Copied Cells. Creating Excel formulas and functions.

UNIT-II: Managing Data with MS-Excel 15 Hours

Sorting and Filtering Worksheet Data. Data Analysis Using Spread Sheets: Data Analysis Pak in Excel, Descriptive Statistics, T-Test, ANOVA, Correlation and Regression, Random number Generation From Different Distributions, Binomial, Poisson, Uniform and Normal Distributions**.** Diagrammatic presentation of data and Graphical presentation of data.

UNIT-III; Introduction to SPSS 15 Hours

Entering and editing data in SPSS: View of data and variables, Importing other extension files into SPSS, Inserting and defining variables and cases, Managing fonts and labels Data screening and cleaning. Splitting and Merging of Files, Frequency tables, Descriptive Statistics, Cross Tabs. Graphical representation of statistical data: Bar, Line & Pie chart, Histogram, Box plot and scatter plot.

UNIT-IV: Statistical analysis using SPSS 15 Hours

15 Hours_ Concept of Testing of Hypothesis, Working with parametric tests, comparison of means: t – test (one sample, independent – sample, paired sample). Concept of Correlation and Regression analysis using SPSS. Use of non-parametric tests: Pearson's Chi-square test, Fisher's exact test, comparing two or several related groups. Data analysis and Interpretation of results.