

MARIS STELLA COLLEGE (AUTONOMOUS), VIJAYAWADA – 8

(Affiliated to Krishna University, Machilipatnam)

SYLLABUS

Subject: Statistics

Semester: I

Course Title: Descriptive Statistics

Course Code: 20STCCDS13

No. of Hours: 60

LTP: 400

Credits: 3

Objectives

- To give the students a good practice in presentation and the format most applicable to their own data.
- To provide an understanding for the graduate student on statistical concepts like measures of central tendency, dispersion and moments along with their applications.
- To provide a clear conceptual idea about Regression and correlation analysis for business / economic forecasting.
- To deal with qualitative data.

Course outcomes

CO1: Interpret diagrammatic data presentation for common understanding

CO2: Determine the reliability of an average and compare variability of two or more series and solve problems using moments.

CO3: Interpret bivariate data and apply curve fitting , correlation and regression methods to forecast business data.

CO4: Differentiate between quantitative and qualitative data and apply association and contingency techniques using attributes.

UNIT-I

(10 Hrs.)

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**(10 Hrs.)**

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**(10 Hrs.)**

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**(10 Hrs.)**

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.

UNIT-V**(8 Hrs.)**

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.

Skill/ Hands-on**(12 Hrs.)**

1. Practical case studies to know diagrammatic and Graphical presentation of data
2. To Apply central tendency and dispersion methods to a real life data and to draw valid conclusions from the data
3. Qualitative character study to check their association with each other by considering real life situations.
4. Hands on practice for EXCEL for Statistical applications.

Co-curricular activities

1. Problem Solving
2. Conducting quiz
3. Peer group discussions
4. Seminars by taking real life examples

Prescribed 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, Vol –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 Bansilal: New Mathematical Statistics: Satya Prakashan, New Delhi

MARIS STELLA COLLEGE (AUTONOMOUS), VIJAYAWADA – 8
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SYLLABUS

Subject: Statistics

Semester: I

Course Title: Descriptive Statistical Methods - Practical

Course Code: 20STP1DS12

No. of Hours: 30

LTP: 002

Credits: 2

Objectives

- To give the students a good practice in presentation and the format most applicable to their own data.
- To provide hands -on experience for the graduate student on statistical concepts like measures of central tendency, dispersion and moments.
- To provide a clear practical experience about Regression & correlation analysis for business / economic forecasting as well as attributes which deal with qualitative data.

Course outcomes

CO1: Interpret diagrammatic data presentation, determine the reliability of an average using central tendency measures and compare the variability of two or more series.

CO2: Apply the curve fitting, correlation and regression methods to the given data

CO3: Apply Association and Contingency techniques for qualitative data using Attributes.

LIST OF PRACTICALS

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, β_1 and β_2 for ungrouped data.
6. Computation of non-central, central moments, β_1 and β_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 Yule's coefficient of association

MARIS STELLA COLLEGE (AUTONOMOUS), VIJAYAWADA –8
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SYLLABUS

Subject: Statistics

Semester: II

Course Title: Probability Theory & Distributions

Course Code: 20STCCPD23

No. of Hours: 60

LTP: 400

Credits: 3

Objectives

- To deal 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.
- To use various standard theoretical distributions, their chief characteristics and applications in analyzing any data.

Course outcomes

CO1: Explain the basics of probability, types, theorems and applications in real life.

CO2: Interpret Univariate & bi-variate random variables.

CO3: Apply mathematical expectations applications to real data.

CO4: Identify different real life problems and apply discrete and continuous distributions to draw valid inferences

UNIT-I

(10 Hrs.)

Introduction to Probability: Basic Concepts of Probability, random experiments, trial, outcome, sample space, event, mutually exclusive and exhaustive events, equally likely and favorable 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 Bayes theorem and its applications in real life problems.

UNIT-II**(8 Hrs.)**

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.

UNIT- III**(10 Hrs.)**

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 - Schwarz inequalities.

UNIT-IV**(10 Hrs.)**

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

UNIT - V**(10 Hrs.)**

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.

Skill / Hands-on**(12 Hrs.)**

1. Practical case studies to apply probability.
2. Review of articles related to the topics in the syllabus
3. Hands-on practice of EXCEL and SPSS for Statistical applications.

Co- curricular activities

1. Peer group discussions on bivariate data applications and their case studies.
2. Problem Solving
3. Conducting quiz
4. Seminars by taking real life examples in case of discrete distributions.
5. Small real life examples to apply different continuous distributions .
6. Preparation of videos on the subject related topics

Prescribed 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.

MARIS STELLA COLLEGE (AUTONOMOUS), VIJAYAWADA – 8

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SYLLABUS

Subject: Statistics

Semester: II

Course Title: Probability Distributions - Practical Course Code: 20STP2PD22

No. of Hours: 30

LTP: 002

Credits:2

Objectives

- To give practical experience on using various discrete distributions by applying them to analyze the real life data.
- To use continuous distributions for practical experience

Course outcomes

CO1: Identify different real life problems

CO2: Apply discrete distributions (Binomial, Poisson, Negative Binomial and Hypergeometric) to the real life situations to draw valid conclusions.

CO3: Interpret continuous distributions (Uniform, Normal and Exponential) in day to day life to draw valid inferences.

List of Practicals

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.

MARIS STELLA COLLEGE (AUTONOMOUS), VIJAYAWADA – 8
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SYLLABUS

Course Title: Elementary Statistics

Course Code: 20LSCES2

No. of Hours: 30

LTP: 200

Credits: 2

Objectives

- To provide basic understating of general statistical tools and their elementary applications
- To create awareness on the Statistical System particularly in India.

Course Outcomes

CO1: Explain the scope and limitations of statistics, collection and representation of data.

CO2: Interpret central tendency and dispersion measures to the given data.

CO3: Estimate the degree of relationship between variables using the concepts of correlation and regression.

UNIT - I

(8 Hrs.)

Meaning, scope and limitations of Statistics , Collection of data: Primary and Secondary, Classification and Tabulation, Construction of frequency distribution.

Graphical and Diagrammatic Representation: Histogram, Ogives and Frequency polygon, Simple, Multiple Bar and Pie diagrams

UNIT-II

(10 Hrs.)

Measures of Central Tendency:

Features of good average, Arithmetic mean, Median, Mode. Empirical relationship between Mean, Median and Mode.

Measures of Dispersion: Range, Quartile Deviation (QD), Mean Deviation(MD), Variance, Standard Deviation(SD), relationship between QD, MD and SD. Concepts of Skewness and Kurtosis.

UNIT III

(7 Hrs.)

Familiarization Of the concepts relating to Correlation and Linear Regression. Their applications in the real world.

Skill / Hands-on

(5 Hrs.)

1. Practical case studies to know diagrammatic and Graphical presentation of data.
2. To Apply central tendency and dispersion methods to a real life data and to draw valid conclusions from the data

Co-curricular activities

1. Problem Solving
2. Conducting quiz
3. Seminars/ Poster presentations

Prescribed Text Books

1. V.K.Kapoor and S.C.Gupta: Fundamentals of Mathematical Statistics,
Sultan Chand & Sons, New Delhi
2. Statistical Methods, S.P. Gupta, Sultan Chand and Sons,
New Delhi

MARIS STELLA COLLEGE (AUTONOMOUS), VIJAYAWADA – 8
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SYLLABUS

Subject: Statistics

Semester: III

Course Title: Statistical Inference

Course Code: 20STCCSI33

No. of Hours: 60

LTP: 400

Credits: 3

Objectives

- To deal with standard sampling distributions like Chi Square, t and F and their characteristics and applications.
- To provide understanding about different techniques of point estimation for estimating the parameter values of population and interval estimation for population parameters.
- To discuss various topics of Inferential Statistics such as interval estimation, Testing of Hypothesis, large sample tests (Z-test), small sample tests (t-test, F-test, chi-square test) and nonparametric tests which play an important role in many fields like pharmaceutical, agricultural, medical etc.

Course outcomes

CO1: Interpret t, F and χ^2 distributions in terms of statistics of a sample from a normal distribution.

CO2: Examine different methods of estimation.

CO3: Explain the definitions and concepts of hypothesis testing

CO4: Differentiate the types of sample sizes and apply large and small sample tests to real data.

CO5: Distinguish between parametric and non-parametric tests.

UNIT-I

(10 Hrs.)

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, interrelations and their applications.

UNIT-II

(8 Hrs.)

Theory of estimation: Estimation of a parameter, criteria of a good estimator – unbiasedness, consistency, efficiency, and sufficiency. 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 estimated by MLE & MME method. Confidence Intervals for mean (When σ^2 is known and unknown).

UNIT-III

(10 Hrs.)

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.

UNIT – IV

(10 Hrs.)

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. χ^2 -test for goodness of fit and independence of attributes, test for single variance.. F-test for equality of variances.

UNIT – V

(10 Hrs.)

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.

Skill / Hands-on**(12 Hrs.)**

1. Practical case studies to know concepts of population, parameter, estimator etc.
2. To small sample tests and large sample tests to a real life data and to draw valid conclusions from the data
3. Hands on practice for EXCEL and SPSS for runs test, sign test and Wilcoxon-signed rank test, Median test, Wilcoxon –Mann Whitney U test, Wald Wolfowitz's runs test.

Co-curricular activities

1. Problem Solving
2. quiz
3. Peer group discussions **on bivariate data applications and their case studies.**
4. Seminars by taking real life examples in case of testing of hypotheses.

Prescribed Text Books

1. V.K.Kapoor and S.C.Gupta: Fundamentals of Mathematical Statistics, Sultan Chand & Sons, New Delhi.
2. BA/BSc II 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.
2. Volume –I, Wiley
3. Goon AM, Gupta MK, Das Gupta B: Fundamentals of Statistics, Vol-I, the World Press Pvt.Ltd., Kolakota.
4. Hoel P.G: Introduction to mathematical statistics, Asia Publishing house.
5. M. JaganMohan Rao and Papa Rao: A Text book of Statistics Paper-I.
6. Sanjay Arora and Bansilal: New Mathematical Statistics: Satya Prakashan, New Delhi

MARIS STELLA COLLEGE (AUTONOMOUS), VIJAYAWADA – 8

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SYLLABUS

Subject: Statistics

Semester: III

Course Title: Statistical Inference- Practical

Course Code: 20STP3SI32

No. of Hours: 30

LTP: 002

Credits: 2

Objectives

- To deal with standard sampling distributions like Chi Square, t and F and their characteristics and applications.
- To discuss various topics like Testing of Hypothesis, large sample tests (Z-test), small sample tests (t-test, F-test, chi-square test) and non-parametric tests which play an important role in many fields like pharmaceutical, agricultural, medical etc.

Course outcomes

CO1: Apply Large sample tests and small sample tests to different real life situations

CO2: Distinguish between the Parametric and the non-parametric tests and apply them for real life data.

LIST OF PRACTICALS

1. a) Large sample test for single mean
b) Large sample test for difference of means
2. a) Large sample test for single proportion
b) Large sample test for difference of proportions
3. a) Large sample test for difference of standard deviations
b) Large sample test for correlation coefficient
4. a) Small sample test for single mean
b) Small sample test for difference of means
5. Small sample test for correlation coefficient
6. Paired t-test (paired samples).
7. a) Small sample test for single variance (χ^2 - test)
b) Small sample test for difference of variances(F-test)

8. χ^2 - test for goodness of fit and independence of attributes
9. Nonparametric tests for single sample (run test, sign test and Wilcoxon signed rank test)
10. Nonparametric tests for related samples (sign test and Wilcoxon signed rank test)
11. Nonparametric tests for two independent samples (Median test, Wilcoxon –Mann-Whitney - U test, Wald - Wolfowitz' s runs test)

MARIS STELLA COLLEGE (AUTONOMOUS), VIJAYAWADA – 8
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SYLLABUS

Subject: Statistics

Semester: III

Course Title: Business Statistics

Course Code: 20STCCBS34

No. of Hours: 75

LTP: 410

Credits: 4

Objectives

- The objective of this paper is to give the students a good practice in presentation and the format most applicable to their own data.
- The objective of this course is to provide an understanding for the graduate student on statistical concepts like measures of central tendency, dispersion and moments along with their applications.
- Course aims to provide a clear conceptual idea about correlation analysis for business / economic forecasting.

Course outcomes

CO1: Interpret diagrammatic data presentation which makes it easier for a common man to understand the given data.

CO2: Determine the reliability of an average and compare variability of two or more series

CO3: Derive the correlation between two variables.

UNIT-I

(12 Hrs.)

Introduction to Statistics: Definition – Importance, Characteristics and Limitations of Statistics -Classification and Tabulation – Frequency Distribution Table -Diagrams and Graphical Presentation of Data (Presentation of the data using MS EXCEL)

UNIT-II

(12 Hrs.)

Measures of Central Tendency: Types of Averages – Characteristics of good Average - Mean, Median, Mode, Geometric Mean, Harmonic Mean (Problem Solving using MS EXCEL)

UNIT- III**(12 Hrs.)**

Measures of Dispersion: Meaning and Properties of Dispersion – Absolute and Relative Measures - Types of Dispersion-Range - Quartile Deviation (Semi – Inter Quartile Range) -Mean Deviation - Standard Deviation - Coefficient of Variation. (Problem Solving using MS EXCEL)

UNIT-IV**(12 Hrs.)**

Skewness and Kurtosis: Measures of Skewness: Absolute and Relative Measures- Coefficient of Skewness: Karl Pearson's, Bowley's and Kelly's - Kurtosis: Meso kurtosis, Platy kurtosis and Leptokurtosis (Problem Solving using MS EXCEL)

UNIT-V**(12 Hrs.)**

Measures of Relation: Meaning and use of Correlation – Types of Correlation - Karlpearson's Correlation Coefficient - Probable Error Spearman's Rank-Correlation (Problem Solving using MS EXCEL)

Skill / Hands-on**(15 Hrs.)**

1. Practical case studies to know diagrammatic and Graphical presentation of data.
2. To Apply central tendency and dispersion methods to a real life data and to draw valid conclusions from the data

Co-curricular activities

1. Problem Solving
2. Conducting quiz
3. Peer group discussions on bivariate data applications and their case studies.
4. Seminars by taking real life examples in case of Correlation

Prescribed Text Books

1. Business Statistics, Reddy C.R., Deep Publications.
2. Statistical Methods: Gupta S.P.Sultan Chand & Sons.
3. Statistics-Problems and Solutions: Kapoor V.K, Sultan Chand & Sons.

Reference Books

1. V.K.Kapoor and S.C.Gupta: Fundamentals of Mathematical Statistics, Sultan Chand & Sons, New Delhi.
2. K.V.S. Sarma: Statistics Made Simple: Do it yourself on PC. PHI

MARIS STELLA COLLEGE (AUTONOMOUS), VIJAYAWADA – 8
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SYLLABUS

Subject: Statistics

Semester: IV

Course Title: Applied Statistics

Course Code: 20STCCAS43

No. of Hours: 60

LTP: 400

Credits: 3

Objectives

- To deal with the time series on simple description methods of data, explains the variation, forecasting the future values, control procedures.
- To give an idea of using index numbers in a range of practical situations, limitations and uses
- To 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.

Course outcomes

CO1: Interpret chronological data to derive trends in economy.

CO2: Analyze the standard of living in different countries using index numbers

CO3: Explain the importance of demography in the development of society.

CO4: Apply the methods of obtaining birth and death rates to draw inferences regarding demography.

CO5: Construct the life table for different age groups to examine the reproduction rates.

UNIT-I

(8 Hrs.)

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

(10 Hrs.)

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

UNIT-III**(10 Hrs.)**

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

UNIT IV**(10 Hrs.)**

Index numbers: Concept, construction, problems involved in the construction of index numbers, uses and limitations. Simple and weighted index numbers. Laspayer'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**(10 Hrs.)**

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.

Skill / Hands-on**(12 Hrs.)**

1. Practical case studies to know different kinds of mathematical models of time series.
2. To apply least squares technique to real life data and to draw valid conclusions regarding the trend of the given time series.
3. Case studies to find out the cost of living of the people using Index numbers.
4. Hands on practice on SPSS and R to draw conclusions about the given time series data, Index numbers and demographic data

Co-curricular activities

1. Problem Solving
2. quiz
3. Peer group discussions
4. Seminars

Prescribed Text Books

1. V.K.Kapoor and S.C.Gupta: Fundamentals of Applied Statistics, Sultan Chand & Sons, New Delhi.
2. BA/BSc III year statistics - descriptive statistics, probability distribution - Telugu Academy - Dr M.Jaganmohan Rao,Dr N.Srinivasa Rao, Dr.P. P.Tirupathi Rao, Smt.D.Vijayalakshmi.

Reference books

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

MARIS STELLA COLLEGE (AUTONOMOUS), VIJAYAWADA – 8

(Affiliated to Krishna University, Machilipatnam)

SYLLABUS

Subject: Statistics

Semester: IV

Course Title: Sampling Techniques & Designs of Experiments

Course Code: 20STCCSD43

No. of Hours: 60

LTP: 400

Credits: 3

Objectives

- To deal 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
- To provide understanding the variability between group and within group through Analysis of Variance
- To give an idea of logical construction of Experimental Design and applications of these designs nowadays in various research areas.

Course Outcomes

CO1: Design and implement surveys using sampling techniques.

CO2: Interpret the results of ANOVA through computation.

CO3: Summarize the principles, phases and scope of designs

CO4: Analyze and interpret basic designs (CRD, RBD and LSD).

CO5: Demonstrate the analysis of full factorial designs.

UNIT-I

(10 Hrs.)

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.

UNIT II

(10 Hrs.)

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

(10 Hrs.)

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 disadvantages and Statistical analysis of Completely Randomized Design (C.R.D).

UNIT IV

(10 Hrs.)

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.

UNIT V

(8 Hrs.)

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.

Skill / Hands-on

(12 Hrs.)

1. Practical case studies to know the applicability of different kinds of sampling techniques.
2. To apply ANOVA technique to a real life data and to draw valid conclusions
3. Hands-on practice on SPSS and R to draw conclusions about the data pertaining to different experimental designs like CRD , RBD and LSD.

Co curricular Activities

1. Problem Solving
2. Quiz
3. Peer group discussions
4. Seminars

Prescribed Text Books

1. V.K.Kapoor and S.C.Gupta: Fundamentals of Applied Statistics, SultaN Chand & Sons, New Delhi.
2. BA/BSc III year statistics - descriptive statistics, probability distribution - Telugu Academy- Dr M.Jaganmohan Rao,Dr N.Srinivasa Rao, Dr P.Tirupathi Rao, Smt.D.Vijayalakshmi.

Reference books

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

MARIS STELLA COLLEGE (AUTONOMOUS), VIJAYAWADA – 8
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SYLLABUS

Subject: Statistics

Semester: IV

Course Title: Applied Statistical Methods- Practical

Course Code: 20STP5AS42

No. of Hours: 30

LTP: 002

Credits: 2

Objectives

- To deal with 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.

Course outcomes

CO1: Apply Trend derivation methods to different chronological series in real life situations.

CO2: Analyze the economy and standard of living in different countries using Index Numbers

CO3: Interpret the methods of obtaining birth & death rates and construct the Life table for living beings from different age groups

LIST OF PRACTICALS

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 Ratio to moving averages
4. Determination of seasonal indices by method of Ratio to trend
5. Determination of seasonal indices by method of Link relatives

Index Numbers

6. Computation of all weighted index numbers.
7. Computation of reversal tests.

Vital Statistics

8. Computation of various Mortality rates
9. Computation of various Fertility rates
10. Construction of Life Tables

MARIS STELLA COLLEGE (AUTONOMOUS), VIJAYAWADA – 8

(Affiliated to Krishna University, Machilipatnam)

SYLLABUS

Subject: Statistics

Semester: IV

Course Title: Sampling & Designs- Practical

Course Code: 20STP4SD42

No. of Hours: 30

LTP: 002

Credits: 2

Objectives

- To deal 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
- To provide understanding the variability between group and within group through Analysis of Variance
- To give an idea of logical construction of Experimental Design and applications of these designs nowadays in various research areas.

Course outcomes

CO1: Design and implement surveys with the sampling designs

(simple random, systematic, stratified).

CO2: Apply the Basic designs (CRD, RBD and LSD) to real life situations and

interpret the results using ANOVA and F-test.

CO3: Demonstrate how to analyze the results of the full Factorial designs.

LIST OF PRACTICALS

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 locations.

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. Estimation of single missing observation in RBD and its analysis
8. Estimation of single missing observation in LSD and its analysis
9. Analysis of 2^2 with RBD layout
10. Analysis of 2^3 with RBD layout

MARIS STELLA COLLEGE (AUTONOMOUS), VIJAYAWADA – 8
(Affiliated to Krishna University, Machilipatnam)
SYLLABUS

Subject: Statistics

Semester: V

Course Title: Sample Surveys and Analysis of Variance

Course Code: STATC036

No. of Hours: 45

Credits: 3

Objectives

- To design and conduct the sample surveys by using different sampling techniques and to draw conclusions.
- To study the variance types and effects on the given data and to analyze it.

Course outcomes

CO1: Design and implement surveys with the sampling designs
(simple random, systematic, stratified).

CO2: Estimate sample size for different sampling designs in order to
estimate population level point estimates and testing null hypothesis

CO3: Estimate design weights and adjust for non-response.

CO4: Interpret the functions of NSSO, CSO and RBI and assess the importance
of Statistical surveys in obtaining the data which in turn helps in drawing
valid conclusions about the social, economical data of the country.

CO5: Compute and interpret the results of ANOVA and F-test.

UNIT – I

(10 Hrs.)

Sample surveys, Concepts of population and sample, need for sampling, Census and sample survey, basic concepts in sampling, organizational aspects of survey sampling, sample selection and sample size

Some basic sampling methods – simple random sampling (SRS) with and without replacement.

UNIT – II

(10 Hrs.)

Stratified random sampling , Systematic sampling, ratio and regression methods of estimation under SRS.

UNIT – III**(9 Hrs.)**

Non-sampling errors, acquaintance with the working (questionnaires, sampling design, methods followed in field investigation, principal findings etc.) of NSSO and RBI undertaking sample surveys. Functions of CSO.

UNIT – IV**(10 Hrs.)**

Analysis of variance for one-way and two-way classifications, clearly stating the assumptions.

UNIT – V**(6 Hrs.)**

Analysis of covariance- it's objectives-types.

Recommended textbook

1. V. K. Kapoor and S.C. Gupta: Fundamentals of Applied Statistics, S Chand Publ.

Reference Books

1. Sampling Theory of surveys with applications by P. V. Sukhatme & B. V. Sukhatme:
2. Sampling theory and Methods by Murthy M.N.
3. Applied Statistics for B.A/B.Sc Third year. Published by Telugu Akademi ,Andhra Pradesh
4. Programmed Statistics by BL Agarwal.

MARIS STELLA COLLEGE (AUTONOMOUS), VIJAYAWADA – 8
(Affiliated to Krishna University, Machilipatnam)
SYLLABUS

Subject: Statistics

Semester: V

Course Title: Statistical Quality Control and Reliability

Course Code: STATC037

No. of Hours: 45

Credits: 3

Objectives

- To construct control charts for different variables and attributes and to check whether the given data's quality is under control.
- To test the reliability of given objectives.

Course outcomes

CO1: Differentiate the concepts of Quality Control(SQC) and Statistical Process Control (SPC)

CO2: Construct different control charts for variables(x-bar, R charts) and attributes(p,np and c charts)

CO3: Identify different acceptance sampling plans and differentiate them.

CO4: Distinguish between quality and reliability

CO5: Describe reliability methods

UNIT – I

(9 Hrs.)

Importance of statistical methods in industrial research and practice, specification of items and lot qualities corresponding to visual gauging, count and measurements, types of inspection, determinations of tolerance limits. General theory of control charts, causes of variations in quality, control limits, sub-grouping, summary of out-of-control criteria.

UNIT – II

(10 Hrs.)

Charts for attributes np chart, p-chart, c-chart, u-chart, Chart for variables – X-bar and R charts, design of X-bar and R charts versus p-charts, process capability studies.

UNIT – III**(10 Hrs.)**

Principle of acceptance sampling – problem of lot acceptance, stipulation of good and bad lots, producers and consumer's risks, single sampling plan, their OC functions, Concepts of AQL LTPD, AOQL, average amount of inspection and ASN function.

UNIT – IV**(8 Hrs.)**

Reliability: Introduction , Hazard function, Exponential distribution as life model, its memory – less property. Reliability function and its estimation.

UNIT-V**(8 Hrs.)**

Concepts of censoring and truncation. System reliability-series, parallel and K out of n systems and their reliability.

Recommended textbook

1. V. K. Kapoor and S.C. Gupta: Fundamentals of Applied Statistics S. Chand Publ.

Reference Books

1. Bowden, D.J.: Statistical Methods in Quality control. by Bowden, D.J.
2. Duncan, A. J.: Quality control and Industrial statistics by Duncan, A. J.
3. Grant E.L.: Statistical Quality control by Grant E.L.
4. Applied Statistics for B.A/B.Sc Third year. Published by Telugu Akademi ,AP
5. Programmed Statistics by BL Agarwal.

MARIS STELLA COLLEGE (AUTONOMOUS), VIJAYAWADA – 8
(Affiliated to Krishna University, Machilipatnam)

SYLLABUS

Subject: Statistics

Semester: V

Course Title: Practical - V

Course Code: STATC038

No. of Hours: 30

Credits: 2

Objectives

- To design and conduct the sample surveys by using different sampling techniques and to draw conclusions.
- To study the variance types and effects on the given data and to analyze it.

Course outcomes

CO1: Able Prepare the questionnaires

CO2: Able to conduct the surveys by applying different sampling techniques

CO3: Able to Draw inferences about the ANOVA techniques

List of Practicals

1. Simple Random Sampling : calculation of Variances , Comparison of SRSWOR and SRSWR
2. Stratified Random Sampling: Allocation of sample sizes(Proportional and Optimum allocation)
3. Analysis of one way classified data
4. Analysis of two way classified data
5. Analysis of covariance

MARIS STELLA COLLEGE (AUTONOMOUS), VIJAYAWADA – 8
(Affiliated to Krishna University, Machilipatnam)
SYLLABUS

Subject: Statistics

Course Title: Practical - VI

No. of Hours: 30

Semester: V

Course Code: STATC039

Credits: 2

Objectives

- To construct control charts for different variables and attributes and to check whether the given data's quality is under control.
- To test the reliability of given objectives.

Course outcomes

CO1: Draw the control charts

CO2: Calculate the risk of probability insurance sector

CO3: To calculate the Reliability methods

List of Practicals

1. Control charts for \bar{x} -bar and R charts
2. Control charts for fraction of defectives
3. Control charts for number of defectives
4. Control charts for \bar{x} -bar charts
5. Calculation of Reliability constants

MARIS STELLA COLLEGE (AUTONOMOUS), VIJAYAWADA – 8
(Affiliated to Krishna University, Machilipatnam)
SYLLABUS

Subject: Statistics

Semester: VI

Course Title: Time Series Analysis

Course Code: STATC040

No. of Hours: 45

Credits: 3

Objectives

- To analyze the given time series data and to estimate the trend, seasonality and cyclic effects on it.
- To incorporate the skills to forecast economic variables by studying AR, ARIMA & ARMA models.

Course outcomes

CO1: Interpret the Chronological data and its importance in Economy

CO2: Apply Trend derivation methods

CO3: Analyze the Growth curves

CO4: Establish relation between cause and effects Cyclic Variations.

CO5: Acquire the skills to forecast about the economic variables.

CO6: Discuss the concepts of white Noise, Auto Regression, Autocorrelation, Stationarity, ARMA and ARIMA

UNIT I

(8 Hrs.)

Introduction to times series data, application of time series from various fields, Components of a times series, Decomposition of time series. Trend: Estimation of trend by free hand curve method, method of semi averages, Method of moving averages, Detrending. Effect of elimination of trend on other time series. components of fitting a various mathematical curve, and growth curves.

UNIT II

(10 Hrs.)

Seasonal Component: Estimation of seasonal component by Method of simple averages, Ratio to Trend, Ratio to Moving Averages and Link Relative method, Deseasonalization.

UNIT III**(10 Hrs.)**

Cyclic Component: Harmonic Analysis. Some Special Processes: Moving-average (MA) process and Autoregressive (AR) process of orders one and two, Estimation of the parameters of AR (1) and AR (2) – Yule-Walker equations.

UNIT IV**(10 Hrs.)**

Random Component: Variate component method. Forecasting: Exponential smoothing methods, Short term forecasting methods: Brown's discounted regression, Box-Jenkins method and Bayesian forecasting.

UNIT V**(7 Hrs.)**

Stationary Time series: Weak stationarity, autocorrelation function and correlogram of moving average.

Prescribed Textbook

1. SC Gupta & VK Kapoor : Fundamentals of Applied Statistics

Suggested Readings

1. Kendall M.G. (1976): Time Series, Charles Griffin.
2. Chatfield C. (1980): The Analysis of Time Series –An Introduction, Chapman & Hall.
3. Mukhopadhyay P. (2011): Applied Statistics, 2nd ed. Revised reprint, Books and Allied

MARIS STELLA COLLEGE (AUTONOMOUS), VIJAYAWADA – 8
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SYLLABUS

Subject: Statistics

Semester: VI

Course Title: Operations Research

Course Code: STATC041

No. of Hours: 45

Credits: 3

Course Objectives

- The objective of this paper is to give the students a good understanding of OR
- The objective of this course is to provide a practice of basic simplex methods and its applications to the real world.

Course Outcomes

CO1: Understand the scope of Operations Research using additional OE resources available in the internet using modern ICT tools.

CO2: Knowledgeable about the Linear programming problem

CO3: Able to solve LPP

CO4: Analyze the Two-phase simplex method

UNIT-1

(8 Hours)

Origin and development of O.R, nature and features of O.R, Modeling in O.R, General solution methods for O.R models, Scientific & Methodology of O.R, Applications of O.R, Opportunities and Shortcomings of O.R.

UNIT -II

(10 Hours)

Linear programming problem:

Introduction, Mathematical formulation of the problem, Introduction to Graphical method, General linear Programming problem, Cononical and standard forms of L.P.P.

UNIT-III

(10Hours)

Simplex Method:

Introduction, Fundamental properties of Solutions, The computational procedure, Use of Artificial variables, solutions of simultaneous Linear equations, Applications of simplex method.

UNIT-IV

(10 Hours)

Duality in Linear programming:

Introduction, General Primal-Dual pair, Formulating a Dual Problem, Primal-Dual pair in matrix form, Duality theorems.

UNIT-V**(7 Hours)**

Complementary slackness theorem, Duality and simplex method, Economic interpretation of Duality, Dual simplex method, Revised simplex method.

Recommended text book

1. Operations Research by...Kanthi Swaroop, P.K. Gupta and Man Mohan
2. Operations Research by V. K. Kapoor.

Reference Books

1. S.K sinha: Reliability and life testing. wiley Eastern
2. Parimal Mukhopadhyay: Applied Statistics, New central book agency
3. L.S.Srinath: Reliability Engineering. Affiliated East-West Press.

MARIS STELLA COLLEGE (AUTONOMOUS), VIJAYAWADA – 8

(Affiliated to Krishna University, Machilipatnam)

SYLLABUS

Subject: Statistics

Semester: VI

Course Title: Designs of Experiments

Course Code:STATC042

No. of Hours: 45

Credits: 3

Objectives

- To understand the principles of designs and layout them
- To analyze the designs by applying them to real world situations and to get valid conclusions.

Course outcomes

CO1: Summarize the principles, phases, and scope of Designs

CO2: Interpret the analysis of Basic designs (CRD, RBD and LSD)

CO3: Explain Balanced and Partially balanced Incomplete Block Designs

CO4: Demonstrate how to analyze the results of the full Factorial designs.

CO5: Explain the concept of Fractional Factorial Designs.

UNIT I

(12 Hrs.)

Experimental designs: Role, historical perspective, terminology, experimental error, basic principles, uniformity trials, fertility contour maps, choice of size and shape of plots and blocks. Basic designs: Completely Randomized Design (CRD), Randomized Block Design (RBD)

UNIT II

(12 Hrs.)

Latin Square Design (LSD) – layout, model and statistical analysis, relative efficiency, analysis. Missing observations derivation in RBD, LSD.

UNIT III

(7 Hrs.)

Incomplete Block Designs: Balanced Incomplete Block Design (BIBD) – parameters, relationships among its parameters, incidence matrix and its properties, Symmetric BIBD, Resolvable BIBD, Affine Resolvable BIBD, Intra Block analysis, complimentary BIBD, Residual BIBD, Dual BIBD, Derived BIBD.

UNIT IV**(9 Hrs.)**

Factorial experiments: advantages, notations and concepts, 2^2 , $2^3 \dots 2^n$ and 3^2 factorial experiments, design and analysis, Total and Partial confounding for 2^n ($n \leq 5$), 3^2 and 3^3 . Factorial experiments in a single replicate.

UNIT V**(5 Hrs.)**

Fractional factorial experiments: Construction of one-half and one-quarter fractions of 2^n ($n \leq 5$) factorial experiments, Alias structure, Resolution of a design.

Prescribed Textbook

1. SC Gupta, VK Kapoor: Fundamentals of Applied Statistics.
S. Chand Publications

Suggested Readings

1. Cochran, W.G. and Cox, G.M. (1959): Experimental Design. Asia Publishing House.
2. Das, M.N. and Giri, N.C. (1986): Design and Analysis of Experiments. Wiley Eastern Ltd.
3. Goon, II, 8th Edn. A.M., World Gupta, Press, M.K. Kolkata. and Dasgupta, B. (2005): Fundamentals of Statistics. Vol. II
4. Kempthorne, O. (1965): The Design and Analysis of Experiments. John Wiley.
5. Montgomery, D. C. (2008): Design and Analysis of Experiments, John Wiley.

MARIS STELLA COLLEGE (AUTONOMOUS), VIJAYAWADA – 8

(Affiliated to Krishna University, Machilipatnam)

SYLLABUS

Subject: Statistics

Course Title: Demography and Vital Statistics

No. of Hours: 45

Semester: VI

Course Code:STATC043

Credits: 3

Objectives

- To understand the theories and types of population and to calculate birth and death rates of the country.
- To construct the life tables and to get the life expectancy which in turn is used in deciding the premiums of the life insurance policies.

Course outcomes

CO1: Understand the basic concepts of population theories and find the errors.

CO2: Interpret birth and death rates.

CO3: Calculate life span of a person.

CO4: Predict the population projections.

UNIT- I

(8 Hrs.)

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

(9 Hrs.)

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**(10 Hrs.)**

Stationary and Stable population, Central Mortality Rates and Force of Mortality. Life(Mortality) Tables: Assumption, description, construction of Life Tables and Uses of Life Tables. Abridged Life Tables; Concept and construction of abridged life tables by Reed-Merrell method, Greville's method and King's Method

UNIT IV**(8 Hrs.)**

Measurements of Fertility: Crude Birth Rate (CBR), General Fertility Rate (GFR), Specific Fertility Rate (SFR) and Total Fertility Rate (TFR).

UNIT-V**(10 Hrs.)**

Measurement of Population Growth: Crude rates of natural increase, Pearl's Vital Index, Gross Reproduction Rate (GRR) and Net Reproduction Rate (NRR).

Prescribed Text book

SC Gupta & VK Kapoor: Fundamentals of Applied Statistics. S. Chand Publ.

Suggested Reading

1. Mukhopadhyay P. (1999): Applied Statistics, Books and Allied (P) Ltd.
2. Gun, A.M., Gupta, M.K. and Dasgupta, B. (2008): Fundamentals of Statistics, Vol. II, 9th Edition, World Press.
3. Biswas, S. (1988): Stochastic Processes in Demography & Application, Wiley Eastern Ltd.
4. Croxton, Fredrick E., Cowden, Dudley J. and Klein, S. (1973): Applied General Statistics, 3rd Edition. Prentice Hall of India Pvt. Ltd.
5. Keyfitz N., Beckman John A.: Demography through Problems S-Verlag New york.

MARIS STELLA COLLEGE (AUTONOMOUS), VIJAYAWADA – 8

(Affiliated to Krishna University, Machilipatnam)

SYLLABUS

Subject: Statistics

Semester: VI

Course Title: Operations Research-I

Course Code:STATC045

No. of Hours: 45

Credits: 3

Course Objectives

- The objective of this course is to give practical knowledge about Transportation and assignment problems.
- This course objective is to process the jobs on different machines.

Course Outcomes

CO1: Understand the special types of LPP

CO2:Formulation of models to different problems

CO3: Explain the best utilization of limited resources to get optimum results using additional OE resources available in the internet using modern ICT tools.

CO4: Describe replacement, recruitment problems

UNIT-I

(10 Hours)

TRANSPORTATION PROBLEM

Transportation Problem- Introduction, Linear programming formulation, Matrix form of transportation problem, Finding an initial basic feasible solution (IBFS) by North West Corner Rule, Lowest cost entry method, Vogel's approximation method, Unbalanced transportation problem, Optimal solution using MODI method and stepping stone algorithm.

UNIT-II

(8 Hours)

ASSIGNMENT PROBLEM

Assignment Problem- introduction, LP formulation of assignment problem, Hungarian method of assignment problem, unbalanced assignment problem, Travelling- Salesman problem.

UNIT - III

(10 Hours)

SEQUENCING PROBLEM

Sequencing Problem- Introduction, Principal Assumptions, Processing n Jobs Through two machines, processing n Jobs Through three machines, n jobs through k machines.

UNIT-IV**(10 Hours)****REPLACEMENT PROBLEM**

Introduction, Replacement of equipment/Asset that Deteriorates Gradually,
Replacement of Equipment that Fails suddenly.

UNIT-V**(7 Hours)**

Recruitment and Promotion problem, Equipment Renewal problem, Reliability
and system failure rates.

Recommended text book

1. Operations Research by...Kanthi Swaroop, P.K. Gupta and Man Mohan
2. Operations Research by V. K. Kapoor.

Reference Books

1. S.K sinha: Reliability and life testing. Wiley Eastern
2. Parimal Mukhopadhyay: Applied Statistics, New central book agency
3. L.S.Srinath: Reliability Engineering. Affiliated East-West Press.

MARIS STELLA COLLEGE (AUTONOMOUS), VIJAYAWADA – 8
(Affiliated to Krishna University, Machilipatnam)

SYLLABUS

Subject: Statistics

Semester: VI

Course Title: Operations Research-II

Course Code: STATC046

No. of Hours: 45

Credits: 3

Course Objectives

- The objective of this course is to give knowledge about Game theory
- This course objective is to process the $m \times n$ game by LPP, EOQ problems and inventory problems.

Course Outcomes

CO1: Understand Game theory

CO2: Understand Inventory control decisions

CO3: Solve deterministic costs inventories using additional OE resources available in the internet using modern ICT tools.

CO4: Analyze the probabilistic Inventory models

UNIT-I

(10 Hours)

GAME THEORY:

Introduction, Two-person zero sum games, Some basic terms, The Maximin-Minimax Principle, Games without saddle point—Mixed Strategies.

UNIT-II

(10 Hours)

Dominance property, Arithmetic method for $n \times n$ games, General solution of $m \times n$ rectangular games, Game against Passivity, limitations and extensions.

UNIT-III

(10 Hours)

INVENTORY CONTROL:

Introduction, the inventory decisions, Costs associated with Inventories, Economic order Quantity.

UNIT-IV

(8 Hours)

Deterministic Inventory problems with No Shortages, Deterministic Inventory with Shortages, EOQ problems with price breaks.

UNIT-V**(7Hours)**

Multi-item Deterministic problems, Inventory problems with Uncertain demand, System of inventory control, Probabilistic Inventory problems.

Recommended text book

1. Operations Research by...Kanthi Swaroop, P.K. Gupta and Man Mohan
2. Operations Research by V. K. Kapoor.

Reference Books

1. S.K sinha: Reliability and life testing. wiley Eastern
2. Parimal Mukhopadhyay: Applied Statistics, New central book agency
3. L.S.Srinath: Reliability Engineering. Affiliated East-West Press.

MARIS STELLA COLLEGE (AUTONOMOUS), VIJAYAWADA – 8

(Affiliated to Krishna University, Machilipatnam)

SYLLABUS

Subject: Statistics

Semester: VI

Course Title: Practical - VII

Course Code: STATC048

No. of Hours: 30

Credits: 2

Objectives

- To analyze the given time series data and to estimate the trend, seasonality and cyclic effects on it.
- To incorporate the skills to forecast economic variables by studying AR, ARIMA & ARMA models.

Course outcomes

CO1: Interpret the Chronological data and its importance in Economy

CO2: Apply Trend derivation methods

CO3: Establish relation between cause and effects Cyclic Variations.

CO4: Acquire the skills to forecast about economic variables.

List of Practicals

1. Fitting and plotting of modified exponential curve
2. Fitting and plotting of Gompertz curve
3. Fitting and plotting of logistic curve
4. Fitting of trend by Moving Average Method
5. Measurement of Seasonal indices Ratio-to-Trend method
6. Measurement of Seasonal indices Ratio-to-Moving Average method
7. Measurement of seasonal indices Link Relative method
9. Forecasting by exponential smoothing
10. Forecasting by short term forecasting methods.

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(Affiliated to Krishna University, Machilipatnam)

SYLLABUS

Subject: Statistics

Semester: VI

Course Title: Practical - VII

Course Code:STATC049

No. of Hours: 30

Credits: 2

Objectives

- The objective of this paper is to give the students a good understanding of OR
- The objective of this course is to provide a practice of basic simplex methods and its applications to the real world.

Course Outcomes

CO1: Able to solve LPP

CO2: Analyze the Two-phase simplex method

List of Practicals

1. Formulation of Linear programming problems
2. Formulation and graphical solution of Linear programming problems
3. Simplex method of solving an LP Problem
4. Solving an LPP using Big-M method.
5. Solving an LPP using the Two Phase method.
6. Solving an LPP using dual simplex method

MARIS STELLA COLLEGE (AUTONOMOUS), VIJAYAWADA – 8
(Affiliated to Krishna University, Machilipatnam)

SYLLABUS

Subject: Statistics

Semester: VI

Course Title: Practical - VIII

Course Code: STATC050

No. of Hours: 30

Credits: 2

Objectives

- To layout the designs
- To analyze the designs by applying them to real world situations and to get valid conclusions.

Course outcomes

CO1: Interpret the analysis of Basic designs (CRD,RBD and LSD)

CO2: Demonstrate how to analyze the results of the full Factorial designs.

List of Practicals

1. Analysis of a CRD
2. Analysis of an RBD
3. Analysis of an LSD
4. Analysis of an RBD with one missing observation
5. Analysis of an LSD with one missing observation
6. Intra Block analysis of a BIBD
7. Analysis of 2^2 and 2^3 factorial in CRD and RBD
8. Analysis of 2^2 and 2^3 factorial in LSD
9. Analysis of a completely confounded two level factorial design in 2 blocks
10. Analysis of a completely confounded two level factorial design in 4 blocks
11. Analysis of a partially confounded two level factorial design
12. Analysis of a single replicate of a 2^n design
13. Analysis of a fraction of 2^n factorial design

MARIS STELLA COLLEGE (AUTONOMOUS), VIJAYAWADA – 8

(Affiliated to Krishna University, Machilipatnam)

SYLLABUS

Subject: Statistics

Semester: VI

Course Title: Practical - IX

Course Code: STATC051

No. of Hours: 30

Credits: 2

Objectives

- To calculate the birth and death rates of the country.
- To construct the life tables and to get the life expectancy which in turn is used in deciding the premiums of the life insurance policies.

Course outcomes

CO1: Interpret birth and death rates.

CO2: Calculate the life span of a person.

CO3: Predict the population projections

List of Practicals

1. To calculate CDR and Age-Specific death rate for a given set of data
2. To find Standardized death rate by (i) Direct method (ii) Indirect method
3. To construct a complete life table
4. To fill in the missing entries in a life table
5. To calculate probabilities of death at pivotal ages and use to construct abridged Life table using (i) Reed-Merrell Method, (ii) Greville's Method, and (iii) King's Method
6. To calculate CBR, GFR, SFR, TFR for a given set of data
7. To calculate the Crude rate of Natural Increase and Pearle's Vital Index for a given set of data
8. Calculate GRR and NRR for a given set of data and compare them

MARIS STELLA COLLEGE (AUTONOMOUS), VIJAYAWADA – 8

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SYLLABUS

Subject: Statistics

Semester: VI

Course Title: Practical - VIII

Course Code: STATC053

No. of Hours: 30

Credits: 2

Objectives

- The objective of this course is to give practical knowledge about Transportation and assignment problems.
- This course objective is to process the jobs on different machines.

Course Outcomes

CO1: Formulation of models to different problems

CO2: Describe replacement, recruitment problems

List of Practicals

1. Formulation and simple solution of Transportation problem
2. Formulation and simple solution of Assignment problem
3. Formulation and simple solution of Traveling salesman's problem
4. Hungarian Method of Assignment problem.
5. Processing 'n' jobs through 2 machines.
6. Processing 'n' jobs through 3 machines.
7. Solving Replacement problems.

MARIS STELLA COLLEGE (AUTONOMOUS), VIJAYAWADA – 8

(Affiliated to Krishna University, Machilipatnam)

SYLLABUS

Subject: Statistics

Semester: VI

Course Title: Practical - IX

Course Code: STATC054

No. of Hours: 30

Credits: 2

Objectives

- The objective of this course is to give practical knowledge about Game theory
- This course objective is to process the $m \times n$ game by LPP, EOQ problems and inventory problems.

Course Outcomes

CO1: Solving a two person zero sum game by using different properties

CO2: Solving Inventory and EOQ problems.

List of Practicals

1. Solving a two person zero sum game using Minimax- Maximin criterion.
2. Solving a two person zero sum game with and without saddle points.
3. Solving a two person zero sum game using dominance property.
4. Solution of $m \times n$ game by LPP.
5. Solving inventory problems with and without shortages.
6. Solving EOQ problems with price breaks.
7. Solving inventory problems with uncertain demand.
8. Solving Probabilistic inventory problems.

MARIS STELLA COLLEGE (AUTONOMOUS), VIJAYAWADA – 8
(Affiliated to Krishna University, Machilipatnam)
SYLLABUS

Subject: Statistics

Semester: VI

Course Title: Major Project

Course Code: STATC056

No. of Hours: 45

Credits: 3

Objectives

- To give a practical exposure to the students towards the applications of statistical techniques in the real world.
- To make them familiar with the use of SPSS

Course outcomes

CO1: Prepare the questionnaire to fit the objective of the project.

CO2: Collect data and apply statistical techniques

CO3: Analysis and interpretation of the project.

CO4: Draw inferences about the data collected.

Guidelines

1. All students must carry out an independent study in an area of their interest.
2. The project should be new, original and not a replica of existing work
3. The project report should be submitted at the 6th SEE
4. The student should work under the guidance of a project guide
5. The student should submit a hard copy of the project report and a soft copy of the same to the guide.
6. The group project includes the names of 3 to 5 students to be mentioned on the title page and certificate page.
7. In case of a student's project being not approved, she is not eligible to get a final degree certificate. The student then has to rewrite the project based on the remarks of the evaluator.

Structure of the Project Report

I. Preliminary pages:

1. Title page
2. Certificate page
3. Declaration
4. Table of contents
5. Abstract of the project

II. Main Document:

Chapter 1: Introduction, Abstract of the project

Chapter 2: Statistical Techniques

Chapter 3: Statistical Analysis of data

Chapter 4: Conclusions and Limitations of study

Chapter 5: References (Bibliography)

Evaluation criteria

1. Evaluation has to be done by the internal examiner & project supervisor
2. Maximum marks: 100
(Project Report: 40M, Project Execution: 50M, Viva: 10M)
3. Minimum pass marks: 40M

MARIS STELLA COLLEGE (AUTONOMOUS), VIJAYAWADA – 8
(Affiliated to Krishna University, Machilipatnam)
SYLLABUS

Subject: Statistics

Semester: VI

Course Title: Major Project

Course Code: STATC057

No. of Hours: 45

Credits: 3

Objectives

- To give a practical exposure to the students towards the applications of statistical techniques in the real world.
- To make them familiar with the use of SPSS

Course outcomes

CO1: Prepare the questionnaire to fit the objective of the project.

CO2: Collect data and apply statistical techniques

CO3: Analysis and interpretation of the project.

CO4: Draw inferences about the data collected.

Guidelines

1. All students must carry out an independent study in an area of their interest.
2. The project should be new, original and not a replica of existing work
3. The project report should be submitted at the 6th SEE
4. The student should work under the guidance of a project guide
5. The student should submit a hard copy of the project report and a soft copy of the same to the guide.
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Structure of the Project Report

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Evaluation criteria

1. Evaluation has to be done by the internal examiner & project supervisor
2. Maximum marks: 100
(Project Report: 40M, Project Execution: 50M, Viva: 10M)
3. Minimum pass marks: 40M

MARIS STELLA COLLEGE (AUTONOMOUS), VIJAYAWADA – 8
(Affiliated to Krishna University, Machilipatnam)
SYLLABUS

Subject: Statistics

Semester: VI

Course Title: Practical - X

Course Code: STATC058

No. of Hours: 30

Credits: 2

Objectives

- To give a practical exposure to the students towards the applications of statistical techniques in the real world by using SPSS.
- To make them familiar with the use of SPSS

Course Outcomes

CO 1: To analyze given data by applying different Statistical techniques using SPSS software.

CO 2: Draw inferences about the data collected

List of Practicals

1. Questionnaire coding-Data cleaning
2. Frequency table, Cross tabs, Establishing ratio into interval scale and converting string into variable form.
3. Data merge, sorting, Transpose and File export.
4. Transformation of variables.
5. Bi -variate and partial correlation.
6. Regression.
7. t- test for one sample.
8. t-test for independent samples.
9. Paired t-test.
10. Z- test for single mean.
11. Z- test for two means.
12. Z- test for two standard deviations.
13. Z- test for single proportion.
14. Z- test for two proportions.
15. Chi-square test.

MARIS STELLA COLLEGE (AUTONOMOUS), VIJAYAWADA – 8

(Affiliated to Krishna University, Machilipatnam)

SYLLABUS

Subject: Statistics

Semester: VI

Course Title: Practical - X

Course Code: STATC059

No. of Hours: 30

Credits: 2

Objectives

- To give a practical exposure to the students towards the applications of statistical techniques in the real world by using SPSS.
- To make them familiar with the use of SPSS

Course Outcomes

CO 1: To analyze given data by applying different Statistical techniques using SPSS software.

CO 2: Draw inferences about the data collected

List of Practicals

1. Questionnaire coding-Data cleaning
2. Frequency table, Cross tabs, Establishing ratio into interval scale and converting string into variable form.
3. Data merge, sorting, Transpose and File export.
4. Transformation of variables.
5. Bi -variate and partial correlation.
6. Regression.
7. One way ANOVA.
8. Two way ANOVA.
9. Construction of \bar{x} and R – charts.
10. Construction of p- chart.
11. Construction of Np- Chart.
12. Construction of C- chart.
13. Construction of U-chart.
14. Construction of Trend line.