BHAVAN'S VIVEKANANDA COLLEGE
STATISTICS SYLLABUS
Proposed scheme for B.Sc Programme under Choice Based Credit System
w.e.f 2016-17

SEMESTER-I				
Code	**Course Title**	**Course Type**	**HPW**	**Credits**
ST122	Discriptive Statistics and Probability	DSC	4T+2P=6	4+1=5
SEMESTER-II				
ST222	Probability Distributions	DSC	4T+2P=6	4+1=5
SEMESTER-III				
SE322	Data Analysis with R - I	SEC-I	2	2
ST322	Statistical Methods and Inference I	DSC	4T+2P=6	4+1=5
SEMESTER-IV				
SE422	Data Analysis with R - II	SEC-2	2	2
ST422	Statistical Inference II	DSC	4T+2P=6	4+1=5
SEMESTER-V				
SE522	Data Analysis with SPSS - I	SEC-3	2	2
ST522	Applied Statistics I	DSC	3T+2P=5	3+1=4
ST522 A	Statistical Quality Control and Reliability	DSE	3T+2P=5	3+1=4
GE522	Data Analysis with MS-Excel	GE-1	2	2
SEMESTER-VI				
SE622	Data Analysis with SPSS-II	SEC-4	2	2
ST622	Applied Statistics II	DSC	3T+2P=5	3+1=4
ST622A	Operation Research	DSE	3T+2P=5	3+1=4
GE622	Data Analysis with SPSS	GE-2	2	2

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STATISTICS SYLLABUS
Proposed scheme for B.Sc Programme under Choice Based Credit System
w.e.f 2016-17

SEMESTER-I				
Code	**Course Title**	**Course Type**	**HPW**	**Credits**
ST122	Discriptive Statistics and Probability	DSC	4T+2P=6	4+1=5
SEMESTER-II				
ST222	Probability Distributions	DSC	4T+2P=6	4+1=5
SEMESTER-III				
SE322	Data Analysis with R - I	SEC-I	2	2
ST322	Statistical Methods and Inference I	DSC	4T+2P=6	4+1=5
SEMESTER-IV				
SE422	Data Analysis with R - II	SEC-2	2	2
ST422	Statistical Inference II	DSC	4T+2P=6	4+1=5
SEMESTER-V				
SE522	Data Analysis with SPSS - I	SEC-3	2	2
ST522	Applied Statistics I	DSC	3T+2P=5	3+1=4
ST522 A	Statistical Quality Control and Reliability	DSE	3T+2P=5	3+1=4
GE522	Data Analysis with MS-Excel	GE-1	2	2
SEMESTER-VI				
SE622	Data Analysis with SPSS-II	SEC-4	2	2
ST622	Applied Statistics II	DSC	3T+2P=5	3+1=4
ST622A	Operation Research	DSE	3T+2P=5	3+1=4
GE622	Data Analysis with SPSS	GE-2	2	2

Bharatiya Vidya Bhavan

Code: ST122

Bhavan's Vivekananda College of Science, Humanities & Commerce
(Accredited with 'A' grade by NAAC)
(Autonomous College)
B.Sc. I Year I Semester (CBCS): Statistics Syllabus
(Examination at the end of I Semester)
Paper-I: Descriptive Statistics & Probability

60 hrs
(4 hrs/ week)
4 Credits

Objectives:

- **To introduce the basic concepts in statistics.**
- **To learn various Statistical methods.**
- **To know the basic idea of Probability and it's applications in real life.**

Outcome:

By the time students completes the course they realize wide ranging applications of the subject.

UNIT –I

Introduction: Importance of statistics, concepts of statistical population and a sample - quantitative and qualitative data - collection of primary and secondary data. Measurement scales- nominal, ordinal, interval and ratio.Classification and tabulation of data. Construction of univariate and bivariate frequency distributions.Diagrammatic and graphical representation of data. Designing a questionnaire and a schedule.

(15L)

UNIT-II

Descriptive Statistics: Measures of central tendency (mean, median, mode, geometric mean and harmonic mean) with simple applications. Absolute and relative measures of dispersion (range, quartile deviation, mean deviation and standard deviation) with simple applications.

Moments - Importance of moments, central and non-central moments, and their interrelationships, Sheppard's corrections for moments for grouped data. Measures of skewness based on quartilesand moments and kurtosis based on moments with real life examples.

(15L)

UNIT-III

Probability: Basic concepts in probability—deterministic and random experiments, trail, outcome, sample space, event, and operations of events, mutually exclusive and exhaustive events, and equally likely and favorable outcomes with examples. Mathematical, statistical and axiomatic definitions of probability with merits and demerits. Conditional probability andand Independent events. Addition and multiplication theorem for n events. Boole's inequality and Bayes' Theorem – numerical problems

(15L)

Chair-Person
B.O.S. in Statistics
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31/03/2017

UNIT-IV

Random Variables: Definition of random variable, discrete and continuous random variables, functions of random variables, probability mass function and probability density function with illustrations and expectation of arandom variable and rules of expectation. Distribution function and its properties. Transformation of one-dimensional random variable (simple 1-1 functions only). Definition of moment generating function (m.g.f), cumulant generating function (c.g.f), probability generating function (p.g.f) and characteristic function (c.f) and statements of their properties with applications. Chebyshev's,and Cauchy-Schwartz's inequalities and their applications. **(15L)**

List of Reference Books:

1. **V.K.Kapoor and S.C.Gupta: Fundamentals of Mathematical Statistics, Sultan Chand &Sons,New Delhi**
2. **William Feller: Introduction to Probability theory and its applications. Volume- I,Wiley**
3. **GoonAM,Gupta and Das Gupta B:Fundamentas of Statistics,Vol-I,the World press pvt.Ltd.,Kolkota**
4. **Hoel P.G:Introduction to Mathematical Statistics, Asia Publishing house.**
5. **M.Jagan Mahon Rao and Papa Rao:A Text book of statistics paper-I.**
6. **Sanjay Arora and Bansi Lal:New mathematical Statistics: Satya Prakashan,New Delhi**
7. **Hogg,Tanis,Rao:Probability and Statistical Inference.7 th edition.Pearson.**
8. **Statistics for B.Sc I year, Telugu Academy.**
9. **Statistics for Management - Levin & Rubin**

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21/02/2017

Bharatiya Vidya Bhavan

Code: ST122P

Bhavan's Vivekananda College of Science, Humanities & Commerce
(Accredited with 'A' grade by NAAC)
(Autonomous College)
B.Sc. I Year I Semester (CBCS)
Statistics Practical Syllabus

(2hrs/ week)
1 Credit

1a. Computation of Measures of Central tendency for raw data.

1b. **Computation of Measures of Central tendency for raw data Using MS Excel.**

2a. Computation of Measures of Central tendency for discrete and continuous data.

2b. **Computation of Measures of Central tendency for discrete and continuous data Using MS Excel**

3a. Computation of Measures of dispersion for raw data.

3b. **Computation of Measures of dispersion for Raw data Using MS Excel.**

4a. Computation of Measures of dispersion for discrete and continuous data.

4b. **Computation of Measures of dispersion for discrete and continuous data Using MS Excel**

5a. Graphical Presentation of data (Histogram, Frequency polygon, Ogives)

5b. **Graphical Presentation of data (Histogram, Frequency polygon, Ogives) Using MS Excel**

6a. Diagrammatic Presentation of data (Bar and Pie)

6b. **Diagrammatic Presentation of data (Bar and Pie) using MS Excel**

7. Computation of non-central and central moments – Sheppard's correction for grouped data.

8a. Computation of co-efficient of Skewness and Kurtosis – Karl Pearson's and Bowley's β_1 and β_2.

8b. **Computation of co-efficient of Skewness and Kurtosis – Karl Pearson's and Bowley's β_1 and β_2 Using MS Excel**

V.V. Haravikumar
31/03/2017

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Bharatiya Vidya Bhavan

Code: ST222

Bhavan's Vivekananda College of Science, Humanities & Commerce
(Accredited with 'A' grade by NAAC)
(Autonomous College)
B.Sc. I Year II Semester (CBCS): Statistics Syllabus
(Examination at the end of II Semester)
Paper-II: Probability Distributions

60 hrs
(4 hrs/ week)
4 Credits

Objectives:

To learn various Statistical Probability distributions and its applications.

Outcome:

By the time students completes the course they realize wide range of applications of Probability distributions in real life.

UNIT – I

Bivariate Random variables: Notion of bivariate random variable, bivariate distribution and statement of its properties. Joint, marginal and conditional distributions. Independence of random variables. Statement and applications of weak law of large numbers and central limit theorem for identically and independently distributed (i.i.d) random variables with finite variance.

(15L)

UNIT – II

Discrete distributions: Uniform, Bernoulli, Binomial, Poisson, Negative binomial, Geometric and Hyper-Geometric (mean and variance only) distributions. Properties of these distributions such as m.g.f ,c.g.f., p.g.f., c.f., and moments up to fourth order and their real life applications. Reproductive property wherever exists. Binomial approximation to Hyper-geometric, Poisson approximation to Binomial and Negative binomial distributions.

(18L)

UNIT – III

Continuous distributions: Rectangular and Normal distributions. Importance of Normal distribution. Normal distribution as a limiting case of Binomial and Poisson distributions. Properties of these distributions such as m.g.f, p.g.f, c.g.f, c.f., and moments up to fourth order ,their real life applications **(12L)**

UNIT – IV

Continuous distributions (Continued): Exponential, Gamma, Beta of two kinds (mean and variance only) and Cauchy (definition and c.f. only) distributions. Properties of these distributions such as m.g.f., c.g.f., c.f., and moments up to fourth order, their real life applicationsand reproductive productive property wherever exists. **(15L)**

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21/03/2017

List of Reference Books:

1. V.K.Kapoor and S.C.Gupta: Fundamentals of Mathematical Statistics, Sultan Chand &Sons,New Delhi
2. William Feller: Introduction to Probability theory and its applications. Volume-I,Wiley
3. GoonAM,Gupta and Das Gupta B:Fundamentas of Statistics,Vol-I,the World press pvt.Ltd.,Kolkota
4. Hoel P.G:Introduction to Mathematical Statistics, Asia Publishing house.
5. M.Jagan Mahon Rao and Papa Rao:A Text book of statistics paper-I
6. Sanjay Arora and Bansi Lal:New mathematical Statistics: Satya Prakashan,New Delhi
7. Hogg,Tanis,Rao:Probability and Statistical Inference.7 th edition.Pearson.
8. Statistics for B.Sc I year, Telugu Academy.
9. Sambhavyata Avadhi Siddantalu—Telugu Academy
10. Sahasambandham-Vibhajana Siddantamulu – Telugu Academy
11. K.V.S. Sarma: statistics Made Simple:do it yourself on PC. PHI
12. Statistics for Management - Kevin & Rubin

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Bharatiya Vidya Bhavan

Code: ST222P

Bhavan's Vivekananda College of Science, Humanities & Commerce
(Accredited with 'A' grade by NAAC)
(Autonomous College) **(2 hrs/ week)**
B.Sc. I Year II Semester (CBCS) **1 Credit**
Statistics Practical Syllabus

1a. Fitting of Binomial distribution – Direct Method.

1b. Fitting of Binomial distribution – Direct Method using MS Excel.

2. Fitting of Binomial distribution – Recurrence Relation Method.

3a. Fitting of Poisson distribution – Direct Method.

3b. Fitting of Poisson distribution – Direct Method using MS Excel.

4. Fitting of Poisson distribution – Recurrence Relation Method.

5. Fitting of Negative Binomial distribution.

6. Fitting of Geometric distribution.

7. Fitting of Hyper geometric distribution.

8. Fitting of Normal distribution – Areas Method.

9. Fitting of Normal distribution – Ordinates Method.

10a. Fitting of Exponential distribution.

10b. Fitting of Exponential distribution using MS Excel.

11a. Fitting of Cauchy distribution.

11b. Fitting of Cauchy distribution using MS Excel.

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Bharatiya Vidya Bhavan

Code: ST322

Bhavan's Vivekananda College of Science, Humanities & Commerce
(Accredited with 'A' grade by NAAC)
B.Sc. II Year III Semester(CBCS): Statistics Syllabus **60 hrs**
(Examination at the end of III Semester) **(4 hrs/ week)**
Paper-III - Statistical Methods & Inference I

Objectives:

To learn various Statistical Methods & Basic statistical Inference and its applications.

Outcome:

By the time students completes the course they realize wide range of applications of Statistical Methods in real life.

UNIT I

Principle of least squares: Fitting of a straight line, quadratic, exponential and power curves.
Analysis of categorical data: Definition of attributes. Independence, association and partial association of attributes, various measures of association (Yule's) for 2 –way data and coefficient of contingency (Pearson and Tcherprow) and coefficient of colligation with real life examples.

(I5L)

UNIT II

Correlation & Regression: Product moment correlation coefficient and its properties. Bivariate data, scattered diagram, computation of correlation coefficient for grouped data, Spearman's Rank correlation coefficient and its properties, correlation ratio. Partial and multiple correlation coefficients (only for three variables. Simple linear regression, lines of regression, properties of regression coefficients, correlation verses regression, Regression for three variables, coefficient of determination- R^2.

(I5L)

UNIT III

Sampling distribution: Concept – Population, Sample, parameter, statistic, sampling distribution and standard error and its application. Definitions of exact sampling distributions-statements and properties of chi-square, t and F distributions and their interrelationships. Independence of sample mean and variance in random sampling from normal distributions.

Estimation: Point Estimation – Distinction between Estimator and Estimate – Properties of Estimators – Concept of Unbiasedness & Consistency, – Simple Applications.

(14L)

UNIT IV

Estimation : Efficiency and Sufficiency – Statement of Neyman's Factorization theorem
Methods Of Estimation: Maximum likelihood estimator (MLE) and their properties – Simple problems on MLE – Method of moments – Simple illustrations.
Interval estimation – Concept, Distinction between point estimation and interval estimation - Confidence interval and confidence limits.

(16L)

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List of Reference Books:

1. V.K.Kapoor and S.C.Gupta :Fundamentals of Mathematical Statistics,Sultan Chand &Sons,New Delhi
2. William Feller:Introduction to Probability theory and its applications.Volume-I,Wiley
3. GoonAM,Guptamk,Das Gupta B:Fundamentas of Statistics,Vol-II,the World press pvt.Ltd.,Kolakota .
4. Hoel P.G:Introduction to mathematical Statistics,Asia Publishing house.
5. Sanjay Arora and Bansi Lal:New mathematical Statistics: Satya Prakashan,New Delhi
6. Hogg,Tanis,Rao:Probability and Statistical Inference.7 th edition.Pearson.
7. Hogg and Craig : Introduction to Mathematical Statistics. Printis Hall
8. Parimal Mukhopadhyay : Mathematical Statistics. New Central Book Agency.

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Code: ST322P

Bharatiya Vidya Bhavan

Bhavan's Vivekananda College of Science, Humanities &Commerce
Accredited with 'A' grade by NACC
Autonomous College
(Affiliated to Osmania University)
B.Sc II Year III Semester
Paper-III – Statistics Practical Syllabus (CBCS)

1a. Fitting of a Straight line by the method of least squares.

1b. Fitting of a Straight line by the method of least squares using MS Excel

2a. Fitting of a Parabola by the method of least squares.

2b. Fitting of a Parabola by the method of least squares using MS Excel

3. Fitting of a Power curve of the type $y= ax^b$ by the method of least squares.

4. Fitting of an Exponential curves of the type $y=ab^x$, $y=ae^{bx}$ by the method of least squares.

5. Computation of Yule's Coefficient of Association and Colligation.

6. Computation of Coefficient of contingency (Pearson and Tcherprow).

7a. Computation of Correlation Co-efficient for ungrouped and grouped data.

7b. Computation of Correlation Co-efficient for ungrouped and grouped data using MS Excel

8. Computation of Multiple and Partial Correlation Co-efficient.

9. Computation of Correlation Ratio.

10a. Computation of Regression lines for ungrouped and grouped data.

10b. Computation of Regression lines for ungrouped and grouped data using MS Excel

11. Computation of Multiple Regression lines for 3 variables.

12a. Computation of Coefficient of determination.

12b. Computation of Coefficient of determination using MS Excel.

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Bharatiya Vidya Bhavan

Code: ST422

Bhavan's Vivekananda College of Science, Humanities & Commerce
(Accredited with 'A' grade by NAAC)
B.Sc. II year IV Semester (CBCS): Statistics Syllabus
(Examination at the end of IV Semester)
Paper-IV – Statistical Inference II

60 hrs
(4 hrs/ week)

Objectives:

To learn various Statistical Inference and its applications.

Outcome:

By the time students completes the course they realize wide range of applications of Statistical Inference in real life.

UNIT I

Hypothesis and General Test Procedures: 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, most powerful test and test function (non-randomized and randomized).
Neyman - Pearson's fundamental lemma for Randomized tests. Examples in case of Binomial, Poisson, Exponential and Normal distributions and their powers. Use of central limit theorem in testing. **(15L)**

UNIT II

Large Sample Tests: Large sample tests for attributes and variables; confidence intervals for mean(s), proportion(s), standard deviation(s) and correlation coefficient(s). **(15L)**

UNIT III

Small Sample Tests: Tests of significance based on $\chi 2$, t and F. $\chi 2$-test for goodness of fit, Single variance and test for independence of attributes. t – test for test for single mean, two mean(independent and dependent). F- test for difference of variances. Definition of order statistics and statement of their distributions. **(15L)**

UNIT IV

Non-Parametric Tests: Their advantages and disadvantages, comparison with parametric tests. One sample run 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 runstest. **(15L)**

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B.O.S. in Statistics
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List of Reference Books:

1. V.K.Kapoor and S.C.Gupta: Fundamentals of Mathematical Statistics, Sultan Chand&Sons, New Delhi
2. Goon AM, Gupta MK,Das Gupta B : Outlines of Statistics , Vol-II, the World Press Pvt.Ltd., Kolakota.
3. Hoel P.G: Introduction to matehematical statistics, Asia Publiushing house.
4. Sanjay Arora and Bansi Lal:.New Mathematical Statistics Satya Prakashan , NewDelhi
5. Hogg and Craig :Introduction to Mathematical statistics. Printis Hall
6. Siegal,S.,and Sidney: Non-param etric statistics for Behavioral Science. McGraw Hill.
7. GibbonsJ.D and Subhabrata Chakraborti: Nonparametric Statistical Inference. Marcel Dekker.
8. Parimal Mukhopadhyay: Mathematical Statistics. New Central Book agency.
9. Conover : Practical Nonparametric Statistics. Wiley series.
10. V.K.Rohatgi and A.K.Md.Ehsanes Saleh: An introduction to probability and statistics. Wiley series.
11. Mood AM,Graybill FA,Boe's DC. Introduction to theory of statistics. TMH
12. Paramiteya mariyu aparameteya parikshalu. Telugu Academy.
13. K.V.S. Sarma: Statistics Made simple do it yourself on PC. PHI
14. Gerald Keller: Applied Statistics with Microsoft excel. Duxbury. Thomson Learning
15. Levin, Stephan, Krehbiel, Berenson: Statistics for Managers using Microsoft Excel.4th edition. Pearson Publication.
16. Hogg, Tanis, Rao. Probability and Statistical Inference. 7th edition. Pearson Publication.
17. Milton and Arnold(fourth Edition):Introduction to Probability and statistics, Tata Mcgraw hill Publication

V. V. Haragopal

Chair-Person
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Bharatiya Vidya Bhavan

Code: ST422P

Bhavan's Vivekananda College of Science, Humanities &Commerce
Accredited with 'A' grade by NACC
Autonomous College
(Affiliated to Osmania University)
B.Sc II Year IV Semester
Paper-IV – Statistics Practical Syllabus (CBCS)

1a. Test for Proportions (Single and difference of proportions in Large Sample).

1b. Test for Proportions (Single and difference of proportions in Large Sample)using MS Excel.

2a. Test for Means (Single and difference of means in Large Sample).

2b. Test for Means (Single and difference of Means in Large Sample) using MS Excel.

3a. Test for Variances (Single and difference of Variances in Large Sample).

3b. Test for Variances (Single and difference of Variances in Large Sample) using MS Excel.

4a. Test for Correlation Co- efficient (Large Sample).

4b. Test for Correlation Co- efficient (Large Sample) using MS Excel.

5a. Test for Means (Single mean, difference of means and paired observations in Small Sample).

5b. Test for Means (Single mean, difference of means and paired observations in Small Sample) using MS Excel.

6a. Test for Correlation Co- efficient (Small Sample).

6b. Test for Correlation Co- efficient (Small Sample) using MS Excel.

7a. Test for Single Variance (Small Sample).

7b. Test for Single Variance (Small Sample) using MS Excel.

8a. Test for difference Variances (Small Sample).

8b. Test for difference Variances (Small Sample)using MS Excel.

9a. $\chi 2$ – test (independence of attributes and goodness of fit).

9b. $\chi 2$ – test (independence of attributes and goodness of fit) using MS Excel.

10. NP –Tests for one sample (Run test, Sign test and Wilcoxon signed rank test).

11. NP –Tests for two samples (Run test, Sign test and Wilcoxon signed rank test).

12. NP – Test for two independent samples (Median test, Mann – Whitney U-test, Run Test).

Chair-Person
B.O.S. in Statistics
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Bharatiya Vidya Bhavan

Code: ST522

Bhavan's Vivekananda College of Science, Humanities & Commerce
(Accredited with 'A' grade by NAAC)
B.Sc. III year V Semester (CBCS): Statistics Syllabus **45 hrs**
(Examination at the end of V Semester) (3 hrs/ week)
Paper-V- Applied Statistics I

Objectives:

- **Identify patterns in correlated data- trends and seasonal variations.**
- **To understand and modeling the data, prediction of short term trends from previous patterns.**
- **To understand meaning of the term index numbers, get accustomed to the use of some widely used index numbers.**
- **Indian Official Statistics provide a picture of a country or different phenomena through data.**
- **Sampling Survey describes the process of selecting a sample of elements from a target population to conduct a survey.**

Outcome:

By the time students completes the course they realize wide ranging applications of the subject.

Unit – I

Design of Sample Surveys: - Organization and execution of sample surveys - principle steps in sample survey - Pilot survey - sampling and non-sampling errors - advantages of sampling over complete census - limitations of sampling.

Sampling techniques: Subjective, probability and mixed sampling methods. Simple random sampling with and without replacement - unbiased estimate of the mean, variance of the estimate of the mean finite population correction estimation of standard error from a sample - determination of sample size. Estimates of population mean, total, and proportion, their variances and the estimates of variances by Simple Random Sampling with and without replacement (SRSWR and SRSWOR). **(12 L)**

Unit – II

Stratified random sampling - properties of the estimates - unbiased estimates of the mean and variance of the estimates of the mean-optimum and proportional allocations – relative precision of a stratified sampling and simple random sampling - estimation of gain in precision in stratified sampling.

Systematic Random Sampling: Systematic sampling with N = nk. Estimates of population mean, total, their variances and estimates of variances. Comparison of relative efficiencies and advantages and disadvantages of above methods of sampling.

(12 L)

Unit – III

Time series: -Time series and its components with illustrations, additive, multiplicative and mixed models. Determination of trend by least squares, moving average methods.

Growth curves and their fitting with reference to Modified exponential, Gompertz and Logistic curves. Determination of seasonal indices by Ratio to moving average, ratio to trend and link relative methods. **(11 L)**

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Unit – IV

Index Numbers: -Concept, construction, uses and limitations of simple and weighted index numbers. Weighted index numbers - Laspeyer's, Paasche's and Fisher's, Marshall Edgeworth and kelly's index numbers. Criterion of a good index numbers (Test of consistency), problems involved in the construction of index numbers. Fisher's index as an ideal index number. Fixed and chain base index numbers. Cost of living index numbers and wholesale price index numbers. Base shifting, splicing and deflation of index numbers.

Official Statistics: - Functions and organization of CSO and NSSO. Agricultural Statistics, area and yield statistics. National Income and its computation, utility and difficulties in estimation of National income. **(10 L)**

Text Books:

1. V.K.Kapoor and S.C.Gupta : Fundamentals of Applied Statistics. Sultan Chand and sons, New Delhi
2. Parimal Mukhopadhyay : Applied Statistics . New Central Book agency. Books and Allied(P) Limited
3. B.L.Agarwal: Basic Statistics.New Age International Limited.

List of reference books:

1. Daroga Singh and Chowdhary: Theory and Analysis of Sample survey designs. Wiley Eastern.
2. M.R.Saluja : Indian Official Statistics. ISI publications.
3. S.P.Gupta : Statistical Methods. Sultan Chand and Sons.
4. K.V.S. Sarma: Statistics made simple : do it yourself on PC. PHI
5. Gerald Keller; Applied Statistics with Microsoft excel. Duxbury. Thomson Learning.
6. Levine, Stephan, Krehbiel, Berenson: Statistics for Managers using Microsoft Excel. Pearson Publication..
7. Arora, Sumeet Arora,S.Arora: Comprehensive Statistical Methods. S.Chand.
8. A.M.Goon,M.K.Gupta,B.Dasgupta Fundamentals of Statistics Vol II World Press Private Ltd.,Calcutta
9. A.M.Goon,M.K.Gupta,B.Dasgupta An outline of Statistical Theory Vol II World Press Private Ltd.,Calcutta17.
10. D.V.L.N. Jogiraju, C. Srikala, Palanati Sudarsan, Applied Statistics, Kalyani Publishers

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Code: ST522P

Bharatiya Vidya Bhavan

Bhavan's Vivekananda College of Science, Humanities & Commerce
Accredited with 'A' grade by NACC
Autonomous College
(Affiliated to Osmania University)
B.Sc III Year V Semester
Paper-V – Statistics Practical Syllabus (CBCS)

Sampling Theory

1. Estimation of Population mean, population total and variance of these estimates by Simple random sampling with and without replacement and their Comparison
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

Time Series

4a. Measurement of trend by method of moving averages.

4b. Measurement of trend by method of moving averages using MS Excel.

5a. Measurement of trend by method of least squares.

5b. Measurement of trend by method of least squares using MS Excel.

6a. Measurement of seasonal indices by the method of Ratio to trend.

6b. Measurement of seasonal indices by the method of Ratio to trend using MS Excel.

7a. Measurement of seasonal indices by the method of Ratio to moving averages.

7b. Measurement of seasonal indices by the method of Ratio to moving averages using MS Excel.

8a. Measurement of seasonal indices by the method of Link Relatives.

8b. Measurement of seasonal indices by the method of Link Relatives using MS Excel.

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Index Numbers

9a. Computation of Laaspayer's, Paasche's, Fisher's, Marshall Edgeworth and Kelly's Price and Quantity Index numbers

9b. Computation of Laaspayer's, Paasche's, Fisher's, Marshall Edgeworth and Kelly's Price and Quantity Index numbers using MS Excel.

10a. Computation of Time Reversal Test, Factor Reversal Test and Circular Test.

10b. Computation of Time Reversal Test, Factor Reversal Test and Circular Test using MS Excel.

11a. Construction of Cost of living index numbers.

11b.Construction of Cost of living index numbers using MS Excel

12. Base shifting, splicing and Deflation

V. V. Haravikar

Chair-Person
B.O.S. in Statistics
U.C.S.
Osmania University,
HYDERABAD-7.

Bharatiya Vidya Bhavan

Code: ST522A

Bhavan's Vivekananda College of Science, Humanities & Commerce
(Accredited with 'A' grade by NAAC)
B.Sc. III year V Semester (CBCS): Statistics Syllabus **45 hrs**
(Examination at the end of V Semester) **(3 hrs/ week)**

Paper-VA –STATISTICAL QUALITY CONTROL& RELIABILITY

Objectives:

- **SQC is used to improve the quality of the products in the organizations.**
- **Reliability is used to understand ability of a system or component to function understated conditions for a specified period of time.**

Outcome:

By the time students completes the course they realize wide ranging applications of the subject.

UNIT – I

Statistical Quality Control:
Importance of SQC in industry. Statistical basis of Shewart control charts. Construction of control charts for variables (mean, range and standard deviation) and attributes (p , np, and c-charts with fixed and varying sample sizes). Interpretation of control charts. Natural tolerance limits and specification limits, process capability index.

(13L)

UNIT – II

Acceptance sampling plans:. Concept of AQL and LTPD. Producers risk and consumer's risk Single and Double sampling plans for attributes and their OC and ASN functions. Design of single and double sampling plans for attributes using Binomial and Poisson distributions.

(12 L)

UNIT III

Six Sigma: Six sigma- Overview, Foundations and principles of Six Sigma, Roles and responsibilities in Six Sigma Implementation, DMAIC / DMDAV methodology, Design for Six Sigma. Natural tolerance limits and specification limits, process capability index.

(10 L)

UNIT IV

Reliability: Introduction. Hazard function, Exponential distribution as life model, its memory-less property. Reliability function and its estimation. System reliability - series, parallel and k out of n systems and their reliabilities.

(10 L)

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Text Books:

1. V.K.Kapoor and S.C.Gupta : Fundamentals of Applied Statistics. Sultan Chand and sons, New Delhi.
2. D. C. Montgomery: Introduction to Statistical Quality Control, John Wiley & Son 2009.

List of reference books

1. S.K.Sinha: Reliability and life testing. Wiley Eastern
2. L.S.Srinath: Reliability Engineering. Affiliated East-West Press
3. S.M.Ross: Probability Models. Harcourt India PVT.Ltd.,
4. Parimal Mukhopadhyay : Applied Statistics . New Central Book agency
5. Anuvartita Sankhyaka sastram – Telugu Academy.
6. R.C.Gupta: Statistical Quality Control.
7. Parikriya Parishodhana - Telugu Academy.
8. A.M.Goon,M.K.Gupta,B.Dasgupta Fundamentals of Statistics Vol II World Press Private Ltd.,Calcutta
9. A.M.Goon,M.K.Gupta,B.Dasgupta An outline of Statistical Theory Vol II World Press Private Ltd.,Calcutta17.
10. D. V. L. N. Jogiraju, C. Srikala, K. Ravi Kumar Quality, Relability and Operations Research, Kalyani Publishers.

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Code: ST522AP

Bharatiya Vidya Bhavan

Bhavan's Vivekananda College of Science, Humanities & Commerce
(Accredited with 'A' grade by NAAC)
B.Sc. III year V Semester (2 hrs/ week)
(Examination at the end of V Semester)
Paper-VA - Statistics Practical Syllabus (CBCS)

Statistical Quality Control

1a. Construction of X-bar and R Charts.

1b. Construction of X-bar and R Charts using MS Excel

2a. Construction of X-bar and Standard deviation Charts.

2b. Construction of X-bar and Standard deviation Charts using MS Excel.

3a. Construction of p, np - charts with fixed and varying sample sizes.

3b. Construction of p, np - charts with fixed and varying sample sizes using MS Excel.

4a. Construction of C - Chart.

4b. Construction of C – Chart using MS Excel

5a. Construction of u - charts.

5b. Construction of u – charts using MS Excel.

Acceptance Sampling Plans

6a. Designing a single sampling plan and construction of its OC and AOQ curves.

6b. Construction of single sampling plan - OC and AOQ curves using MS Excel.

7a. Designing a double sampling plan and construction of its ASN curve

7b. Construction of double sampling plan –ASN curves using MS Excel

Reliability

8. Problems on Hazard rate, Series, Parallel and K out of n system.

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Bharatiya Vidya Bhavan

Code: ST622

Bhavan's Vivekananda College of Science, Humanities & Commerce
(Accredited with 'A' grade by NAAC)
B.Sc. III year VI Semester (CBCS): Statistics Syllabus **45 hrs**
(Examination at the end of VI Semester) (3 hrs/ week)
Paper-VI - Applied Statistics II

Objectives:

- **To understand the issues and principles of Designs of Experiments.**
- **To list the guidelines for designing experiments.**
- **To understand the Principal events in the life history of an individual.**
- **To understand the forecasting sales and Manipulating demand.**

Outcome:

By the time students completes the course they realize wide ranging applications of the subject.

UNIT I

Analysis of Variance - ANOVA
Concept of Gauss-Mark off linear model with examples, statement of Cochran's theorem, ANOVA – one-way, two-way classifications with one observation per cell. Expectation of Various sums of squares and their Statistical analysis

(12 L)

UNIT II

Design of Experiments
Importance and applications of design of experiments. Principles of experimentation.
Analysis of Completely randomized Design (C.R.D), Randomized Block Design (R.B.D) and Latin Square Design (L.S.D) including one missing observation, expectation of various sum of squares. Comparison of the efficiencies of the above designs.

(12 L)

UNIT III

Vital statistics: Introduction, definition and uses of vital statistics. Sources of vital statistics, registration method and census method. Rates and ratios, Crude death rates, age specific death rate, standardized death rates, crude birth rate, age specific fertility rate, general fertility rate, total fertility rate. Measurement of population growth, crude rate of natural increase- Pearl's vital index. Gross reproductive rate and Net reproductive rate, Life tables, construction and uses of life tables and Abridged life tables.

(11 L)

UNIT IV

Demand Analysis: Introduction. Demand and supply, price elasticity of supply and demand. Methods of determining demand and supply curves, Leontiff's, Pigous's methods of determining demand curve from time series data, limitations of these methods. Pareto law of income distribution, curves of concentration.

(10 L)

V. V. Haragopal
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Text Books:

1. V.K.Kapoor and S.C.Gupta : Fundamentals of Applied Statistics. Sultan Chand and sons, New Delhi
2. Parimal Mukhopadhyay : Applied Statistics . New Central Book agency. Books and Allied(P) Limited
3. B.L.Agarwal: Basic Statistics.New Age International Limited.

List of reference books:

1. Daroga Singh and Chowdhary: Theory and Analysis of Sample survey designs. Wiley Eastern.
2. M.R.Saluja : Indian Official Statistics. ISI publications.
3. S.P.Gupta : Statistical Methods. Sultan Chand and Sons.
4. Pratirupa Sidhanthamulu – Telugu Academy.
5. Prayoga Rachana and Visleshana – Telugu Academy.
6. K.V.S. Sarma: Statistics made simple : do it yourself on PC. PHI
7. Gerald Keller; Applied Statistics with Microsoft excel. Duxbury. Thomson Learning.
8. Levine, Stephan, Krehbiel, Berenson: Statistics for Managers using Microsoft Excel. Pearson Publication.
9. Anuvartita Sankhyaka sastram – Telugu Academy.
10. Arora, Sumeet Arora,S.Arora: Comprehensive Statistical Methods. S.Chand.
11. A.M.Goon,M.K.Gupta,B.Dasgupta Fundamentals of Statistics Vol II World Press Private Ltd.,Calcutta
12. A.M.Goon,M.K.Gupta,B.Dasgupta An outline of Statistical Theory Vol II World Press Private Ltd.,Calcutta17.

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Bharatiya Vidya Bhavan

Code: ST622P

Bhavan's Vivekananda College of Science, Humanities & Commerce
(Accredited with 'A' grade by NAAC)
B.Sc. III year VI Semester (2 hrs/ week)
(Examination at the end of VI Semester)
Paper-VI - Statistics Practical Syllabus (CBCS)

Designs of Experiments

1a. ANOVA of One-Way Classification.

1b. ANOVA of One-Way Classification using MS Excel.

2a. ANOVA of Two-Way Classification.

2b. ANOVA of Two-Way Classification using MS Excel.

3a. Analysis of Completely Randomized Design.

3b. Analysis of Completely Randomized Design using MS Excel.

4a. Analysis of Randomized Block Design and estimation of one missing value in RBD

4b. Analysis of Randomized Block Design using MS Excel.

5. Analysis of Latin Square Design and Estimation of one missing value in LSD

Vital Statistics

6. Computation of various Morality rates, Fertility rates and Reproduction rates.

7a. Construction of Complete life tables.

7b. Construction of Complete life tables using MS Excel.

Demand Analysis

8. Fitting of Pareto's Curve.

9a. Fitting of Lorenz curve.

9b. Fitting of Lorenz curve using MS Excel.

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Bharatiya Vidya Bhavan

Code: ST622A

Bhavan's Vivekananda College of Science, Humanities & Commerce
(Accredited with 'A' grade by NAAC)
B.Sc. III year VI Semester (CBCS): Statistics Syllabus
(Examination at the end of VI Semester)
Paper VIA – OPERATIONS RESEARCH

45 hrs
(3 hrs/ week)

Objectives:

Operations research is optimization, i.e., "to do things best under the given circumstances."

Outcome:

By the time students completes the course they realize wide ranging applications of the subject.

UNIT – I

Linear Programming: Introduction to OR, Convex sets and their properties, Nature, Scope, Functions, Formulation of LPP - Solving the LPP by graphical method. Fundamental theorem of LPP (only statement). Solving the LPP by simplex method, Two - phase simplex method.

(14 L)

UNIT II

Big - M Method: Solution to LPP using Big – M method(Penalty Method) and Concept of degeneracy and resolving it.

Duality: Concept of duality, duality as LPP. Dual-Primal relationship.

Sequencing: Processing n Jobs through 2 and 3 Machines & 2 Jobs through m Machines.

(10 L)

UNIT – III

Transportation Problem: Definition of transportation problem, TP as a special case of LPP, Initial basic feasible solutions by North-West Corner Rule, Matrix minimum methods and VAM. Optimal solution through MODI method and stepping stone method for balanced and unbalanced Transportation problem. Maximization in TP. Degeneracy in TP and resolving it. Concept of Transshipment problem.

(10 L)

UNIT IV

Assignment Problem: Concept. Mathematical Formulation. Assignment problem as special case of TP and LPP Solution. Optimal solution using Hungarian method for Balanced and Unbalanced problems. Travelling Salesman Problem.

(11 L)

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Text Books:

1. Kanti Swaroop, P.K.Gupta andManMohan : Operations Research. Sultan Chand.
2. Operations Research – S D Sharma.
3. Taha : Operations Research : An Introduction, Mac Millan

List of reference books

1. Gass: Linear Programming. Mc Graw Hill.
2. Hadly : Linrar programming. Addison-Wesley.
3.Wayne L. Winston : Operations Research. Thomson, India edition. 4th edition.
4. Anuvartita Sankhyaka sastram – Telugu Academy.
5. Parikriya Parishodhana - Telugu Academy.
6 A.M.Goon,M.K.Gupta,B.Dasgupta Fundamentals of Statistics Vol II World Press Private Ltd.,Calcutta
7. D. V. L. N. Jogiraju, C. Srikala, K. Ravi Kumar Quality, Relability and Operations Research, Kalyani Publishers.

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Code: ST622AP

Bharatiya Vidya Bhavan

Bhavan's Vivekananda College of Science, Humanities & Commerce
(Accredited with 'A' grade by NAAC)
B.Sc. III year VI Semester (2 hrs/ week)
(Examination at the end of V Semester)
Paper-VIA - Statistics Practical Syllabus (CBCS)

Operations Research

1a. Solution of L.P. problem by Graphical method.

1b. Solution of L.P. problem by Graphical method using TORA.

2a. Solution of L.P. problem by simplex method.

2b. Solution of L.P. problem by simplex method using TORA.

3a. Solution of L.P. problem by Big-M method.

3b. Solution of L.P. problem by Big-M method using TORA.

4a. Solution of L.P. problem by Two – phase method.

4b. Solution of L.P. problem by Two – phase method using TORA.

5. Solution of L.P. problem by Duality.

6a. Determination of Optimum solution to T.P. using MODI algorithm.

6b. Determination of Optimum solution to T.P. using MODI algorithm using TORA.

7. Determination of Optimum solution to Traveling salesman problem.

8a. Determination of Optimum assignment problem (Balanced and unbalanced) for all cases.

8b. Determination of Optimum assignment problem (Balanced and unbalanced) for all cases using TORA.

9. Problems of n jobs on 2 Machines.

10. Problems of n jobs on 3 Machines.

11. Problems of n jobs on m Machines.

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Code: SE322

Bhavan's Vivekananda College of Science, Humanities & Commerce
(Accredited with 'A' grade by NAAC)
(Autonomous College)
B.Sc. II Year III Semester (CBCS): Statistics Syllabus (SEC-1)
(Examination at the end of Semester)
SEC –1: Data Analysis with R - I

30 hrs
(2 hrs/ week)
2 Credits

UNIT –I

General introduction to computing R: Introduction, Overview and History of R, Downloading and Installing R, Getting Help, Writing Code/Setting Working Directory, Data types, Reading data from external sources, storing data to external files , simple mathematical operations(addition, subtraction, multiplication, division, log x, e^x, inverse). **(15 hrs)**

UNIT –II

Exploratory data analysis: Measures of Central Tendency, Measures of dispersions, Diagrams and Graphs, Box plot and Scatter plot.

Probability distributions and Simulations: Generation of Random number, Fitting of Binomial, Poisson and Normal distribution. **(15 hrs)**

List of Reference Books:

1. **Beginning R: The statistical programming language – Dr. Mark Gardener**
2. **Hands on Programming with R – Garrett Grolemund Shroff publishers and distributes private limited**
3. **R for Everyone: Advanced Analytics and Graphics – Jared P.Lamder – Pearson education India**

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Bharatiya Vidya Bhavan

Code: SE422

Bhavan's Vivekananda College of Science, Humanities & Commerce
(Accredited with 'A' grade by NAAC)
(Autonomous College)
B.Sc. II Year IV Semester (CBCS): Statistics Syllabus (SEC-2)
(Examination at the end of Semester)
SEC – 2 : Data Analysis with R - II

30 hrs
(2 hrs/ week)
2 Credits

UNIT –I

Computing R: Write a code and program for Fitting of Bernouli, Binomial, Poison and Normal distribution.

Correlation and Regression Analysis: Computation of Correlation co-efficient and Simple Regression lines and forecast. **(15 hrs)**

UNIT –II

Testing of Hypothesis: Test for Proportion(s), Mean(s), S.d.(s) for Large samples, t-test for single mean, difference of means(independent and dependent samples), Chi-square test for goodness of fit, independent of attributes and single variance, F-test for difference of variances. **(15 hrs)**

List of Reference Books:

1. **Beginning R: The statistical programming language – Dr. Mark Gardener**
2. **Hands on Programming with R – Garrett Grolemund Shroff publishers and distributes private limited**
3. **R for Everyone: Advanced Analytics and Graphics – Jared P.Lamder – Pearson education India**

V. V. Harigopal

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Bharatiya Vidya Bhavan

Code: SE522

Bhavan's Vivekananda College of Science, Humanities & Commerce
(Accredited with 'A' grade by NAAC)
(Autonomous College)
B.Sc. III Year V Semester (CBCS): Statistics Syllabus (SEC-3)
(Examination at the end of Semester)
SEC - 3: Data Analysis with SPSS-I

30 hrs
(2 hrs/ week)
2 Credits

UNIT –I

Introduction to SPSS: Introduction, Data Analysis with SPSS: general aspects, work flow, Entering data into SPSS Editor, Inserting and defining variables, Data entry, Data Editor. Sorting, Transposing, Splitting and Merging. **(15 hrs)**

UNIT –II

Descriptive Analysis of data: Frequency tables, using frequency tables for analyzing data (Central tendency and dispersion).

Graphical Representation of Statistical data: Chart builder, Histograms, line Charts, Bar Charts, box plots, Error bar, Pie Charts, Scatter Plots (Simple, grouped, drop-line), Editing graphs and Axes.

(15 hrs)

List of Reference Books:

1. **SPSS for windows step by step - Darren George/Paul Mallery**
2. **SPSS: Stats practically short and simple – Sidney Tyrrell.**

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Bharatiya Vidya Bhavan

Code: SE622

Bhavan's Vivekananda College of Science, Humanities & Commerce
(Accredited with 'A' grade by NAAC)
(Autonomous College)
B.Sc. III Year VI Semester (CBCS): Statistics Syllabus (SEC-4)
(Examination at the end of Semester)
SEC – 4 : Data Analysis with SPSS-II

30 hrs
(2 hrs/ week)
2 Credits

UNIT –I

Statistical testing: Sample and Population, Concept of confidence Interval, t-test (one sample, Independent sample, Paired sample), ANOVA- GLM 1, Cross tabulation and Chi Square analysis.

(15 hrs)

UNIT –II

Correlation and Regression: Pearson's Correlation and Spearman Correlation, Scatter plots, Linear Regression , Multiple Regression (Linear) and Simple examples.

Statistical Quality Control: Construction of variable and attribute charts.

(15 hrs)

List of Reference Books:

1. **SPSS for windows step by step - Darren George/Paul Mallery**
2. **SPSS: Stats practically short and simple – Sidney Tyrrell.**

Chairperson
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Bharatiya Vidya Bhavan

Code: GE522

Bhavan's Vivekananda College of Science, Humanities & Commerce
(Accredited with 'A' grade by NAAC)
(Autonomous College)
Semester V (CBCS): Statistics Syllabus
(Examination at the end of Semester)
GE - 1: Data Analysis with MS Excel

30 hrs
(2 hrs/ week)
2 Credits

UNIT –I

Introduction: Data Analysis with MS Excel: Entering data into MS Excel, Inserting and defining variables, Data entry.

Graphical Representation of Statistical data: Histograms, line Charts, Bar Charts, Pie Chart.

Descriptive Analysis of data: Frequency tables, using frequency tables for analyzing data (Central tendency and dispersion). **(15 hrs)**

UNIT –II

Correlation and Regression: Pearson's Correlation and Spearman Rank Correlation, Scatter plots, Linear Regression , Multiple Regression (Linear) and Simple examples.

Time Series Analysis: Fitting of Straight line, Second degree Parabola, Power curve and Exponential curves. **(15 hrs)**

List of Reference Books:

1. **Excel for Beginners – M.L. Humphrey**
2. **Excel charts – John Walkenbach**
3. **Microsoft Excel Data Analysis & Business modeling (5th Edition) – Wayne winston**

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Bharatiya Vidya Bhavan

Code: GE622

Bhavan's Vivekananda College of Science, Humanities & Commerce
(Accredited with 'A' grade by NAAC)
(Autonomous College)
VI Semester (CBCS): Statistics Syllabus
(Examination at the end of Semester)
GE – 2: Data Analysis with SPSS

30 hrs
(2 hrs/ week)
2 Credits

UNIT –I

Introduction: Data Analysis with SPSS: Entering data into SPSS Editor, Inserting and defining variables, Data entry.

Graphical Representation of Statistical data: Chart builder, Histograms, line Charts, Bar Charts, box plots, Error bar, Pie Charts, Scatter Plots (Simple, grouped, drop-line), Editing graphs and Axes. **(15 hrs)**

UNIT –II

Descriptive Analysis of data: Frequency tables, using frequency tables for analyzing data (Central tendency and dispersion).

Correlation and Regression: Pearson's Correlation and Spearman Rank Correlation, Scatter plots, Linear Regression , Multiple Regression (Linear) and Simple examples. **(15 hrs)**

List of Reference Books:

1. **SPSS for windows step by step - Darren George/Paul Mallery**
2. **SPSS: Stats practically short and simple – Sidney Tyrrell.**

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Bharatiya Vidya Bhavan

BHAVAN'S VIVEKANANDA COLLEGE OF SCIENCE, HUMANITIES AND COMMERCE

ACCREDITED WITH A GRADE BY NAAC

Autonomous College(Affiliated To Osmania University)

DEPARTMENT OF STATISTICS

LIST OF EXTERNAL EXAMINERS

S.NO	NAME	COLLEGE	PHONE NO.
1	Dr. Ch. Yugandhar	St. Francis Degree college for Women	9849651251
2	Mr.G. Govardhan	MNR Degree college, Kukatpally	9848019846
3	Mr. Raghavendra Kulkarni	Nrupathunga Degree college	9849621263
4	Mrs. Rama Devi	Sujatha Degree college For Women	9908019440
5	Mrs. L. Rajini	Koti Women's Degree college	9032822116
6	Mrs. V. Sai Sri Kishore	St. Ann's Degree college, Mehdipatnam	9908277382
7	Mr. Venugopal	Avanti Degree College	9492543935
8	Mr. Venkata Ramana	Jagruti Degree college	9490313411
9	Mrs. Parimala Sudheer	Aurora Degree College	9885128667
10	Dr. Lavanya	AMS Degree College	9948470727
11	Mr. Vishveshwar	Wesley Boys Degree college, Sec-Bad	9989685936
12	Mr. Shekaran	Mega Women's Degree college, RamanthaPur.	9966960382
13	Mrs. Sailaja	Loyola Academy Degree & PG College, Old Alwal, Sec_bad.	9490124257
14	Mrs. Jaya Sree	RBVRR Women's college	9849236602
15	Dr. M. Jagan Mohan Rao	Jagruti Degree college	9849821368
16	Mrs. Sunita	Govt. Degree college, Vidya Nagar	9000103953
17	Mrs. Srikala	St. Ann's Degree college, Mehdipatnam	7729077295
18	Mrs. Sumalatha	Koti Women's Degree college	9291434772
19	Mrs. Aarti	Anurag Degree college	9959875222

20. Mrs. Laxmi Prasanna RBVRR Women's college

21. Mrs. Vedavati Begumpet Women's college

22. Mrs. K. Padmavathi Babu Jagjeevan Ram college.

501/BVC/BOS/2015-16

31st March 2017

Prof. V. V. Haragopal
Chairman, BOS
Department of Statistiscs
OU, Hyderabad.

Dear Sir/Madam,

We express our sincere thanks for your presence for the meeting of Board of Studies, Department of Statistics on 31st March 2017. We also thank you for your valuable contribution on various aspects of the agenda.

Thanking you,

Yours Sincerely

Prof. Y Ashok
Principal

V. V. Haragopal
31/03/2017

Chair-Person
B.O.S. in Statistics
U.C.S.
Osmania University,
HYDERABAD-7.

501/BVC/BOS/Stat/2017 27th March 2017

Prof. V. V. Haragopal
Chairman, BOS
Department of Statistiscs
OU, Hyderabad.

Dear Sir/Madam,

Sub : Meeting of BOS – Department of Statistics.

***

The meeting of Board of Studies, Department of Statistics is scheduled on 31st March 2017 at 12.00 noon in Committee Room, MBA Block. We request you to make it convenient to attend the meeting.

We look forward for your presence and valuable contribution.

Thanking you,

Yours Sincerely

Prof. Y Ashok
Principal

V.V. Haragopal 30/03/2017
Chair-Person
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U.C.S.
Osmania University,
HYDERABAD-7.