Code: ST522A

BHAVAN'S VIVEKANANDA COLLEGE

of Science, Humanities and Commerce, Sainikpuri
Autonomous College | Affiliated to Osmania University
Reaccredited with 'A' Grade by NAAC

60 hrs
(4 hrs/ week)
4 Credits

B.Sc. III Year (CBCS): Statistics Syllabus

(To be implemented for the students joined in 2023-24)
wef the academic year: 2023-24

Semester V – (DSE - 1A) Applied Statistics I

Course Objectives:

This course aims to,

COB1: *Learn techniques in survey sampling with practical applications in daily life this would be beneficial for the further research*

COB2: *Understand the principles underlying sampling as a means of making inferences about a population,*

COB3: *Understand the concept of various components of time series modeling.*

COB4: *To Analyze the quality problems and solve them. Monitoring and maintaining of the quality of products and services.*

UNIT - I **(15)**

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).

UNIT – II **(15)**

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.

UNIT - III **(15)**

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

UNIT - IV **(15)**

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

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Prof. N. Ch. Bhattacharyulu
Department of Statistics

c- charts with fixed and varying sample sizes). Interpretation of control charts. Natural tolerance limits and specification limits, process capability index.

Course Outcomes:

Upon successful completion of the course, students able to:

CO1: *Understand distinctive features of sampling schemes and its applications in real life.*

CO2: *Estimate statistics of interest and the sample sizes are determined so that those statistics are estimated with an acceptable sampling error.*

CO3: *Understand the past behavior and would be helpful for future predictions.*

CO4: *Demonstrate continuous improvement methodology for eliminating defects in a product, process ,or service.*

List of Reference Books:

1. Hoel PG: Introduction to mathematical statistics, Asia Publishing house.
2. VKRohatgi and A.K.Md.Ehsanes Saleh: An Introduction to probability and statistics. Wiley series.
3. Parimal Mukhopadhyay: Mathematical Statistics. New Central Book Agency.
4. Sanjay Arora and Bansi Lal:New Mathematical Statistics Satya Prakashan, NewDelhi.
5. Hogg and Craig:Introduction to Mathematical statistics. Printis Hall
6. Siegal. Sand Sidney: Non-parametric statistics for Behavioural Science. McGraw Hill.
7. GibbonsJ.D and Subhabrata Chakrabarti: Nonparametric Statistical Inference, MarcelDekker.
8. Conover: Practical Nonparametric Statistics. Wiley series.
9. Mood AM,Graybill FA,Boe's DC Introduction to the theory of statistics. TMH.
10. Paramiteya mariyuaparameteyaparikshalu. Telugu Academy.
11. K.V.S. Sarma: Statistics Made simple do it-yourself on PC. PHI
12. Gerald Keller: Applied Statistics with Microsoft excel. Duxbury. Thomson Learning
13. Levin, Stephan, Krehbiel, Berenson: Statistics for Managers Using Microsoft Excel, 4th edition. Pearson Publication.
14. Hogg, Tanis, Rao. Probability and Statistical Inference. 7th edition, PearsonPublication.
15. Milton and Arnold(Fourth Edition): Introduction to Probability and statistics, TataMcgraw hill Publication

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Code: ST522AP

BHAVAN'S VIVEKANANDA COLLEGE

of Science, Humanities and Commerce, Sainikpuri
Autonomous College | Affiliated to Osmania University
Reaccredited with 'A' Grade by NAAC

45 hrs
(3hrs/ week)
1 Credit

B.Sc. III Year (CBCS): Statistics Syllabus

(To be implemented for the students joined in 2023-24)
wef the academic year: 2023-24

Semester V – (DSE - 1A) Applied Statistics I Practical

Course Objectives:

This course aims to,

COB1: *To learn computational skills to implement various sampling techniques, trend and seasonal variation applications.*

COB2: *To Analyze the quality problems and solve them. Monitoring and maintaining of the quality of products and services.*

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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Statistical Quality Control

9a. Construction of X-bar and R Charts.

9b. Construction of X-bar and R Charts using MS Excel

10a. Construction of X-bar and Standard deviation Charts.

10b. Construction of X-bar and Standard deviation Charts using MS Excel.

11a. Construction of p, np - charts with fixed and varying sample sizes.

11b. Construction of p, np - charts with fixed and varying sample sizes using MS Excel.

12a. Construction of C - Chart.

12b. Construction of C – Chart using MS Excel

13a. Construction of u - charts.

13b. Construction of u – charts using MS Excel.

Course Outcomes:

Upon successful completion of the course, students able to:

CO1: *Handle and process the data using sampling techniques, trend and seasonal variations*

CO2: *Demonstrate continuous improvement methodology for eliminating defectives and defects in a product, process, or service.*

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Sainikpuri

Bharatiya Vidya Bhavan

Code: ST522B

BHAVAN'S VIVEKANANDA COLLEGE

of Science, Humanities and Commerce, Sainikpuri
Autonomous College | Affiliated to Osmania University
Reaccredited with 'A' Grade by NAAC

60 hrs
(4 hrs/ week)
4 Credits

B.Sc. III Year (CBCS): Statistics Syllabus

(To be implemented for the students joined in 2023-24)
wef the academic year: 2023-24

Semester V – (DSE –1B) Analytical Statistics I

Course Objectives:

This course aims to,

COB1: *Learn techniques in survey sampling with practical applications in daily life this would be beneficial for the further research*

COB2: *Understand the concept of various components of time series modeling.*

COB3: *To Analyze the quality problems and solve them. Monitoring and maintaining of the quality of products and services.*

COB4: *Demonstrate an application of one - way and two - way analysis of variance and obtain the knowledge about application of Design of Experiments.*

UNIT-I **(15)**

Sample Surveys: Principal steps in sample surveys, census versus sample surveys, sampling and non-sampling errors, advantages and limitations of sampling.

Sampling Methods: Types of sampling: Subjective, Quota, probability and mixed sampling methods. Methods of drawing random samples with and without replacement. Estimates of population mean and total, their variances and the estimates of variances in Simple Random Sampling With and Without Replacement, Stratified Random Sampling with Proportional and Neyman optimum allocation and Systematic Sampling when N= nk.

UNIT-II **(15)**

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

UNIT-III **(15)**

Statistical Quality Control: Importance of SQC in industry. Dimensions of quality, Statistical basis of Shewart control charts. Construction of control charts for variables (mean, range and standard deviation) and attributes (p , np, c and u- charts with fixed and varying sample sizes). Interpretation of control charts.

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Osmania University, Hyd-07.

UNIT-IV **(15)**

Analysis of Variance and Design of Experiments: Concept of Gauss-Markov linear model with examples, statement of Cochran's theorem, ANOVA – one-way, two-way classifications with one observation per cell, Statistical analysis, 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 (LSD) including one missing observation.

Course Outcomes:

Upon successful completion of the course, students able to:

CO1: *Understand distinctive features of sampling schemes and its applications in real life.*

CO2: *Understand the past behavior and would be helpful for future predictions.*

CO3: *Demonstrate continuous improvement methodology for eliminating defects in a product, process, or service.*

CO4: *Analyze and interpret the data using Design of Experiments.*

List of Reference Books:

1. V.K. Kapoor and S.C. Gupta : Fundamentals of Applied Statistics. Sultan Chand
2. A. M. Goon, M. K. Gupta, B. Das Gupta : Fundamentals of Statistics Vol - II World Press Private Ltd.,Calcutta
3. A. M. Goon, M. K. Gupta, B. Das Gupta : An outline of Statistical Theory Vol – II, World Press Private Ltd.,Calcutta17.
4. Anuvartita Sankhyaka Sastram – Telugu Academy.
5. Arora, Sumeet Arora, S.Arora : Comprehensive Statistical Methods, S. Chand.
6. B. L. Agarwal : Basic Statistics, New Age publications.
7. S. P. Gupta : Statistical Methods. Sultan Chand and Sons.
8. Parimal Mukhopadhyay : Applied Statistics, New Central Book agency.
9. Daroga Singh and Chowdhary : Theory and Analysis of Sample survey designs. Wiley Eastern.
10. M. R. Saluja : Indian Official Statistics. ISI publications.

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Sainikpuri

Code: ST522BP

Bharatiya Vidya Bhavan

BHAVAN'S VIVEKANANDA COLLEGE

of Science, Humanities and Commerce, Sainikpuri
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Reaccredited with 'A' Grade by NAAC

45 hrs
(3hrs/ week)
1 Credit

B.Sc. III Year (CBCS): Statistics Syllabus

(To be implemented for the students joined in 2023-24)
wef the academic year: 2023-24

Semester V – (DSE –1B) Analytical Statistics I Practical

Course Objectives:

This course aims to,

COB1: *To learn computational skills to implement various sampling techniques, trend and seasonal variation applications.*

COB2: *To Analyze the quality problems and solve them. Monitoring and maintaining of the quality of products and services and Demonstrate an application of one - way and two - way analysis of variance and obtain the knowledge about application of Design of Experiments.*

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 averagesusing MS Excel.

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

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

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Statistical Quality Control

9a. Construction of X-bar and R Charts.

9b. Construction of X-bar and R Charts using MS Excel

10a. Construction of X-bar and Standard deviation Charts.

10b. Construction of X-bar and Standard deviation Charts using MS Excel.

11a. Construction of p, np - charts with fixed and varying sample sizes.

11b. Construction of p, np - charts with fixed and varying sample sizes using MS Excel.

12a. Construction of C - Chart.

12b. Construction of C – Chart using MS Excel

13a. Construction of u - charts.

13b. Construction of u – charts using MS Excel.

Designs of Experiments

14a. ANOVA of One-Way Classification.

14b. ANOVA of One-Way Classification using MS Excel.

15a. ANOVA of Two-Way Classification.

15b. ANOVA of Two-Way Classification using MS Excel.

16a. Analysis of Completely Randomized Design.

16b. Analysis of Completely Randomized Design using MS Excel.

17a. Analysis of Randomized Block Design and estimation of one missing value in RBD

17b. Analysis of Randomized Block Design using MS Excel.

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

Course Outcomes:

Upon successful completion of the course, students able to:

CO1: *Handle and process the data using sampling techniques, trend and seasonal variations*

CO2: *Demonstrate continuous improvement methodology for eliminating defectives and defects in a product, process, or service and analyze & interpret the data using Design of Experiments.*

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Bharatiya Vidya Bhavan

Code: ST622A

BHAVAN'S VIVEKANANDA COLLEGE

of Science, Humanities and Commerce, Sainikpuri
Autonomous College | Affiliated to Osmania University
Reaccredited with 'A' Grade by NAAC

60 hrs
(4 hrs/ week)
4 Credits

B.Sc. III Year (CBCS): Statistics Syllabus

(To be implemented for the students joined in 2023-24)
wef the academic year: 2023-24

Semester VI – (DSE - 1A) Applied Statistics II

Course Objectives:

This course aims to,

COB1: *Demonstrate an application of one - way and two - way analysis of variance*

COB2: *Obtain the knowledge about application of Design of Experiments.*

COB3: *Procure the basis for the estimates of births and deaths used in the cohort method.*

COB4: *Anticipate value useful for comparing magnitudes of aggregates of related variables to each other, and to measure the changes in these magnitudes*

UNIT - I **(15)**

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.

UNIT – II **(15)**

Design of Experiments: Importance and applications of design of experiments. Principles of experimentation. Analysis of Completely randomized Design (CRD), Randomized Block Design (RBD) and Latin Square Design (LSD) including one missing observation, expectation of various sum of squares. Comparison of the efficiencies of the above designs.

UNIT - III **(15)**

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.

UNIT - IV **(15)**

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.

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College of Science

Course Outcomes:

Upon successful completion of the course, students able to:

CO1: *Assess ANOVA for one-way, two –way classification, fixed effect models with equal, number of observations per cell in real time problems.*

CO2: *Analyze and interpret the data using Design of Experiments.*

CO3: *Acknowledge the Vital statistics data uses—they serve as a base for public health, social service, and economic planning and program development and are used to track progress toward health goals.*

CO4: *Determining the direction of production and employment to facilitate future payments and to know changes in the real income of different groups of people at different places and times.*

List of Reference Books:

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

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Bharatiya Vidya Bhavan

Code: ST622AP

BHAVAN'S VIVEKANANDA COLLEGE

of Science, Humanities and Commerce, Sainikpuri
Autonomous College | Affiliated to Osmania University
Reaccredited with 'A' Grade by NAAC

45 hrs
(3hrs/ week)
1 Credit

B.Sc. III Year (CBCS): Statistics Syllabus

(To be implemented for the students joined in 2023-24)
wef the academic year: 2023-24

Semester VI – (DSE - 1A) Applied Statistics II Practical

Course Objectives:

This course aims to,

COB1: *To learn computational skills on applications of one – way, two - way analysis of variance and Design of Experiments*

COB2: *To learn computational skills for the estimates of births, deaths used in the cohort method and comparing magnitudes of aggregates of related variables to each other, and to measure the changes in these magnitudes.*

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.

Index Numbers

8a. Computation of Laspeyer's, Paasche's, Fisher's, Marshall Edgeworth and Kelly's Price and Quantity Index numbers

8b. Computation of Laspeyer's, Paasche's, Fisher's, Marshall Edgeworth and Kelly's Price and Quantity Index numbers using MS Excel.

9a. Computation of Time Reversal Test, Factor Reversal Test and Circular Test.

CHAIRPERSON Prof. N. [illegible] Bhatracharyulu M.Sc., M.Phil., Ph.D. Department of Statistics

8a. Computation of Time Reversal Test, Factor Reversal Test and Circular Test.

8b. Computation of Time Reversal Test, Factor Reversal Test and Circular Test using MS Excel.

9a. Construction of Cost of living index numbers.

9b.Construction of Cost of living index numbers using MS Excel

10. Base shifting, splicing and Deflation

Course Outcomes:

Upon successful completion of the course, students able to:

CO1: *Apply simple and logistic regression techniques to predict the value of continuous variables.*

CO2: *Acknowledge the Vital statistics data and determining the direction of production and employment to facilitate future payments and to know changes in the real income of different groups of people at different places and times.*

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Osmania University, Hyd-07.

Code: ST622B

BHAVAN'S VIVEKANANDA COLLEGE

of Science, Humanities and Commerce, Sainikpuri
Autonomous College | Affiliated to Osmania University
Reaccredited with 'A' Grade by NAAC

60 hrs
(4 hrs/ week)
4 Credits

B.Sc. III Year (CBCS): Statistics Syllabus

(To be implemented for the students joined in 2023-24)
wef the academic year: 2023-24

Semester VI – (DSE –1B) Analytical Statistics II

Course Objectives:

This course aims to,

COB1: *Recommend appropriate types of predictive modeling for use in data analysis scenarios.*

COB2: *Analyzing complex datasets, allowing to gain a deeper understanding of data and how it relates to real-world scenarios.*

COB3: *Procure the basis for the estimates of births and deaths used in the cohort method.*

COB4: *Anticipate value useful for comparing magnitudes of aggregates of related variables to each other, and to measure the changes in these magnitudes*

Unit –I **(15)**

Multivariate distributions: Introduction, concept of Multivariate, Definitions and Statements of properties of Multinomial and Multivariate Normal Distributions with Real life applications.

Regression Analysis : Definition, procedure of Least square estimation, methods of analysis and interpretation, Simple Linear Regression and Multiple Linear Regression for 'n' variables : estimation of parameters, Lack of fit, Mean Square Error, R^2 and adjusted R^2 values, Testing Regression coefficients.

Logistic regression: Definition and model assumptions, estimation of parameters, statements of properties for simple and Multiple Logistic regression. Interpretation of the same.

UNIT-II **(15)**

Multivariate Data Analysis Techniques : Definitions, Statements of properties of Principal Component Analysis, Factor Analysis, Cluster analysis and Linear Discriminant Analysis (Bayesian and Fishers approaches), Multidimensional Scaling, Applications and interpretation of above techniques to Image processing / pattern recognition.

Unit – III **(15)**

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 sand Net reproductive rate, Life tables, construction and uses of life tables and Abridged life tables.

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Unit –IV **(15)**

Indian 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.

Index Numbers : Concept, construction, uses and limitations of simple and weighted index numbers. Laspeyer's, Paasche's and Fisher's index numbers, criterion of a good index numbers, 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.

Note: In first two Units emphasis will be on concepts and applications of techniques only.

Course Outcomes:

Upon successful completion of the course, students able to:

CO1: *Apply simple and logistic regression techniques to predict the value of continuous variables.*

CO2: *To study the relationships among the P attributes, classify the n collected samples into homogeneous groups, and make inferences about the underlying populations from the sample.*

CO3: *Acknowledge the Vital statistics data uses—they serve as a base for public health, social service, and economic planning and program development and are used to track progress toward health goals.*

CO4: *Determining the direction of production and employment to facilitate future payments and to know changes in the real income of different groups of people at different places and times.*

List of Reference Books:

1. V.K.Kapoor and S.C.Gupta : Fundamentals of Applied Statistics. Sultan Chand
2. **Multivariate Analysis by Johnson and Wrichon**
3. Pratirupa Sidhanthamulu – Telugu Academy,
4. Prayoga Rachana and Visleshana – Telugu Academy.
5. ParimalMukhopadhyay : Applied Statistics . New Central Book agency.
6. M.R.Saluja : Indian Official Statistics. ISI publications.
7. B.L.Agarwal: Basic Statistics.New Age publications.
8. S.P.Gupta : Statistical Methods. Sultan Chand and Sons.
9. **E-Book :** https://onlinelibrary.wiley.com/doi/book/10.1002/9781118391686.

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Bharatiya Vidya Bhavan

BHAVAN'S VIVEKANANDA COLLEGE

Code: ST622BP

of Science, Humanities and Commerce, Sainikpuri
Autonomous College | Affiliated to Osmania University
Reaccredited with 'A' Grade by NAAC

45 hrs
(3 hrs/ week)
3 Credits

B.Sc. III Year (CBCS): Statistics Syllabus

(To be implemented for the students joined in 2023-24)
wef the academic year: 2023-24

Semester VI – (DSE –1B) Analytical Statistics II Practical

Course Objectives:

This course aims to,

COB1: *To learn computational skills to implement Regression and Logistic Regression models.*

COB2: *To learn computational skills for the estimates of births, deaths used in the cohort method and comparing magnitudes of aggregates of related variables to each other, and to measure the changes in these magnitudes.*

Multivariate Regression Analysis

1. Computation of Simple Regression Analysis.

1b. Computation of Simple Regression Analysis using MS Excel.

2. Computation of Multiple Regression Analysis (for three variables only).

2b. Computation of Multiple Regression Analysis (for three variables only)using MS Excel.

3. Computation of simple Logistic Regression Analysis.

4. Computation of simple Logistic Regression Analysis (for three variables only).

Vital Statistics

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

6a. Construction of Complete life tables.

6b. Construction of Complete life tables using MS Excel.

Index Numbers

7a. Computation of Laspeyer's, Paasche's, Fisher's, Marshall Edgeworth and Kelly's Price and Quantity Index numbers

7b. Computation of Laspeyer's, Paasche's, Fisher's, Marshall Edgeworth and Kelly's Price and Quantity Index numbers using MS Excel.

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Bhavan's Vivekananda College

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M.Sc., M.Phil., Ph.D.
Department of Statistics
Osmania University

9b. Computation of Time Reversal Test, Factor Reversal Test and Circular Test using MS Excel.

10a. Construction of Cost of living index numbers.

10b.Construction of Cost of living index numbers using MS Excel

11. Base shifting, splicing and Deflation

Course Outcomes:

Upon successful completion of the course, students able to:

CO1: *Analyze and interpret the data using ANOVA and Design of Experiments.*

CO2: *Acknowledge the Vital statistics data and determining the direction of production and employment to facilitate future payments and to know changes in the real income of different groups of people at different places and times.*

CHAIRPERSON
BOS in Mathematics and Statistics
Bhavan's Vivekananda College
Sainikpuri

Prof. N. Ch. Bhatracharyulu
M.Sc., M.Phil., Ph.D.
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University College of Science
Osmania University, Hyd-07.

Bharatiya Vidya Bhavan

Code: GE 522

BHAVAN'S VIVEKANANDA COLLEGE

of Science, Humanities and Commerce, Sainikpuri
Autonomous College | Affiliated to Osmania University
Reaccredited with 'A' Grade by NAAC

60 hrs
(4 hrs/ week)
4 Credits

B.Sc. III Year (CBCS): Statistics Syllabus

(To be implemented for the students joined in 2023-24)
wef the academic year: 2023-24

Semester V – (GE) Basic Statistics

Course Objective:

The main objective of this course is to provide both theoretical and practical knowledge in the field of descriptive statistics. incorporated with data science fields and its applications.

COB1: *To perceive the basic concepts in Statistics*

COB2: *To calculate and interpret the various descriptive measures of centrality, dispersion and higher-order measures of location.*

CoB3: *The concept of association between two variables and forecast future values by regression equations.*

CoB4: *To introduce the basic practice of statistics by using SPSS, a statistical software program used for data management and data analysis.*

UNIT I **(15)**

Introduction: Definition and scope of Statistics, concepts of statistical population and sample. Data: quantitative and qualitative, attributes, variables, scales of measurement - nominal, ordinal, interval and ratio. Presentation: tabular and graphic, including histogram and ogives.

UNIT II **(15)**

Measures of Central Tendency: mathematical and positional. Measures of Dispersion: range, quartile deviation, mean deviation, standard deviation, coefficient of variation, moments, skewness and kurtosis.

UNIT III **(15)**

Bivariate data: Definition, scatter diagram, simple, partial and multiple correlation (3 variables only), rank correlation. Simple linear regression, principle of least squares and fitting of polynomials and exponential curves.

UNIT IV **(15)**

Practicals on SPSS: Introduction, Data Analysis with SPSS: general aspects, work flow, entering data into SPSS Editor, Inserting and defining variables, Data entry, Data Editor.

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

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

Correlation and Regression: Pearson's Correlation, Scatter plots, Linear Regression Simple examples.

Course Outcomes:

After completing this course students will be able to:

CO1: *Develop skills in presenting quantitative and qualitative data using appropriate diagrams, tabulations and construction of frequency distributions.*

CO2: *Evaluate data using measures of central tendency, dispersion and interpret the higher order measures of central tendency.*

CO3: *Compute an interrelation between the variables using Correlation and regression analysis.*

CO4: *Demonstrate the applicability of analyzing univariate and bivariate data analysis using SPSS.*

List of Reference Books:

1. Goon A.M., Gupta M.K. and Dasgupta B. (2002): Fundamentals of Statistics, Vol. I & II, 8th Edn. The World Press, Kolkata.
2. Miller, Irwin and Miller, Marylees (2006): John E. Freund's Mathematical Statistics with Applications, (7th Edn.), Pearson Education, Asia.
3. Mood, A.M. Graybill, F.A. and Boes, D.C. (2007): Introduction to the Theory of Statistics, 3rd Edn., (Reprint), Tata McGraw-Hill Pub. Co. Ltd. PRACTICAL/ LAB WORK.
4. SPSS for windows step by step - Darren George/Paul Mallery
5. SPSS: Stats practically short and simple – Sidney Tyrrell.

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Code: ST622 O

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60 hrs
(4hrs/ week)
4 Credits

B.Sc. III Year (CBCS): Statistics Syllabus

(To be implemented for the students joined in 2023-24)
Wef the academic year 2023-24
Semester VI – Optional Course

Course Name: Operation Research/ ProjectCourse

Course Objectives:

The objective of this course is to,

COB1: *Impart knowledge in concepts and tools of Operations Research.*

COB2: *Determining the Optimum solution to the LPP by using the Big –M method dual LPP. Understand the sequence of n jobs on m machines.*

COB3: *Model formulation and applications that are used in solving Transportation problems.*

COB4: *Describe the theoretical workings of the solution methods for assignment problems and demonstrate their working by hand and solver.*

UNIT - I **(15)**

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

UNIT – II **(15)**

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 L.P.P. Dual-Primal relationship.

Problem of Sequencing - Optimal sequence of n jobs on two and three machines without passing.

UNIT - III **(15)**

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.

UNIT - IV **(15)**

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.

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Course Outcomes:

Upon successful completion of the course, students able to:

CO1: *Identify and express a decision problem in mathematical form and solve it graphically and by Simplex method*

CO2: *Explain the relationship between a linear program and its dual, including strong duality and Complementary slackness and understand the usage of Sequencing Jobs for solving Business Problems*

CO3: *Recognize and formulate transportation problems and drive their optimal solution.*

CO4: *Recognize and formulate Assignment problems and drive their optimal solution.*

List of Reference Books:

1. Kanti Swaroop, P.K. Gupta and ManMohn : Operations Research. Sultan Chand.
2. Operations Research – S D Sharma.
3. Taha: Operations Research: An Introduction, Mac Millan.
4. Gass: Linear Programming. Mc Graw Hill.
5. Hadly: Linear programming. Addison-Wesley.
6. Wayne L. Winston: Operations Research. Thomson, India edition. 4th edition.
7. Anuvartita Sankhyaka sastram – Telugu Academy.
8. Parikriya Parishodhana - Telugu Academy.
9. A.M. Goon, M.K. Gupta, B. Dasgupta: Fundamentals of Statistics, Vol II World Press Private Ltd, Calcutta.
10. D. V. L. N. Jogiraju, C. Srikala, K. Ravi Kumar Quality, Reliability and Operations Research, Kalyani Publishers.

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