

**DR. BABASAHEB AMBEDKAR MARATHWADA UNIVERSITY**



**CIRCULAR NO.SU/B.Sc./Stat./21/2022**

It is hereby inform to all concerned that, the syllabi prepared by the Ad-hoc Board and recommended by the Dean, Faculty of Science & Technology, the Hon'ble Vice-Chancellor has accepted **the syllabus of B.A./B.Sc. Statistics Ist & IInd semester with Regulation under the scheme of Choice Based Credit & Grading System** in his emergency powers under section 12(7) of the Maharashtra Public Universities Act, 2016 on behalf of the Academic Council as appended herewith.

This is effective from the Academic Year 2022-23 and onwards.

All concerned are requested to note the contents of this circular and bring the notice to the students, teachers and staff for their information and necessary action.

University Campus,  
Aurangabad-431 004.

REF.NO.SU/2022/10445-53

Date:- 15.09.2022.

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*[Signature]*  
**Deputy Registrar,  
Academic Section**

**Copy forwarded with compliments to :-**

- 1] **The Principal of all concerned Colleges,**  
Dr. Babasaheb Ambedkar Marathwada University,
- 2] **The Director, University Network & Information Centre, UNIC, with a request to upload this Circular on University Website.**

**Copy to :-**

- 1] **The Director, Board of Examinations & Evaluation,**  
**Dr.BAMU,A'bad.**
- 2] The Section Officer,[B.Sc.Unit] Examination Branch,Dr.BAMU,A'bad.
- 3] The Programmer [Computer Unit-1] Examinations, Dr.BAMU,A'bad.
- 4] The Programmer [Computer Unit-2] Examinations, Dr.BAMU,A'bad.
- 5] The In-charge,[E-Suvidha Kendra], Rajarshi Shahu Maharaj Pariksha Bhavan, Dr.BAMU,A'bad.
- 6] The Public Relation Officer, Dr.BAMU,A'bad.
- 7] The Record Keeper, Dr.BAMU,A'bad.

**DR. BABASAHEB AMBEDKAR  
MARATHWADA UNIVERSITY,  
AURANGABAD.**



**Curriculum of**

**B.A./B.Sc. Statistics (Optional)**

**(Ist & IInd semester)**

**Choice Based Credit & Grading System**

**UNDER THE FACULTY OF SCIENCE & TECHNOLOGY**

**[ Effective from 2022-23 & onwards ]**

**Preamble to the syllabus:** Originally the word Statistics was used for collection of data, but now it has acquired much wider meaning and the subject statistics is used for various types of analysis, comparison and interpretation. Statistics help to design data collection plans, analyze data appropriately and interpret and draw conclusions from those. Statistics helps in collecting information about the quantitative as well qualitative data. It also helps to organize the complex data in tabular form and its graphical /diagrammatical representation. It also helps in getting valid inferences about the population parameters from sample data. It is a science of learning from data.

Statistics has a significant importance in almost all fields such as in marketing surveys, computer science/information technology, manufacturing industries, pharmaceutical industries, agriculture, financial sector, engineering etc. Knowledge of different aspects of Statistics has become crucial. There is a continuous demand for statisticians in every field – education, industry, software, insurance, clinical trials medical data and research. The syllabus of the three Year B. Sc. degree course in Statistics is framed in such a way that the students at the end of the course can apply judiciously the statistical tools to a variety of data sets to arrive at some conclusions.

Up to higher secondary school, students are mostly exposed to descriptive statistics. These techniques are briefly reviewed but the emphasis in degree course is on inferential statistics. At the end of the degree course a student is expected to apply the statistical tools to real life data, analyze it and interpret the results.

## 2. Structure and Curriculum for Bachelor of Science (B.Sc) Statistics (Optional Subject) (Choice Based Credit System)

**Dr. Babasaheb Ambedkar Marathwada University, Aurangabad**  
Choice Based Credit System (CBCS) Curriculum

For  
Faculty of Science and Technology  
Course Structure and Scheme of Examination  
B.Sc. Three Year Undergraduate Degree Program

### Semester-I

|                                                             | Course Code | Course Title                                                                               | Total Periods<br>(Teaching periods/Week) | Credits | Scheme of Examination |     |     |           |
|-------------------------------------------------------------|-------------|--------------------------------------------------------------------------------------------|------------------------------------------|---------|-----------------------|-----|-----|-----------|
|                                                             |             |                                                                                            |                                          |         | Max Marks             | CIA | UA  | Min Marks |
| Optional I<br>(DSC-1A)<br>Core Courses                      | STA-111     | Descriptive Statistics I                                                                   | 45 (3/week)                              | 2       | 50                    | 10  | 40  | 20        |
|                                                             | STA-112     | Core Course (Theory Paper-II)<br>Probability Theory                                        | 45 (3/week)                              | 2       | 50                    | 10  | 40  | 20        |
|                                                             | STA-021     | Lab course I<br>(Based on STA-111 and STA-112)                                             | 45 (3/week)                              | 1.5     | 50                    | 10  | 40  | 20        |
| Ability<br>Enhancement<br>Compulsory<br>courses<br>(AECC-1) | STA-131     | Communication skills in English-I                                                          | 45 (5/week)                              | 3       | 50                    | 10  | 40  | 20        |
|                                                             | STA-132     | Marathi/Hindi/Urdu/Sanskrit<br>A Student can Opt. for any one of<br>these languages (SL-I) | 45 (4/week)                              | 3       | 50                    | 10  | 40  | 20        |
|                                                             |             |                                                                                            | 225                                      | 11.5    | 250                   | 50  | 200 | 100       |

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**Total Credits for Semester I : 11.5 ( Theory: 10; Laboratory : 1.5 )**

### Semester-II

|                                                             | Course Code | Course Title                                                                                | Total Periods<br>(Teaching periods/Week) | Credits | Scheme of Examination |     |     |           |
|-------------------------------------------------------------|-------------|---------------------------------------------------------------------------------------------|------------------------------------------|---------|-----------------------|-----|-----|-----------|
|                                                             |             |                                                                                             |                                          |         | Max Marks             | CIA | UA  | Min Marks |
| Optional I<br>(DSC-1B)<br>Core Courses                      | STA-211     | Descriptive Statistics II                                                                   | 45 (3/week)                              | 2       | 50                    | 10  | 40  | 20        |
|                                                             | STA-212     | Core Course (Theory Paper-IV)<br>Probability Theory                                         | 45 (3/week)                              | 2       | 50                    | 10  | 40  | 20        |
|                                                             | STA-021     | Lab course -2<br>(Based on STA-211 and STA-212)                                             | 45 (3/week)                              | 1.5     | 50                    | 10  | 40  | 20        |
| Ability<br>Enhancement<br>Compulsory<br>courses<br>(AECC-2) | STA-231     | Communication skills in English-II                                                          | 45 (5/week)                              | 3       | 50                    | 10  | 40  | 20        |
|                                                             | STA-232     | Marathi/Hindi/Urdu/Sanskrit<br>A Student can Opt. for any one of<br>these languages (SL-II) | 45 (4/week)                              | 3       | 50                    | 10  | 40  | 20        |
| Non-Credit<br>Course                                        | STA-213     | Constitution of India                                                                       | 45 (3/week)                              | 2*      | 50                    |     |     |           |
| Non-Credit<br>Course/<br>additional<br>credits              | STA-214     | Compulsory Computer Course                                                                  | 45 (3/week)                              | 2*      | 50                    |     |     |           |
|                                                             |             |                                                                                             | 225                                      | 11.5    | 250                   | 50  | 200 | 100       |

**Total Credits for Semester II : 11.5 ( Theory: 10; Laboratory : 1.5 )**

Dean

Faculty of Science & Technology

Dr. Babasaheb Ambedkar Marathwada

University, Aurangabad

#### Vision

To inspire students for acquiring knowledge across different areas in Statistics  
To empower students by expanding the horizons of wisdom.  
To equip students with good quality to appear for competitive examination.

#### Mission

To ensure overall development of the students by imparting training in curricular and co-curricular activities.

To teach the complex methodology of statistics through simple real life situation to students in order to find solution to social problems.

#### Program Educational Outcomes (PEOs)

On successful completion of the B.Sc Statistics program, the graduates will be able to:

|      |                                                                                                        |
|------|--------------------------------------------------------------------------------------------------------|
| PEO1 | Find employment utilizing their statistical knowledge in government, public and private sector         |
| PEO2 | Perform data analysis and make interpretations with knowledge attained during the course of            |
| PEO3 | Gain knowledge to pursue higher studies in statistics                                                  |
| PEO4 | Write code to extract and reformat real data and to utilize statistical programming environment        |
| PEO5 | Serve as biostatistician, statistical investigator, statistical assistant with knowledge in statistics |

### Program Specific Outcomes (PSOs)

On successful completion of the B.Sc Statistics program, the students are expected to

|       |                                                                                                                                  |
|-------|----------------------------------------------------------------------------------------------------------------------------------|
| PSO1  | Apply the concepts, principles and methods of statistics to various fields of study                                              |
| PSO2  | Understand the importance and value of statistical principles and convert a problem description into a statistical problem       |
| PSO3  | Select appropriate statistical tools to investigate a research hypothesis.                                                       |
| PSO4  | Perform data analysis by apply appropriate statistical methodology and interpret result in a meaningful way                      |
| PSO5  | Compute statistical measures using software and programs.                                                                        |
| PSO6  | Apply likelihood principles and calculus to derive fundamental results in probability, estimation and hypothesis testing.        |
| PSO7  | Select standard experiment designs, with consideration of selection process, data collection and analysis of a scientific study. |
| PSO8  | Write code to extract and reformat real data and to utilize statistical programming environment.                                 |
| PSO9  | Acquire skills to write competitive examinations and get opportunities for job placements in various fields.                     |
| PSO10 | Move for higher level learning                                                                                                   |

Eligibility: 12 th Science

Duration : 3 Years

Medium of Instructions: English

### FirstYear B.Sc.(Statistics) Semester- I

#### Descriptive Statistics-I

STA-111

Credit: 2

Max Marks: 50

(15 Lectures)

#### Unit-I

##### Introduction of some basic concepts

- 1.1 Introduction to statistics.
- 1.2 Scope and importance of Statistics.
- 1.3 Various definitions of Statistics.
- 1.4 Statistical Organisations (ISI, NSSO, DES, IIPS)
- 1.5 Statisticians and their contributions. (R.A Fisher, Mahalanobis, C.R. Rao)
- 1.6 Primary and Secondary data, Types of data : qualitative, quantitative, discrete, continuous, cross-section, time series, Meta data.

### 1.7 Presentation of data.

- a. Graphical presentation: Histogram, frequency polygon, frequency curves, ogive curves, stem and leaf charts, check sheet.
- b. Diagrammatic presentation: Bar diagrams, Pie diagram, Parato diagram, scatter diagram.

### 1.8 Different types of scales:

Qualitative data (Attributes): Nominal and ordinal scales Quantitative data (Variables): Interval and ratio scales, linear and circular scales. Data validation, Classification of data: Discrete and continuous frequency distributions, inclusive and exclusive methods of classification, relative and cumulative frequency distributions.

## Unit II

(15 Lectures)

### 2.1 Measures of Central Tendency

Concept of central tendency. Prerequisites of ideal measure of central tendency.

2.2 Arithmetic mean (A.M.) for grouped and ungrouped data (simple and weighted) trimmed mean, mean of pooled data.

2.3 Effect of change of origin and scale of A.M., properties of A.M. merits and demerits of A.M.

2.4 Mode: Computation for grouped and ungrouped data. Derivation of formula for mode. Computation of mode by graphical method. Merits and demerits of mode.

2.5 Median: Computation for grouped and ungrouped data, computation by graphical method, merits & demerits of median. Empirical relation between mean, median and mode.

2.6 Geometric mean (G.M.) computation for G M for pooled data (for two groups.) G M for ratio of two variables. merits demerits and applications

2.7 Harmonic Mean (HM) computation for frequency, non-frequency data, merits, demerits,

2.8 Order relation between AM, GM, HM ( with proof for  $n=2$ )

2.9 Selection of an average.

## Unit-III

(15 Lectures)

### Partition values & Measures of Dispersion

3.1 Concept of Dispersion and characteristics of good measure of dispersion.

3.2 Range and coefficient of range: merits, demerits and applications.

3.3 Partition values: Computation by formulae, computation by graphical method and Boxplot.

Quartile deviation (QD), coefficient of quartile deviation

3.4 Mean deviation (MD) about mean, mode, and median, coefficient of MD minimality property (with proof)

3.5 Variance, standard deviation (S.D.) effect of change of origin and scale on variance  
Variance for pooled data (Proof for two groups)

$S.D. \leq MD$  about mean

Merits, demerits & uses of S.D.

3.6 Concept of covariance, Covariance of grouped and ungrouped data. Effect of change of origin and scale & properties

3.7 Coefficient of variation (C.V.) uses of C.V., merits & demerits

3.8 Variance of linear combination

Note: Problems should be taken wherever necessary by concern teacher.

#### Recommended Books:

1. Agarwal, B. L. (2003). Programmed Statistics, Second Edition, New Age International Publishers, New Delhi.
2. Ghosh, J. K. and Mitra, S. K., Parthsarthy, K. R. (1993). Glimpses of India's Statistics Heritage, Wiley publishing Co.
3. Gupta, S. C. and Kapoor, V. K. (1997). Fundamentals of Applied Statistics, Third Edition, Sultan Chand and Sons Publishers, New Delhi.
4. Neil A. Weiss, (2016). Introductory Statistics, Tenth Edition, Pearson.
5. Sarma, K. V. S. (2001). Statistics Made it Simple: Do it yourself on PC. Prentice Hall of India, New Delhi.

### Probability Theory

STA-112

Credit: 2

Max Marks: 50

#### Unit I

(15 Lectures)

#### Basic concepts in probability theory

1.1 Concepts of experiments and random experiments

1.2 Definitions: Sample Space, Discrete sample space (finite and countably infinite) Event,

Elementary event, complement of an event.

1.3 Algebra of events (Union, Intersection and Complementation)

1.4 Definitions: Exhaustive events, Favourable events, Mutually Exclusive events, Equally Likely events, Independent events, Impossible events and certain events.

1.5 Power Set  $P(\Omega)$  (sample space consisting at least three sample points.)

1.6 Symbolic representation of given events and description of events in symbolic forms.

1.7 A priori (Classical) definition of probability of an event. Equiprobable sample space, simple examples of computation of probability of the events based on Permutations & Combinations

1.7 Axiomatic definition of Probability (with reference to finite and countably infinite sample space)

Proof of the results

i  $P(\Phi) = 0$

ii  $P(A') = 1 - P(A)$

iii  $P(A \cup B) = P(A) + P(B) - P(A \cap B)$  (with proof) and its generalization (statement only)

iv if  $A \subset B$ ,  $P(A) \leq P(B)$

v Boole's Inequality  $0 \leq P(A \cap B) \leq P(A) \leq P(A \cup B) \leq P(A) + P(B)$

## Unit II

(15 Lectures)

### Conditional Probability

2.1 Definition of conditional Probability

2.2 Multiplication theorem  $P(A \cap B) = P(A) \cdot P(B/A)$

2.3 Partition of sample space.

2.4 Posteriori Probability

2.5 Statement and proof of Baye's Theorem

2.6 Independence of events

2.7 Proof of the results that if A & B are independent then

i)  $A \& B'$  ii)  $A' \& B$  iii)  $A' \& B'$  are independent

2.8 Pair wise & mutual independence of three events

## Unit III

(15 Lectures)

### Prerequisites of distribution functions

- 3.1 Definition of Discrete and continuous random variables.
- 3.2 Probability mass function (p.m.f.) and Probability density function (p.d.f.), cumulative distribution functions (discrete and continuous) their properties (Statements only)
- 3.3 Probability distribution function of a random variable
- 3.4 Expectation of a random variable (discrete and continuous) and expectation of function of a random variable.
- 3.5 Properties of expectation.
- 3.6 Median and Mode of univariate discrete & continuous Probability Distribution.
- 3.7 Mean and variance of univariate distribution and effect of change of origin and scale.
- 3.8 Raw and Central moments of univariate distribution their relationship, skewness and kurtosis.
- 3.9 Moment generating function (M.g.f) of a random variable, definition and properties
  - i.  $M_{aX+b}(t) = e^{bt} M_X(at)$
  - ii.  $M_{X+Y}(t) = M_X(t) \cdot M_Y(t)$ ; when X and Y are independent.

Note: Problems should be taken wherever necessary by concern teacher.

### Recommended Books:

1. Agarwal B. L. (2003). Programmed Statistics, second edition, New Age International Publishers, New Delhi.
2. Gupta, S.C. and Kapoor, V. K. (1983). Fundamentals of Mathematical Statistics, Eighth Edition, Sultan Chand and Sons Publishers, New Delhi.
3. Hoel P. G. (1971). Introduction to Mathematical Statistics, John Wiley and Sons, New York.
4. Hogg, R. V. and Craig R. G. (1989). Introduction to Mathematical Statistics, Ed. MacMillan Publishing Co., New York.
5. Mayer, P. (1972). Introductory Probability and Statistical Applications, Addison Wesley Publishing Co., London.
6. Mood, A. M. and Graybill, F. A. and Boes D.C. (1974). Introduction to the Theory of Statistics, Ed. 3, McGraw Hill Book Company.
7. Rao, VLS Prakash (2008). First Course in Probability and Statistics, New Age International Publishers, New Delhi.
8. Ross S. (2002). A First Course in Probability, Sixth Edition, Pearson Education, Inc. & Dorling Kindersley Publishing, Inc.

### Semester II

### Descriptive Statistics- II

STA-211

Credit: 2

Max Marks: 50

Unit-I

(15 Lectures)

## Moments & different measures

1.1 Moments about  $x = a$  : definition, computation for raw and grouped data.

1.2 Raw moments: Definition, computation for raw and grouped data.

1.3 Central moments: Definition, computation for raw and grouped data.

Effect of change of origin and scale.

Sheppard's corrections

1.4 Relation between raw and central moments up to 4<sup>th</sup> order (with proof)

1.5 Skewness: Concept, types of skewness, measures of skewness i

Karl Pearson's

ii Bowley's, show that it lies between -1 and +

iii Pearsonian Coefficient of skewness ( $\beta_1, \gamma_1$ )

1.6 Kurtosis : Concept, types of Kurtosis, Pearsonian coefficients  $\beta_2, \gamma_2$

The results with proof

$$\begin{array}{ll} \text{i} & \beta_2 \geq 1 \\ \text{ii} & \beta_2 \geq \beta_1 + 1 \end{array}$$

## Unit-II

(15 Lectures)

### Correlation & regression

2.1 Bivariate data, its frequency distribution

2.2 Correlation: Concepts, positive, negative correlation, interpretation of scatter diagram

2.3 Karl Pearson's Coefficient of correlation, computation for grouped, ungrouped data

2.4 Properties of Karl Pearson's Coefficient of correlation i

Effect of change of origin & scale

ii Limits ( -1, +1)

iii  $r_{xy} = r_{yx}$

(15 Lectures)

2.5 Merits, demerits, interpretation, applications, of correlation

Unit-2.6 Spearman's rank correlation : Derivation of formula

(without repetition), for non repeated and repeated ranks computation-comparison of Karl Pearson's and Spearman's Correlation coefficient.

2.7 Regression: Concept, Independent and response variables, fitting of lines of regression by using principle of least squares (with derivation) Properties of lines of regression, Determination of angle between lines

2.8 Regression coefficient: Properties,

Difference between correlation and regression.

(15 lectures)

### Unit-III

#### a) Theory of attributes

3.1 Attributes: Notations and definitions of dichotomy, class frequency, positive & negative classes, ultimate class frequency, fundamental set, relationship among different class frequencies (up to three attributes)

3.2 Concept of consistency and conditions of consistency (up to three attributes.)

3.3 Independence and association of attributes.

3.4 Yule's coefficient of association, (Q), coefficient of colligation (y) and relation between Q & y.

#### b) Vital Statistics

3.5 Introduction and Uses of Vital Statistics

3.6 Methods of Obtaining Vital Statistics

3.7 Death Rates: i. Crude Death Rate

ii. Specific Death Rate

iii. Standardized Death Rate

3.8 Fertility Rates: i. Crude Birth Rate

ii. General Fertility Rate

iii. Specific Fertility Rate

3.9 Introduction to Life Tables and their Uses.

Note: Problems should be taken wherever necessary by concern teacher.

**Recommended Books:**

1. Agarwal, B. L. (2003). Programmed Statistics, Second Edition, New Age International Publishers, New Delhi.
2. Goon, A. M., Gupta, M. K. and Dasgupta, B. (1983). Fundamentals of Statistics, Vol. 1, Sixth Revised Edition, The World Press Pvt. Ltd., Calcutta.
3. Gupta, S. C. and Kapoor, V. K. (1983). Fundamentals of Mathematical Statistics, Eighth Edition, Sultan Chand and Sons Publishers, New Delhi.
4. Gupta, S. C. and Kapoor, V. K. (1997). Fundamentals of Applied Statistics, Third Edition, Sultan Chand and Sons Publishers, New Delhi.
5. Montgomery, D. C; Peck, E. A.; Vining, G. G. (2006). Introduction to Linear Regression Analysis, John Wiley and Sons
6. Snedecor G. W. and Cochran W. G. (1989). Statistical Methods, Eighth Ed. East- West Press.

**Probability Distributions STA-212**

**Credit: 2**

**Max Marks: 50**

**Unit I**

**(15 lecturers)**

**Bivariate probability distribution**

- 1.1 Concept of Bivariate probability distribution (on finite sample space)
- 1.2 Definition of two dimensional discrete random variable, its joint probability mass function, distribution function and their properties.
- 1.3 Computation of probabilities of events in Bivariate probability distribution
- 1.4 Marginal and conditional probability distributions
- 1.5 Independence of two discrete random variables.
- 1.6 Mathematical expectation of jointly distributed random variables.
- 1.7 Conditional expectation, Conditional mean and variance
- 1.8 Raw and Central moments
- 1.9 Covariance, Coefficient of correlation, variance of linear combination

**Unit II**

**(15 lecturers)**

**Some standard discrete probability distributions**

- 2.1 Definition of Bernoulli distribution and moments of the distribution
- 2.2 Additive property of Bernoulli distribution (Two variables)

2.3 Definition of Binomial distribution and applications of Binomial distribution

2.4 Mode of Binomial distribution

2.5 Moments and recurrence relation in moments of Binomial distribution.

2.6 Additive property of Binomial distribution

2.7 Fitting of Binomial distribution

2.8 Definition of Poisson distribution and applications.

2.9 (Poisson distribution as a limiting form of Binomial distribution.)

2.10 Mode of Poisson distribution, Moments of Poisson distribution.

2.11 Additive property and its generalization for Poisson distribution and fitting of Poisson distribution

(15 lecturers)

### Unit III

#### Discrete probability distributions continued

3.1 Geometric Distribution :- Definition, mean, variance,

3.2 MGF, Distribution function,

3.3 Lack of memory property,

3.4 Distribution of  $x+y$  when  $x$  &  $y$  are independent Distribution of  $\min(x,y)$

3.5 Negative Binomial Distribution :- Definition, mean, variance,

3.6 MGF, CGF, Skewness, kurtosis (recursive relation not expected)

3.7 Relation between geometric and negative binomial distribution.

3.8 Poisson approximation to negative binomial distribution.

Note: Problems should be taken wherever necessary by concern teacher.

#### Recommended Books:

1. Agarwal B. L. (2003). Programmed Statistics, second edition, New Age International Publishers, New Delhi.
2. Gupta, S.C. and Kapoor, V. K. (1983). Fundamentals of Mathematical Statistics, Eighth Edition, Sultan Chand and Sons Publishers, New Delhi.
3. Hoel P. G. (1971). Introduction to Mathematical Statistics, John Wiley and Sons, New York.
4. Hogg, R.V. and Craig R.G. (1989). Introduction to Mathematical Statistics, Ed. MacMillan Publishing Co., New York.
5. Mayer, P. (1972). Introductory Probability and Statistical Applications, Addison Wesley Publishing Co., London.

6. Mood, A. M. and Graybill, F. A. and Boes D.C. (1974). Introduction to the Theory of Statistics, Ed. 3, McGraw Hill Book Company.
7. Ross S. (2002). A First Course in Probability, Sixth Edition, Pearson Education, Inc. & Dorling Kindersley Publishing, Inc.

#### **Additional Reference Websites for Paper I and Paper II:**

1. [www.stats.unipune.ac.in](http://www.stats.unipune.ac.in) (100 Data sets for Statistics Education by Dr. Anil P. Gore, Dr. Mrs. S. A. Paranjpe and Madhav B. Kulkarni available in ISPS folder).
2. [www.freestatistics.tk](http://www.freestatistics.tk) (National Statistical Agencies)
3. [www.psychstat.smsu.edu/sbk00.htm](http://www.psychstat.smsu.edu/sbk00.htm) (Onlinebook)
4. [www.bmj.bmjournals.com/collections/statsbk/index.shtml](http://www.bmj.bmjournals.com/collections/statsbk/index.shtml)
5. [www.statweb.calpoly.edu/bchance/stat-stuff.html](http://www.statweb.calpoly.edu/bchance/stat-stuff.html)
6. [www.amstat.org/publications/jse/jse-data-archive.html](http://www.amstat.org/publications/jse/jse-data-archive.html) (International journal on teaching and learning of statistics)
7. [www.amstat.org/publications/chance](http://www.amstat.org/publications/chance) (Chancemagazine)
8. [www.statsci.org/datasets.html](http://www.statsci.org/datasets.html) (Datasets)
9. [www.math.uah.edu/stat](http://www.math.uah.edu/stat) (Virtual laboratories in Statistics)
10. [www.amstat.org/publications/stats](http://www.amstat.org/publications/stats) (STATS : the magazine for students of Statistics)
11. [www.stat.ucla.edu/cases](http://www.stat.ucla.edu/cases) (Case studies in Statistics).
12. [www.statsoft.com](http://www.statsoft.com)
13. [www.statistics.com](http://www.statistics.com)
14. [www.indiastat.com](http://www.indiastat.com)
15. [www.unstat.un.org](http://www.unstat.un.org)
16. [www.stat.stanford.edu](http://www.stat.stanford.edu)
17. [www.statpages.net](http://www.statpages.net)
18. [www.wto.org](http://www.wto.org)
19. [www.censusindia.gov.in](http://www.censusindia.gov.in)
20. [www.mospi.nic.in](http://www.mospi.nic.in)
21. [www.statisticsofindia.in](http://www.statisticsofindia.in)

#### **Annual Practical Based on Theory Papers-111,112,211&212 STA-021**

##### **List of Practicals**

1. Classification, tabulation, diagrammatical representation of grouped and ungrouped data.
2. Computation of Arithmetic Mean, median, mode for grouped and ungrouped data
3. Computation of arithmetic mean by change of origin and scale.
4. Computation of Quartiles, Deciles and Percentiles, deviation and Mean deviation, Variance, S.D., coefficient of variation (C.V.) box plot.
5. Computation of raw moments, central moments for ungrouped and grouped data and computation of measures of skewness and kurtosis.
6. Computation of Karl Pearson's coefficient of correlation, scatter diagram, Spearman's Rank correlation
7. Fitting lines of regression and Verification of properties of regression coefficients
8. Attributes: Testing consistency of data and Computation of Coefficient of Association.

9. Computation of CDR, SFR and Standardized Death Rates, CBR, SFR and GFR..
10. Model sampling from Binomial distribution
11. Fitting of Binomial distribution.
12. Model sampling from Poisson distribution
13. Fitting of Poisson distribution
14. Model sampling from Geometric distribution
15. Fitting of Geometric distribution
16. Model sampling from negative Binomial distribution
17. Fitting of negative Binomial distribution
18. Construction of life tables.
19. Computation of marginal, conditional probability distributions from bivariate probability distribution
20. Independence of two discrete random variables from a Bivariate Probability distribution.