



Syllabus

For B.Sc 1st Semester Courses in Statistics
(June 2020 onwards)

Contents:

- Theory Syllabus for Courses:
 - SSTA0101 – Descriptive Statistics (A)
 - SSTA0102 – Statistical Methods (A)
- Practical Course Syllabus for: SSTA01PR
- Evaluation and Assessment guidelines.

F.Y.B.Sc_Statistics

Course: SSTA0101

Title: Descriptive Statistics (A)

Course Objectives:

1. To introduce the technique of data collection and its presentation.
2. To emphasize the need for numerical summary measures for data analysis.

Number of lectures: 45

Course Outcomes:

On completion of the course the learner should be able to:

1. Use various techniques of data collection and presentation.
2. Understand different summary measures of location (averages) used for data analysis and the basis for their selection.
3. Choose appropriate methods to present data.
4. Select and calculate appropriate averages to represent data sets
5. Use of statistical tools to carry out elementary categorical data analysis.
6. Know statistical organizations in India and their functions.

Unit – 1 Data: Types , Collection and Management.

(15 L)

Types of data from a population:

Qualitative and Quantitative data; Geographical, Time series data; Discrete and Continuous data, Panel and Cross Section data.

Different types of scales: Nominal, Ordinal, Ratio and Interval.

Illustrations of Likert scale.

Collection of Data:

Concepts of statistical population and sample.

Primary data- designing a questionnaire / schedule, distinction between the two.

Concept of validation of questionnaire.

Problems faced when collecting data through the questionnaire.

Secondary data– its major sources including some government publications.

Elementary Categorical Data Analysis

Preparation of tables with two or three factors (variable /attributes) of classification. Requisites of a good table. Independence and Association for 2 attributes in a 2 x 2 table using Yule's coefficient of colligation and coefficient of association. Relationship between the two coefficients.

Unit 2

Presentation of Data.

(15 L)

Univariate: Frequency distribution of discrete and continuous variables. Cumulative frequency distribution.

Graphical representation of frequency distribution by Histogram, Frequency polygon, Frequency curve and Ogives.

Data Presentation and Visualization using Bar diagrams and Pie chart.

Exploratory data analysis: Stem and Leaf diagram, Dot plot.

Bivariate: Frequency distribution, Marginal and Conditional frequency distributions.

Unit 3

Measures of Central Tendency or Location.

(15 L)

Arithmetic mean and its properties (simple and weighted), Combined mean. Geometric mean and Harmonic mean. Quantiles (Median, Quartiles, Deciles, Percentiles.) Mode. (Grouping Method not expected). Empirical relationship between mean, median and mode. Merits, Demerits and Uses of Mean, Median, Mode, G.M. and H.M.

Requisites of a good average.

Choice of scale of measurement for each measure of central tendency.

List Of Recommended Reference Books

1. Goon A.M., Gupta M.K., Dasgupta B. Fundamentals of Statistics, Volume I, The World Press Private Limited, Calcutta. Fifth edition.
2. Kothari, C.R.: Research Methodology, Methods and Techniques, Wiley Eastern Limited. First Edition.
3. Shah R.J.: Descriptive Statistics, Seth Publications. Eighth edition.
4. Spiegel, M.R.: Theory and Problems of Statistics, Schaum's Publishing Series. Tata McGraw-Hill. First edition.
5. Welling, Khandeparkar, Pawar, Naralkar: Descriptive Statistics: Manan Prakashan
6. S.P. Gupta: Statistical Methods, Sultan Chand & Sons. First edition.
7. Richard. I. Levin, David. S. Rubin: Statistics for Management. Fifth edition
8. Prem. S. Mann (2007). Introductory Statistics (6th edition) John Wiley & Sons.
9. Allan Bluman (2009) Introductory Statistics. A step-by-step approach (7th edition). McGraw-Hill

Topics for Practicals:

1. Collection of Data from Secondary source (including Internet sites) / Primary source.
2. Tabulation of data (Quantitative and Categorical)
3. Classification of data.
4. Graphs and Diagrams
5. Measures of Central Tendency.

Evaluation (Theory):

Total marks per course - 100.

CIA- 40 marks

CIA 1: Written test -20 marks

CIA 2: Written test -20 marks

End Semester Examination – 60 marks

One question from each unit for 20 marks, with internal choice.

Total marks per question with choice – 25 to 30

Evaluation of SSTA01PR (0101)

Total marks - 50.

Group Project – 15 marks

Journal – 5 marks.

End Semester Practical Examination – 30 marks.

Grid Template - End Semester Examination (Theory)

Q. No	Knowledge (Definition, Descriptive Notes, Theoretical Proofs)	Understanding & Application (Illustration/Numerical Problems)	Marks
1.	15	05	20
2.	15	05	20
3.	15	05	20
Total	45	15	60
Weightage (%)	75%	25%	100%

F.Y.B.Sc_ Statistics

Course: SSTA0102

Title: Statistical Methods (A)

Course Objectives:

To study

1. Concept of probability
2. Probability distribution
3. Testing of hypotheses.

Number of lectures: 45

Course Outcomes:

On completion of the course the learner should be able to:

1. Comprehend the concept of probability and random variables.
2. Identify basic discrete distributions and know their properties.
3. Understand the properties and uses of various discrete distributions (Uniform, Bernoulli, Binomial, Poisson, Hypergeometric).

Unit 1

(15 L)

Elementary probability theory.

Random Experiment, Sample Point & Sample Space.

Discrete Sample Space, Definition of Event, Elementary Event, Algebra of Events.

Mutually exclusive events, Exhaustive events. Subjective Probability.

Classical, Empirical and Axiomatic definitions of probability.

Conditional Probability, Independence of n Events. (n = 2, 3).

Theorems on Addition & Multiplication of Probabilities,

Bayes' Theorem (All theorems with proofs).

Unit 2

Discrete Random variable: (15 L)

Univariate:

Random variable. Definition, Properties of Probability Mass Function & Cumulative Distribution Function. Expectation and variance of a random variable. Theorems on Expectation and Variance. Raw & Central Moments and their relationship (without proof). Concept of Skewness and Kurtosis.

Bivariate:

Joint Probability Mass Function of two Discrete Random Variables, Marginal and Conditional Probability Distributions, Independence of Two Random Variables.

Theorems on Expectation, Variance.

Covariance, Correlation coefficient between two random variables

Unit 3

Standard Discrete Probability Distributions: (15 L)

Degenerate distribution, Bernoulli distribution, Binomial Distribution, Poisson Distribution, Hypergeometric Distribution. Uniform Distribution Derivation of mean, & variance, Calculation of Expected frequencies.

Binomial approximation to Poisson and Hypergeometric approximation to Binomial Distribution (statement only).

List of Recommended Reference Books

1. Statistical Methods: Welling, Khandeparkar, Pawar, Naralkar Manan Publications. First edition.
2. Statistical Methods: R.J. Shah – Seth Publications. Tenth edition.
3. Basic Statistics: B.L. Agarwal – New Age International Ltd. Fifth edition
4. Theory and Problems of Statistics: Spiegel M.R. – Schaum's Publishing Series, Tata McGraw - Hill. First edition
5. Probability and Statistical Inference: Hogg R.V, Tanis E.P. – Macmillan Publishing Co. Inc.
6. Fundamentals of Mathematical Statistics: S. C. Gupta, V.K. Kapoor – Sultan Chand & Sons. Eleventh edition.
7. Statistical Methods: S.P. Gupta – Sultan Chand & Sons. Thirty third edition.
8. Fundamentals of Statistics, Volume II, - Goon A.M., Gupta M.K., Dasgupta B. – The World Press Pvt. Ltd, Calcutta. Fifth edition.
9. Richard. I. Levin, David.S. Rubin: Statistics for Management Fifth edition
10. Prem. S. Mann (2007). Introductory Statistics (6th edition) John Wiley & Sons.
11. Allan Bluman (2009) Introductory Statistics. A step-by-step approach (7th edition). McGraw-Hill

Topics for Practicals

1. Probability
2. Discrete Random Variable
3. Bivariate Probability Distributions.
4. Binomial, Poisson and Hypergeometric Distributions.
5. Calculation of Expected frequency from a conducted experiment

Evaluation (Theory):

Total marks per course - 100.

CIA- 40 marks

CIA 1: Written test - 20 marks

CIA 2: Written test - 20 marks

End Semester Examination – 60 marks

One question from each unit for 20 marks, with internal choice.

Total marks per question with choice – 25 to 30

Evaluation of SSTA01PR (0102)

Total marks - 50.

Group Project – 15 marks

Journal – 5 marks.

End Semester Practical Examination – 30 marks.

Grid Template - End Semester Examination (Theory)

Q. No	Knowledge (Definition, Descriptive Notes, Theoretical Proofs)	Understanding & Application (Illustration/Numerical Problems)	Marks
1.	15	05	20
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