



Syllabus

For B.Sc 2nd Semester Courses in Statistics
(June 2020 onwards)

Contents:

- Theory Syllabus for Courses:
 - SSTA0201 – Descriptive Statistics (B)
 - SSTA0202 – Statistical Methods (B)

- Practical Course Syllabus for: SSTA02PR
- Evaluation and Assessment guidelines.

F.Y.B.Sc_Statistics

Course: SSTA0201

Title: Descriptive Statistics (B)

Course Objective : To orient students on techniques of Data Analysis.

Number of lectures: 45

Course Outcomes:

On completing the course, the student will be able to:

1. Use a wider range of summary measures available for data analysis.
2. Select and calculate appropriate measures of dispersion for data sets.
3. Measure simple correlation, regression & diagnostic regression in bivariate data sets.
4. Know specialized averages under the domain of index numbers.

Unit –1 : Measures of Dispersion, Skewness & Kurtosis (15 L)

Range, Interquartile Range, Quartile Deviation, Mean Absolute Deviation, Standard Deviation (Variance) and their relative measures. Combined variance. Raw and Central moments up to fourth order and the relationship between them (with proof). Measures of Skewness and Kurtosis
Box-Whisker Plot.

Unit-2 : Analysis of Bivariate Data. (15 L)

Scatter diagram. Product Moment correlation coefficient and its properties. Rank correlation-Spearman's measure. Concept of linear regression. Principle of least squares. Fitting of straight line by method of least squares. Relation between regression coefficients and correlation coefficient. Coefficient of determination. Fitting of curves reducible to linear form by transformation. Fitting of quadratic curve using least squares.

Unit-3 : Index Numbers. (15 L)

Index number as a comparative tool. Stages in the construction of Index Numbers.

Simple and Composite Index Numbers.

Fixed base Index Numbers. Chain Base Index Numbers, Base shifting, Splicing and Deflating. Price and Quantity Index Numbers - Laspeyres', Paasche's, Marshal-Edgeworth's, Dorbisch-Bowley's and Fisher's Index Numbers. Value Index Number. Time reversal test. Factor reversal test, Circular test. Cost of Living Index Number. Concept of Real Income based on the Consumer Price Index Number. Problems in the construction of Consumer Price Index Number.

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. Measures of Dispersion.
2. Skewness and Kurtosis.
1. Correlation Analysis
3. Regression Analysis.
4. Curve fitting by the Method of Least Squares.
5. Index Numbers.

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 SSTA02PR (0201)

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: SSTA0202

Title: Statistical Methods (B)

Course Objectives:

To study

1. Continuous probability distributions
2. Testing of hypotheses.

Number of lectures: 45

Course Outcomes:

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

1. Identify some basic continuous distributions and know their properties.
2. Understand the theoretical 'normal' distribution, its properties and uses.
3. Utilize the concept of 'testing of hypothesis' and in particular for 'test of hypothesis for large samples.

Unit 1 : Continuous Random variable

(15 L)

Concept and properties of Probability Density Function and Cumulative Probability distribution Function. Expectation and variance of a random variable and its properties. Measures of location, dispersion, skewness and kurtosis. Raw and Central Moments. (Simple illustrations.),

Unit 2: Some Standard Continuous Probability Distributions.

(15L)

Rectangular Distribution, Exponential Distribution and Normal Distribution. Derivation of mean, median and variance for Rectangular and Exponential distribution. Properties of Normal Distribution and Normal Curve (without proof).

Normal Approximation to Binomial and Poisson Distributions (without proof).
and using graph / probability histogram

Unit 3 : Sampling Distribution.

(15 L)

Concept of Parameter, Statistic, Estimator and bias. Sampling distribution of estimator.

Standard error and M.S.E. of an estimator.

Central Limit Theorem (Statement only).

Sampling distribution of sample mean and sample proportion for large samples.

Point and interval estimation of single mean and single proportion, for large sample only.

Statistical tests - Concept of Hypotheses. (Null and Alternative Hypotheses.).

Types of Errors, Critical Region, Level of Significance, p-value,

Large Sample Tests using Central Limit Theorem, if necessary.

- For testing specified value of population mean
- For testing specified value in difference of two population means
- For testing specified value of population proportion
- For testing specified value in difference of two population proportions

List of Recommended Reference Books

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

Topics for Practicals

1. Continuous Random Variables.
2. Uniform, Exponential Distributions.
3. Normal Distribution
4. Testing of Hypotheses
5. Estimation
6. Large Sample Tests.

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 SSTA02PR (0202)

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%