Contents:
Theory Syllabus for Courses:
S.STA.1.01 – Descriptive Statistics (A)
S.STA.1.02 – Statistical Methods (A)

Practical Course Syllabus for: S.STA.1.PR
Academic/field/industrial visits and seminars may be organized by the Department, at other venues, as part of the curriculum.

F.Y.B.Sc  STATISTICS  
Course: S.STA.1.01
Title: Descriptive Statistics (A)

Learning 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

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.

Collection of Data:
- Concepts of statistical population and sample.

Primary data- designing a questionnaire / schedule, distinction between them, Problems 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.
Diagrammatic representation 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

5. Welling, Khandeparkar, Pawar, Naralkar : Descriptive Statistics : Manan Prakashan
10. www.actuaries.org.uk
11. www.actuariesindia.org
12. www.soa.org

List of 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.
Learning Objectives:
To study
1. Concept of probability
2. Probability distribution
3. Testing of hypotheses.

Number of lectures: 45

Unit 1
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:
Univariate:
Raw & Central Moments and their relationship (without proof). Concept of Skewness and Kurtosis.
Bivariate:

Unit 3
Standard Discrete Probability Distributions:
Degenerate distribution, Bernoulli distribution, Binomial Distribution, Poisson

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

**List Of Recommended Reference Books**

12. [www.actuaries.org.uk](http://www.actuaries.org.uk)
13. [www.actuariesindia.org](http://www.actuariesindia.org)
14. [www.soa.org](http://www.soa.org)

**List of Practicals:**

1. Probability
2. Discrete Random Variable
4. Binomial, Poisson and Hypergeometric Distributions.
5. Calculation of Expected frequency from a conducted experiment
St. Xavier’s College – Autonomous
Mumbai

F.Y.B.Sc

Syllabus
For 2nd Semester Courses in
Statistics
(June 2015 onwards)

Contents:
Theory Syllabus for Courses:
S.STA.2.01 – Descriptive Statistics (B).
S.STA.2.02 – Statistical Methods (B).
Academic/field/industrial visits and seminars may be organized by the Department, at other venues, as part of the curriculum.

**F.Y.B.Sc**

(STATISTICS)

**SEMESTER 2**

**COURSE:** S.STA.2.01

**DESCRIPTIVE STATISTICS (B)**

[45 LECTURES]

**LEARNING OBJECTIVE:** To orient students on techniques of data analysis.

**Unit – 4: Absolute and Relative Measures of Dispersion.**

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 – 5: Analysis of Bivariate Data.**


**Unit – 6: Index Numbers.**

List of Practicals:

7. Skewness and Kurtosis.
8. Correlation Analysis
9. Regression Analysis.
10. Curve fitting by the Method of Least Squares.
11. Index Numbers.

REFERENCES:

5. Welling, Khandeparkar, Pawar, Naralkar : Descriptive Statistics : Manan Prakashan
10. www.actuaries.org.uk
11. www.actuariesindia.org
12. www.soa.org

***************
LEARNING OBJECTIVES:
To study:
1) Continuous probability distributions
2) Testing of hypotheses.

Unit 1: Continuous Random variable
(15 L)

Unit 2: Some Standard Continuous Probability Distributions.
(15 L)

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.

TOPICS FOR PRACTICALS.
7. Uniform, Exponential Distributions.
8. Normal Distribution
9. Testing of Hypotheses
10. Estimation
11. Large Sample Tests.
REFERENCES:
26. www.actuaries.org.uk
27. www.actuariesindia.org
28. www.soa.org