St. Xavier’s College – Autonomous
Mumbai

Syllabus
For 2\textsuperscript{nd} Semester Course in Statistics
(June 2015 onwards)

Contents:
Theory Syllabus for Courses:
S.STA.2.01 – Descriptive Statistics (B)

S.STA.2.02 – Statistical methods (B)

Practical Course Syllabus for: S.STA.2. PR
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.** (15 Lectures)
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.** (15 Lectures)

**Unit-6 : Index Numbers.** (15 Lectures)
Index number as a comparative tool. Stages in the construction of Index Numbers. Simple and Composite Index Numbers.
Problems in the construction of Consumer Price Index Number.

**List of Practicals:**

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

**REFERENCES:**

5. Welling, Khandeparkar, Pawar, Naralkar: Descriptive Statistics, Manan Prakashan
10. [www.actuaries.org.uk](http://www.actuaries.org.uk)
11. [www.actuariesindia.org](http://www.actuariesindia.org)
12. [www.soa.org](http://www.soa.org)
F.Y.B.Sc
(STATISTICS)

SEMESTER 2  COURSE : S.STA.2.02

STATISTICAL METHODS ( B)  [ 45 LECTURES ]

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

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.  ( 15 L )
    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.

Statistics in Psychology and Education
Scaling Procedures:- 1) Scaling individual Test items in terms of Difficulty.
                      2) scaling of scores on a test
                      a) Z or $\sigma$ score  b) Standard scores  c) Normalized scores  d) T- scores  e) Percentile scores.
Scaling of Rankings in terms of Normal Probability Curve.
Scaling of Ratings in terms of Normal Probability Curve.

**TOPICS FOR PRACTICALS.**
1. Continuous Random Variables.
2. Uniform, Exponential Distributions.
3. Normal Distribution
4. Testing of Hypotheses
5. Estimation

**REFERENCES:**
12. www.actuaries.org.uk
13. www.actuariesindia.org
14. www.soa.org