

St. Xavier's College (Autonomous), Ahmedabad
Syllabus of Semester – V of the following departments under Faculty of Science
based on Under Graduate Curriculum Framework – 2023 (NEP)
to be implemented from the Academic Year 2025-26.

FACULTY OF ARTS

DEPARTMENT OF STATISTICS

Course	Title	Content	Hours/Week	Credit
STMN553C	Statistical Methods – II	U-1: Large Sample Test U-2: Small Sample Test U-3: Correlation and Regression U-4: Association of Attributes	4 hrs	4

STMN553C Mathematical Methods for Statistics – I

CREDIT DISTRIBUTION, ELIGIBILITY AND PRE-REQUISITES OF THE COURSE

Course Title & Code	Credit Distribution of The Course (Total - 04 Credit)			Eligibility Criteria	Prerequisite(s) of the Course (if any)
	Lecture	Practical	Experiential Learning		
Statistical Methods – II & STMN553C	4	0	0	10 + 2 from a recognized board in any stream	Basic Mathematics, Observation & Analytical Skills

Course Outcomes:

- CO-1 Identify the real-life situations to apply large sample tests with hypothesis and different errors.
- CO-2 Identify the real-life situations to apply small sample tests.
- CO-3 Demonstrate the need of identifying the real-life situation to apply correlation and Regression
- CO-4 Demonstrate the need of identifying the real-life situation to apply Association of Attribution.

Learning Outcomes: After completion of this course, the students will be able to

- (1) Formulate and execute Large Sample Tests (Z-tests) to analyze population parameters and draw statistical inferences from large datasets.
- (2) Implement Small Sample Tests (such as t-test, F-test, and Chi-square test) to perform hypothesis testing on limited data structures.
- (3) Analyze linear relationships between variables by calculating, interpreting, and modeling Correlation and Regression coefficients.
- (4) Evaluate categorical data relationships by assessing the Association of Attributes and test independence in qualitative data models.

Unit1: Large Sample tests: (15Hrs)

- Meaning of parameters and statistics
- Idea of hypothesis testing, Statistical hypothesis-null and alternative hypothesis
- Types of error, Standard error, level of significance.
- Standard errors of mean and proportion.
- Procedure of hypothesis testing.
- Test for variables- test of significance of one sample mean and difference between two sample means.
- Test of Proportions – test of significance of one sample proportion and difference between two sample proportion.

Unit2: Small Sample Tests: (15Hrs)

- Chi-square test of goodness of fit, independence of attributes and 2X2 contingency table.
- t-test for single mean, difference of two means, correlation coefficient ,regression coefficient
- F-test for equality of two variances and Fisher's Z-transformation

Unit3: Correlation, Regression and Association of Attributes: (15Hrs)

- Concept of bivariate data, Correlation Coefficient and its types, Scatter diagram.
- Karl Pearson's coefficient of correlation, Independence of variables.
- Spearman's Rank correlation coefficient.
- Coefficient of Determination and Probable Error.
- Meaning of Regression
- Linear Regression model
- Equations of lines of Regression
- Calculation of Regression coefficient
- Simple examples based on Correlation and Regression

Unit4: Correlation, Regression and Association of Attributes: (15Hrs)

- Concept of Association of attributes
- Consistency of data
- Types of Association and methods of studying Association
- Simple examples based on Association

Teaching Methodology: Apart from the conventional blackboard teaching, other modes of teaching that will be adopted are power points, group discussions, quizzes, class tests, problem-solving, and assignments.

References

1. S. C. Gupta & V. K. Kapoor: "Fundamental of applied statistics", Sultan Chand & Sons New Delhi (2007).
2. Sancheti & Kapoor: "Business Mathematics", Sultan Chand & Sons, New Delhi.
3. Kapoor V.K.: "Business Mathematics", Sultan Chand & Sons, New Delhi.
4. Parimal Mukhopadhyay: "Mathematical Statistics" Books & allied(p) Ltd (2000).

