

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 SCIENCE

DEPARTMENT OF STATISTICS

Course	Title	Content	Hours/Week	Credit
STMN552C	Basic Probability Distributions	U-1: Discrete distributions U-2: Continuous distributions U-3: Practical using manual calculation and Excel	6 hrs	4

STMN552C Basic Probability Distribution

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 Lab-1		
Basic probability distributions & STMN552C	2	2	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 Binomial and Poisson Probability Distribution and compute related probabilities & expected values.
- CO-2 Demonstrate the need of identifying the real-life situation to apply Normal and Log-normal Probability Distributions and compute related probabilities & expected values, confidence intervals.

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

- (1) Define the Bernoulli distribution and compute its r-th moments about the origin.
- (2) Apply the binomial and Poisson distribution to real-world scenarios and solve related problems.
- (3) Apply the normal distribution to various practical examples and interpret the results.
- (4) Define the log-normal distribution and understand its fundamental characteristics.

Unit 1: Discrete distributions

- Definition, r^{th} moments about origin, mean and variance of Bernoulli Distribution.
- Derivation and definition, basic properties of binomial distribution (without proof)
- Applications and examples of binomial distribution.
- Derivation and definition, basic properties of Poisson (without proof)
- Applications and examples of Poisson distributions.

Unit 2: Continuous distributions

- Definition, basic properties of normal and log normal distributions (without proof)
- Applications and examples of normal distribution
- Applications and examples of log normal distribution

Unit 3: Practicals based on Unit-1 and Unit-2 (Computing all the practicals manually and using Excel)

1. Fitting of Binomial distribution.
2. Drawing random sample of Binomial distribution.
3. Fitting of Poisson distribution.
4. Drawing random sample of Poisson distribution.
5. Fitting of Normal distribution.
6. Drawing random sample of Normal distribution.

References:

1. Hogg, R.V. and Craig, A.T. (1972): Introduction to Mathematical Statistics, Amerind Pub. Co.
2. Mood, A.M., Greybill, F.A. and Bose, D.C. (1974): Introduction to the Theory of Statistics, McGraw Hill.
3. Mukhopadhyay, P. (1996): Mathematical Statistics, New Central Book Agency.
4. Rohtagi, V.K. (1967): An Introduction to Probability Theory and Mathematical Statistics, John Wiley and Sons.
5. Hoel, P.G. (1971): Introduction to Mathematical Statistics, Asia Pub. House.
6. Meyer, P.L. (1970): Introductory Probability and statistical Applications, Addison Wesley.
7. Gupta, S.C., and Kapoor, V.K.: Fundamentals of Mathematical Statistics, Sultan Chand publications.
8. Goon, A.M., Gupta, M.K. and Das Gupta, B. (1991): Fundamentals of Statistics, Vol. I, World Press, Calcutta.
9. A First Course in Probability - Sheldon. M. Ross, (Mc Millian publishing Co.).
10. Introduction to Probability and Statistics for Engineers and Scientists- S.M. Ross (Elsever).
11. A First course in Probability - T.Chandra &D. Chatterjee (Narosa Pub. House)
12. Mathematical Statistics (VI Edition) - John E. Freund.