



(Bachelor of Science in Statistics) (Bachelor of Science)
(B. Sc.) (Statistics) Semester (IV)

Course Code	US04CSTA51	Title of the Course	STATISTICAL TECHNIQUES
Total Credits of the Course	04	Hours per Week	04

Course Objectives:	<ol style="list-style-type: none"> 1. To study causal relationship between two related variables and measure the strength of relationship between two variables. 2. Understand the line of best fit as a tool for summarizing a linear relationship and predicting for the future. 3. To provide basic idea and tools of Statistical Quality Control 4. Understand the fundamental advantage and necessity of forecasting in various situations
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Course Content		
Unit	Description	Weightage* (%)
1.	Curve fitting: Principle of least squares, Fitting of (i) $Y = a + bX$ (ii) $Y = a + bX + cX^2$ (iii) $Y = ab^X$ (iv) $Y = aX^b$, Correlation, Objectives, Definition, Methods of studying correlation, Scatter diagram method, Karl- Pearson's correlation coefficients and its properties (with proof), Spearman's Rank Correlation coefficient and its properties (with proof), Examples	25
2.	Multiple, Partial correlation (for 3 variables only) and Regression, Multiple correlation, Partial correlation, Examples, Regression, Meaning and importance, Derivation of both the regression lines and properties of regression coefficients (with proof), Examples, Multiple linear regression with two independent variables	25
3.	Time series Analysis: Components, Additive and Multiplicative models, Calculation of trend using, Free hand curve, Semi averages method, Moving average, Least squares method, Calculation of seasonal indices using, Simple Average, Ratio to Trend, Ratio to Moving Average, method	25





4.	Statistical Quality Control (SQC): Introduction, Types of Control charts, For Variables: \bar{X} and R Charts, For Attributes: p , np and C charts	25
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Teaching- Learning Methodology	
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Evaluation Pattern		
Sr. No.	Details of the Evaluation	Weightage
1.	Internal Written / Practical Examination (As per CBCS R.6.8.3)	15%
2.	Internal Continuous Assessment in the form of Practical, Viva-voce, Quizzes, Seminars, Assignments, Attendance (As per CBCS R.6.8.3)	15%
3.	University Examination	70%

Course Outcomes: Having completed this course, the learner will be able to	
1.	learn how to apply linear regression models in practice
2.	understand and interpret the correlation between two variables
3.	understand the importance and components of time series and measures to analyse time series data.
4.	understand the basic concepts of quality, quality control and tools to improve quality
5.	demonstrate the ability to use and interpret control charts for variables and attributes

Suggested References:	
Sr.	References





No.	
1.	Gupta S.C. and Kapoor V.K. Fundamentals of applied statistics
2.	Ken Black, Business Statistics (4 th edition) Willey student edition
3	Gupta S.C, Fundamentals of statistics by S.C. Gupta
4	Douglas C. Montgomery : Introduction to Statistical Quality Control Wiley student edition

On-line resources to be used if available as reference material
On-line Resources





(Bachelor of Science in Statistics) (Bachelor of Science)
(B. Sc.) (Statistics) Semester (IV)

Course Code	US04CSTA52	Title of the Course	PROBABILITY DISTRIBUTIONS
Total Credits of the Course	04	Hours per Week	04

Course Objectives:	<ol style="list-style-type: none">1. To study various discrete and continuous probability distributions and its applications in various real life situations.2. To identify the appropriate probability model that can be used.
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Course Content		
Unit	Description	Weightage* (%)
1.	Discrete probability distributions: Bernoulli distribution, Binomial distribution, Poisson distribution, Geometric distribution, Negative binomial distribution, Hyper geometric distribution, Discrete uniform distribution, Mean variance, m.g.f, p.g.f and c.g.f. and its applications	25
2.	Continuous probability distributions: Continuous uniform distribution, Normal distribution, Mean variance, m.g.f, p.g.f and c.g.f. and its applications, Exponential distribution, Gamma distribution, Beta distribution of first and second kind, Mean variance, m.g.f, p.g.f and c.g.f. and its applications	25
3.	Properties and Applications of Standard Distributions: Normal distribution as a limiting case of Binomial and Poisson distribution (without proof). Additive properties of Bernoulli, Binomial, Poisson and Normal distribution and its applications.	25
4.	Sampling from Normal distribution: Sampling distributions of Mean and variance, Chi-square, t, and F distributions and examples	25

Teaching-Learning	
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Methodology	
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Evaluation Pattern		
Sr. No.	Details of the Evaluation	Weightage
1.	Internal Written / Practical Examination (As per CBCS R.6.8.3)	15%
2.	Internal Continuous Assessment in the form of Practical, Viva-voce, Quizzes, Seminars, Assignments, Attendance (As per CBCS R.6.8.3)	15%
3.	University Examination	70%

Course Outcomes: Having completed this course, the learner will be able to	
1.	Have knowledge related to concept of discrete and continuous random variable and its probability distributions including expectations and moments
2.	Knowledge of important discrete and continuous probability distributions and their interrelations, if any.

Suggested References:	
Sr. No.	References
1.	Gupta S.C. and Kapoor V.K. Fundamentals of Mathematical Statistics
2.	Richard Johnson and Gouri Bhattacharya, Statistics-Principles and methods
3	Robert V. Hogg and Elliot Tanis : Introduction to Mathematical Statistics Fourth Edition

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On-line Resources





SARDAR PATEL UNIVERSITY
Vallabh Vidyanagar, Gujarat
(Reaccredited with 'A' Grade by NAAC (CGPA 3.25))
Syllabus with effect from the Academic Year 2022-2023

