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

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

Course Code	US03CSTA51	Title of the Course	DESCRIPTIVE STATISTICS
Total Credits of the Course	04	Hours per Week	04

Course Objectives:	1. To understand the purpose of descriptive statistics 2. To compute various measures of central tendency, dispersion with its merits and demerits and its usefulness in real life. 3. To explain the problems arising in the construction of index numbers, importance of an index numbers. 4. To perform basic demographic analyses using various techniques. 5. To learn the main theories used to understand population studies.

Course Content		
Unit	Description	Weightage* (%)
1.	Analysis of Quantitative data - I Types of data : Quantitative data : Discrete and Continuous, Qualitative data : Nominal and Ordinal Measures of central tendency : Mean, Median, Mode, Geometric mean, Harmonic mean, Weighted mean, Combined mean, Merits & demerits, Properties (with proof), Real life examples	25
2.	Analysis of Quantitative data - II Partition values and their graphical representation Measures of Dispersion : Range, Quartile derivation, Mean Derivation, Standard derivation, Coefficient of variation(C.V), Merits & Demerits, Properties (with proof), Box – and – whisker plot, Lorenz curve, Stem – and – Leaf diagram Moments : Raw moments, Central moments, Relationship between raw and central moments, Skewness, Kurtosis, Real life examples	25
3.	Index numbers : Introduction, Uses of index number, Steps for construction of index numbers, Problems in the construction of index numbers, Methods of constructing index numbers, Simple (Unweighted) Aggregate method, Weighted Aggregate method, Laspeyre's Price Index, Paasche's Price Index, Fisher's Price Index, Marshall Edgeworth Price Index, Tests of consistency of Index number, Time reversal test, Factor reversal test	25

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

4.	Vital Statistics : Uses of Vital statistics and methods of collecting vital statistics Measurement of Mortality: Crude Death Rate (CDR), Specific Death Rate (SDR), Standardized Death Rate (STDR) Measurement of Fertility: Crude Birth Rate (CBR), General Fertility Rate (GFR), Specific Fertility Rate (SFR), Total Fertility Rate (TFR) Measurement of population growth, Methods of measuring population growth, Crude rate of natural increase, Vital index, Gross Reproduction Rate (GRR)	25

Teaching-Learning Methodology	

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/impart	
1.	Understand the fundamental statistics concepts and its applications and to organize, manage and present the data.
2.	Knowledge of various types of data, their organization and evaluation of summary measures such as measures of central tendency and dispersion.
3.	Understand the uses of index numbers, Unweighted and weighted index numbers.
4	Commonly used measures of demography pertaining to its three basic aspects, viz, the mortality, and fertility and population growth.

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

Suggested References:	
Sr. No.	References
1.	Gupta S.C. : Fundamentals of Statistics
2.	Gupta S.C. : Fundamentals of Applied Statistics
3	Gupta S.C. and V.K.Kapoor : Fundamentals of Mathematical Statistics
4	Agarwal B.L. : Basic statistics

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

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

Course Code	US03CSTA52	Title of the Course	ELEMENTS OF PROBABILITY THEORY
Total Credits of the Course	04	Hours per Week	04

Course Objectives:	1. Understand the basic principles of probability including the set theory, conditional probability, Bayes' theorem and its applications in real life problems. 2. Distinguish between independent and correlated random variables. 3. Distinguish between discrete, continuous and mixed random variables and be able to represent them using probability mass, probability density and cumulative distribution functions.

Course Content		
Unit	Description	Weightage* (%)
1.	Probability : Concept of Set theory, Permutation & combination, Random experiment , sample space, Events, Types of sample space, Meaning and definition of probability - classical & axiomatic, Laws of probability (with proof), Conditional probability and independent events, Law of total probability, Bayes' theorem, Examples	25
2.	Random variables and probability distribution : Random variable, Types of r.v : Discrete and Continuous, Probability mass function (p.m.f), Probability density function (p.d.f), Distribution function (c.d.f), Median, mode and partition values	25
3.	Mathematical Expectation: Definition, Properties (with proof), Moments, measures of central tendency, dispersion, skewness and kurtosis, Moments and Generating functions (non - standard distributions), Probability generating function (p.g.f), moment generating function (m.g.f.) and its properties, cumulant generating function(c.g.f.)	25
4.	Bivariate distribution :Joint, marginal and conditional p.m.f of two random variables, Joint, marginal and conditional p.d.f of two random variables, Independence of two random variables (examples-nonstandard distribution), Product moments, Correlation, Conditional mean and variance	25

Teaching-Learning Methodology	

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

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.	Use the basic probability rules, including additive and multiplicative laws, using the terms, independent and mutually exclusive events.
2.	Acquire knowledge related to concept of discrete and continuous random variables and their probability distributions including mathematical expectations and moments

Suggested References:	
Sr. No.	References
1.	Gupta S.C. and Kapoor V.K. : Fundamentals of Mathematical Statistics
2.	Mood A.M. and Graybill F.A. and Boes D.C.E.: Introduction to theory of statistics
3	Hogg and Craig: Introduction to Mathematical Statistics
4	Biswas Purna Chandra: Probability & Statistics (PHI Edition)

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

*****