



SARDAR PATEL UNIVERSITY

Vallabh Vidyanagar

NAAC 'A' Grade (10-01-2023 To 09-01-2028)

NEP-2020 aligned Curriculum with effect from Academic Year 2026-27

Bachelor of Science Statistical Science Semester-I

Course Type	Course Code	Course Title	Teaching-Learning Scheme	Total Notional Hours	Course credits
			L-P-T		
DSC	US01MASTS01	Data Structures and Algorithms	4-0-0	120	04

• Course Learning Outcomes (CLOs)

On completion of this course, students will be able to:

CLO1: Demonstrate knowledge of seventeen forms of data (structures) and express about data operations.

CLO2: Identify, distinguish and give examples about the four fundamental data types.

CLO3: Structure data, specifically, time series, cross-sectional, panel, and time-to-event for data computing.

CLO4: Handle diverse data formats including text, image, audio, and video.

CLO5: Select appropriate visualizations and distinguish between inferential, probabilistic and mechanistic algorithms.

Unit	Course Content	Learning Pedagogies*	CLO(s)
I	Older Data Forms and Structures (Statistical) - Data: Definition; literal, statistical, computational, 'datum'; examples. Four statistical data types; qualitative; quantitative; nominal-categorical; ordinal-ranked; interval-numeric; ratio-quantitative; discrete-integer-countable; continuous-range-uncountable-measurable; examples; data operations. - Data Structures in statistic: set-collection; raw-unstructured; organised-structured; univariate-row of n (>1) columns (or column of n (>1) rows); bivariate; tri-variate; multivariate-p (>1)-variate;	CL PBL ICT EL	1 2 3
II	Special Data Structures - Special Data: Sequence; binary; cross-sectional; time series; longitudinal; panel; examples - Data Structures in computing form: quantitative; vectors; matrices; arrays; qualitative; list, factors; structured data; data frames; tree and graphs; Bloom.	CL PBL ICT EL	1 3
III	21 st Century Data Structures	CL	1



SARDAR PATEL UNIVERSITY

Vallabh Vidyanagar

NAAC 'A' Grade (10-01-2023 To 09-01-2028)

NEP-2020 aligned Curriculum with effect from Academic Year 2026-27

Bachelor of Science Statistical Science Semester-I

	- Life time: time-to-event data; censoring; types; examples - Object form: text, image, audio, video data representations (structures); examples	CBL ICT EL	4
IV	Data Operations Algorithms - Four data types: data operations; descriptive; visualization; exploratory; relational- transformation. - Special tasks: inferential; association; direct-regression; indirect-moderation-mediation; classification-cross and nested; prediction; forecast; prescription; probabilistic; mechanistic.	CL PBL	1 5

- Learning Pedagogies/Methods**

- (a) Classroom Lecture (CL)
- (b) Case-Based Learning (CBL)
- (c) Problem-Based Learning (PBL)
- (d) ICT-Enabled Learning through Digital Resources/ Virtual Labs/Webinars (ICT EL)

- Assessment Methodologies**

- (A) Internal Assessment**

- a. Internal Formative assessment**

- i. MCQ and Objective question Quiz:** Students select or give the correct answer from the list of options four /none for a given question.
 - ii. Assignment:** A practical task or setup questions given to measure a student's knowledge, skill and ability in subject or field.
 - iii. Seminar:** A student-led academic activity designed to evaluate student's ability to research, understand, and present a specific topic.
 - iv. Group Discussion:** An interactive method to assess a student's personality and inter- personal skills in team setting. It typically involves 5 to 15 participants discussing a topic for 15 to 30 minutes in presence of an observer.

- b. Internal Summative Assessment**

- i. Mid-term tests**
A test conducted roughly halfway through an academic term or semester.
 - ii. Laboratory performance**
Students demonstrate their laboratory hands-on performance skills, knowledge and ability to apply concepts in subjects.
 - iii. Viva-voce**
An oral examination conducted to evaluate a student's in-depth knowledge, understanding, and critical thinking regarding a subject or project.

- (B) Weightage of Learning Efforts for External Assessment**



SARDAR PATEL UNIVERSITY

Vallabh Vidyanagar

NAAC 'A' Grade (10-01-2023 To 09-01-2028)

NEP-2020 aligned Curriculum with effect from Academic Year 2026-27

Bachelor of Science Statistical Science Semester-I

Unit	Aligned CLOs	Total Learning Hours	Approximate weightage (Marks) to Learning levels (BT)			Total Marks
			Remember (R)	Understanding (U)	Application/ Analyse & above (A)	
I	1, 2, 3	30	4	5	3	12
II	1, 3	30	4	5	4	13
III	1, 4	30	4	5	4	13
IV	1, 5	30	3	5	4	12
		120	15	20	15	50

• Assessment and Evaluation

Sr. No.	Assessment/Evaluation	Component	Weightage (%)
1	Continuous Internal Evaluation	FA: Seminars, Assignments, Quizzes, Group Discussion	25
		SA: Mid Term Test	25
2	End-Semester Examination	Written Exam	50

(C) CLOs – PLOs Matrix

CLO	PLO										
	1	2	3	4	5	6	7	8	9	10	11
CLO1	3	-	1	-	-	-	3	-	-	-	-
CLO2	2	-	1	-	-	3	-	1	1	-	1
CLO3	2	-	2	-	-	-	3	1	1	-	1
CLO4	2	-	1	-	-	-	3	2	-	-	-
CLO5	2	3	2	3	1	3	3	2	-	2	1

CLO – PLO correlation	Value
Strong	3
Moderate	2
Low	1
No correlation	-



SARDAR PATEL UNIVERSITY

Vallabh Vidyanagar

NAAC 'A' Grade (10-01-2023 To 09-01-2028)

NEP-2020 aligned Curriculum with effect from Academic Year 2026-27

Bachelor of Science Statistical Science Semester-I

- Suggested Learning Materials Books:**

Sr. No.	Title	Author(s)	Edition/Year	Publisher
1	(to be filled later)			
2	Elements of Dual Scaling: An Introduction to Practical Data Analysis	Shizuhiko Nishisato	Special Indian Edition/2018	Psychology Press, Taylor and Francis Group, NY
3	Research Methods and Statistics in Psychology	Hugh Coolican	Seventh/2019	Routledge
4	Bayesian Decision Analysis: Principles and Practice	Jim Q. Smith	First/2010	Cambridge University Press
5	The Bayesian Way Introductory Statistics for Economists and Engineers	Svein Olav Nyberg	First/2019	John Wiley & Sons

- Online Resources (Open Source)**

Sr. No.	Description of Resource(s)	Weblink
1		



SARDAR PATEL UNIVERSITY

Vallabh Vidyanagar

NAAC 'A' Grade (10-01-2023 To 09-01-2028)

NEP-2020 aligned Curriculum with effect from Academic Year 2026-27

Bachelor of Science Statistical Science Semester-I

Course Type	Course Code	Course Title	Teaching-Learning Scheme	Total Notional Hours	Course credits
			L-P-T		
DSC	US01MASTS02	Elements of Statistics	4-0-0	120	04

• Course Learning Outcomes (CLOs)

On completion of this course, students will be able to:

CLO1: Conceptualize random experiments and map all possible outcomes into a formal sample space.

CLO2: Compute and interpret mean, median, and mode, variance, standard deviation, and quartiles and construct graphical summary using box-whisker plots with outliers.

CLO3: Calculate joint, marginal, and conditional probabilities, applying their properties to solve problems involving dependent and independent events.

CLO4: Use integrals (for continuous variables) and summations (for discrete variables) to compute the expected value of single and joint random variable.

CLO5: Distinguish between primary and secondary observations and identify sources of sampling and non-sampling errors, and experimental errors.

Unit	Course Content	Learning Pedagogies*	CLO(s)
I	Practice of Numbers - Numerical summaries: Measures of central tendency; measures of dispersion; quartiles; quantiles, Tabular summaries: frequency table; 2x2, rxc contingency table, multi-level tables, multi-computation tables - Graphical summaries: Bar diagrams, frequency polygons; histograms; skewness; pie diagrams, box-whisker plot and outliers	CL PBL ICT EL	2 4
II	Inferential aspect - Random phenomena; Random experiment Sample space, probability; joint; marginal; conditional and its properties, Random variable as mapping of data and sample space - Population: finite, infinite, examples from at least 10 real life fields, population hypothesis: Two opposite statements about population for decision making,	CL PBL ICT EL	1 5



SARDAR PATEL UNIVERSITY

Vallabh Vidyanagar

NAAC 'A' Grade (10-01-2023 To 09-01-2028)

NEP-2020 aligned Curriculum with effect from Academic Year 2026-27

Bachelor of Science Statistical Science Semester-I

	Sample: random sample, non-random sample, uni-variate, bi-variate, multi-variate sample		
III	Data Collection • Observations: Primary or Secondary • Survey; Sampling techniques, sampling error, non-sampling error; Experimental: experimental principles, experimental error; measurement error • Simulation: device -generated, mechanism-generated, computer-generated observation	CL CBL ICT EL	5
IV	Mathematical tools in Statistics • Set function: set, subsets as events, set operations as composite events, length; area as probability • Point function: distribution functions having range $[0, 1]$ as probability distribution function, examples • Integral: continuous, discrete (summation) as expectation; single random variable, (two) joint random variable, examples	CL PBL	3 4

• Learning Pedagogies/Methods

- (a) Classroom Lecture (CL)
- (b) Case-Based Learning (CBL)
- (c) Problem-Based Learning (PBL)
- (d) ICT-Enabled Learning through Digital Resources/ Virtual Labs/Webinars (ICT EL)

• Assessment Methodologies

(A) Internal Assessment

a. Internal Formative assessment

- i. **MCQ and Objective question Quiz:** Students select or give the correct answer from the list of options four /none for a given questions.
- ii. **Assignment:** A practical task or setup questions given to measure a student's knowledge, skill and ability in subject or field.
- iii. **Seminar:** A student-led academic activity designed to evaluate student's ability to research, understand, and present a specific topic.
- iv. **Group Discussion:** An interactive method to assess a student's personality and inter- personal skills in team setting. It typically involves 5 to 15 participants discussing a topic for 15 to 30 minutes in presence of an observer.

b. Internal Summative Assessment

- i. **Mid-term tests**
A test conducted roughly halfway through an academic term or semester.
- ii. **Laboratory performance**
Students demonstrate their laboratory hands-on performance skills, knowledge and ability to apply concepts in subjects.



SARDAR PATEL UNIVERSITY

Vallabh Vidyanagar

NAAC 'A' Grade (10-01-2023 To 09-01-2028)

NEP-2020 aligned Curriculum with effect from Academic Year 2026-27

Bachelor of Science Statistical Science Semester-I

iii. Viva-voce

An oral examination conducted to evaluate a student's in-depth knowledge, understanding, and critical thinking regarding a subject or project.

(B) Weightage of Learning Efforts for External Assessment

Unit	Aligned CLOs	Total Learning Hours	Approximate weightage (Marks) to Learning levels (BT)			Total Marks
			Remember (R)	Understanding (U)	Application/ Analyse & above (A)	
I	2, 4	30	4	5	3	12
II	1, 5	30	4	5	4	13
III	5	30	4	5	4	13
IV	3, 4	30	3	5	4	12
		120	15	20	15	50

• Assessment and Evaluation

Sr. No.	Assessment/Evaluation	Component	Weightage (%)
1	Continuous Internal Evaluation	FA: Seminars, Assignments, Quizzes, Group Discussion	25
		SA: Mid Term Test	25
2	End-Semester Examination	Written Exam	50

(C) CLOs – PLOs Matrix

CLO	PLO										
	1	2	3	4	5	6	7	8	9	10	11
CLO1	2	-	1	-	-	-	-	3	-	-	-
CLO2	2	2	1	-	-	3	3	-	-	-	-
CLO3	-	-	1	-	2	-	-	-	-	-	-
CLO4	-	-	1	-	-	-	-	-	-	-	-
CLO5	2	3	-	-	-	-	-	-	2	2	1

CLO – PLO correlation	Value
Strong	3
Moderate	2
Low	1
No correlation	-



SARDAR PATEL UNIVERSITY

Vallabh Vidyanagar

NAAC 'A' Grade (10-01-2023 To 09-01-2028)

NEP-2020 aligned Curriculum with effect from Academic Year 2026-27

Bachelor of Science Statistical Science Semester-I

- Suggested Learning Materials Books:**

Sr. No.	Title	Author(s)	Edition/Year	Publisher
1	Statistics Theory and Practice (multiple copies available)	R S N Pillai and Bagavathi	Eighth/2016	S. Chand and Company Ltd.
2	Engineering Statistics SI version	D. C. Montgomery, George C. Runger and Norma faris Hubele	Fifth/2013	WileyIndia Pvt. Ltd.
3	Practical Statistics Vol-I	K. R. Gupta	First/2012	Atlantic Publishers & Distributors Pvt. Ltd.
4	Probability and Statistics for Computer Science (ch. 3)	James L. Johnson	Student Edition/2003	John Wiley & Sons
5	The Bayesian Way Introductory Statistics for Economists and Engineers	Svein Olav Nyberg	First/2019	John Wiley & Sons

- Online Resources (Open Source)**

Sr. No.	Description of Resource(s)	Weblink
1		



SARDAR PATEL UNIVERSITY

Vallabh Vidyanagar

NAAC 'A' Grade (10-01-2023 To 09-01-2028)

NEP-2020 aligned Curriculum with effect from Academic Year 2026-27

Bachelor of Science Statistical Science Semester-I

Course Type	Course Code	Course Title	Teaching-Learning Scheme	Total Notional Hours	Course credits
			L-P-T		
DSC	US01MISTS01	Fundamentals of Economics – I	4-0-0	120	04

• Course Learning Outcomes (CLOs)

On completion of this course, students will be able to:

CLO1: Explain the fundamental concepts, definitions, nature, scope, and importance of economics, and critically compare the contributions of Adam Smith, Marshall, Lionel Robbins, and Samuelson.

CLO2: Analyze the concepts of demand and supply, their determinants, market functions, and the process of price determination using economic principles.

CLO3: Examine the production process by explaining the production function and the characteristics and roles of the factors of production (land, labour, capital, and entrepreneur).

CLO4: Evaluate the theories of distribution of factor rewards, including rent, wages, interest, and profit, and relate them to the contribution of factors of production.

CLO5: Apply fundamental economic concepts and theories to analyze real-world economic issues involving markets, production, pricing, and income distribution.

Unit	Course Content	Learning Pedagogies*	CLO(s)
I	Basic Concepts of Economics - Definitions of Economics and their Critical evaluation: Adam Smith, Marshall, Lionel Robbins, Samuelson - Nature and Scope of Economics: Subject matter of Economics, Divisions of Economics, Scope of Economics, Relations of Economics with other sciences, Methods and Importance of Economics - Various Concepts of Economics: Consumer, Producer, Market, Production, Factors of Production, Utility, Value, Price, Goods, Services, Wealth, Stock and Supply	CL	1 5
II	Demand and Supply - Meaning of Demand - Demand function: Increase and Decrease & Expansion and Contraction of demand - Meaning of Supply	CL	2 5



SARDAR PATEL UNIVERSITY

Vallabh Vidyanagar

NAAC 'A' Grade (10-01-2023 To 09-01-2028)

NEP-2020 aligned Curriculum with effect from Academic Year 2026-27

Bachelor of Science Statistical Science Semester-I

	- Supply function: Increase and Decrease & Expansion and Contraction of supply - General price determination		
III	Factors of Production - Production function - Land: Meaning and Characteristics - Labour: Meaning and Characteristics, Division of Labour - Meaning, merits and limitations of Division of labour - Capital: Meaning and Characteristics, Capital formation - Entrepreneur: Meaning and Characteristics	CL CBL	3 5
IV	Returns to Factors of Production - Wage: Meaning, Theories- Marginal Productivity Theory, Modern Theory - Wage: Meaning, Theories- Marginal Productivity Theory, Modern Theory - Interest: Meaning, Classical and loanable theories - Profit: Meaning, Uncertainty and profit, Innovations and profit	CL CBL	4 5

• Learning Pedagogies/Methods

- Classroom Lecture (CL)
- Case-Based Learning (CBL)
- Problem-Based Learning (PBL)
- ICT-Enabled Learning through Digital Resources/ Virtual Labs/Webinars (ICT EL)

• Assessment Methodologies

(A) Internal Assessment

a. Internal Formative assessment

- MCQ and Objective question Quiz:** Students select or give the correct answer from the list of options four /none for a given questions.
- Assignment:** A practical task or setup questions given to measure a student's knowledge, skill and ability in subject or field.
- Seminar:** A student-led academic activity designed to evaluate student's ability to research, understand, and present a specific topic.
- Group Discussion:** An interactive method to assess a student's personality and inter- personal skills in team setting. It typically involves 5 to 15 participants discussing a topic for 15 to 30 minutes in presence of an observer.

b. Internal Summative Assessment

- Mid-term tests**
A test conducted roughly halfway through an academic term or semester.
- Laboratory performance**
Students demonstrate their laboratory hands-on performance skills,



SARDAR PATEL UNIVERSITY

Vallabh Vidyanagar

NAAC 'A' Grade (10-01-2023 To 09-01-2028)

NEP-2020 aligned Curriculum with effect from Academic Year 2026-27

Bachelor of Science Statistical Science Semester-I

- iii. knowledge and ability to apply concepts in subjects.
Viva-voce
An oral examination conducted to evaluate a student's in-depth knowledge, understanding, and critical thinking regarding a subject or project.

(B) Weightage of Learning Efforts for External Assessment

Unit	Aligned CLOs	Total Learning Hours	Approximate weightage (Marks) to Learning levels (BT)			Total Marks
			Remember (R)	Understanding (U)	Application/ Analyse & above (A)	
I	1,5	30	4	5	3	12
II	2,5	30	4	5	4	13
III	3,5	30	4	5	4	13
IV	4,5	30	3	5	4	12
		120	15	20	15	50

• Assessment and Evaluation

Sr. No.	Assessment/Evaluation	Component	Weightage (%)
1	Continuous Internal Evaluation	FA: Seminars, Assignments, Quizzes, Group Discussion	25
		SA: Mid Term Test	25
2	End-Semester Examination	Written Exam	50

(C) CLOs – PLOs Matrix

CLO	PLO										
	1	2	3	4	5	6	7	8	9	10	11
CLO1	3	1	2	-	-	-	2	-	1	2	-
CLO2	3	3	3	2	1	-	2	-	1	2	-
CLO3	3	2	3	2	1	1	2	-	2	2	1
CLO4	3	2	3	2	-	-	2	1	1	2	1
CLO5	3	3	3	2	2	2	3	1	2	3	2



SARDAR PATEL UNIVERSITY

Vallabh Vidyanagar

NAAC 'A' Grade (10-01-2023 To 09-01-2028)

NEP-2020 aligned Curriculum with effect from Academic Year 2026-27

Bachelor of Science Statistical Science Semester-I

CLO – PLO correlation	Value
Strong	3
Moderate	2
Low	1
No correlation	-

- Suggested Learning Materials Books:**

Sr. No.	Title	Author(s)	Edition/Year	Publisher
1	Elementary Economic Theory	K. K. Dewett & J. D. Verma	1996	S. Chand Publishing, New Delhi
2	Advanced Economic Theory	H. L. Ahuja	2017	S. Chand Publishing
3	Modern Economics: An Analytical Study	H. L. Ahuja	2016	S. Chand Publishing
4	Principles of Microeconomics	Mankiw, N. G	2001	Cengage Learning, Boston. Latest edition
5	Microeconomic theory	Andreu, M. C., Michael, D. W., & Jerry, R. G.	1995	Oxford University Press.
	Lectures on microeconomic theory (Vol. 2)	Malinvaud, E., & Silvey, A.	1985	Amsterdam: North-Holland

- Online Resources (Open Source)**

Sr. No.	Description of Resource(s)	Weblink
1		



SARDAR PATEL UNIVERSITY

Vallabh Vidyanagar

NAAC 'A' Grade (10-01-2023 To 09-01-2028)

NEP-2020 aligned Curriculum with effect from Academic Year 2026-27

Bachelor of Science Statistical Science Semester-I

Course Type	Course Code	Course Title	Teaching-Learning Scheme	Total Notional Hours	Course credits
			L-P-T		
MD	US01MDSTS01	Set Theory and Calculus	4-0-0	120	04

• Course Learning Outcomes (CLOs)

On completion of this course, students will be able to:

CLO1: Explain the fundamental concepts of sets, set operations, relations, and functions, and apply their properties to solve elementary mathematical problems.

CLO2: Analyze sequences, evaluate limits of functions using algebraic laws and standard techniques, and determine the continuity of functions.

CLO3: Compute derivatives of algebraic, exponential, logarithmic, and multivariable functions, and apply differential calculus to analyze the behavior of functions and solve optimization problems.

CLO4: Evaluate definite and indefinite integrals using appropriate integration techniques and apply integral calculus to determine areas and solve practical mathematical problems.

CLO5: Integrate the concepts of set theory, functions, limits, differentiation, and integration to formulate and solve mathematical problems relevant to statistics and related disciplines.

Unit	Course Content	Learning Pedagogies*	CLO(s)
I	Set and function - Fundamentals of Set Theory: Introduction to Sets, Representation of Sets, Types of Sets, Subsets and Proper Subsets, Power Set, Universal Set - Operations on Sets: Union of Sets, Intersection of Sets, Difference of Sets, Complement of Sets, Venn Diagrams, Laws of Algebra of Sets, De Morgan's Laws. - Functions Definition of Functions: Types of Functions, One-one Function, Many-one Function, Onto Function, Into Function, Bijective Function, Composite Functions, Inverse Functions.	CL PBL ICT EL	1
II	Sequences, Limits and Continuity - Sequences of Real Numbers: Definition of a Sequence, Types of Sequences, Bounded and Unbounded Sequences, Monotonic Sequences (Increasing and Decreasing), Convergent and Divergent Sequences (Basic Idea). - Limits of Functions: Concept of Limits, Algebra of Limits, One-sided Limits (Left-hand and Right-hand Limits), Infinite Limits, Limits at Infinity. L-hospital Rule (Statement Only)	CL PBL ICT EL	2



SARDAR PATEL UNIVERSITY

Vallabh Vidyanagar

NAAC 'A' Grade (10-01-2023 To 09-01-2028)

NEP-2020 aligned Curriculum with effect from Academic Year 2026-27

Bachelor of Science Statistical Science Semester-I

	Continuity, Types of Discontinuity, Properties, and Intermediate Value Theorem (Statement Only).		
III	Differential Calculus Derivative from First Principles, Rules of Differentiation, Derivatives of Algebraic Functions, Exponential and Logarithmic Functions, First-Order Derivatives, Second-Order Derivatives, Leibnitz Theorem (Statement Only), Maxima and Minima, Increasing and Decreasing Functions, Partial Differentiation, Taylor Expansion.	CL PBL ICT EL	3
IV	Integral Calculus Indefinite Integration, Methods of Integration, Substitution, Integration by Parts, Partial Fractions, Definite Integrals, Properties of Definite Integrals, Fundamental Theorem of Calculus, Area Under Curves, Area Between Two Curves, and Applications of Integration.	CL PBL	4 5

• Learning Pedagogies/Methods

- (a) Classroom Lecture (CL)
- (b) Case-Based Learning (CBL)
- (c) Problem-Based Learning (PBL)
- (d) ICT-Enabled Learning through Digital Resources/ Virtual Labs/Webinars (ICT EL)

• Assessment Methodologies

(A) Internal Assessment

a. Internal Formative assessment

- i. **MCQ and Objective question Quiz:** Students select or give the correct answer from the list of options four /none for a given question.
- ii. **Assignment:** A practical task or setup questions given to measure a student's knowledge, skill and ability in subject or field.
- iii. **Seminar:** A student-led academic activity designed to evaluate student's ability to research, understand, and present a specific topic.
- iv. **Group Discussion:** An interactive method to assess a student's personality and inter- personal skills in team setting. It typically involves 5 to 15 participants discussing a topic for 15 to 30 minutes in presence of an observer.



SARDAR PATEL UNIVERSITY

Vallabh Vidyanagar

NAAC 'A' Grade (10-01-2023 To 09-01-2028)

NEP-2020 aligned Curriculum with effect from Academic Year 2026-27

Bachelor of Science Statistical Science Semester-I

b. Internal Summative Assessment

i. Mid-term tests

A test conducted roughly halfway through an academic term or semester.

ii. Laboratory performance

Students demonstrate their laboratory hands-on performance skills, knowledge and ability to apply concepts in subjects.

iii. Viva-voce

An oral examination conducted to evaluate a student's in-depth knowledge, understanding, and critical thinking regarding a subject or project.

(B) Weightage of Learning Efforts for External Assessment

Unit	Aligned CLOs	Total Learning Hours	Approximate weightage (Marks) to Learning levels (BT)			Total Marks
			Remember (R)	Understanding (U)	Application/ Analyse & above (A)	
I	1, 2	30	4	5	3	12
II	2, 3	30	4	5	4	13
III	3, 4	30	4	5	4	13
IV	4, 5	30	3	5	4	12
		120	15	20	15	50

• Assessment and Evaluation

Sr. No.	Assessment/Evaluation	Component	Weightage (%)
1	Continuous Internal Evaluation	FA: Seminars, Assignments, Quizzes, Group Discussion	25
		SA: Mid Term Test	25
2	End-Semester Examination	Written Exam	50



SARDAR PATEL UNIVERSITY

Vallabh Vidyanagar

NAAC 'A' Grade (10-01-2023 To 09-01-2028)

NEP-2020 aligned Curriculum with effect from Academic Year 2026-27

Bachelor of Science Statistical Science Semester-I

(C) CLOs – PLOs Matrix

CLO	PLO										
	1	2	3	4	5	6	7	8	9	10	11
CLO1	2	1	1	-	-	2	1	-	-	-	-
CLO2	2	1	1	-	1	2	1	-	-	-	-
CLO3	2	-	1	-	1	3	1	-	-	-	-
CLO4	3	-	2	-	1	3	1	-	-	-	-
CLO5	2	1	1	-	2	3	2	1	-	1	1

CLO – PLO correlation	Value
Strong	3
Moderate	2
Low	1
No correlation	-

• Suggested Learning Materials Books:

Sr. No.	Title	Author(s)	Edition/Year	Publisher
1	Real Analysis	Richard R. Goldberg	2 nd Edition/1976	Oxford University Press
2	Introduction to Real Analysis	Robert G. Bartle and Donald R. Shebert	4 th Edition/2011	John Wiley & Sons
3	Principles of Mathematical Analysis	Walter Rudin	3 rd Edition/1976	McGraw-Hill Education
4	Thomas' Calculus	George B Thomas, Jr. Maurice D Weir and Joel Hass	14 th Edition//2018	Pearson Education

• Online Resources (Open Source)

Sr. No.	Description of Resource(s)	Weblink
1.	Prof. Arindama Singh, IIT Madras	https://onlinecourses.nptel.ac.in/noc21_ma16/preview
2.	Prof. Amit Kuber, IIT Kanpur	https://nptel.ac.in/courses/111104416

Bachelor of Science in Statistical Science
B.Sc. Statistical Science Semester I

Course Type	Course Code	US01AESTS01	Title of the Course	Functional English-I
Ability Enhancement Course	Total Credits of the Course	2 (Theory)	Hours per Week	02

Course Objectives:	1. To introduce students to the fundamentals of functional English. 2. To enhance students' verbal and non-verbal communication skills. 3. To develop basic writing skills suitable for academic and professional contexts. 4. To improve students' reading comprehension abilities. 5. To apply functional English in practical scenarios through role-plays and discussions.
--------------------	--

Course Outcomes:	1. Students will be able to differentiate between academic and functional English. 2. Students will improve their listening and speaking skills for effective communication. 3. Students will be able to write clear and coherent sentences and paragraphs. 4. Students will develop the ability to comprehend and analyse written texts. 5. Students will demonstrate practical application of functional English in real-life situations.
------------------	---

Course Content				
Unit	Description	Type	Credit	Hours
1.	Introduction to Functional English • Vocabulary (Homophones, Homonyms, Phrasal Verbs, & Word Formation) • Basics of Grammar (Tenses, Sequence of Tenses, Modal Auxiliaries, Prepositions, Linking words) • Common Grammatical Errors	T	1	15
2.	Communication Skills • Meaning, Objectives and Process of Verbal Communication • Listening – Qualities of an Active Listener, Note-Taking (Use of relevant audios/videos is recommended) • Speaking – Qualities of a Good Speech and Speaker, Various Speeches	T	1	15



	(Welcome/Farewell, Vote of Thanks) during Technical and Non-Technical Events • Reading Comprehension – Practice in Reading Comprehension using relevant scientific passages • Writing – Paragraph Writing			
	Assessment Methods • Continuous assessment through presentations, group discussions, assignments, quizzes, and class participation • Mid-semester and end-semester examinations • Practical assessments through presentations, group projects, and role-plays			

Teaching-Learning Methodology	
-------------------------------	--

Evaluation Pattern		
Sr. No.	Details of the Evaluation	Weightage
1.	Internal Written / Practical Examination	50%
2.	University Examination	50%

Suggested References:	
Sr. No.	References
1	Effective Communication Skills for Scientific and Technical Professionals by Harry Chambers
2	English for Everyone: Phrasal Verbs by Thomas Booth, Ben Ffrancon Davies, Peter Dainty, et al
3	English for Everyone: Idioms by Thomas Booth, Jenny Wilson
4	Oxford English Grammar Course (Advanced) by Michael Swan, Catherine Walter



5	Communication Skills by Parul Papat & Kaushal Kotadia
6	Listen to Me, Listen to You: A Step-by-Step Guide to Communication Skills Training by Mandy Kotzman, Anne Kotzman
7	Note Taking Made Easy: Strategies for Helping All Students Take Effective Notes by Deana Hippie
8	Functional English Grammar: An Introduction for Second Language Teachers by Graham Lock (Cambridge Language Education)
9	Practical English Grammar (4th ed.) by A.V. Martinet & A.J.A. Thomason (Oxford University Press, Delhi)
10	Active Listening Techniques: 30 Practical Tools to Hone Your Communication Skills by Nixsali Leonardo LCSW
11	Web Resources 1. https://readtheory.org/ 2. https://www.bbc.co.uk/learningenglish/ 3. https://www.khanacademy.org/humanities/grammar 4. https://www.quill.org/





SARDAR PATEL UNIVERSITY

Vallabh Vidyanagar

NAAC 'A' Grade (10-01-2023 To 09-01-2028)

NEP-2020 aligned Curriculum with effect from Academic Year 2026-27

Bachelor of Science Statistical Science Semester-I

Course Type	Course Code	Course Title	Teaching-Learning Scheme	Total Notional Hours	Course credits
			L-P-T		
DSC	US01SESTS01	Computer Applications for Economics	0-2-0	60	02

• Course Learning Outcomes (CLOs)

On completion of this course, students will be able to:

CLO1: Demonstrate proficiency in creating, editing, formatting, and managing documents using a word processing application.

CLO2: Design and deliver professional presentations by applying appropriate themes, layouts, multimedia elements, animations, and slide transitions.

CLO3: Apply spreadsheet fundamentals to enter, organize, format, and manage data efficiently using spreadsheet applications.

CLO4: Use spreadsheet formulas, functions, and data management features to perform calculations, analyze data, and solve basic computational problems.

CLO5: Integrate word processing, presentation, and spreadsheet tools to prepare professional reports, presentations, and data summaries for academic and workplace applications.

Unit	Course Content	Learning Pedagogies*	CLO(s)
I	• Creating, Editing, Formatting, and Printing Word Documents	ICT EL	1
	• Working with Word Processor Tools and Advanced Formatting		2
	• Creating and Designing PowerPoint Presentations		
	• Applying Slide Transitions, Animations, and Slide Timings		
	• Delivering and Automating PowerPoint Slide Shows		
II	• Introduction to Electronic Spreadsheets and Workbook Management	ICT EL	3
	• Data Entry, Cell Manipulation, and Worksheet Formatting		4
	• Performing Calculations Using Spreadsheet Formulas and Functions		5
	• Creating and Customizing Charts for Data Visualization		
	• Developing an Integrated Spreadsheet Application		



SARDAR PATEL UNIVERSITY

Vallabh Vidyanagar

NAAC 'A' Grade (10-01-2023 To 09-01-2028)

NEP-2020 aligned Curriculum with effect from Academic Year 2026-27

Bachelor of Science Statistical Science Semester-I

- **Learning Pedagogies/Methods**

- (a) Classroom Lecture (CL)
- (b) Case-Based Learning (CBL)
- (c) Problem-Based Learning (PBL)
- (d) ICT-Enabled Learning through Digital Resources/ Virtual Labs/Webinars (ICT EL)

- **Assessment Methodologies**

- (A) **Internal Assessment**

- a. **Internal Formative assessment**

- i. **MCQ and Objective question Quiz:** Students select or give the correct answer from the list of options four /none for a given questions.
 - ii. **Assignment:** A practical task or setup questions given to measure a student's knowledge, skill and ability in subject or field.
 - iii. **Seminar:** A student-led academic activity designed to evaluate student's ability to research, understand, and present a specific topic.
 - iv. **Group Discussion:** An interactive method to assess a student's personality and inter- personal skills in team setting. It typically involves 5 to 15 participants discussing a topic for 15 to 30 minutes in presence of an observer.

- b. **Internal Summative Assessment**

- i. **Mid-term tests**
A test conducted roughly halfway through an academic term or semester.
 - ii. **Laboratory performance**
Students demonstrate their laboratory hands-on performance skills, knowledge and ability to apply concepts in subjects.
 - iii. **Viva-voce**
An oral examination conducted to evaluate a student's in-depth knowledge, understanding, and critical thinking regarding a subject or project.

- **Assessment and Evaluation**

Sr. No.	Assessment/Evaluation	Component	Weightage (%)
1	Continuous Internal Evaluation	FA: Seminars, Assignments, Quizzes, Group Discussion	25
		SA: Mid Term Test	25



SARDAR PATEL UNIVERSITY

Vallabh Vidyanagar

NAAC 'A' Grade (10-01-2023 To 09-01-2028)

NEP-2020 aligned Curriculum with effect from Academic Year 2026-27

Bachelor of Science Statistical Science Semester-I

(B) CLOs – PLOs Matrix

CLO	PLO										
	1	2	3	4	5	6	7	8	9	10	11
CLO1	-	1	-	-	1	-	2	1	-	3	-
CLO2	-	1	-	2	-	-	2	2	-	3	-
CLO3	1	3	-	1	-	2	1	-	1	1	-
CLO4	2	3	1	2	1	3	1	-	1	1	-
CLO5	1	2	1	2	2	2	2	2	1	3	1

CLO – PLO correlation	Value
Strong	3
Moderate	2
Low	1
No correlation	-

• Suggested Learning Materials Books:

Sr. No.	Title	Author(s)	Edition/Year	Publisher
1	Data Processing and Information Technology	French C.S.	1998	BPB Publications
2	Computer Fundamentals	Sinha P. K	1992	BPB Publications
3	The ABCs of Microsoft Office 97 Professional edition	Davis G. H.	1998	BPB Publications
4	Microsoft Windows 98 Training Guide	Schwartz K.	1998	Tech/DDC Asian Ed
5	Comdex Computer Course Kit	Gupta V.	2007	Comdex
6	Fundamentals of Computers	Rajaraman	2003	PHI Publication

• Online Resources (Open Source)

Sr. No.	Description of Resource(s)	Weblink



SARDAR PATEL UNIVERSITY

Vallabh Vidyanagar

NAAC 'A' Grade (10-01-2023 To 09-01-2028)

NEP-2020 aligned Curriculum with effect from Academic Year 2026-27

Bachelor of Science Statistical Science Semester-I

Course Type	Course Code	Course Title	Teaching-Learning Scheme	Total Notional Hours	Course credits
			L-P-T		
DSC	US01IKSTS01	Kautilya's Arthashastra	2-0-0	60	02

• Course Learning Outcomes (CLOs)

On completion of this course, students will be able to:

CLO1: Explain the contemporary perspectives on Kautilya's Arthashastra, including socio-economic heritage, Dharmic capitalism, state-market dynamics, and sustainable economic development.

CLO2: Analyze the significance of socio-economic heritage, ethical values, and societal responsibilities in fostering sustainable economic growth and business practices.

CLO3: Examine the application of Kautilya's Arthashastra in contemporary business and economic systems, including the role of savings, organizations, and institutional frameworks.

CLO4: Evaluate the relevance of Kautilya's economic principles in addressing modern economic issues and global financial crises.

CLO5: Apply the principles of Kautilya's Arthashastra to interpret contemporary economic and business scenarios from an ethical and sustainable perspective.

Unit	Course Content	Learning Pedagogies*	CLO(s)
I	Sriram Balasubramanian's take on contemporary views on Kautilya's arthashastra • Socio-economic heritage as foundation of economic prosperity • Dharmic capitalism and its components • State-market dynamics • Sustainable growth through societal and familial responsibilities	CL	1 2
II	Kanagasabapathi's take on application of Kautilya's arthashastra in contemporary times • Virtue of savings • Organizations to facilitate business and economies • Systems and societal values facilitating businesses and economics • Learning lessons for global economic crises	CL	3 4 5



SARDAR PATEL UNIVERSITY

Vallabh Vidyanagar

NAAC 'A' Grade (10-01-2023 To 09-01-2028)

NEP-2020 aligned Curriculum with effect from Academic Year 2026-27

Bachelor of Science Statistical Science Semester-I

- **Learning Pedagogies/Methods**

- (a) Classroom Lecture (CL)
- (b) Case-Based Learning (CBL)
- (c) Problem-Based Learning (PBL)
- (d) ICT-Enabled Learning through Digital Resources/ Virtual Labs/Webinars (ICT EL)

- **Assessment Methodologies**

- (A) **Internal Assessment**

- a. **Internal Formative assessment**

- i. **MCQ and Objective question Quiz:** Students select or give the correct answer from the list of options four /none for a given questions.
- ii. **Assignment:** A practical task or setup questions given to measure a student's knowledge, skill and ability in subject or field.
- iii. **Seminar:** A student-led academic activity designed to evaluate student's ability to research, understand, and present a specific topic.
- iv. **Group Discussion:** An interactive method to assess a student's personality and inter- personal skills in team setting. It typically involves 5 to 15 participants discussing a topic for 15 to 30 minutes in presence of an observer.

- b. **Internal Summative Assessment**

- i. **Mid-term tests**
A test conducted roughly halfway through an academic term or semester.
- ii. **Laboratory performance**
Students demonstrate their laboratory hands-on performance skills, knowledge and ability to apply concepts in subjects.
- iii. **Viva-voce**
An oral examination conducted to evaluate a student's in-depth knowledge, understanding, and critical thinking regarding a subject or project.

- **Assessment and Evaluation**

Sr. No.	Assessment/Evaluation	Component	Weightage (%)
1	Continuous Internal Evaluation	FA: Seminars, Assignments, Quizzes, Group Discussion	25
		SA: Mid Term Test	25



SARDAR PATEL UNIVERSITY

Vallabh Vidyanagar

NAAC 'A' Grade (10-01-2023 To 09-01-2028)

NEP-2020 aligned Curriculum with effect from Academic Year 2026-27

Bachelor of Science Statistical Science Semester-I

(B) CLOs – PLOs Matrix

CLO	PLO										
	1	2	3	4	5	6	7	8	9	10	11
CLO1	-	-	2	-	-	1	2	-	-	-	-
CLO2	-	-	2	-	1	2	2	1	-	-	-
CLO3	-	-	3	-	1	2	2	2	-	-	-
CLO4	-	-	3	-	2	3	2	-	-	-	-
CLO5	-	-	2	-	1	2	2	-	-	-	-

CLO – PLO correlation	Value
Strong	3
Moderate	2
Low	1
No correlation	-

• Suggested Learning Materials Books:

Sr. No.	Title	Author(s)	Edition/Year	Publisher
1	The Arthashastra. Penguin Books India	Rangarajan, L. N.	1992	Penguin Books India
2	The Arthashastra Kautilya	Shamasastri, R.	2017	
3	Kautilyanomics	Balasubramanian, Sriram	2022	Bloomsbury Publishing India Pvt. Ltd.
4	Indian Models of Economy	Kanagasabapathi, P.	2012	Business and Management Prentice Hall India Learning Private Limited
5	Kautilya's Arthashastra Strategic Cultural Roots of India's Contemporary Statecraft	Kajari, Kamal	2023	Taylor & Francis Books India Pvt. Ltd

• Online Resources (Open Source)

Sr. No.	Description of Resource(s)	Weblink
---------	----------------------------	---------



SARDAR PATEL UNIVERSITY

Vallabh Vidyanagar

NAAC 'A' Grade (10-01-2023 To 09-01-2028)

NEP-2020 aligned Curriculum with effect from Academic Year 2026-27

Bachelor of Science Statistical Science Semester-I

--	--	--