COURSE DATA SHEET

SEMESTER	**I**	**BATCH**	**2026-2029**
COURSENAME	**STATISTICAL TECHNIQUES FOR BUSINESS**	**COURSE CODE**	**26UMAGE1E05**
COURSE UNITS	**5**	**COURSE TYPE**	**GENERIC ELECTIVE-I**
CONTACT HOURS (L-T-P)	**4-2-0**	**CREDITS**	**4**
OFFERED BY	**MATHEMATICS**	**SHIFT-(I/II) Shift-I-8.15am -12.50pm Shift-II-1.00pm to 5.30pm**	**II**

COURSE OBJECTIVES	
1	To impart foundational knowledge of statistical data collection, sampling methods, and theoretical probability distributions used in business decision-making.
2	To equip students with analytical skills to calculate measures of central tendency and analyze time-series data for effective forecasting and trend analysis.
3	To develop a conceptual understanding of hypothesis testing and large-sample parametric tests (Z-tests) to enable valid statistical inferences from business data.

COURSE OUTCOMES: On completion of the course the students will be able to…		
	CO Statement	**Cognitive Level**
CO1	Identify appropriate data collection methods and sampling techniques to gather relevant business data while understanding its scope and limitations.	**K1-K5 (Understand, Apply, Analyze and Evaluate)**
CO2	Calculate and interpret mathematical and positional averages (Mean, Median, Mode) to analyze central tendencies in business scenarios.	**K1-K5 (Understand, Apply, Analyze and Evaluate)**
CO3	Apply time series methods, including moving averages and least squares, to isolate variations and forecast future business trends.	**K1-K5 (Understand, Apply, Analyze and Evaluate)**
CO4	Analyze business probabilities and risk scenarios using Binomial and Poisson probability distributions.	**K1-K5 (Understand, Apply, Analyze and Evaluate)**

CO5	Formulate and execute hypothesis testing using Z-tests to draw valid statistical inferences from large sample data.	**K1-K5 (Understand, Apply, Analyze and Evaluate)**

SYLLABUS

UNIT	TOPICS	HOURS
1	**Introduction to Statistics:** Meaning, definition, scope, and significance of statistics in business and management; limitations of statistics. **Data Types and Sources:** Primary vs. Secondary data; Qualitative vs. Quantitative data. **Data Collection Methods:** Designing questionnaires and schedules; Sampling vs. Census method; Basic sampling techniques (Simple Random, Stratified, Systematic, and Cluster sampling).	**15**
2	**Measures of Central Tendency** Mathematical Averages: Arithmetic Mean, Geometric Mean, and Harmonic Mean (Concepts and computation). Positional Averages: Median and Mode, Geometric Mean, and Harmonic Mean; Weighted Mean; Application in business scenarios.	**15**
3	**Time Series Analysis** Time Series Analysis: Variations in time series; Components of time series (Secular trend, Seasonal, Cyclical, and Irregular variations); Measurement of trend using Semi-average, Moving Average, and Least Squares methods.	**15**
4	**Probability Theory & Distributions** Probability Distributions: Concept of a random variable and probability mass/density functions; Characteristics, properties, and practical business applications of: o Binomial Distribution o Poisson Distribution	**15**
5	**Foundations of Hypothesis Testing** Introduction to Inference: Population vs. Sample; Parameter vs. Statistic; Sampling distribution and the concept of Standard Error. Hypothesis Testing Framework: Formulation of Null (H0) and Alternative (H1) hypotheses; One-tailed and Two-tailed tests; Signicance levels (α); Type I and Type II errors; Parametric Tests: Large Sample Tests: Z-test for a single mean, difference between two means, single proportion, and difference between two proportions.	**15**
Note (if any)	**Theory-20% Problems-80%**	

TEXT/REFERENCE BOOKS/E - RESOURCES:

Text Books	1. Gupta, S. P, Fundamentals of Business Statistics (Latest Revised Edition) Sultan Chand & Sons (2025) 2. Sharma, J. K. Business Statistics (5th Edition) Vikas Publishing House (2020/Revised). 3. Nag, N. K. , Business Statistics, Kalyani Publishers (2024/2025 Revised Edition)
Books For Reference	1. Gupta, S. P., & Gupta, M. P., Business Statistics, Sultan Chand & Sons (Recent Revised Edition). 2. Gupta, S. C., & Gupta, I., Practical Statistics (Supplement to Fundamentals of Statistics) Himalaya Publishing House (2026 Revised Edition). 3. Jain, C., Udupa, P. N., Byahatti, P., & Ramesha, H. H., Business Statistics (1.st Edition) Himalaya Publishing (2026)
E-Learning Resources	1. https://ug.its.edu.in/sites/default/files/Business%20Statistics.pdf 2. https://www.slideshare.net/slideshow/business-statistics-dcm-214-notes/129572438 3. https://www.smtasmc.org/images/Study_Material/SBD.pdf 4.https://www.msuniv.ac.in/images/distance%20education/learning%20materials/ug%20pg%202023/ug%202021/JEBA31_III_Sem_Business_Statistics.pdf

PEDAGOGY(TEACHING METHODOLOGY):

- Chalk and Talk
- Online Coaching
- LCD
- Assignment
- Seminar
- Quiz
- Group discussion
- Reference material and videos
- Web resources

CO-PO AND CO-PSO MAPPING:									
	PO1	PO2	PO3	PO4	PO5	PO6	PSO1	PSO2	PSO3
CO1	3	2	2	2	2	2	2	2	2
CO2	3	3	2	3	2	1	3	2	2
CO3	3	2	3	3	3	1	3	3	3
CO4	3	3	2	3	2	1	3	3	3
CO5	3	3	3	3	3	2	3	3	3
Average (Use only filled in cells for calculation)	3.0	2.6	2.4	2.8	2.4	1.4	2.8	2.6	2.6

Correlation Level: 1-Low 2-Moderate 3-Strong

JUSTIFICATION OF CO-PO/PSO MAPPING			
CO	**PO/PSO**	**Level of correlation**	**Justification**
CO1	PO1	**3**	Identifying proper data collection and sampling techniques builds the foundational clarity required to confidently apply statistical domain knowledge.
	PO2	**2**	Reliable data selection techniques allow students to logically appraise situations and draw accurate, unbiased real-world conclusions.
	PO3	**1**	Developing questionnaires helps gather primary data to identify issues, which is the first step in solving societal problems.
	PO4	**2**	Understanding sampling methods is a basic research skill that facilitates academic inquiry and advanced domain studies.
	PO5	**2**	Learning dynamic methods of data collection prepares students to constantly adapt to changing information sources in specialized fields.
	PO6	**2**	Addresses the ethical and moral values of statistical inquiry by emphasizing participant consent and unbiased sampling methods.
	PSO1	**3**	Establishes a fundamental understanding of variables, data classification, and mathematical representations.
	PSO2	**2**	Provides practical knowledge of data collection methods utilized heavily in modern market surveys and industrial research.
	PSO3	**2**	Questionnaire design and sampling strategy enhance problem-solving, structured thinking, and basic analytical employability.
CO2	PO1	**3**	Calculating and interpreting mathematical and positional averages ensures high clarity of core statistical concepts.
	PO2	**3**	Synthesizing raw data into averages (Mean, Median, Mode) is a crucial life skill used to appraise everyday business scenarios logically.
	PO3	**2**	Calculating average indicators (like average household income) is key to formulating baseline parameters for social development solutions.
	PO4	**2**	Mastery of central tendencies acts as a stepping stone for subsequent statistical analyses, research, and higher education.
	PO5	**2**	Developing data summarization skills provides constant readiness to interpret operational performance reports in dynamic industries.

	PO6	**1**	Encourages objective, honest presentation of data over biased selection of specific averages (e.g., median vs. mean).
	PSO1	**3**	Directly implements the core mathematical concepts of geometric, harmonic, and arithmetic means.
	PSO2	**3**	Inculcates mathematical reasoning through positional and weighted averages to meet rigorous quantitative demands in global markets.
	PSO3	**2**	Calculating central tendencies is heavily tested in competitive exams and is a highly sought-after basic data-literacy skill in the workplace.
CO3	PO1	**3**	Applying least squares and moving averages gives clear, domain-specific forecasting knowledge to confidently handle planning roles.
	PO2	**3**	Isolating variations (secular, cyclical, seasonal) teaches logical appraisal of chronological patterns in everyday business and economics.
	PO3	**2**	Trend forecasting enables students to anticipate future resource requirements and proactively address societal challenges.
	PO4	**3**	Time series analysis is a prerequisite for econometric modeling, forecasting, and specialized academic studies.
	PO5	**2**	Prepares students to handle market volatility and adapt to business fluctuations dynamically over their careers.
	PO6	**1**	Guides students to present forecasting models ethically without manipulating projections to mislead stakeholders.
	PSO1	**2**	Employs mathematical functions and linear equations (least squares method) to model chronological data.
	PSO2	**3**	Directly applies advanced mathematical techniques to solve financial modeling problems, fulfilling global market demands.
	PSO3	**3**	Developing predictive models fosters creativity, entrepreneurial trend planning, and highly sought analytical employability.
CO4	PO1	**3**	Understanding probability distributions ensures clarity in quantifying risk and dealing confidently with uncertain environments.
	PO2	**3**	Analyzing risk via Binomial and Poisson models develops life skills to appraise probabilities and make logical calculated choices.
	PO3	**2**	Modeling probabilities (e.g., accident rates, failure rates) aids in developing safe and reliable architectural and societal solutions.

	PO4	**2**	Probability theory is critical for risk analysis, business analytics, and subsequent statistics/math programs.
	PO5	**2**	Teaches lifelong readiness in managing unpredictability and adapting to highly volatile industrial and environmental conditions.
	PO6	**1**	Promotes ethical risk communication, discouraging downplaying probabilities of failure or hazard events.
	PSO1	**3**	Directly engages with core mathematical concepts of random variables and probability mass/density functions.
	PSO2	**3**	Equips students with mathematical techniques (distributions) required to assess dynamic risk profiles in global industries.
	PSO3	**3**	Quantitative risk modeling is heavily assessed in competitive exams (like actuarial and statistical services) and boosts niche employability.
CO5	PO1	**3**	Formulating null hypotheses and executing Z-tests demands high assertiveness and clarity of domain concepts to validate claims.
	PO2	**3**	Validating hypotheses is a paramount logical reasoning skill used to systematically separate actual truths from assumptions.
	PO3	**2**	Used to run comparative studies on public policy changes, medical schemes, or educational programs to optimize solutions.
	PO4	**3**	Parametric testing forms the core of research methodology, serving as a critical requirement for pursuing PG/PhD research programs.
	PO5	**2**	Prepares the student to continuously challenge claims and maintain an evidence-based mindset throughout their careers.
	PO6	**2**	Instills professional integrity by discouraging unethical practices like p-hacking or manipulating significance levels.
	PSO1	**3**	Requires deep understanding of mathematical concepts like sampling distributions, standard errors, and probability curves.
	PSO2	**3**	Employs advanced statistical testing methods used extensively in business analysis, quality control, and international market research.
	PSO3	**3**	Nurtures highly sought research skills, critical thinking, and logical deduction necessary for research, competitive exams, and analytics.