Lecture Plan

Program: MBA

Name of the Course: Statistics for Management L-P-T-C
Credit: 03 2-0-1-3
Sem: I **Academic Year:** 2025-26
Faculty Member: Manish Dadhich, PhD **Code:** MGM4110
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Introduction /Course Description:

This course offers a comprehensive introduction to the principles and practices of statistics with a strong emphasis on their application in business and managerial contexts. Designed to build analytical and quantitative reasoning, the course covers foundational concepts such as descriptive statistics, probability, and sampling, before progressing to advanced tools like hypothesis testing, regression analysis, and decision theory. Students explore various types of data, probability distributions, and inferential techniques to analyze and interpret business data effectively. Topics such as the Central Limit Theorem, confidence intervals, and non-parametric tests are introduced to support sound decision-making under uncertainty. A significant focus is also given to real-world applications through correlation and regression modeling, time series analysis, and decision trees, equipping students to handle diverse business problems with statistical insight. By the end of the course, learners will be able to collect relevant data, apply suitable statistical methods, interpret outputs meaningfully, and make evidence-based business decisions in uncertain environments.

Course Objectives:

- To develop a strong foundation in statistical concepts and their relevance to managerial decision-making, including descriptive statistics, probability, and data classification.
- To enable students to apply appropriate probability distributions and sampling methods for analyzing business data under uncertainty.
- To equip students with skills to formulate and test statistical hypotheses, including both parametric and non-parametric techniques, for informed managerial judgments.
- To train students in the use of correlation, regression, and time series analysis for modeling

relationships and forecasting in various business scenarios.

- To introduce decision theory and its applications in real-world business problems, helping students make rational choices using tools like decision trees, utility analysis, and marginal analysis.

Course Outcomes (COs) & Bloom's Taxonomy:

Course Outcomes	Bloom's Taxonomy
CO1: Explain key statistical concepts and data types used in business decision-making.	• Remembering (K1) • Knowledge (K2)
CO2: Apply probability distributions and sampling methods to real-world business cases.	• Remembering (K2) • Knowledge (K3)
CO3: Analyze data using hypothesis testing and inferential statistical tools.	• Apply (K3) • Analyze (K4)
CO4: Evaluate relationships between variables using regression and correlation analysis.	• Apply (K3) • Analyze (K4)
CO5: Formulate and solve business problems using time series and decision theory tools.	• Analyze (K4) • Evaluate (K5)

*Level of Learning- Use the number from 1 to 5 for indicating the level. Level 1- Remember & Understand, Level 2- Apply, Level 3- Analyse, Level 4- Evaluate, Level 5- Create. Mention the highest level that will be attained in the particular Course Outcome.

Course Outcome (CO) - Program Outcome (PO)/ Program Specific Outcome (PSO) Mapping

Sem	Course	CO-PO/PSO Mapping	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PSO1	PSO2	PSO3
I	Statistics for Management (MGM4101)	CO1				1	1						
		CO2	1		2		3			2			
		CO3	1		2	1		3			3		
		CO4		4		2	5			1		4	
		CO5		3		4	4				5		

Note: 1 for “Low”, 2 for “Medium”, and 3 for “High”

Pedagogy

The pedagogy for Statistics for Management is designed to balance theoretical understanding with practical application, ensuring students not only grasp statistical concepts but also learn how to use them effectively in real business contexts. The course begins with interactive lectures that explain foundational statistical theories, probability principles, and their managerial relevance, supported by real-life business examples to make abstract concepts more accessible. To deepen learning, hands-

on practical sessions using software tools such as Excel and SPSS are conducted regularly. These sessions train students in applying statistical methods like descriptive statistics, hypothesis testing, correlation, regression, and time series analysis to actual datasets. Case study analysis is an integral part of the pedagogy, where students assess business problems, such as forecasting demand, evaluating risk, or testing market hypotheses through a statistical lens. Additionally, group discussions and collaborative problem-solving activities promote peer learning and foster critical thinking. Frequent quizzes, in-class assignments, and concept checks are used to evaluate and reinforce learning progress after each module. The course also includes data interpretation exercises, where students are required to read statistical outputs and make managerial recommendations, thereby linking analytical skills with decision-making. Towards the end of the course, students undertake mini-projects or assignments involving real-world datasets from domains such as marketing, operations, and finance. They are expected to collect, clean, analyze, and interpret the data, and prepare a report with actionable insights. This blended pedagogy equips students with the ability to extract value from data and use it effectively in strategic and operational business decisions.

Employability Skills Measuring Tools:

- Critical Thinking and Problem Solving
- Managerial Competitive skills (assignment on contemporary issues).
- Use of Analytical Software Tools:

Suggested Readings:
Textbooks:

- Levin, R. I., & Vishwanathan, P. K. (2020). *Business Statistics* (7th ed.). Pearson Education.
- Gupta, S. P., & Gupta, M. P. (2022). *Business Statistics*. Sultan Chand & Sons.
- Sharma, J. K. (2021). *Fundamentals of Business Statistics*. Vikas Publishing.
- Kapoor, V. K. (2020). *Business Statistics*. Sultan Chand & Sons.

Reference Books:

- Berenson, M. L., Levine, D. M., & Szabat, K. A. (2019). *Basic Business Statistics: Concepts and Applications* (14th ed.). Pearson Education.
- Anderson, D. R., Sweeney, D. J., & Williams, T. A. (2018). *Statistics for Business and Economics* (13th ed.). Cengage Learning.
- Aczel, A. D., & Sounderpandian, J. (2017). *Complete Business Statistics* (7th ed.). McGraw-Hill Education.
- Black, K. (2019). *Business Statistics: For Contemporary Decision Making* (10th ed.). Wiley.

Important Websites:

- StatTrek. (n.d.). StatTrek: Teach Yourself Statistics. Retrieved August 3, 2025, from https://www.stattrek.com
- NIST/SEMATECH. (2012). e-Handbook of statistical methods. National Institute of Standards and Technology. Retrieved August 3, 2025, from https://www.itl.nist.gov/div898/handbook
- Coursera. (n.d.). Online courses on statistics. Retrieved August 3, 2025, from https://www.coursera.org
- Harvard Business Publishing Education. (n.d.). Cases, simulations, and resources. Retrieved August 3, 2025, from https://hbsp.harvard.edu
- Wolfram Alpha. (n.d.). Computational intelligence. Retrieved August 3, 2025, from https://www.wolframalpha.com
- Posit (formerly RStudio). (n.d.). RStudio Cloud. Retrieved August 3, 2025, from https://posit.cloud
- NCERT. (n.d.). National Council of Educational Research and Training. Retrieved August 3, 2025, from https://ncert.nic.inSEC EDGAR: www.sec.gov/edgar.shtml

Scheme of Evaluation

Assessment		**Weightage (in %)**
Continuous Internal Assessment		**40**
Assessment Task	Frequency * Marks = Total Marks (100)	Weightage for individual Component
Mid-Term Examination – I	1*20=20	15
Quiz	3*10 = 30	10
Assignments (Class Assignment /Home Assignments)/Case Study/ Case Discussions/ Project Work.	1*10 = 10	5
Assignments (Class Assignment /Home Assignments)	1*10 = 10	5
Attendance	10	5
External Assessment		60
End Term Examination	1*100	60

Evaluation of Components and Weightage for Practical or Project Mode:

Scheme of Evaluation		
Assessment Components		*Weightage of Marks*
Assessment Task	**Frequency * Marks = Total Marks**	**Weightage of Marks for Individual Component**
Quiz	2 * 10 = 20	5
Project Report $	1 * 20 = 20	20
Project Report Presentation $	1 * 20 = 20	20
Attendance, Discussion on doubt clearing and Briefing the Project Progress work to the Faculty Member once in 15 days	10	5
Continuous Internal Assessment including Project Work		**50**

Detailed Lecture Plan:

Session No	Topics	Reading/Reference	Learning Outcome & Course Outcome (CO)
UNIT-I: Introduction to Statistics			
1	Introduction to Statistics and Business Applications	Ch. 1, Levin, R. I., & Vishwanathan, P. K. (2022). Business Statistics (7th ed.). Pearson Education.pp-05	Understand basic statistics and their business relevance. (CO1, K1)
2	Types of Data: Nominal, Ordinal, Interval, Ratio	Ch. 2: Descriptive Statistics, pp- 25, https://manishdadhich.gnomio.com	Classify data types and understand their usage. (CO1, K1, K2)
3	Frequency Distributions and Data Representation	Ch. 2: Descriptive Statistics, pp- 35, https://manishdadhich.gnomio.com	Interpret data through frequency distributions. (CO1, K2)
4	Measures of Central Tendency: Mean, Median, Mode	Ch. 3: Descriptive Statistics, pp-82, https://manishdadhich.gnomio.com	Compute and interpret measures of central tendency. (CO1, K2, K3)
5	Measures of Variation: Range, Variance, Std. Deviation	Ch. 3: Measures of Central Tendency, pp-58, https://manishdadhich.gnomio.com	Compute and analyze variability in data. (CO1, K2, K3)
6	Introduction to Probability and	Ch. 4: Basic Concepts of	Understand basic probability

	Key Terminologies	Probability, pp-134, https://manishdadhich.gnomio.com	and related concepts. (CO1, K2)
7	Probability Rules, Joint and Conditional Probability	Ch. 4: Basic Concepts of Probability, pp-144, https://manishdadhich.gnomio.com	Apply probability rules in business problems. (CO1, K2, K3,4)
8	Bayes' Theorem and Its Applications	Ch. 4: Rules & Conditional Probability, pp-152, https://manishdadhich.gnomio.com	Apply Bayes' theorem in decision-making. (CO1, K3,4)
9	Quiz 1: Descriptive statistics and Practical exercises	Further: https://manishdadhich.gnomio.com	Understand the concept of descriptive statistics. (CO1, K3)
UNIT-II: Probability Distribution			
10	Random Variables and Types of Distributions	Ch. 5: Probability Distributions, pp- 164, https://manishdadhich.gnomio.com	Differentiate types of random variables and distributions. (CO2, K2)
11	Discrete Distributions: Binomial Distribution, Practical and case analysis	Ch. 5: Discrete Distributions – Binomial, pp-174, https://manishdadhich.gnomio.com	Calculate probabilities using binomial distribution. (CO2, K3)
12	Poisson Distribution: Concept, Mean, and Variance	Ch. 5: Discrete Distributions – Poisson, pp-180, https://manishdadhich.gnomio.com	Use Poisson distribution for business modeling. (CO2, K3)
13	Normal Distribution: Properties and Applications, Practical and case analysis	Ch. 6: Continuous Distributions – Normal, pp-190, https://manishdadhich.gnomio.com	Apply normal distribution and understand properties. (CO2, K3)
14	Approximations: Binomial & Poisson to Normal	Ch. 6: Applications of Distributions, pp-199.	Use approximations for simplified calculations. (CO2, K4)
15	Sampling Concepts and Techniques	Ch. 7: Sampling Techniques, pp-218, https://manishdadhich.gnomio.com	Understand sampling techniques and applications. (CO2, K2)
16	Central Limit Theorem and Sampling Distribution	Ch. 7: Sampling Distributions, pp-225, https://manishdadhich.gnomio.com	Explain the Central Limit Theorem and its implications. (CO2, K2, K3)
17	Estimation and Confidence Intervals	Ch. 7: Point and Interval Estimation,, pp-230, https://manishdadhich.gnomio.com	Estimate population parameters with confidence. (CO2, K4)
18	Practical problems on probability	https://manishdadhich.gnomi	Understand the practical

	distribution	o.com	problems of probability distribution. (CO2, K4)
19	Quiz 2: Probability Distribution and Practical exercises	https://manishdadhich.gnomio.com	Understand the practical problems of probability distribution. (CO2, K4)
UNIT-III: Hypothesis Testing			
20	Introduction to Hypothesis Testing: Null & Alternate	Ch. 9: Hypothesis Testing Concepts, pp-288, https://manishdadhich.gnomio.com	Understand and formulate hypotheses for statistical testing. (CO3, K2)
21	Type I and Type II Errors, One and Two-tailed Tests, Practical and case analysis	Ch. 9: Errors & Significance Levels, pp-295.	Distinguish between types of errors in hypothesis testing. (CO3, K2)
22	Z-test for One Sample Mean and Two Sample Means	Ch. 10: One & Two-Sample t-tests , pp-349	Apply z-tests for mean comparison. (CO3, K4)
23	Proportion Tests: One and Two Proportions	Ch. 10: One & Two-Sample Tests, pp-355	Understand how to conduct proportion tests for one and two samples. (CO3, K3)
24	F-Test for Two Population Variances	Ch. 10: One & Two-Sample Tests, pp-355	Perform F-test for variance analysis. (CO3, K3)
25	Small Sample Tests: t-test for Mean, Practical and case analysis	Ch. 10: t-tests Recap, pp-360	Conduct t-test for small samples. (CO3, K4)
26	Analysis of Variance (ANOVA)	Ch. 10: Introduction to ANOVA, pp-361	Analyze group differences using ANOVA. (CO3, K3, K4)
27	Nonparametric Tests: Chi-square, Sign Test, Wilcoxon, class assignment. Practical	Ch. 11: Nonparametric Tests (Chi-Square, Sign, etc.), pp-400	Apply nonparametric tests in real scenarios. (CO3, K4)
UNIT-IV: Correlation, Regression & Time Series Analysis			
28	Introduction to Correlation and Types, Practical and case analysis	Ch. 12: Correlation Introduction, pp- 430, https://manishdadhich.gnomio.com	Explain correlation and its types. (CO4, K2)
29	Karl Pearson and Rank Correlation Coefficients, Practical and case analysis	Ch. 12: Karl Pearson & Rank Correlation. pp- 440,	Calculate and interpret correlation coefficients. (CO4, K3)
30	Simple Linear Regression: Least Squares Method	Ch. 12: Simple Regression (Least Squares), pp- 450,	Apply regression using the least squares method. (CO4, K3)
31	Standard Error of Estimate and Model Fit	Ch. 12: Model Fit and Std. Error, pp- 460,	Interpret standard errors and model fit. (CO4, K4)
32	Multiple Regression and Equation Estimation, Practical and case analysis	Ch. 12: Multiple Regression Models, pp- 470,	Develop and analyze multiple regression models. (CO4, K4)
33	Inference about Population	Ch. 12: Inference using	Infer population parameters

	Parameters using Models	Regression, https://manishdadhich.gnomio.com	from regression models. (CO4, K4)
34	Time Series Components and Trend Identification, case study, practical	Time Series Components, https://manishdadhich.gnomio.com	Identify components of time series. (CO4, K2)
UNIT-V: Decision Theory			
35	Introduction to Decision Theory and Environments	Ch. 15: Introduction to Decision Theory, Gupta, S. P., & Gupta, M. P. (2022). Business Statistics. Sultan Chand & Sons.	Understand decision-making environments. (CO5, K2)
36	Expected Monetary Value and Payoff Tables	Ch. 15: Expected Value & Payoff Tables, pp-554	Calculate expected profit under uncertainty. (CO5, K3)
37	Marginal Analysis in Decision Making	Ch. 15: Marginal Analysis, pp-544	Apply marginal analysis for decisions. (CO5, K3)
38	Utility Theory and Decision Criteria, Practical and case analysis	Ch. 15: Utility & Decision Making, pp-565	Use utility as a decision criterion. (CO5, K3)
39	Decision Trees: Concepts and Construction	Risk & Uncertainty, https://manishdadhich.gnomio.com	Construct decision trees for problem-solving. (CO5, K3)
40	Application of Decision Trees in Business	Risk & Uncertainty, https://manishdadhich.gnomio.com	Analyze decision problems using decision trees. (CO5, K4)
41	Risk and Uncertainty in Decision-Making, Practical and case analysis	Risk & Uncertainty, https://manishdadhich.gnomio.com	Evaluate risk and uncertainty in decisions. (CO5, K5)
42	Revision, Quiz 3, and Case Applications	Review: Recap and Case Analysis, https://manishdadhich.gnomio.com	Integrate course concepts via review and application. (CO5, K5)
43	Home assignment on decision theory.	Further: https://manishdadhich.gnomio.com	Analysis of the assignment with rubrics and discussion.
44	Recapitulation/Seminar/ presentation	https://manishdadhich.gnomio.com	-
45	Recapitulation/Seminar/ presentation	Further: https://manishdadhich.gnomio.com	-

Students' Interaction Time: Tuesday (04:30 PM – 05:30 PM)
Thursday (04:30 PM – 05:30 PM)