



GUJARAT TECHNOLOGICAL UNIVERSITY

Program Name: Master of Business Administration

Level: PG

Course / Subject Code: MB04092031

Course / Subject Name: Advanced Statistical Techniques

w. e. f. Academic Year:	2025-2026
Semester:	4
Category of the Course:	Specialization Advanced Business Research (Major 4)

Prerequisite:	Basic knowledge of statistics and quantitative methods
Rationale:	This course equips students with the ability to apply advanced statistical techniques for data-driven business decision-making. It bridges theoretical concepts and practical applications through the use of statistical software and real-world datasets. Students develop analytical thinking, model-building, and interpretation skills essential for managerial research and strategic problem-solving in dynamic business environments.

Course Outcome:

After Completion of the Course, Student will able to:

No	Course Outcomes	RBT Level
01	Understand and differentiate between various advanced statistical techniques	Understand
02	Apply appropriate statistical methods to analyze complex business data	Apply
03	Interpret output from statistical software and derive business insights	Analyze
04	Evaluate the assumptions and limitations of different statistical models	Evaluate
05	Develop statistical models using open-source software and Excel add-ins	Create

**Revised Bloom's Taxonomy (RBT)*

Teaching and Examination Scheme:

Teaching Scheme (in Hours)			Total Credits L+T+ (PR/2)	Assessment Pattern and Marks				Total Marks
L	T	PR	C	Theory		Tutorial / Practical		
				ESE (E)	PA / CA (M)	PA/CA (I)	ESE (V)	
3	1	0	4	70	30	50	0	150



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Course Content:

Unit No.	Content	No. of Hours	% of Weightage
1.	Multivariate Analysis Techniques: <ul style="list-style-type: none"> Introduction to Multivariate Statistics Factor Analysis and Principal Component Analysis (PCA) Cluster Analysis – Hierarchical and K-Means Discriminant Analysis – Applications in Segmentation and Classification 	10	25
2.	Regression & Time Series Modelling <ul style="list-style-type: none"> Multiple Regression and Assumptions Testing Logistic Regression and Model Fit Time Series Decomposition, Smoothing, ARIMA Models Forecast Accuracy Measures (MAE, MAPE, RMSE) 	12	25
3.	Hypothesis Testing and ANOVA <ul style="list-style-type: none"> Parametric and Non-Parametric Tests T-Test, Chi-Square Test, Mann-Whitney U Test ANOVA and MANOVA – Use Cases in Business Post Hoc Tests and Interpretation 	13	25
4.	Advanced data analysis Tools & Concepts <ul style="list-style-type: none"> Correspondence Analysis and Canonical Correlation Structural Equation Modeling (SEM) – Basics Bootstrapping and Resampling Methods Data Reduction and Model Building Strategies 	10	25
5.	Practical <ul style="list-style-type: none"> Practical Exercises using Excel Analysis ToolPak Project Work: Case Study Based Statistical Analysis Sample Topics: Consumer Segmentation, HR Attrition, Demand Forecasting 	15	CEC
Total		60	100

Suggested Specification Table with Marks (Theory):

Distribution of Theory Marks (in %)					
R Level	U Level	A Level	N Level	E Level	C Level
20%	30%	25%	0%	15%	10%

Where R: Remember; U: Understanding; A: Application, N: Analyze and E: Evaluate C: Create



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References/Suggested Learning Resources:

(a) Books:

No.	Title	Author	Publisher	Edition
1	Multivariate Data Analysis	Hair, Anderson, Tatham	Cengage	Latest
2	Discovering Statistics Using IBM SPSS	Andy Field	Sage Publications	Latest
3	Introduction to Time Series Analysis and Forecasting	Montgomery, Jennings	Wiley	Latest

(b) Open-source software and website:

- R: <https://cran.r-project.org/>
- Jamovi: <https://www.jamovi.org/>
- PSPP: <https://www.gnu.org/software/pspp/>
- SOFA Statistics: <https://www.sofastatistics.com/>
- Excel Data Analysis ToolPak: <https://support.microsoft.com/en-us/office/load-the-analysis-toolpak-in-excel-6a63e598-cd6d-42e3-9317-6b40ba1a66b4>

CO- PO Mapping:

Semester 4	Course Name : Advanced Statistical Techniques				
	POs				
Course Outcomes	PO1	PO2	PO3	PO4	PO5
CO1	3	2	-	1	-
CO2	3	3	-	2	1
CO3	2	3	-	2	2
CO4	2	3	1	3	1
CO5	3	3	1	2	2

Legend: '3' for high, '2' for medium, '1' for low and '-' for no correlation of each CO with PO.