PARVATHANENI BRAHMAYYA
SIDDHARTHA COLLEGE OF ARTS & SCIENCE
Autonomous
Siddhartha Nagar, Vijayawada–520010
Re-accredited at 'A+' by the NAAC

Course Code	23STMAL237				
Title of the Course	Essential Statistics for Business Management				
Offered to: (Programme/s)	BBA Honours General				
L	4	T	0	P	0	C	3
Year of Introduction:	2024-25	Semester:			3
Course Category:	MAJOR	Course Relates to:	Local, Regional, National, Global		
Year of Revision	NA	Percentage:	NA		
Type of the Course:	Theory				
Crosscutting Issues of the Course :	NA				
Pre-requisites, if any	Basic Mathematics				

Course Description:

This course provides a comprehensive overview of fundamental statistical concepts, beginning with the origin, history, and definitions of statistics, followed by an exploration of its importance, scope, and limitations. Students will engage with the core functions of statistics, including data collection (primary and secondary methods), presentation (textual and tabular), analysis, and interpretation. The classification of data into quantitative, qualitative, temporal, and spatial forms, along with constructing frequency distributions, will be covered. Visual representation techniques such as histograms, bar charts, pie charts, frequency polygons, and ogives will be practiced. The course will delve into measures of central tendency (arithmetic mean, geometric mean, harmonic mean, median, and mode) and measures of dispersion (range, quartile deviation, variance, and standard deviation), examining their properties, applications, merits, and demerits. Students will also explore moments (central and non-central), skewness (Karl Pearson's and Bowley's coefficients), and kurtosis, with a focus on practical applications. Finally, the course addresses correlation and regression, covering types, methods, and properties, with a distinction between the two concepts to aid in data analysis and prediction.

Course Aims and Objectives:

S. No	COURSE OBJECTIVES
1	Understand the concepts of data organization, classification, tabulation and presentation of data.
2	Understand the impact of outliers on each measure of central tendency.
3	Understand the properties and applications of each measure of dispersion.
4	Understand the relationship between moments and also identify the shape of the distribution using skewness and kurtosis.
5	Understand the concepts of correlation and regression

Course Outcomes

At the end of the course, the student will be able to…

NO	COURSE OUTCOME	BTL	PO	PSO
CO1	explain the origin, history, and definitions of statistics, demonstrating an understanding of its scope, limitations, and functions in various applications.	K1	1	1
CO2	classify different types of data (quantitative, qualitative, temporal, spatial) and differentiate between primary and secondary data collection methods.	K4	1	1
CO3	organize data into frequency distributions and represent it using appropriate diagrammatic and graphical techniques, such as histograms, bar charts, and frequency polygons.	K3	1	1
CO4	evaluate the effectiveness of various methods for presenting statistical data, including textual and tabular formats, based on their merits and limitations.	K5	1	1
CO5	create accurate graphical representations of data (e.g., histograms, ogives) using real-world examples, and **interpret** the results for better decision-making.	K4	1	1

For BTL: K1: Remember; K2: Understand; K3: Apply; K4: Analyze; K5: Evaluate; K6: Create

CO-PO-PSO MATRIX									
CO NO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2
CO1	2							2	
CO2	3							3	
CO3	3							3	
CO4	3							3	
CO5	3							3	

Use the codes 3, 2, 1 for High, Moderate and Low correlation Between CO-PO-PSO respectively

Course Structure:

Unit– 1: Introduction to Statistics (12 hours)

Origin, history and definitions of Statistics. Importance, Scope and limitations Statistics. Function of Statistics – Collection, Presentation, Analysis and Interpretation. Collection of data - primary and secondary methods and its methods. Classification of data – Quantitative, Qualitative, Temporal, Spatial. Presentation of data – Textual, Tabular – essential parts. Frequency distribution and types of frequency distributions, forming a frequency distribution. Diagrammatic representation of data – Histogram, Simple Bar, Multiple bar and Pie with simple problems. Graphical representation of data: Histogram, frequency polygon and Ogives with simple problems

Examples/Applications:
1. Market research: Understanding consumer behavior, preferences, and market trends. Estimating consumer preferences and demand for products
2. Financial analysis: Making investment decisions, risk assessment, and portfolio management.Estimating student performance and program effectiveness.
Exercises/Project:
1. Conduct a class survey on favorite subjects, hobbies, or sports.
2. Collect data on the number of students present each day for a week.

Unit–2: Measures of Central tendency **(12 hours)**

Objectives of averages, Characteristics of a good average. Arithmetic mean, Geometric mean, Harmonic mean, Median and Mode – merits, demerits, properties and applications.
Examples/Applications/Case Study:

1. Average sales for each product, helping identify top-performing items.
2. average profit margin to assess overall business profitability.

Case Study:

A high school principal is interested in understanding the overall performance of students in a recent math exam. They have collected data on the test scores of all 100 students who took the exam. By using measures of central tendency we can summarize and analyze the student test scores.

Exercises/Projects:

Project 1: Real − Life application

Objective: Apply measures of central tendency to find the average values of real life scenario

Choose a Scenario: For instance, understanding the average sales performance of a product or company.

Data Collection: Collect Sales data of a product for a specific period.

Analysis: Analyze the data by using measures of central tendency to identify average sales and the most common sales amount.

Unit–3: Measures of Dispersion (12 hours)

Significance of measures of dispersion, Characteristic of an ideal measure of dispersion, Absolute and relative measures of dispersion − range, quartile deviation, mean deviation, variance and standard deviation − merits, demerits, properties and applications.

Examples/Applications/Case Study:
1. Analyzing the dispersion of price changes and corresponding demand changes helps in pricing strategies.
2. Standard deviation helps in setting quality control limits and identifying process variations.

Case Study:

A financial analyst wants to assess the risk associated with investing in two different stocks, Stock A and Stock B. By using measures of dispersion, the analyst can make more informed decisions about investing in stocks and assess the level of risk associated with each option.

Exercise/Project:

Project : Real − life applications

Objective: Apply measures of dispersion to analyze the variability of a variable.

Choose a Scenario: For instance, analyze the variability of temperature or precipitation over time using measures of dispersion.

Data Collection: Collect the historical temperature or precipitation data for a specific period.

Analysis: Analyze the data by using measures of dispersion to identify trends and patterns in climate variability.

Unit–4: Moments, Skewness and Kurtosis (12 hours)

Moments − Concept, Central and Non − central moments. Interrelationship between central and non − central moments and vice versa. Skewness −Karl Pearson's coefficient of skewness, Bowley's coefficient of skewness based on moments. Kurtosis − Concept, Measures of kurtosis based on moments and simple problems.

Examples/Applications/Case Study:
1. Skewness can be used to analyze the distribution of health outcomes, such as survival times or disease severity.
2. Kurtosis can be used to assess the consistency of product

Exercises/Projects:

Project : Real − life applications

Objective: Apply Moments, skewness, and kurtosis to provide a comprehensive understanding of the shape and characteristics of a probability distribution

Choose a Scenario: For instance, compare the risk and return characteristics of different stocks or indices using moments: Skewness and kurtosis.

Data Collection: Collect the on Daily returns for multiple stocks or indices.

Analysis: Calculate skewness and kurtosis for each stock or index and compare the results.

Unit–5: Correlation and Regression (12 hours)

Correlation − Introduction, types of correlation, Methods of studying correlation − Scatter diagram, Karl Pearson's coefficient of correlation and Spearman's rank correlation − Properties and

Applications. Regression – Introduction, lines of regression, coefficient of regression - Properties and Applications. Distinguish between correlation and regression.

Examples/Applications:
1. Correlation measures the strength and direction of the relationship between two variables. It helps businesses understand how variables are connected. Example: Correlation between advertising expenditure and sales.
2. Regression analysis helps predict the value of a dependent variable based on independent variables. Example, predicting sales based on advertising expenditure, price, and competition.
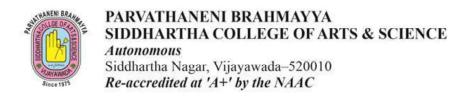
Exercises/Projects:
1. Collect data on sales, advertising expenditure, and competitor activity. Calculate correlation between these variables. Build a regression model to predict future sales.
2. Analyze the relationship between price and demand using regression analysis to determine optimal pricing strategy.

Textbook:
S. C. Gupta, Fundamentals of Statistics, 8th Edition, 2023, Himalaya Publishing House Pvt. Ltd 'Ramdoot', Dr. Bhalerao Marg, Girgaon, Mumbai – 400 004, Maharashtra, India

References Books:
1. **Business Statistics A First Course, 8e Paperback – 30 October 2022, David. Levine (Author)**
2. Business Statistics: Problems & Solutions by J.K. Sharma (Author), Vikas Publishing House Pvt Ltd. Noida, UP, India

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23STMAL237:   Essential Statistics for Business Management

Major-8   BBA Honours (General)   Semester III

Time: 3 hours   Maximum Marks: 70

Section - A

Answer the following questions   **5 X 4M = 20M**

1. a. Define statistics. Write down the limitations of statistics. (CO-1, K-1)

    (OR)

    b. Define a classification. Explain the types of classification. (CO-1, K-1)

2. a. Calculate Geometric mean to the following data.(CO-2, K-2)

x	110	115	118	119	120
f	4	11	21	6	2

    (OR)

    b. Calculate Harmonic Mean to the following data (CO-2, K-2)

Profit (in thousands of Rs.)	10	15	20	25	30
No. Of companies	5	10	25	12	8

3. a. Write down the characteristics of ideal measures of dispersion. (CO-3, K-1)

    (OR)

    b. Write the properties and applications of variance. (CO-3, K-1)

4. a. Define skewness. Explain the measures of skewness. (CO-4, K-2)

    (OR)

    b. Write a short note on kurtosis. (CO-4, K-2)

5. a. Explain the types of correlation with examples. (CO-5, K-1)

    (OR)

    b. Write down the properties of regression coefficient. (CO-5, K-1)

Section - B

Answer the following questions   **5 X 10M = 50M**

6. a. Draw a suitable diagram to the following data. (CO-1, K-2)

Category	Budget Allocation (in crores of rupees)
Agriculture	1,089
Irrigation	664
Electricity	1,252
Industry	1,967
Transport	896
Telecommunication	2,112
Miscellaneous	1,493

    (OR)

b. Draw Ogive curve to the following data and obtain median through Ogive curve.

(CO-1, K-2)

Wages (in Rs.)	50 – 60	60 – 70	70 – 80	80 – 90	90 – 100	100 – 110	110 - 120
No. Of workers	20	60	100	150	75	50	25

7. a. Calculate Mean, Median and Mode to the following data. (CO-2, K-2)

Height (in inches)	48 – 52	52 – 56	56 – 60	60 – 64	64 – 68	68 – 72
No. Of Persons	6	12	28	30	20	4

(OR)

b. The mean salary paid to 1500 employees of an organization was found to be Rs.12, 500. Later on, after disbursement of salary, it was discovered that the salary of two employees was wrongly entered as Rs.15, 760 and Rs.9, 590. Their correct salaries were Rs.17, 760 and Rs.8, 590. Calculate correct mean. (CO-2, K-2)

8. a. Calculate Standard deviation and variance to the following data. (CO-3, K-2)

Age	15 – 20	20 – 25	25 – 30	30 – 35	35 – 40	40 – 45	45 – 50	50 – 55
No. Of persons	9	16	22	26	14	12	6	5

(OR)

b. The number of employees, wages per employee and the variance of the wages of employees for two factories are given below:

Number of employees	Factory A	Factory B
Average wages per employee per month	1,200	100
Variance of the wages	81	256

(i) In which factory is there greater variation in the distribution of wages per employee?

(ii) Suppose in factory B, the wages of an employee were wrongly noted as Rs.900 instead of Rs.910. Find the corrected variance for factory B. (CO-3, K-2)

9. a. The first four moments about the value 5 are -0.55, 4.46, -0.43 and 68.52. Find mean, first four moments about mean. And also find moments about origin. (CO-4, K-2)

(OR)

b. For a distribution the mean is 10, variance is 16, $\gamma_1 = +1$ and β_2 is 4. Obtain the first four moments about the origin. Comment the nature of the distribution. (CO-4, K-2)

10. a. Sales and advertisement expenditure of a commodity is given below. Obtain correlation coefficient between them. (CO-5, L-2)

Advertisement expenses (in thousands of Rs.)	39	65	62	90	82	75	25	98	36	78	54	48
Sales (In lacks of Rs.)	47	53	58	84	65	68	60	89	51	84	66	55

(OR)

b. The sales and profits of a company are given below. Obtain regression lines. Estimate profit if the sales of the product is Rs. 72 lakhs. (CO-5, K-2)

Sales (in lakhs of Rs.)	75	70	55	65	60	69	80	65	59	61
Profit (in lakhs of Rs.)	59	65	45	52	60	62	70	55	45	49

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