



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

22ANL204: Advanced Statistics for Business Analytics

Course Code	22 ANL 204	Course Delivery Method	Class Room / Blended Mode
Credits	4	CIA Marks	30
No. of Lecture Hours / Week	5	Semester End Exam Marks	70
Total Number of Lecture Hours	75	Total Marks	100
Year of Introduction: 2023-24	Year of offering:2024	Year of Revision: NIL	Percentage of Revision: NIL
Course Focus	<i>Employability</i>	Entrepreneurship	Skill Development.

Course Outcomes

By the end of the course, students will be able to

CO1	Compute multiple partial correlation and regression models to for better business decision making. PO1 , PO2
CO2	Estimate the time series components and assessing the forecasts by various models. PO2, PO7
CO3	Apply various Non-parametric Tests and interpret the results. PO1 , PO7
CO4	Develop various Designs and conduct the experiment for analysing the data and interpterion. PO1 , PO7
CO5	Understand the concepts of 3 σ control limits and to apply various tools for Statistical Quality Control in Industry. PO1 , PO7

Contribution of Course Outcomes towards achievement of Program Outcomes & Strength of correlations (H-High, M-Medium, L-Low)

22ANL204	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1	2	3					
CO2		2					3
CO3	2						3
CO4	2						2
CO5	2						3

Course Content

Unit 1: Multiple Correlation and Regression Analysis:

Introduction to multiple and partial correlation, Yules notation, properties of multiple correlation coefficient, coefficient of multiple correlation, coefficient of partial correlation. Introduction to multiple regression, generalisation of plane of regression to n variables, expression of regression coefficient in terms of regression coefficient of lower order.

Unit II: Time Series Analysis

Introduction, Components of time series, Periodic changes, Irregular components, **Analysis of time series**, Uses of time series, **Measurement of trend**, Method of curve fitting by principle of least squares growth curves and their fitting, moving average method, Approximate to moving average method, **Measures of measures of seasonal fluctuations**, Methods of simple averages, Ratio to trend method, Ratio to moving average method, Link relative methods.

UNIT III: Non-Parametric Tests:

Introduction to Non-parametric Tests, Difference between Parametric and Non Parametric tests, Advantages and Disadvantages of Non-Parametric Tests, Non-parametric Test Methods: Kruskal Wallis Test, Sign Test, Mann Whitney U Test, Wilcoxon Signed-Rank Test, Kolmogorov–Smirnov test.

UNIT IV: Design of Experiments:

Introduction, **Terminology in experimental designs**, **Principles of an experimental design**, Replications, Randomization of local control, **Size of the plot**, **Completely randomised design (C.R.D)**, Statistical analysis of C.R.D. **Randomised block design (R.B.D)**, Statistical analysis of R.B.D for one observation for experimental unit, Efficiency of R.B.D relative to CRD, **Latin square design**, Statistical analysis of $m \times m$ L.S.D. for one observation per experiment unit.

Unit V : Statistical Quality Control

Introduction , Process and Product control charts, 3σ control limits, Tools for S.Q.C, Control charts for variables, \bar{x} and R Charts , Criteria for detecting lack of control in \bar{x} and R Charts , Interpretation of \bar{x} and R, Control charts for standard deviation or σ chart, Control charts for attributes , P chart or control chart for fraction defective, Control chart for number of (D Charts) defectives, interpretation of P chart, Control chart for number of defects per unit C charts, Limits of C chart , C Chart for variable sample size or U chart application of C chart. Natural tolerance limit and specification limits, Modified control limits..

Suggested Readings

1. S.C. Gupta.-, Fundamentals of Statistics, 7th Revised Edition (2013) Himalaya Publishing House, New Delhi.
2. Sharma, J.K.-, Fundamentals of Business Statistics, 2nd Edition (2000) Pearson Education, New Delhi.
3. Sancheti, Dc & V.K Kapoor, Business Mathematics, 3rd Edition (2014) Sultan Chand & Sons, New Delhi..
4. Sharma, J.K., Quantitative Methods- Theory & Applications, 3rd Edition (2010) Macmillan New Delhi.
5. Shmueli, Patel and Bruce, *Data Mining for Business Intelligence, Concepts, Techniques and Applications*, Wiley.



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

**MODEL QUESTION PAPER
SECOND SEMESTER
22 ANL 204 : Advanced Statics for Business Analytics**

Duration: 3 hours

Max. Marks: 70

Note:

1. This question paper contains three parts- Part-A, Part-B and Part-C.
2. Part-A contains 5 short answer questions with an internal choice. Answer any **ALL** questions. Each question carries 4 Marks.
3. Part-B contains 5 Essay questions with an internal choice from each unit. Each question carries 8 Marks.
4. Part-C contains one Case Study for 10 Marks. (Compulsory)

Part-A

5 x 4= 20 Marks

		Bloom's Level	CO	Max Marks
1	a) Define Partial correlation? Distinguish between correlation and partial correlation.	L1	CO 1	4M
	(OR)			
2	b) What is multiple regression? Mention its properties?	L1	CO 1	4M
	(OR)			
3	a) Explain clearly what is meant by trend of a time series?	L2	CO 2	4M
	(OR)			
4	b) Explain the moving average method for determining trend?	L2	CO 2	4M
	(OR)			
3	a) Distinguish between Parametric and Non-Parametric tests?	L4	CO 3	4M
	(OR)			
4	b) Analyse the procedure of Sign test?	L4	CO 3	4M
	(OR)			
4	a) Explain the purpose of design of experiments and indicate the characteristics of a good experimental design?	L2	CO 4	4M
	(OR)			
4	b) Explain the following three fundamental principles: i)Randomization ii)Replication iii)Local Control.	L2	CO 4	4M
	(OR)			