Department of Liberal Education
Era University, Lucknow
Course Outline
Effective From: 2023-24

Name of the Program	**B.A. / B.Sc. (LIBERAL EDUCATION)**			**Year/ Semester:**	**3rd / 5th**
Course Name	**Non-Parametric Methods**	**Course Code:**	**ST303**	**Type:**	**Theory**
Credits	**04**			**Total Sessions Hours:**	**60 Hours**
Evaluation Spread	**Internal Continuous Assessment:**	**50 Marks**		**End Term Exam:**	**50 Marks**
Type of Course	○ Compulsory	◉ Core		○ Creative	○ Life Skill
Course Objectives	1. Understand and apply non-parametric testing for dichotomous data, one-sample and two-sample location problems, and dispersion problems. 2. Conduct non-parametric tests for randomness and evaluate goodness of fit using techniques like the Sign test and Wilcoxon Signed rank tests. 3. Analyze and address the general two-sample problem through non-parametric tests such as the Run Test, Median Test, Kolmogorov-Smirnov Test, and Mann Whitney U test. **4.** Apply non-parametric tests in the context of one-way layout testing using the Kruskal-Wallis Test and analyze data in two-way layouts using techniques associated with Friedman Rank Sums.				
Course Outcomes (CO): ***After the successful course completion, learners will develop following attributes:***					
Course Outcome (CO)	**Attributes**				
CO1	Develop proficiency in non-parametric testing methods for analyzing dichotomous data, one-sample and two-sample location problems, and dispersion problems.				
CO2	Acquire the ability to apply non-parametric tests for randomness and goodness of fit. Gain proficiency in conducting one-sample tests using the Sign test and Wilcoxon Signed rank tests.				
CO3	Develop the skills to address the general two-sample problem using non-parametric tests, including the Run Test, Median Test, Kolmogorov-Smirnov Test, and Mann Whitney U test.				
CO4	Acquire proficiency in performing non-parametric tests in the context of the one-way layout testing, specifically using the Kruskal-Wallis Test. Develop the ability to analyze data in the two-way layout through techniques associated with Friedman Rank Sums.				
Pedagogy	Interactive, discussion-bases, student-centered, presentation.				
Internal Evaluation Mode	Mid-term Examination: 20 Marks Activity: 10 Marks Class test: 05 Marks Online Test/Objective Test: 05 Marks Assignments/Presentation: 05 Marks Attendance: 05 Marks				

Session Details	Topic	Hours	Mapped CO
Unit 1	Introduction to Non-parametric testing: dichotomous data problems, one and two sample location problems, dispersion problems.	15	CO1
Activity (Unit-1)	Assignment based activity		
Unit 2	Non-parametric tests, Tests for randomness and test for goodness of fit. One sample tests: Sign test, Wilcoxon Signed rank tests.	15	CO2
Activity (Unit-2)	Assignment based activity		
Unit 3	The General Two-Sample Problem, Run Test, Median Test, Kolmogorov-Smirnov Test, Mann Whitney U test.	15	CO3
Activity (Unit-3)	Assignment based activity.		
Unit 4	The One-Way Layout testing - Kruskal-Wallis Test, The Two-Way Layout testing- Analyses associated with Friedman Rank Sums	15	CO4
Activity (Unit-4)	Assignment based activity.		

CO-PO and PSO Mapping

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1			3	2		1			2	3	1	2		
CO2			2	3		1			1	3	2	3		
CO3			2	3		1			2	2	3	2		
CO4			3	3		1			1	3	3	3		

Strong contribution-3, ***Average contribution-2 ,*** ***Low contribution-1,***

Suggested Readings:

Text- Books

Goon, A.M., Gupta, M.K., and Dasgupta, B. (2013). "Fundamentals of Statistics, Vol I." World Press, Kolkata.

Reference Books

1. Hollander, M., Wolfe, D.A., and Chicken, E. (2013). "Nonparametric Statistical Methods." John Wiley & Sons.
2. Conover, W.J. (1999). "Practical Nonparametric Statistics." John Wiley & Sons.
3. Gibbons, J.D., and Chakraborti, S. (2010). "Nonparametric Statistical Inference." CRC Press.

Para Text

Unit 1:

1. [https://www.youtube.com/watch?v=dqeq8KgYpLo](Introduction to Non-parametric Testing)

Unit 2:

1. [https://www.youtube.com/watch?v=zbSedP9Cj3U](Non-parametric Tests - Sign Test and Wilcoxon Signed Rank Test)
2. [https://www.youtube.com/watch?v=OpPmuOzJbaE](Tests for Randomness and Goodness of Fit)

Unit 3:

1. [https://www.youtube.com/watch?v=MHbRrxWYw-o](The General Two-Sample Problem and Mann-Whitney U Test)
2. [https://www.youtube.com/watch?v=ysy1W7IqOlE](Kolmogorov-Smirnov Test and Median Test)

Unit 4:

1. [https://www.youtube.com/watch?v=ep4ozRAPyrQ](One-Way Layout Testing - Kruskal-Wallis Test)
2. [https://www.youtube.com/watch?v=UPNJyrc5f9Y](Two-Way Layout Testing - Friedman Rank Sum Test)

Recapitulation & Examination Pattern		
Internal Continuous Assessment:		
Component	**Marks**	**Pattern**
Mid Semester	20	**Section A:** Contains **10** MCQs/Fill in the blanks/One Word Answer/ True-False type of questions. Each question carries **0.5 mark.** **Section B:** Contains **07** descriptive questions out of which **05** questions are to be attempted. Each question carries **03 marks**.
Activity	10	Will be decided by subject teacher
Class Test	05	Contains **05 descriptive questions.** Each question carries **01** mark.
Online Test/ Objective Test	05	Contains **10 multiple choice questions.** Each question carries **0.5** mark.
Assignment/ Presentation	05	Assignment to be made on topics and instruction given by subject teacher
Attendance	05	As per policy
Total Marks	**50**	

Course created by: **Dr. Abdul Quddoos**
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Signature:

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