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 / 6th**
Course Name	**Statistical Computing and Introduction to Statistical Software**	**Course Code:**	**ST305**	**Type:**	**Theory**
Credits	**03**			**Total Sessions Hours:**	**45 Hours**
Evaluation Spread	**Internal Continuous Assessment:**	**50 Marks**		**End Term Exam:**	**50 Marks**
Type of Course	○ Compulsory	◉ Core		○ Creative	○ Life Skill
Course Objectives	1. This computational course attempts to aware students with the advanced computation statistical tools like SPSS and R. 2. It will teach students to review the fundamental knowledge and understanding of the principles and nature of statistics, identify the most appropriate technique and analyze the data related to any discipline/field by quantifying it. 3. This paper will cover codes to create descriptive statistics table, visualize graphs and charts, to run correlation and regression analysis, apply parametric and non-parametric tests using cleaned data in R and SPSS.				

Course Outcomes (CO): *After the successful course completion, learners will develop following attributes:*

Course Outcome (CO)	**Attributes**
CO1	To be able to import and manipulate data in R environment, to efficiently summarize and visualize the data using specific packages in R library. To run different types of parametric tests as appropriate to a given practical situation.
CO2	Student will be able to apply non-parametric tests, fit linear regression models to cross sectional data using particular commands and function from recommended packages present in R library.
CO3	To gain familiarity in the SPSS environment and manage to create and transform data. to be able to produce tables for summary statistics and visualize it through appropriate graph in SPSS.. To perform parametric testing to data related with real life examples.
CO4	Student will have the ability to identify the appropriate test needed in to analyze data of any particular field and manage to fit models if necessary using the inbuilt commands and formulas in SPSS.
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 R Programming and R Studio, Importing Data from Excel, SPSS, creating new variables, recoding variable, Descriptive Statistics, Graphs using R, Inferential Statistics- Parametric test: Normality test, t-test for single mean, t-test for difference between means, paired t-test.	10	CO1
Unit 2	Using R: Wilcoxon signed rank test, Mann Whitney U test, Kruskal Wallis test, Analysis of Variance (One way & Two way Anova), Karl Pearson correlation coefficient, Linear Regression: Simple and Multiple regression.	13	CO2
Unit 3	SPSS Environment, Importing and Exporting data, Data Preparation, Data Transformation. Descriptive Statistics, Explore Graphs using SPSS. Inferential Statistics- Parametric test: Test for Normality, t-test for single mean, t-test for difference between means, paired t-test.	10	CO3
Unit 4	Using SPSS: Non-parametric tests, Analysis of Variance (One-way & Two way Anova), Karl Pearson correlation coefficient, Linear Regression : Simple and Multiple regression	12	CO4

CO-PO and PSO Mapping

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

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

Suggested Readings:

Text- Books

1. Chambers, J. (2008). Software for Data Analysis: Programming with R, Springer.
2. Margan G A: SPSS for Introductory Statistics; Uses and Interpretation.
3. Crawley, M.J. (2017). The R Book, John Wiley & Sons.

Reference Books

1. Crawley, M.J. (2017). The R Book, John Wiley & Sons.
2. Eckhouse, R.H. and Morris, L.R. (1975). Minicomputer Systems Organization, Programming and Applications, Prentice-Hall.

Para Text

Unit 1:
1. https://www.youtube.com/watch?v=fVR1LGdHQrc
2. https://www.youtube.com/watch?v=yBvOS91jIXI

Unit 2:
1. https://www.youtube.com/watch?v=I4NRCN9DPTI
2. https://www.youtube.com/watch?v=KlsYCECWEWE

Unit 3:
1. https://www.youtube.com/watch?v=YKFxm2BzcgA
2. https://www.youtube.com/watch?v=gkioleFZBMs

Unit4:
1. https://www.youtube.com/watch?v=U18BD4jqz5g
2. https://www.youtube.com/watch?v=6rgwgwv8qdA&t=40s

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. Nazia Naqvi**
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Signature:

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Shashi Bhushan

Signature: