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	**Applied Statistics**	**Course Code:**	**ST302**	**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. Develop an understanding of time series analysis, including its components and models, and acquire the ability to determine trends and analyze seasonal components. 2. Gain proficiency in calculating and interpreting index numbers, understanding their applications, and addressing challenges in their computation. 3. Acquire knowledge and skills in measuring fertility rates using various indicators and understanding complete life tables. 4. Introduce the concept of Statistical Quality Control (SQC) and its tools, focusing on process control and the construction of control charts for variables. 5. Develop problem-solving skills and critical thinking in the application of these concepts and methods to real-world scenarios.				

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

Course Outcome (CO)	**Attributes**
CO1	Analyze time series data, determine trends, and understand seasonal components using various methods.
CO2	Apply index numbers to measure changes, compute price and quantity relatives, and perform time and factor reversal tests.
CO3	Measure fertility rates, interpret demographic data, and analyze complete life tables.
CO4	Understand Statistical Quality Control (SQC), use tools for process control, and construct control charts for variables.
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 Time Series, its different components, additive and multiplicative models. Determination of trend, Analysis of Seasonal Component by Simple average method, Ratio to moving Average Ratio to Trend, Link relative method.	15	CO1
Activity	Assignment based activity		

(Unit-1)			
Unit 2	Index number – its definition, application of index number, price relative and quantity relatives, problem involved in computation of index number, use of averages, Laspeyre's, Paasche's and Fisher's index number, time and factor reversal tests of index numbers.	15	CO2
Activity (Unit-2)	Assignment based activity		
Unit 3	Measurement of Fertility– Crude birthrate, general fertility rate, age-specific birth rate, total fertility rate, gross reproduction rate, net reproduction rate, standardized death rates, Complete life table.	15	CO3
Activity (Unit-3)	Assignment based activity		
Unit 4	Introduction to Statistical Quality Control, Process control, tools of statistical quality control, control limits, Control charts for variables, 'X' and 'R' charts.	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			2	3		1			1	1	1	2		
CO2			3	2		1			1	3	2	2		
CO3			3	3		2			1	2	3	3		
CO4			2	3		2			2	2	3	2		

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. Chatfield, C. (2019). "The Analysis of Time Series: An Introduction." CRC Press. 2. Kenney, J.F., and Keeping, E.S. (2011). "Index Numbers: A Stochastic Approach." Springer. 3. Siegel, S., and Swanson, D.A. (2004). "The Methods and Materials of Demography." Elsevier Academic Press. 4. Montgomery, D.C., and Runger, G.C. (2018). "Applied Statistics and Probability for Engineers." John Wiley & Sons.
Para Text	**Unit 1:** https://www.youtube.com/watch?v=ZaWhUT2S2qU https://www.youtube.com/watch?v=JntA6nzK1Og https://www.youtube.com/watch?v=Hj5Z0SmePYA **Unit 2:** https://www.youtube.com/watch?v=1lmFk3DpKaU https://www.youtube.com/watch?v=4ws-6Tsa-7s https://www.youtube.com/watch?v=QzRSdB7Sd7M **Unit 3:** https://www.youtube.com/watch?v=9mTqLPTLol0 https://www.youtube.com/watch?v=9a7TyfhXZs8 https://www.youtube.com/watch?v=nblbcLjWuxw **Unit 4:** https://www.youtube.com/watch?v=3b6OMhwf_jE https://www.youtube.com/watch?v=4KvYK07uBis https://www.youtube.com/watch?v=xu5h7KfOJcM

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**	

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