

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

Name of the	B.A. / B.Sc. (LIBERA	AL EDUCA	TION)	Year/ Semester:	3 rd / 5 th			
Program	Or anotion a Course ST201		Tuno	Theory				
Name	Research	Search Code:		Type:	тнеогу			
Credits	(03		Total Sessions Hours	45 Hours			
Evaluation	Internal	40 Marks		End Term Exam.	35 Marks			
Spread	Continuous	40 Iviarks			JJ IVIALKS			
~Pi ona	Assessment:							
Type of	-	<u>.</u>						
Course	C Compulsory	Core		O Creative	O Life Skill			
Objectives	 Understand the historical background and principles of Operations Research (OR) and its applications in real-world problem-solving. Apply various mathematical techniques such as linear programming, transportation, assignment, replacement, job sequencing, and game theory to model and solve optimization problems. 							
	 Develop proficiency in formulating linear programming problems and applying graphical, simplex, Big-M, and two-phase methods to find optimal solutions. Solve transportation problems using methods like the North-west corner rule, Least Cost method, and Vogel's approximation method, and solve assignment problems using the Hungarian Method. Analyze and solve replacement problems, job sequencing problems, and rectangular games, including the minimax-maximin principle, dominance property, and mixed strategy solutions. 							
Course Outc attributes:	Course Outcomes (CO): After the successful course completion, learners will develop following attributes:							
Course Outcome (CO)	Attributes							
COI	Gain a comprehensive understanding of Operations Research (OR) and its historical background. Acquire the ability to formulate and solve general linear programming problems using different methods. Understand and handle degeneracy and duality in linear programming problems.							
CO2	Develop proficiency in solving transportation problems using. Acquire the skills to determine the optimum solution using the Modified Distribution method. Apply the Hungarian Method to solve assignment problems and gain familiarity with the Travelling Salesman Problem.							
CO3	Gain the ability to analyze and solve replacement problems involving individual and group replacements. Develop proficiency in solving job sequencing problems with various configurations, including n jobs - 2 machines, n jobs - k machines, and 2 jobs - n machines.							
CO4	Understand the fundamentals of game theory and its applications in competitive situations. Analyze and solve rectangular games and Two-Person Zero-Sum games using techniques such as the minimax-maximin principle and graphical method. Acquire the skills to utilize the dominance property to reduce game matrices and solve rectangular games with mixed strategies.							
Pedagogy	Interactive, discussion-bases, student-centered, presentation.							

Evalua Mode	al ation	Mid-term Examination: 20 Marks Class test: 05 Marks Online Test/Objective Test: 05 Marks Assignments/Presentation: 05 Marks Attendance: 05 Marks												
Session Details	n s	Торіс							Hours	Ma C	pped CO			
Uni	it 1	History & background of OR, General linear programming problems and their formulations. Solving LPP by Graphical Method.12CO1Solving LPP by, Simplex method, Big–M method, Two-phase Method, Duality in LPP.12CO1								01				
Uni	it 2	Transportation problem: North-west corner rule, Least cost method, Vogel's approximation method. Optimum solution: Modified Distribution method.10CO2Assignment Problem: Hungarian Method, Travelling Salesman Problem.10CO2								O2				
Uni	it 3	Replacement problem: Individual and Group replacement. Job sequencing: n jobs – 2 machines, n jobs – k machines, 2 jobs – n12CO3machines.							O3					
Uni	it 4	Game theory: Introduction, Games. Two-Person Zero-Sum game, minimax-maximin principle, Solution to TPZS game using graphical method.11CO4Dominance property to reduce the game matrix and solution to TPZS game with mixed strategy, LPP method.11CO4								O4				
CO-PO	O and F	PSO Ma	apping					1	I			1		
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Recanitulation & 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 .				
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	40					

Course created by:

Dr. Abdul Quddoos Dr. Nazia Naqvi Approved by: Prof. Shashi Bhushan

Signature:

Shashi Bhushan Signature: