

Lecture Plan		
Name of the College: Government College of Arts, Science and Commerce, Sanquelim-Goa		
Name of Faculty: Rohit R. Redkar	Subject: Mathematics	
Paper code: MAT-327 Linear Programming Problems (Theory)	Program: B.Sc.	Division: -
Academic year: 2026-27	Semester: - V	Total Lectures: 45
Course Objectives:		
1. To make students familiarize with the mathematical formulation of real-world problems. 2. To acquaint students with the problem-solving techniques theoretically and graphically.		
Expected Course Outcome:		
1) Formulate real world problems as mathematical problems. 2) Solve the linear programming problems. 3) Apply the concept of duality to solve LPPs. 4) Formulate and solve transportation and assignment problems.		
Student Learning Outcome: Student will be able to		
1) Formulate and solve linear programming problems graphically and using the Simplex, Big-M and Two-Phase methods. 2) Apply duality theory and the dual simplex method, and solve transportation and assignment problems using standard algorithms.		

Month	Lecture From	Lecture To	No. of lectures allotted	Topic, Subtopic to be covered	Exercise/ Assignment	ICT Tools	Reference books
June	22/06/2026	27/06/2026	3	Convex sets - definition, extreme points, convex combination. Convex polyhedron; properties of convex sets. Linear Programming Problem - introduction and formulation of LPP.		Hando uts in LaTeX	Kanti Swarup, P. K. Gupta and Man Mohan: Operations Research
	29/06/2026	04/07/2026	3	General LPP; canonical and standard forms of LPP. Basic solution and degenerate solution of a system of equations. Basic feasible solution; optimum basic feasible solution.		Hando uts in LaTeX	Kanti Swarup, P. K. Gupta and Man Mohan: Operations Research
	06/07/2026	11/07/2026	3	Improved basic feasible solution. Graphical solution to LPP - concepts. Graphical solution to LPP - worked examples.		Hando uts in LaTeX	Kanti Swarup, P. K. Gupta and Man Mohan: Operations Research
July	13/07/2026	18/07/2026	3	Simplex method: reduction of a feasible solution to a basic feasible solution (statement and problems). Extreme point correspondence theorem (statement and examples). Fundamental theorem of linear programming (statement and examples).		Hando uts in LaTeX	Kanti Swarup, P. K. Gupta and Man Mohan: Operations Research
	20/07/2026	25/07/2026	3	Replacement of a basis vector. Net evaluation; conditions of optimality. Improved basic feasible solution; unbounded solution.		Hando uts in LaTeX	Kanti Swarup, P. K. Gupta and Man Mohan: Operations Research
Jul/Aug	27/07/2026	01/08/2026	3	Computational procedure of the Simplex method. Practice problems on the Simplex method.	ISA I Assignment	Hando uts in LaTeX	Kanti Swarup, P. K. Gupta and Man

							Mohan: Operations Research
August	03/08/2026	08/08/2026	3	Big-M method. Practice problems on Big-M method. Two-Phase method.		Handouts in LaTeX	Kanti Swarup, P. K. Gupta and Man Mohan: Operations Research
	10/08/2026	15/08/2026	3	Practice problems on Two-Phase method (Unit II review). Duality in Linear Programming - general primal-dual pair. Formulating a dual problem; primal-dual pair in matrix form.		Handouts in LaTeX	Kanti Swarup, P. K. Gupta and Man Mohan: Operations Research
	17/08/2026	22/08/2026	3	Weak duality theorem. Basic duality theorem. Fundamental theorem of duality.		Handouts in LaTeX	Kanti Swarup, P. K. Gupta and Man Mohan: Operations Research
	24/08/2026	29/08/2026	3	Existence theorem in duality. Practice problems on duality theorems. Duality and the Simplex method.		Smart Board	Handouts in LaTeX
Aug/Sep	31/08/2026	05/09/2026	3	Dual Simplex method - concept. Dual Simplex method - worked examples. Practice problems on dual Simplex method.	ISA II Test	Smart Board	Handouts in LaTeX
September	07/09/2026	12/09/2026	3	Unit III review and problem solving. Transportation Problem - LP formulation. Existence of feasible solution (theorem with proof).		Handouts in LaTeX	Kanti Swarup, P. K. Gupta and Man Mohan: Operations Research
	14/09/2026	19/09/2026	0	Ganesh Chaturthi Break (14–19 Sep)		Handouts in LaTeX	

	21/09/2026	26/09/2026	3	Basic feasible solution (theorem with proof); duality in transportation problem. The transportation table; loops in transportation table. Finding IBFS - North-West corner method.		Hando uts in LaTeX	Kanti Swarup, P. K. Gupta and Man Mohan: Operations Research
Sep/Oct	28/09/2026	03/10/2026	3	Finding IBFS - Least Cost method and Vogel's Approximation method. Optimal solution using MODI method (non-degenerate case). Optimal solution using MODI method (degenerate case).	ISA III	Hando uts in LaTeX	Kanti Swarup, P. K. Gupta and Man Mohan: Operations Research
October	05/10/2026	10/10/2026	3	Assignment problem - mathematical formulation; reduction theorem (with proof). Hungarian assignment method. Unit IV review and problem solving.		Hando uts in LaTeX	Kanti Swarup, P. K. Gupta and Man Mohan: Operations Research
	12/10/2026	14/10/2026	1	Term-end revision			

*** Assessment Rubrics**

Component	Max Marks
ISA 1	7.5
ISA 2	7.5
Practical	Nil
Project	Nil
Semester End Exam	60