4PE01:OPERATION RESEARCH
CREDITS -4 (LTP: 3, 0, 1)

Course Objective:

The core focus of operations research is optimization, i.e.to do things with optimality under the given circumstances or provide a quantitative technique or a scientific approach for making better decisions for operations under their control. Themajor objective of this subject are:

- To build concepts and make learn tools of Operations Research
- To learn mathematical models used in Operations Research
- To apply scientifictechniques constructively to make effective decisions

Teaching and Assessment Scheme:

Teaching Scheme (Hours per Week)			Credits	Assessment Scheme				Total Marks
				Theory Marks		Practical Marks		
L	T	P	C	ESE	CE	ESE	CE	
3	0	2	4	60	40	20	30	150

Course Contents:

Unit No.	Topics	Teaching Hours
1	**An Introduction:** Historyand definition of operations research (OR), characteristic features of OR, applications and methodology of OR, models and modelling in OR.	03
2	**Linear Programming Problem:** Introduction and characteristics of Linear Programming (LP) problem, formulation of LP Problems, assumptions of LP Models, graphicalsolution for LP problem, special cases in LP, Analytical Methods: Simplex Method, Big-M Method, Two Phase Method, Dual Simplex Method, Duality in linearProgramming, Sensitivity Analysis - Change in (i) objective function coefficient (ii) availability of resources (iii) input-output coefficient andaddition of new variable.	12
3	**Transportation Problem:** Introduction and problem statement of transportation problem, various methods oftransportation problem: north west corner method, least cost method, Vogel's approximation method, modified distribution method, special cases in transportation problem,transhipmentproblems.	08

Unit No.	Topics	Teaching Hours
4	**Assignment Problem:** Various methods for solution of Assignment Problem,complete enumeration method, transportation method, Simplex method and Hungarian Method, variations in AssignmentProblem, Travelling Salesman Problem.	06
5	**Theory of Games:** Game models, two person zero sum games, saddle point, pure and mixed strategies, principle of dominance, solution methods- algebraic method, arithmetic method, graphical method, matrix method, LP method, limitations of Game Theory.	06
6	**Decision and Replacement Theory:** Introduction, decision under certainty, decision under risk, decision under uncertainty: Laplace criterion, Maxi-Min criterion, Mini-Max criterion, savage Mini-Max regret criterion, Hurwicz criterion, Decision tree. Introduction, Replacement policy for equipment which deteriorates gradually, replacement of items that fails suddenly, staff replacement	06
	Total	**42**

List of References:

1. N D Vohra, "*Quantitative Techniques in Management*", Tata McGraw-Hill Education Pvt. Ltd., New Delhi.
2. J KSharma, "*Quantitative Techniques for Managerial Decisions*", MACMILLAN PUBLISHERS, INDIA LTD.
3. Taha, "*Operations Research*", Tata McGraw-Hill Education Pvt. Ltd., New Delhi.
4. RPaneerselvam "*Operations Research*", Prentice Hall of India Pvt. Ltd.
5. P K Gupta & D S Hira "*Operations Research*", S Chand.

Course Outcomes (COs):

At the end of this course students will be able to …

1. Describe the various techniques of operation research.
2. Formulate the optimization problem with initial feasible solution.
3. Analyze & revise feasible solution to achieve optimal solution.
4. Apply scientific techniques to take managerial decisions.