					AE-309: Operation Research					
L	**T**	**P**	Credit	Area		**CWS**	**PRS**	**MTE**	**ETE**	**PRE**
3	0/1	2/0	4	DEC		15/25	25/-	20/25	40/50	-

Objectives: This course aims to introduce students to use mathematical approach for effective decision making, model formulation and applications that are used in solving business decision problems. After study, the students will be able to solve the real life problems and obtaining the right solution requires understanding and modelling the problem carefully and applying appropriate optimization tool and skills to solve the mathematical models.

	AE-309: Operation Research	Contact Hours
Unit-1	**Introduction:** Nature, Scope and Historical developments, Linear programming- Model formulation, Graphical and simplex methods, Duality, Degeneracy, sensitivity analysis.	8
Unit-2	**Transportation:** North-West corner rule, least cost method, VAM, Methods to check the optimality, Assignment- Hungarian method and Sequencing models: Johnson Rule for n- job two-machine, n- job m- machine.	6
Unit-3	**Queuing theory :**Assumptions and applications of waiting line theory, M/M/1: /FCFS, M/M/K: /FCFS, M/M/K.	6
Unit-4	**Game theory and its applications:** Pure and mixed strategy, dominance principle, Algebraic, arithmetic, and graphical methods to solve GT problems.	8
Unit-5	**Replacement models:** Replacement policy for the items that deteriorate over time, replacement policy for the items that deteriorate over time when time value of money is declining, replacement policy for the items that fails suddenly.	8
Unit-6	**Network Planning:** PERT, CPM, Project crashing, Shortes tpath problem, Maximum flow problem, Minimum spanning tree problem, minimum cost flow problem, Resource levelling.	6
	Total	42

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Reference Books:	
1	Operations Research: Theory and Applications by J K Sharma, Macmillan, ISBN: 9780230638853
2	Operations Research: An introduction by H A Taha, Pearson Education, ISBN: 978- 0132555937
3	Operations Research: Concepts and cases by F S Hiller and G J Liebermaan, TMH, ISBN:0073523453
4	Quantitative Technique in Management by N D Vohra, TMH, ISBN: 9780070611931

Course Outcomes

CO1	To study about history of operation research and learn about linear programming.
CO2	To study about Transportation and different methods of its optimization.
CO3	To study about Queuing theory and its different methods.
CO4	To understand about Game theory and its applications.
CO5	To study about Replacement and its models.
CO6	To study about Network Planning(PERT, CPM, Project crashing etc)

CO-PO/PSOMatrix

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	3	3	2	2	0	0	0	0	0	0	2	2	1	1
CO2	3	3	2	3	1	0	0	0	0	0	0	1	2	1	1
CO3	3	3	3	3	1	0	0	0	0	0	0	2	3	3	2
CO4	3	3	3	3	1	0	0	0	0	0	0	1	3	3	2
CO5	2	2	2	2	2	0	0	0	0	0	0	1	2	2	2