ME423 Operations Research										
L	**T**	**P**	Credit	Area		**CWS**	**PRS**	**MTE**	**ETE**	**PRE**
3	0/1	2/0	4	DEC/GEC		15/25	25	20/25	40/50	-

Objective: To allow students to develop the technical, analytic, and managerial skills necessary to perform the tasks successfully

Syllabus		**Contact Hours**
Unit-1	**Introduction:** Nature, Scope and Historical developments, Linear programming- Model formulation, Graphical and simplex methods, Duality, Degeneracy, sensitivity analysis.	**6**
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 mmachine.	6
Unit-3	**Queuing theory:** Assumptions and applications of waiting line theory, M/M/1: /FCFS, M/M/K: /FCFS, M/M/K	8
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.	**7**
Unit-6	**Network Planning:** PERT, CPM, Project crashing, Shortest path problem, Maximum flow problem, Minimum **spanning tree problem, minimum cost flow problem, Resource levelling.**	**7**
	Total	**42**

Reference Book:	
1	Operations Research: Theory and Applications by J K Sharma, Macmillan, ISBN- 9789350593363, 2013.
2	Operations Research: An introduction by H A Taha, Pearson Education
3	Operations Research: Concepts and cases by F S Hiller and G J Liebermaan, TMH
4	Quantitative Technique in Management by N D Vohra, TMH

Course Outcomes

CO1	To identify and develop operational research models from the verbal description of the real system.
CO2	To understand the mathematical tools that are needed to solve optimization problems.
CO3	To use mathematical software to solve the proposed models
CO4	To understand the characteristics of different types of decision-making environments and the appropriate decision-making approaches and tools
CO5	To design new simple models to improve decision –making and develop critical thinking and objective analysis of decision problems
CO6	To develop a report that describes the model and the solving technique, analyse the results and propose recommendations in language understandable to the decision-making processes.

CO-PO/PSO Matrix

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	1	2	3	2	2	3	3	3	3	3	3	3	2	2	3
CO2	3	3	1	1	3	1	3	1	3	3	1	3	3	2	2
CO3	3	2	2	2	1	2	1	2	1	2	1	2	2	1	3
CO4	2	1	1	1	1	1	1	1	3	2	2	2	2	3	1
CO5	2	1	1	3	3	3	3	2	2	1	1	1	3	1	3
CO6	3	1	2	2	2	2	2	3	3	3	3	3	3	3	2