Course Type	Course Code	Name of Course	L	T	P	Credit
DE	NMND501	Managerial Decision Making	3	0	0	3

Course Objective

With the growth of engineering skills over time, the emphasis has shifted from "production and product at any cost" to conservation of resources through their optimal utilisation resulting in minimum cost. Engineers and managers responsible for strategic as well as routine decision making must be armed with tools and techniques of quantitative decision making.

Learning Outcomes

The following are the learning outcomes:

- Development of critical thinking skills and problem-solving abilities through the analysis and solution of complex linear programming problems
- Effectively communicate the results of linear programming analyses, including presenting findings, interpreting implications, and recommending courses of action to stakeholders.

Unit No.	Topics to be Covered	Lecture Hours	Learning Outcome
1	**Introduction to systems engineering:** Concept of system, sub-system and system environment; Classification of systems; Systems analysis	2	Student will learn how all mining systems are interconnected and their operations
2	**Linear Programming:** Linear Programming models; Assumption of linear programming, Graphical and Simple method ofsolving Linear Programming Problems; Basic and Basic feasible solution, optimal solution, interpretationof SIMPLEX table. Primal and Dual Problem. Application of Linear Programming for solution of miningrelated problems of production planning, scheduling and blending.	10	Student will gain proficiency in applying various solution techniques to solve linear programming problems
3	**Multi-objective Programming (Goal Programming):** Mathematical models, Concepts of structural and goal constraints, Ranking of goals and solution methods.	2	Student will gain capability to optimize resource allocation for multiple objectives simultaneously
4	**Transportation and Assignment Problem:** Transportation models, Variations on Classical Transportation models, Solution. Algorithm forTransportation problem. Assignment model, Variations on Classical Assignment model; solutionalgorithm for Assignment problems.	8	Student will learn ability to apply linear programming techniques to solve real-world problems in logistics
5	**Network Models:** Shortest route algorithm, Minimal spanning tree problem. Algorithms such as Djakstra, Kruskal & Prims, Ford Fulkerson etc	4	Students will learn thorough understanding algorithms and graphical representation of LP
6	**Project Management with PERT & CPM:** Assumption of PERT and CPM; Methods of drawing network; Redundancy and identification ofredundant jobs; Critical path calculation,	4	Students will learn in project management contexts to schedule, analyze, and control project activities and resources

	Criticality index; Statistics related to PERT		
7	**Inventory Model:** Nature of inventory problems, Technical and economic parameters, Classical EOQ model, Inventory model with quantity discount, Deterministic and probabilistic inventory models with constraints	8	Student will learn ability to select and apply the most appropriate inventory model based on the characteristics of the inventory system
8	**Simulation:** Nature & process of Simulation, Fundamental of Monte Carlo Simulation, Simulation of queueing and inventory systems.	4	Students will learn modelling and analysing complex simulations
Total		**42**	

Text Books:

1. Operations Research. An Introduction. Tenth Edition. Global Edition. Hamdy A. Taha. University of Arkansas, Fayetteville. Harlow, England

Reference Books:

2. Title, Linear Programming and Network Flows; Authors, Mokhtar S. Bazaraa, John J. Jarvis, Hanif D. Sherali ; Edition, 4, illustrated.