GENERIC ELECTIVES (GE-5): QUANTITATIVE TECHNIQUES IN

CREDIT DISTRIBUTION, ELIGIBILITY AND PRE-REQUISITES OF THE COURSE

Course title & Code	Credits	Credit distribution of the course			Eligibility criteria	Pre-requisite of the course (if any)
		Lecture	Tutorial	Practical/ Practice		
Quantitative Techniques in Management (GEC 5)	4	3	1	0	Class 12	None

Learning Objectives

To apprise students:

- To understand the concepts, formulation and interpretation of linear programming methods and its application in diverse problems.
- To formulate and solve Transportation and Assignment problems
- To understand basic concept, construction of the Network diagram and Critical Path Analysis
- To introduce game theory and network analysis forms part of the course.

Learning outcomes

By studying this course, students will be able to:

- Identify and develop operational research models from the verbal description of the real system.
- Understand the mathematical tools that are needed to solve optimization problems.
- Develop critical thinking and use PERT and CPM techniques to improve decision making.

SYLLABUS OF GEC-5

UNIT – I: Introduction - Operations Research, Linear Programming (15 hours)

(i) Introduction to Operations Research, characteristics, Phases, Methodology, Applications and scope

(ii) Formulation of Linear Programming problems, Graphical Solutions (Special cases: Multiple optimal solution, infeasibility, unbounded solution); Simplex Method, Special cases, Big-M method and Two-phase method; Duality (emphasis on formulation & economic interpretation); Sensitivity Analysis. (Excel Solver application)

UNIT – II:Transportation and Assignment Problem (12 hours)

(i) Transportation Problem: Formulation, Solution by N.W. Corner Rule, Least Cost method, Vogel's Approximation Method (VAM), Modified Distribution Method; Special cases: Multiple Solutions, Maximization case, unbalanced case, prohibited routes.

(ii) Assignment Problem: Hungarian Method, Special cases: Multiple Solutions, Maximization case, Unbalanced case, Restrictions on assignment.

UNIT – III: Network Analysis (9 hours)

Basic Concept, Construction of the Network diagram, Critical Path Analysis, float and slack analysis (Total float, free float, independent float), probability consideration in PERT (Interface with Project Management open-source software)

UNIT – IV: Decision Theory (9 hours)

Decision making environment, Construction of Pay off Table, Opportunity Loss Table, Decision under uncertainty. Decision under Conflict: Game Theory, Two-person Zero-Sum games, Maximin Minimax Principle, Games without Saddle point - Mixed strategy, Dominance Rule.

Essential/recommended readings

1. Vohra, N.D., Quantitative Techniques in Management (5th ed.). Tata McGraw Hill
2. Swarup, K., Gupta, P.K. and Mohan, Man, Introduction to Management Science Operations Research (19th ed.). Sultan Chand & Sons.
3. Sharma, J.K., Operations Research: Theory and Applications (6th ed.). Trinity.
4. Taha, H.A., Operations Research: An Introduction (9th ed.). Pearson.

Note: Examination scheme and mode shall be as prescribed by the Examination Branch, University of Delhi, from time to time.