

DISCIPLINE SPECIFIC ELECTIVE COURSE-6(iv): OPTIMIZATION TECHNIQUES

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		
Optimization Techniques	4	3	1	0	Class XII pass with Mathematics	Multivariate Calculus

Learning Objectives: The primary objective of this course is to introduce:

- Nonlinear optimization problems, Transshipment, and dynamic programming problems.
- Integer Programming, and fractional programming problems.
- Convex and generalized convex functions with their properties.

Learning Outcomes: This course will enable the students to:

- Nonlinear programming problems and their applications.
- Method to solve fractional programming problems with linear constraints.
- Methods to solve dynamic programming problems using recursive computations.

SYLLABUS OF DSE-6(iv)

UNIT-I: Transshipment and Dynamic Programming Problems (15 hours)

Transshipment problem, Shortest-route problem; Dynamic programming, Recursive forward and backward computation, Knapsack/fly-away/cargo-loading problems solution through dynamic programming.

UNIT-II: Integer Programming Problems (15 hours)

Integer programming problem, Gomory's cutting plane method for integer problems, Mixed integer problems, Branch and bound method.

UNIT-III: Nonlinear Programming Problems**(15 hours)**

Convex functions, Convex programming problems; Generalized convex functions; Linear fractional programming problem, Charnes and Cooper transformation, Simplex algorithm to solve linear fractional programming problem.

Essential Readings

1. Chandra, Suresh, Jayadeva and Mehra, Aparna (2009). Numerical Optimization with Applications. Narosa Publishing House Pvt. Ltd. Second Reprint 2016.
2. Taha, Hamdy A. (2017). Operations Research: An Introduction (10th ed.). Pearson.

Suggestive Reading

- Swarup, K., Gupta, P.K., and Mohan, M. (1984). Operations Research. Sultan Chand.