Course Type	Course Code	Name of Course	L	T	P	Credit
DE	**NMCD518**	**Optimization Techniques**	3	0	0	3

Course Objective

- The course deals with the basic idea of mathematical programming (Linear and Nonlinear). We shall see how simple mathematics plays a significance role in the development of these ideas. Further, explore the different approaches to find the solution for the various Linear and Nonlinear Programming Problems.

Learning Outcomes

Upon successful completion of this course, students will:

- have the basic nature of the convex set and its solution set.
- Known how we can optimize the path with the help of available resource.
- be able to solve the nonlinear and linear programming problem with different approaches.
- learn the different types of Queuing system according to service, time, etc.

Unit No.	Topics to be Covered	Contact Hours	Learning Outcome
1.	Convex Analysis: Convex Set, Convex functions, Local and Global Extrema, Convex Hull, Supporting and Separating Hyperplane, Convex Cone, Differentiable Convex function.	6	Understanding the fundamental concept of the convex set and its solution set.
2.	Linear programs formulation through examples from engineering/business decision making problems, preliminary theory and geometry of linear programs, basic feasible solution, simplex method, variants of simplex method, like two phase method and revised simplex method.	10	This unit helps to understand the fundamental concept and general mathematical structure and solution technique of a linear programming problem.
3.	Duality and its principles, interpretation of dual variables, dual simplex method, duality theorem.	6	This unit will helps to understand how the primal problem can associate with a problem which reduced the complexity of the original problem.
4.	Nonlinear Optimization: General Nonlinear Programming Problem, Method of Lagrange multipliers, Constrained Optimization with Equality and Inequality Constraints, Kuhn-Tucker Conditions.	10	Student will be able to construct the network diagrams with single and three time estimates of activities involving in a project.
5.	Numerical Methods for Unconstrained Optimization: one dimensional and multi-dimensional.	10	The students will get an exposure on how to work out the computational implementation of numerical algorithms for solving classes of optimization problems.
Total		**42**	

Text Books

1. G. Hadley, "Linear Programming", Narosa, 2002.
2. M. S. Bazaraa, J. J. Jarvis and H. D. Sherali, "Linear Programming and Network Flows", 4th Ed., Wiley, 2011.

Reference Books

1. Hamdy A. Taha: "Operations Research-An Introduction", Pearson, 2016.

2. Frederick S. Hillier and Gerald J. Lieberman: "Introduction to Operations Research", McGraw Hill, 2009.