

**Course Objective::** To familiarize with various optimization techniques and their applications.

S. NO	Course Outcomes (CO)
CO1	To describe various concepts of linear programming
CO2	To perform Duality Theory and Sensitivity Analysis
CO3	To solve problems using Dynamic Programming
CO4	To solve problems using Integer Programming
CO5	To solve problems using Integer Programming

S. NO	Contents	Contact Hours
UNIT 1	Linear Programming of Linear Programming, Additional Examples, Some Classic Case Studies. Graphical method, The Simplex Method: The Essence of the Simplex Method, Setting up the Simplex Method, The Algebra of the Simplex Method, The Simplex Method in Tabular Form, Tie Breaking in the Simplex Method, Adapting to Other Model Forms, Post optimality Analysis.	8
UNIT 2	Duality theory and Essence of Duality Theory, Economic Interpretation of Duality, Primal-Dual relationships, Adapting to Other Primal Forms, The Role of Duality Theory in Sensitivity Analysis. Algorithms for Linear Programming: The Dual Simplex Method, Parametric Linear Programming, the Upper Bound Techniques, An Interior-Point Algorithm.	6
UNIT 3	Dynamic programming, prototype example for Dynamic Programming, Characteristics of Dynamic Programming Problems, Deterministic Dynamic Programming, Probabilistic Dynamic Programming.	6
UNIT 4	Integer Programming and Prototype Example, Some BIP Applications, Innovative Uses of Binary Variables in Model Formulation, Some Formulation examples, Some Perspectives on Solving Integer Programming Problems, The Branch-and-Bound Technique and Its application to Binary Integer Programming, A Branch-and-Bound Algorithm for Mixed Integer.	8
UNIT 5	Nonlinear Programming and Sample Applications, Graphical Illustration of Nonlinear Programming Problems, Types of Nonlinear Programming Problems, One-Variable Unconstrained Optimization, Multivariable Unconstrained Optimization, The Karush-Kuhn-Tucker (KKT) Conditions for Constrained Optimization, Quadratic Programming, Separable Programming, Convex Programming.	8

<b>UNIT6</b>	Discussion about the Queuing Theory and Prototype Example, Basic Structure of queuing Models, Examples of Real Queuing Systems, The role of the Exponential Distribution, The Birth-and-Death Process, Queuing Models Based on the Birth-and Death Process, Queuing Models involving non exponential distributions.	<b>6</b>
	<b>TOTAL</b>	<b>42</b>

<b>REFERENCES</b>		
<b>S.No.</b>	<b>Name of Books/Authors/Publishers</b>	<b>Year of Publication / Reprint</b>
<b>1</b>	H.A.Taha – Operations Research, 8/e , Pearson Education , New Delhi,	2007
<b>2</b>	J.K. Sharma – Operations Research, 3/e, Mcmillan , India Ltd	2007
<b>3</b>	S. Hiller & G.J. Lieberman – Operations Research, 8th Edn, TMH, New Delhi	2006

<b>B.Tech. Information Technology</b>		
<b>Course code: Course Title</b>	<b>Course Structure</b>	<b>Pre-Requisite</b>