OPERATIONS RESEARCH
[As per Choice Based Credit System (CBCS) scheme]
(Effective from the academic year 2016 -2017)
SEMESTER – VI

Subject Code	15CS653	IA Marks	20
Number of Lecture Hours/Week	3	Exam Marks	80
Total Number of Lecture Hours	40	Exam Hours	03

CREDITS – 03

Course objectives: This course will enable students to

- Formulate optimization problem as a linear programming problem.
- Solve optimization problems using simplex method.
- Formulate and solve transportation and assignment problems.
- Apply game theory for decision making problems.

Module – 1	**Teaching Hours**
Introduction, Linear Programming: Introduction: The origin, nature and impact of OR; Defining the problem and gathering data; Formulating a mathematical model; Deriving solutions from the model; Testing the model; Preparing to apply the model; Implementation . **Introduction to Linear Programming Problem (LPP):** Prototype example, Assumptions of LPP, Formulation of LPP and Graphical method various examples.	**8 Hours**
Module – 2	
Simplex Method – 1: The essence of the simplex method; Setting up the simplex method; Types of variables, Algebra of the simplex method; the simplex method in tabular form; Tie breaking in the simplex method, Big M method, Two phase method.	**8 Hours**
Module – 3	
Simplex Method – 2: Duality Theory - The essence of duality theory, Primal dual relationship, conversion of primal to dual problem and vice versa. The dual simplex method.	**8 Hours**
Module – 4	
Transportation and Assignment Problems: The transportation problem, Initial Basic Feasible Solution (IBFS) by North West Corner Rule method, Matrix Minima Method, Vogel's Approximation Method. Optimal solution by Modified Distribution Method (MODI). The Assignment problem; A Hungarian algorithm for the assignment problem. Minimization and Maximization varieties in transportation and assignment problems.	**8 Hours**
Module – 5	
Game Theory: Game Theory: The formulation of two persons, zero sum games; saddle point, maximin and minimax principle, Solving simple games- a prototype example; Games with mixed strategies; Graphical solution procedure. **Metaheuristics:** The nature of Metaheuristics, Tabu Search, Simulated Annealing, Genetic Algorithms.	**8 Hours**

Course outcomes: The students should be able to:

- Select and apply optimization techniques for various problems.
- Model the given problem as transportation and assignment problem and solve.
- Apply game theory for decision support system.

Question paper pattern:
The question paper will have TEN questions. There will be TWO questions from each module. Each question will have questions covering all the topics under a module. The students will have to answer FIVE full questions, selecting ONE full question from each module.
Text Books:
1. D.S. Hira and P.K. Gupta, Operations Research, (Revised Edition), Published by S. Chand & Company Ltd, 2014
Reference Books:
1. S Kalavathy, Operation Research, Vikas Publishing House Pvt Limited, 01-Aug-2002 2. S D Sharma, Operation Research, Kedar Nath Ram Nath Publishers.

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