23ES22T2 -OPTIMIZATION TECHNIQUES

(Common to CSE-DS, CSE-AI & ML and IT)

Course Category:	Engineering Science		Credits:	2
Course Type:	Theory		Lecture-Tutorial-Practical:	2-0-0
Prerequisite:	Engineering Mathematics		Sessional Evaluation: Univ. Exam Evaluation: Total Marks:	30 70 100
Objectives:	**Students undergoing this course are expected:**			
	• To provide the basic knowledge about Optimization, importance, application areas of in the industry, Linear Programming. • To impart different optimization models under typical situations in the business organization like transportation, assignment. • To understand the process of sequencing in a typical industry. • To describe different game strategies under cut-throat competitive business environment • To develop networks of activities of projects and to find out optimal modes of completing projects using network modelling evaluation techniques.			

	Upon successful completion of the course, the students will be able to:	
Course Outcomes	CO1	Understanding Optimization and Formulation of Linear Programming Models(L1)
	CO2	Formulate and Solve Transportation & Assignment Models(L3)
	CO3	Sequencing of operations and optimizing(L2)
	CO4	Discuss the game theory and strategies(L2)
	CO5	Developing networks of activities and finding optimal mode of projects evaluation.(L3)
Course Content	### UNIT-I **Introduction:** Meaning, Nature, Scope &amp, Significance of Optimization -Typical applications. The Linear Programming Problem – Introduction, Formulation of Linear Programming problem, Limitations of L.P.P, Graphical method, Simplex method: Maximization and Minimization model(exclude Duality problems), Big-M method and Two Phase method. ### UNIT-II **Transportation Problem:** Introduction, Transportation Model, Finding initial basic feasible solutions, Moving towards optimality, Unbalanced Transportation problems, Transportation problems with maximization, Degeneracy. Assignment Problem – Introduction, Mathematical formulation of the problem, Solution of an Assignment problem, Hungarian Algorithm, Multiple Solution, Unbalanced Assignment problems, Maximization in Assignment Model.	

	### UNIT-III

Sequencing: Job sequencing, Johnsons Algorithm for n Jobs and Two machines, n Jobs and Three Machines, n jobs through m machines, two jobs and m Machines Problems.

UNIT-IV

Game Theory: Concepts, Definitions and Terminology, Two Person Zero Sum Games, Pure Strategy Games (with Saddle Point), Principal of Dominance, Mixed Strategy Games (Game without Saddle Point), Significance of Game Theory in Managerial Application.

UNIT-V

Project Management: Network Analysis, Definition, objectives, Rules for constructing network diagram, Determining Critical Path, Earliest &amp, Latest Times, Floats, Application of CPM and PERT techniques in Project Planning and Control, PERT Vs CPM.(Exclude Project Crashing). |
| **Text Books & References Books** | **TEXT BOOKS:**

1. Operations Research / R. Pannerselvam, PHI Publications.
2. Operations Research / S.D. Sharma Kedarnath
3. Operations Research /A.M. Natarajan, P. Balasubramani, A.Tailarasi/Pearson Education.
4. Engineering Optimization: Theory and practice / S.S.Rao, New Age International (P)Limited

REFERENCE BOOKS:
1. Quantitative Techniques in Management / ND Vohra, Tata McGraw Hill,
2. 4th Edition, 2011.
3. Introduction to O.R/Hiller &Libermann (TMH).
4. Operations Research: Methods &amp, Problems / Maurice Saseini,
5. Arhur Yaspan & amp, Lawrence Friedman. Pearson
6. Quantitative Analysis For Management/ Barry Render, Ralph M. Stair,
7. Jr and Michael E. Hanna/ Operations Research / Wagner/ PHI Publications. |
| **E-Resources** | 1. https://onlinecourses.swayam2.ac.in/cec20_ma10/preview
2. https://onlinecourses.nptel.ac.in/noc20_ma23/preview
3. https://onlinecourses.nptel.ac.in/noc19_ma29/preview |