VASAVI COLLEGE OF ENGINEERING (Autonomous)

IBRAHIMBAGH, HYDERABAD – 500 031

Department of Mechanical Engineering

OPTIMIZATION METHODS (OE-IV)

SYLLABUS FOR B.E.V-SEMESTER

L:T:P(Hrs/week):3:0:0	SEE Marks:60	Course Code: **OE510ME**
Credits :03	CIE Marks:40	Duration of SEE: 03Hours

COURSE OBJECTIVE	COURSE OUTCOMES *On completion of the course, students will be able to*	
understand Linear & non-linear programming, transportation modeling , CPM & PERT for project scheduling and control, and application of various optimization techniques for respective field engineering (Inter disciplinary)	1	optimization of resources in multi disciplinary areas through linear programming under different conditions.
	2	sensitivity analysis of a linear programming problem as per customer requirements tosuit various Organizations.
	3	minimization of total cost to apply for transportation techniques for the transhipment of Goods and products and Implement techniques like project management to analyze about material management.
	4	optimization of resources in multi disciplinary areas through non-linear programming under different conditions.

UNIT-I: OPTIMIZATION-AN OVERVIEW

Meaning of Optimization-Origin of Optimization-Introduction to Linear programming problems (LPP) -Formulation of LPP- Graphical method, simplex method.

UNIT-II: ADVANCED TOPICS IN LINEAR PROGRAMMING

Duality in LPP, Differences between primal and dual, shadow prices, Dual simplex method, sensitivity analysis. special cases in LPP.

UNIT-III

Transportation Model: Definition of the transportation model-matrix of Transportation model-Formulation and solution of transportation models- Methods for calculating Initial basic feasible solution-Optimization of transportation model using MODI method.

Project Scheduling: Introduction to network analysis, Rules to draw network diagram, Fulkerson rule for numbering events, Critical path method, PERT.

UNIT-IV

Non linear programming problems: Optimization methods for single variable, multivariable functions, Maxima-Minima

One Dimensional Minimization: Uni-modal Function, Unrestricted search, Exhaustive search,Dichtomous search, Interval Halving method, Fibonacci and golden bisection Method , Newton and Quasi Newton method.

UNIT-V

Non Linear - Unconstrained Optimization

classification, scaling of design variables, Random search methods, Univeriate search, pattern Directions, Hook Jeeves, Powel method, Rosenbrock method.

Learning Resources:

1. Singiresu S.Rao, "Engineering optimization- Theory and Practice", 4th Edition, John Wiley and Sons, 2009.
2. NVS Raju, "Optimization methods for Engineers ", PHI Learning Pvt. Ltd., 2014.
3. Prem Kumar Gupta and Dr. DS Hira, "Operations Research", S.Chand & Company Pvt. Ltd., 2014.
4. R. Paneerselvam, "Operations Research", PHI Learning Pvt Ltd., 2009.
5. Kalyanmoy Deb, Optimization for Engineering Design- algorithms and examples, PHI Pvt. Ltd., 1st Edition 2003, Delhi.

The break-up of CIE: Internal Tests + Assignments + Quizzes

1 No. of Internal Tests: [02] Max.Marks for each Internal Tests: [30]

2 No. of Assignments: [03] Max. Marks for each Assignment: [05]

3 No. of Quizzes: [03] Max. Marks for each Quiz Test: [05]

Duration of Internal Test: **1 Hour 30 Minutes**