

GUJARAT TECHNOLOGICAL UNIVERSITY

MECHATRONICS ENGINEERING

B. E. SEMESTER: VII

Subject Name: **Production Optimization Techniques**

Subject Code: **172004**

Teaching Scheme				Evaluation Scheme			
Theory	Tutorial	Practical	Total	University Exam (E)		Mid Sem Exam (Theory) (M)	Practical (Internal)
				Theory	Practical		
3	2	0	5	70	30	30	20

Sr. No	Course Content	Total Hrs.
1.	GENERAL CONCEPTS: Evolution of Modern Management; Functional approach, systems approach; Decision making; Models and Model building; Models to solve production problems.	2
2.	LINEAR PROGRAMMING: General L. P. Format, formulation of production problems, Methods of Solution : Graphical, Simplex, Modified simplex, Big M and 2 Phase methods; Duality, degeneracy and redundancy in L.P., Sensitivity analysis, Application of L.P. to solve problems of Production systems.	6
3.	TRANSPORTATION MODEL: Formulation, methods of solution : NW Corner, Least cost and Vogels approximation methods; Optimality test : Stepping stone and MODI methods; Degenerate and unbalanced transportation problems; Sensitivity analysis; Application to Production systems.	5
4.	ASSIGNMENT MODEL: Formulation; Methods of solution: Enumeration, transportation, Hungarian methods; Areas of application in the solution of production problems.	4
5.	NETWORK ANALYSIS: CPM and PERT, Concept of slack/float and its significance; Project cost analysis, crashing, resource smoothing and leveling, Applications in production systems.	4

6.	SEQUENCING PROBLEMS: Johnson's Rule and its logic, methods of solution; n jobs two machines, n jobs 3 machines, 2 jobs M machines and n jobs M machines problems; Graphical and Heuristic methods; Applications and limitations.	4
7.	DECISION THEORY: Expected Value and Break even analysis; Decision tree concept; Relevance to production systems.	3
8.	REPLACEMENT: Basic replacement model, replacement of items that deteriorate with time, replacement of items that fail completely, group replacement; Failure tree concept; Statistical and algebraic methods; Application to production problems.	4
9.	QUEUING MODELS: Simple queues, multiple service channels; Arrival and service characteristics; Optimization of queuing systems; Application to production problems.	4
10.	INVENTORY CONTROL: Inventory parameters and properties; Deterministic and probabilistic inventory models; Concept of zero inventory; Sensitivity analysis; Application to production problems.	4

Text Books:

1. Quantitative Techniques in Management
Vohra D. N.
Tata McGraw Hill

Reference Books:

1. Operational Research, Analysis and Applications
Wilkes Michael
McGraw Hill
2. Applied OR and Management Science
Fabrycky, Ghare and Torgersen
Prentice Hall of India
3. Quantitative approaches to Management
Richard Levin et.al
McGraw Hill.