GUJARAT TECHNOLOGICAL UNIVERSITY

MASTER OF BUSINESS ADMINISTRATION

Year – 2 (Semester – IV) (W.E.F. Academic Year 2018-19)

Specialization: Production and Operations Management
Subject Name: Operations Research (OR)
Subject Code: 3549271

1. **Learning Outcome:**
    - Understand the mathematical tools that are needed to solve optimization problems.
    - Use mathematical software to solve the proposed models.
    - Develop linear programming (LP) models for shortest path, maximum flow, minimal spanning tree, critical path, minimum cost flow, and transshipment problems.
    - Solve the problems using special solution algorithms.
    - Use CPM and PERT techniques, to plan, schedule, and control project activities.

2. **Course Duration:** The course duration is of **36 sessions of 75 minutes** each.

3. **Course Contents:**

Module No.	Modules / Sub-Modules	No. of Sessions	70 Marks (External Evaluation)
I	**Mathematical Model: -** Mathematics – The Language of Modeling, Building a Mathematical Model, Verifying and Refining a Model, Variables and Parameters, Continuous-in Time vs Direct-in Time Models, Deterministic Model Example, Probabilistic Models	9	17
II	**Linear Programming: Graphical Method:** Essentials of Linear Programming Model, Properties of Linear Programming Model, Formulation f Linear Programming, General Linear Programming Model, Maximization and Minimization Models, Graphical Method, Unbounded LP Problem **Linear Programming: Simplex Method:** Additional Variables Used in Solving LPP, Maximization Case, Solving LP Problems using Computer With TORA, Minimization	9	18

	LP Problems, Big M Method, Degeneracy in LP Problems, Unbounded Solutions in LPP, Multiple Solutions in LPP, Duality in LPP Problems, Sensitivity Analysis.		
III	**Transportation Model:** Mathematical Formulation, Network Representation of Transportation Model, General Representation of Transportation Model, Use of Linear Programming to Solve Transportation Problem, Formulation of LP Model, Solving Transportation Problem using Computer, Balanced Transportation Problem, Unbalanced Transportation Problem, Procedure to Solve Transportation Problem, Maximization Transportation Problem, Prohibited Routes Problem, Transshipment Problem. **Network Model:** Development of Project Network, Obtaining Time Estimates, Critical Path, PERT/CPM Network Components, Errors to be Avoided in Constructing A Network, Rules in Constructing a Network, Procedure for Numbering the Events Using Fulkerson's Rule, Critical Path Analysis, Determination Of Float and Slack Times, Solving CPM Problems Using Computer, Project Evaluation Review Technique (PERT), Solving PERT Problems Using Computer, Cost Analysis	9	18
IV	**Waiting Model (Queuing Theory):** Queuing Systems, Characteristics of Queuing System, Poisson and Exponential Distributions, Symbols and Notations, Single Server Queuing Model, Solving The Problem using Computer with TORA **Game Theory:** Two-Person Zero-Sum Game, Pure Strategies: Game with Saddle Point, Mixed Strategies: Games without Saddle Point, Dominance Property, Solving Problem on the Computer with TORA, Solving LP Model Games Graphically Using Computer **Simulation:** Advantages and Disadvantages of Simulation, Monte Carlo Simulation, Simulation of Demand Forecasting Problems, Simulation of Queuing Problems.	9	17
V	**Practical:** The students are required to undertake the practical work related to services and relationship marketing from any of the below mentioned areas: • Understand the current extended marketing mix of any	---	(30 marks CEC)

	service organization, identify the gaps in services and develop a new framework/plan/strategy of extended marketing mix for them. • A detailed study of any of the extended marketing mix element: viz: understanding the current strategy, identifying the gap and framing a new strategy for better outcome. • Study of the current blueprint of the service organization, identifying the gaps and developing a new service blueprint (This can be undertaken for those service organization that are in requirement of changing the blueprint). • Understanding the productivity trade-off of a service organization and developing new strategies to increase the productivity. • Conducting a small-scale research on finding the gaps in the service quality of the organization, analyze the data and suggest and find the managerial implications of the results. • Study the CRM of a large service organization. • Comparison of the loyalty programs of competing service organizations. • Any other area of interest of the student/s.		

4. Teaching Methods:

The course will use the following pedagogical tools:

- Lectures
- Case Discussions and Role Playing
- Audio-visual Material (Using CDs/Clippings/ online videos)
- Assignments and Presentations

5. Evaluation:

The evaluation of participants will be on continuous basis comprising of the following elements:

A	Continuous Evaluation Component comprising of Projects / Assignments / Quiz / Class Participation / Class test / Presentation on specific topic etc.	(Internal Assessment- 50 Marks)
B	Mid-Semester examination	(Internal Assessment-30 Marks)
C	End –Semester Examination	(External Assessment-70 Marks)

6. Reference Books:

Sr. No.	Author	Name of the Book	Publisher	Year of Publication
1	S. R. Yadav, A. K. Malik	Operations Research	Oxford	2014
2	J. K. Sharma	Operations Research: Theory and Application	Macmillan	2017
3	Hamdy A. Taha	Operations Research : An Introduction	Pearson	Latest Edition
4	P. Mariappan	Operations Research	Pearson	2013
5	Frederick S. Hillier, Gerald J. Liberman	Introduction to Operations Research	McGraw Hill	Latest Edition

Note: Wherever the standard books are not available for the topic appropriate print and online resources, journals and books published by different authors may be prescribed.

7. List of Journals / Periodicals / Magazines / Newspapers, etc.

1. International Journal of Operational Research
2. Opsearch
3. The IUP Journal of Operations Management