

## NIRMA UNIVERSITY

<b>Institute:</b>	Institute of Technology
<b>Name of Programme:</b>	Master of Computer Application (2-Years Programme)
<b>Course Code:</b>	3MCAD301
<b>Course Title:</b>	Operations Research
<b>Course Type:</b>	Departmental Elective
<b>Year of Introduction:</b>	2021-22

### Credit Scheme

L	T	Practical Component				C
		LPW	PW	W	S	
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### Course Learning Outcomes (CLO):

At the end of the course, students will be able to –

1. illustrate the importance of optimization in industrial process management
2. apply concepts and methods in optimization theory to formulate and solve different optimization problem
3. analyse and appreciate variety of performance measures for various optimization problems
4. apply the optimal solutions of different operation research concepts to solve networks and graph problems

### Syllabus:

**Total Teaching hours: 45**

Unit	Syllabus	Teaching hours
Unit-I	<b>Introduction to Operation Research:</b> Operation Research approach, scientific methods, introduction to models and modelling techniques, general methods for Operation Research models, methodology and advantages of Operation Research, history of Operation Research	02
Unit-II	<b>Linear Programming (LP):</b> Introduction to LP and formulation of Linear Programming problems, Graphical solution method, alternative or multiple optimal solutions, Unbounded solutions, Infeasible solutions, Maximization – Simplex Algorithm, Minimization – Simplex Algorithm using Big-M method, Two phase method, Duality in linear programming	08
Unit-III	<b>Transportation &amp; Assignment Problems:</b> Introduction to Transportation problems, various methods of Transportation problem, Variations in Transportation problem, introduction to Assignment problems, variations in Assignment problems	06
Unit-IV	<b>Network Analysis:</b> Network definition and Network diagram, probability in PERT analysis, project time cost trade off, introduction to resource smoothing and allocation	06
Unit-V	<b>Sequencing:</b> Introduction, processing N jobs through two machines, processing N jobs through three machines, processing N jobs through m machines	04

Unit-VI	<b>Inventory Model:</b> Introduction to inventory control, deterministic inventory model, EOQ model with quantity discount	06
Unit-VII	<b>Queuing Models:</b> Concepts relating to queuing systems, basic elements of queuing model, role of Poisson & exponential distribution, concepts of birth and death process	05
Unit-VIII	<b>Replacement &amp; Maintenance Models:</b> Replacement of items, subject to deterioration of items subject to random failure group vs. individual replacement policies, Simulation: Introduction & steps of simulation method, distribution functions and random number generation	08

Self-Study: The self-study contents will be declared at the commencement of semester. Around 10% of the questions will be asked from self-study contents.

Suggested Readings/References:

1. J K Sharma, Operations Research Theory and Applications, MacMillan India Ltd.
2. N D Vohra, Quantitative Techniques in management, Tata McGraw Hill
3. Handy A Taha, Operations Research – An Introduction, Prentice Hall of India, New Delhi
4. Wagner H M, Principles of Operations Research: With Applications to Management Decisions, Prentice-Hall of India, New Delhi
5. Hillier F S and Lieberman G J, Operations Research, Holden Day Inc., San Francisco
6. Payne T A, Quantitative Techniques for Management: A Practical Approach, Reston Publishing Co. Inc., Virginia
7. Wilkes F M, Baum P and Smith G D, Management Science: An Introduction, John Wiley and Sons, Santa Barbara

Suggested List of Experiments: -NA-

Suggested Case List: -NA-