C. U. SHAH UNIVERSITY
Wadhwan City

FACULTY OF:- Computer Science
DEPARTMENT OF: - MCA
SEMESTER: -IV
CODE: - 5CS04MOR1
NAME: – OPERATIONS RESEARCH (OR)

Teaching and Evaluation Scheme:-

Subject Code	Name of the Subject	Teaching Scheme (Hours)				Credits	Evaluation Scheme							
							Theory				Practical (Marks)			Total
							Sessional Exam		University Exam		Internal		University	
		Th	Tu	Pr	Total		Marks	Hrs	Marks	Hrs	Pr/Viva	TW	Pr	
5CS04MOR1	OPERATIONS RESEARCH (OR)	4	0	0	4	4	30	1.5	70	3	---	---	---	**100**

Objectives:-

- To study the numerical methods to solve transcendental equations The course is intended to provide basic understanding of Operation Research Techniques of strategic decision planning for optimum utilization of constraint resources in various span of human life viz. industry, business, commerce, administration, management, service supply, maintenance, agriculture, medicines and healthcare, defense etc.
- The students will learn purpose, importance and applications of optimization techniques of Operation Research and will be able to design and construct suitable optimization models to solve real life strategic problems – issues.
- It is expected to emphasis on the algorithmic approach rather than on theoretical side.
- Mathematical derivations are not included for any topic identified

Prerequisite:- None

Course Outline:-

Sr. No.	Course Content	Hours
1	**Introduction to OR** Concepts, genesis, Art of modeling, components of model, Types of OR models, effect of data availability on modeling, Computations in OR, Phases of OR study	**05**
2	**Linear Programming Problem (L.P.P.)** Linear Programming Problem (L.P.P.), Mathematical definition of a L.P.P. with its components: objective function and constraints, optimal solution, slack, surplus and artificial variables, Graphic method, Simplex method, Big – M method, Primal & Dual problem definition	**07**

3	**Transportation & Assignment problems:** Concepts, formulations of models, Solution procedures, Optimality checks, Balanced/Unbalanced, Maximum/Minimum problems, Prohibited case –degeneracy	**06**
4	**Theory of Games** Introduction, Two – Person Zero Sum game, Pure strategies (Minimax & Maximin principles) Games with saddle point, Rules to determine saddle point.	**04**
5	**Theory of Queues** Introduction, Queuing system and problem, transient and steady states, traffic intensity, probability distributions in queuing systems, single service queuing model.	**04**
6	**Network Analysis :** Network Definition, Minimal spanning tree problem, Shortest route problem, Maximal flow problem concepts and solution algorithm as applied to problems. Project planning and control by CPM network, Probability assessment in PERT network.	**07**
7	**Simulation** Introduction, applications, Monte-Carlo Method, Simulation using Computers	**02**
8	**Management of Replacement** Definition, replacement of items that deteriorates, replacement of item that fails completely	**04**
9	**Production scheduling (job sequencing)** Introduction, Johnson's algorithm for n jobs 2 machines, Johnson's algorithm for N jobs m machines, 2 jobs m machines using graphical method.	**04**
10	**Management of Inventory** Introduction and terminology of the inventory management Single Item Inventory Control Models without Shortages Model –I : EOQ model with constant rate of demand Model – II : EOQ model with different rate of demand.	**05**
	Total hours	**48**

Learning Outcomes:

- Proficiency with tools from optimization, probability, statistics, simulation, and engineering economic analysis, including fundamental applications of those tools in industry and the public sector in contexts involving uncertainty and scarce or expensive resources.
- Facility with mathematical and computational modeling of real decision-making problems, including the use of modeling tools and computational tools, as well as analytic skills to evaluate the problems.
- Facility with the design, implementation, and analysis of computational experiments.

Teaching & Learning Methodology:

- Lecture method using standard teaching aids.
- Solving term assignments in tutorials.

Books Recommended:

- "Operations Research – Theory and Application", **J. K. Sharma**, 4th Edition, Macmillan Publishers India Ltd.
- "Quantitative Techniques in management", **N.D. Vora** – Tata McGraw Hill
- "Operations Research – An Introduction – Fifth edition", **Hamdy A Taha**- Prentice Hall of India
- "Principles of Operations Research: With Applications to Management Decisions", **Wagner, H.M.** , Prentice-Hall of India, New Delhi, 1982.